



ENHANCING COASTAL AND OCEAN RESOURCE EFFICIENCY PROGRAM



ENCORE

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

Volume I

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DRAFT FINAL

Prepared by

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GOVERNMENT OF INDIA**

This is a Draft Environmental and Social Management Framework (ESMF) for the proposed Enhancing Coastal and Ocean Resource Efficiency (ENCORE) Project with financial assistance from the World Bank. This is hereby disclosed with a view to soliciting comments / suggestions on or before October 2019. In this regard, please send your comments/suggestions by email to esmf.apdsicom@gmail.com or by post to ***Additional Project Director, SICOM, Pt. Deendayal Antyodaya Bhawan, Ground Floor, CGO Complex, Ministry of Environment, Forests and Climate Change, New Delhi.***

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List of Abbreviations

<i>Abbreviation</i>	<i>Expansion</i>
A&N	Andaman and Nicobar (Islands)
AEWA	African-Eurasian Migratory Water Birds
AMASR	Ancient Monuments and Archaeological Sites and Remains Act
ASI	Archeological Survey of India
BOQ	Bill of Quantities
BP	Bank Procedures
BPL	Below Poverty Line
CAA	Coastal Aquaculture Authority
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CC	Climate Change
CMS	Conservation of Migratory Species
CoI	Corridor of Impact
CPCB	Central Pollution Control Board
CPR	Common Property Resource
CRZ	Coastal Regulation Zone
CVCA	Critically Vulnerable Coastal Areas
CZMP	Coastal Zone Management Plan
DPR	Detailed Project Report
DTP	Directorate of Town Panchayats
E&S	Environmental and Social
EA	Environmental Assessment
EAFM	Ecosystems Approach to Fisheries Management
EAP	Externally Aided Project
EAR	Environmental Assessment Report
EHS	Environmental Health and Safety
EHSS	Environmental, Occupational Health & Safety and Social Manual
ESIA	Environmental Impact Assessment
ESMF	Environmental Management Framework
ESMP	Environmental Management Plan
ENCORE	Enhancing Coastal and Ocean Resource Efficiency
ESA	Environmentally Sensitive Areas
ESAR	Environmental and Social Assessment Report
ESIA	Environmental and Social Impact Assessment
ESF	Environmental and Social Framework
ESMF	Environmental and Social Management Framework
ESR	Environmental and Social Report
ESSM	Environmental and Social Safeguards Manager
ETP	Effluent Treatment Plant
FAR	Floor Area Ratio
FAQ	Frequently Asked Questions
FGD	Focus Group Discussions
FSI	Floor Space Index
GDP	Gross Domestic Product

<i>Abbreviation</i>	<i>Expansion</i>
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GoI	Government of India
GRC	Grievance Redressal Committee
HL	Hazard Line
HR	Human Resources
HTL	High Tide Line
ICB	International Competitive Bidding
ICRZ	Island Coastal Regulation Zone
ICZMP	Integrated Coastal Zone Management Plan
IFC	International Finance Corporation
IIMP	Integrated Islands Management Plans
IP	Indigenous People
IPPF	Indigenous People Policy Framework
IPZ	Island Protection Zone
ISR	Initial Screening Report
IT	Island Territories
IUCN	International Union for Conservation of Nature
LB	Local Body (Urban or Rural)
LTL	Low Tide Line
LULC	Landuse and Land Classification
M&E	Monitoring and Evaluation
MA	Multilateral Agencies
MADA	Modified Area Development Approach
MoEFCC	Ministry of Environment, Forests and Climate Change
NCB	National Competitive Bidding
NCSCM	National Centre for sustainable Coastal Management
NCZMA	National Coastal Zone Management Authority
NDZ	No Development Zone
NGO	Non-Governmental Organization
NIOT	National Institute of Ocean Technology
NMA	National Monuments Authority
NOC	No Objection Certificate
NPDM	National Policy on Disaster Management
O&M	Operations and Maintenance
OD	Operational Directives
OHS	Occupational Health and Safety
OP	Operational Policies
OP	Operational Procedures
PAF	Project Affected Family
PAP	Project Affected Person
PAP	Program Action Plan
PCB	Pollution Control Board
PCR	Physical Cultural Resources
PCRMP	Physical Cultural Resources Management Plan
PDO	Program Development Outcome

<i>Abbreviation</i>	<i>Expansion</i>
PEA	Project implementation Agency
PMC	Project Management Consultant
PMU	Project Management Unit
POP	Persistent Organic Pollutants
PPP	Public Private Partnership
PPR	Preliminary Project Report
PWD	Public Works Department
R&R	Resettlement and Rehabilitation
RMP	Risk Management Plan
ROB	Road Over Bridge
RoHS	Restriction of Hazardous Substances
RoW	Right of Way
RP/RAP	Resettlement Plan/ Resettlement Action Plan
RTFCTLARR	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement
RUB	Road Under Bridge
SAR	Social Assessment Report
SCZMA	State Coastal Zone Management Authority
SDGs	Sustainable Development Goals
SEIAA	State Environmental Impact Assessment Authority
SESA	Strategic Environmental and Social Assessment
SEC	Sensitive Environmental Components
SHC	Stakeholder Consultations
SIA	Social Impact Assessment
SICOM	Society of Integrated Coastal Management
SoI	Survey of India
SSR	Social Status Report
STP	Sewage Treatment Plant
SWD	Storm Water Drains
SWM	Solid Waste Management
TA	Technical Assistance
ToR	Terms of Reference
TSP	Tribal Sub Plan
ULB	Urban Local Body
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UT	Union Territories (of the Government of India)
WB	The World Bank
WTP	Water Treatment Plant

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK FOR ENCORE

EXECUTIVE SUMMARY

ENHANCING COASTAL AND OCEAN RESOURCE EFFICIENCY (ENCORE) PROJECT

A. Project Overview

ENCORE aims to strengthen integrated coastal zone management in all coastal States and Union Territories of India. The Project seeks to assist the Government of India (GoI) in enhancing coastal resource efficiency and resilience, by building collective capacity (including communities and decentralized governance) for adopting and implementing integrated coastal management approaches. Recognizing Integrated Coastal Zone Management (ICZM) as a continuous process rather than a one-off investment action, ENCORE will build upon and draw from the experience of the ongoing World Bank-supported Integrated Coastal Zone Management Project (ICZMP), including the linkages between coastal conservation, climate resilience, and poverty reduction.

Project activities considered for implementation in Seven (07) States / and Two (02) Union Territories (UTs) of coastal India relate to improving the coastal environment; leveraging the concepts of resource efficiency. Three coastal States, namely; Gujarat, Odisha and West Bengal have prepared ICZM Plans as part of ICZMP Project supported by the World Bank. During MPA Phase I, ICZM Plans would be prepared for the selected coastal stretches in other States/UTs under the program. In addition to priority projects for coastal pollution prevention, livelihood support and coastal resilience identified in these ICZM Plans, those investments which will inform effective coastal management solutions to guide ICZM Plan preparation in these States/UTs will also be taken up for pilot / demonstration purposes during MPA Phase I.

Institutional capacity building for effective coastal management, Mapping and Database creation, and Monitoring and Research Facilities would be supported under Phase I. Investments proposed by the States/UTs include a) mangrove afforestation / shelter beds, b) habitat conservation activities such as restoration of seagrass meadows, eco-restoration of sacred groves, development of hatcheries, rearing / rescue centers for turtles and other marine animals etc., c) creation of infrastructure for tourism, restoration and recharge of waterbodies, beach cleaning and development, other small infrastructure facilities. Livelihood improvement projects include demonstration of climate resilient or salinity resistant agriculture, water harvesting and recharge/storage, creation of infrastructure and facilities to support ecotourism, community-based; small-scale mariculture, seaweed cultivation, aquaponics, and value addition to other livelihood activities.

Since ENCORE Program is funded under Investment Project Financing (IPF) instrument of the World Bank, its Operational Policies (OPs) and Bank Procedures (BPs) are applicable for the project. ENCORE also aims to use Development Linked Indicators (IPF + DLIs) and as under regular IPF, environmental and social requirements apply to all activities for which Bank support is sought by the Borrower, as defined in the project's legal agreement between the Borrower and the Bank, whether they are financed by the Bank or from another source. In addition, Bank Standards also apply to 'associated activities' – defined as facilities or activities that are not funded as part of the project, but are 'directly and significantly related' to the project, carried out or planned to be carried out, contemporaneously with the project, and necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist. Likewise, the scope of the environmental assessment includes the 'area of influence' of Bank-financed activities, which may span an entire sector or region. In each case the Bank policies are applied and compliance with them is verified at the same level.

Project Concept Note Review for ENCORE program was before 01 October 2018 (cutoff date for application of World Bank's new Environmental and Social Framework (ESF)) and hence World Bank Safeguard policies are applicable to the project. ESF is applicable to all project financing prepared post 01 October 2018. Hence, Safeguard Policies will be applicable to the Phase I of this Multi-Phase Program and the safeguards instruments will be reassessed in line with the ESF as and when Phase II of the project is prepared for approval by the World Bank's Board of Directors.

Exact locations of the all project investment activities are not known at this stage. The Project investments are expected to enhance and support coastal resources, minimize coastal pollution and improve the livelihoods of coastal communities. It is envisaged that the project would lead to positive impacts, including marine and coastal conservation, pollution prevention and effective utilization of coastal resources, and promotion of sustainable coastal livelihoods. In addition, the project is expected to provide a scientific basis and an effective coastal management framework (including institutional capacity) for resource efficient and integrated coastal management. Rather than adhoc placing and implementation of project investments in time and space without adequate planning considerations, the ICZM Plan which would be prepared by each State as part of the project would set the stage for investments, with a scientific basis; considering the environmental, social and climate related sensitivities among others. Thus, the proposed project mandate subsumes safeguards management as an integral part of the project objectives and implementation.

B. Baseline Assessment and Environment and Social Issues

Project activities considered relate to improving the coastal environment; leveraging the concepts of resource efficiency. ICZM Plans would be prepared for selected coastal stretches.

The project investments or locations are not finalized yet. Considering the nature and spread of project activities, Safeguards Category is considered as “A” as per the World Bank’s Safeguards Policy OP 4.01 Environmental Assessment; and hence a framework for management of environmental and social aspects under the project has been prepared by the borrower.

Though siting of subprojects is taken care of by comprehensive ICZM Planning which prelude the subproject implementation in the coastal zone, environmental impacts may be expected in case the subprojects are designed without adequate care. The assessment reveals no large scale, significant and/or irreversible impacts due to the proposed project interventions. The program will avoid undertaking any activities that will cause significant conversion or negative impacts on natural habitats and sensitive environmental receptors. Activities that may have cumulative/regional impacts or large scale construction / Operation and Maintenance (O&M) stage impacts (such as waste management, coastal protection structures) will be taken up for implementation only if its necessity is established and guided by ICZM Plans. While the overall program is environmentally beneficial, some activities such construction and upgradation of infrastructure and facilities for coastal protection and pollution prevention, and certain livelihood support activities are likely to result in impacts that can effectively be managed across the detailed design and implementation phases of the investments.

No large scale significant or irreversible social impacts are envisaged. No private land acquisition is envisaged under the project. Mangrove plantations and small infrastructure in villages will be carried out on public land. Rehabilitation of assets will be in-situ and will not require any additional land. However, there are chances of encroachment of public land. During the construction phase, influx of large numbers of migrant workers in the project area is also not envisaged as assets to be created will be small. Mangrove plantations and rehabilitation work will be carried out the local community. At the same time, the Project will benefit the community in general. However, inclusion and equity issues may remain a concern in accessing the benefits of the project.

Impact assessment of the proposed subprojects reveals that most of the likely adverse impacts could be minimized or eliminated by adopting standard mitigation measures. In addition, there is ample scope to enhance some of the beneficial impacts to be generated from the proposed project. The ESMF prepared for the ENCORE program acknowledges these impacts, and integrates measures for assessing, mitigating / managing these during pre-construction, construction, and O&M and work closeout.

C. Environmental and Social Management Framework

The Environment and Social Management Framework (ESMF) document has been prepared with an objective to manage the social and environment impacts through appropriate measures during the planning, design, construction and operation of various sub-projects of ENCORE. The framework identifies the level of safeguard and due-diligence required for all categories of sub-projects and provides specific guidance on the policies and procedures to be followed

for environmental and social assessment, along with roles and responsibilities of the implementing agencies to ensure effective environmental and social management.

This ESMF aims to ensure the following:

- integration of environmental and social aspects into the decision-making process at all stages of the sub-projects; including planning, design, implementation and work close out, operation and maintenance (O&M) of sub-projects by identifying, avoiding and/or minimizing adverse environmental and social impacts early-on in the project cycle,
- Enhancement of positive/sustainable environmental and social outcomes through sensitive planning, design and implementation of sub-projects,
- Avoidance or minimization of impacts on cultural properties and natural habitats and / or other direct/indirect impacts through careful planning and safeguards,
- Restoration or improvement of the livelihoods and living standards of the subproject affected people (if any) and compensate any loss of livelihood or assets, and
- Adoption of higher work safety standards, occupational and community health and safety including, labor/work camp site management, by following applicable regulations, contract management, monitoring and supervision protocols and capacity building.

Project investments are hence expected to contribute to positive environmental enhancements. Moderate construction and operations stage impacts will be managed using the ESMF.

ESMF for ENCORE Program is presented in two Volumes; Volume I and Volume II.

Volume I presents the Baseline Environmental and Social Assessment, ESMF for this project discussing the applicable regulations, process for carrying out subproject environmental screening, assessment, preparation of environmental and social management plan including mitigation measures, and monitoring plan. It also presents the Resettlement Policy Framework, Indigenous Peoples Planning Framework, Gender Action Plan, Labor management Framework and Grievance Redressal Mechanism. It also presents the institutional mechanism and its budgetary requirements for implementing the ESMF, process for updating this ESMF in addition to details on Stakeholder Consultation and Information Disclosure (for ESMF and subprojects).

Volume II presents the documentation formats to be used for screening of projects, sample Terms of References (ToRs) for (i) Impact Assessment, (ii) Specialists to manage ESMF, and (iii) auditing / monitoring compliance to ESMF. It also provides guidance materials for licenses, permits, clearances under various regulations, and indicative environmental and social management plans (ESMPs) and monitoring plans for typical types of projects. It also presents a comprehensive set of Environmental Codes of Practices for guiding various project activities.

D. Applicable Environmental Regulations

Applicable National and State regulations, and the World Bank Operational Policies need to be considered for siting criteria, environmental pollution control requirements, institutional arrangements, ensuring occupational health and safety, resource utilisation and considerations on cultural and social aspects. Several national and state-level environment and social laws will be applicable to ENCORE, including the Environment (Protection) Act, 1986; Coastal Regulation Zone Notification 2019, Water (Prevention and Control of Pollution) Act, 1974; Forest (Conservation) Act, 1980; Air (Prevention and Control of Pollution) Act 1981; Solid waste (Handling and Management) Rules, 2016; Plastic waste Management Rules 2018, Construction and Demolition Waste Management Rules 2016, Labour laws, Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013; Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014.

In addition, the following policies of the World Bank are applicable for Phase I of this Multi-Phase Program: a) Environmental Assessment (OP/BP 4.01), b) Natural Habitats (OP/BP 4.04), c) Pest Management (OP 4.09), d) Forests (OP/BP 4.36), e) Physical Cultural Resources (OP/BP 4.11), f) Indigenous Peoples Policy (OP/BP 4.10), g) Involuntary Resettlement (OP/BP 4.12) and World Bank Policy on Access to Information and Disclosure. The ESMF also recommends WBG EHS Guidelines for all projects, and WBG Industry Sector Guidelines as applicable to the sub-projects such as Waste Management Facilities, Water and Sanitation.

E. ESMF Process

ESMF describes the process to be adopted to screen the subprojects to decide on including / excluding them; to categorize based on defined criteria and to manage these using either full-fledged ESIAs and ESMPs or using Generic ESMP. ESMF describes the process, institutional mechanism and budget to undertake screening, scoping, assessing and incorporation of mitigation measures during the project cycle involving a) Sub-project Initiation, b) Sub-project Preparation, c) Sub-Project Implementation, d) Monitoring and Evaluation; presented in ***Figure A***.

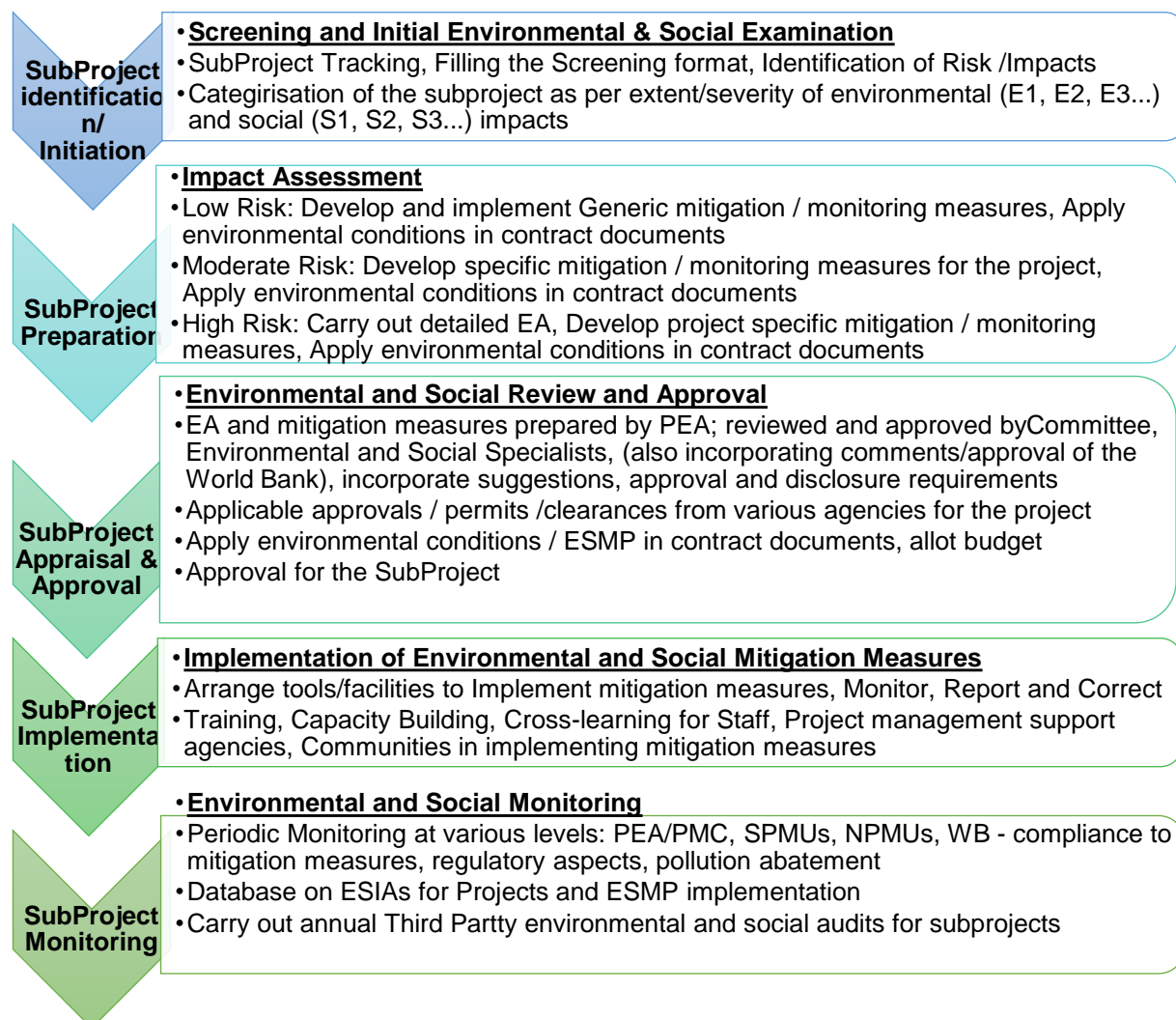


Figure A: ESMF Process

F. Environmental and Social Management for ENCORE

Depending on the type of investments and nature of activities, proposed subprojects will have varying impacts on the environment. Hence, the type and extent of environmental assessment to be carried out to identify and mitigate the impacts also largely depends upon the complexities of project activities and exact locations. It is important to identify the probable impacts and plan for mitigation measures early on, to manage them effectively. In order to facilitate effective screening, under ENCORE Program, the subprojects are grouped into different categories – E1, E2 and E3 linked to extent and severity of impacts (depending on type of activities and locational characteristics) and regulatory requirements.

As per the ESMF, the first step will be to conduct screening exercise, where the environmental and social issues will be identified through filling of Environmental and Social Screening Checklist for the potential sub-projects. The objective of filling this checklist will be to collect

basic information on environmental and social baseline parameters, issues, and potential impacts. Based on this, the sub-projects will be categorised.

Based on the screening process undertaken, Environmental and Social Specialists of the SPMU would undertake project categorization. They would classify subproject into E1, E2, E3 as per severity and extent of environmental impacts and S1, S2 and S3 based on social impacts.

Projects categorised as E1, will follow the requirements of Bank OP 4.01 Category A projects requirements, and E2, E3 projects will follow the requirements of Bank OP 4.01 Category B project requirements. Guidance is provided here for indicative categorization of projects.

Table A: Environmental Categorization of Projects

Proposed Subproject Categories	Description		Type of project
	Extent of Environmental impacts	Management measures	
E1	Major environmental issues expected	Project specific EA preferably by an independent agency. In case the DPR consultant undertakes the ESIA for better alignment with project details; the ESIA will be reviewed by independent consultant. Specific mitigation/monitoring measures including those to improve environmental performance, ensure environmental sustainability and climate resilience / adaptation.	- Projects impacting sensitive environmental components including natural habitats - Projects requiring CRZ Clearance (National Level) as per CRZ Notification 2019 and Environmental Clearance as per EIA Notification 2006, of MoEFCC
E2	Moderate environmental issues expected	Project specific EA along with the DPR. ESMP including measures to improve environmental performance, sustainability and climate resilience / adaptation.	- Projects with impacts less adverse (in intensity and spread) than E1 category and mostly generic in nature. - Projects requiring only CRZ clearance (State Level) or Environmental Clearance (State Level)
E3	No environmental issues expected	Generic ESMP. These will also consider measures to improve environmental performance, sustainability and climate resilience / adaptation as part of overall design / plan	- Projects which would improve the environment without any negative impacts. - Research and Capacity building activities

In addition, in case a subproject has more than one among these subcomponents, the higher category applicable for any subcomponent would be considered as the category for the subproject as a whole.

Social categorisation of subprojects would be based on the following criteria.

Table B: Social Categorization of Projects

Category	Level of Issue	Management Measure	Type of Projects
S1	Serious social issues expected	SIA and RAP	<ul style="list-style-type: none"> - If it involves acquisition of private land with major impacts (people lose more than 20 % of the productive assets) - If it involves physical displacement.
S2	Moderate social issues expected	SIA and Abbreviated RAP	<ul style="list-style-type: none"> - If impacts are limited to less than 200 Persons or about 50 families of minor nature (people lose less than 20 percent of the productive assets).
S3	No social issues expected; hence socially benign	Social Screening Report	<ul style="list-style-type: none"> - No private land acquisition or no impacts to PAPs.

Specialists shall apply adequate experience and expertise-based judgment to determine the category of subprojects. For projects not listed in the guidance tool, categorization will be done based on its environmental sensitivity. Any upward/ downward scaling of categories such as from E2 to E1 and *vice versa* requires proper justification, concurrence of Society of Integrated Coastal Management (SICOM) under MoEFCC which is the National Project Management Unit (NPMU) for ENCORE and shall follow National and State Regulations and the safeguard policies of the World Bank. In addition to addressing environmental issues, NPMU commits itself to explore opportunities for environmental enhancement in various sub-projects.

ESMF describes the process for managing and mitigating anticipated impacts by a) following Strategic Environmental and Social Assessments (SESA) approach as integral part of regional / sectoral plan preparation activities including ICZM Planning, b) Environmental and Social Impact Assessments (ESIA) and ESMPs for moderate risk projects; and c) using Generic ESMPs for low risk projects. In addition, set of Environmental Codes of Practice are also included in the ESMF to guide integration of environmental aspects in planning and project related activities.

ESMF also suggests the use of the World Bank Group EHS Guidelines on cross-cutting environmental and social, health, and safety issues potentially applicable to construction and other projects. Further, ESMF provides guidance on screening, assessing, planning and implementing mitigation measures, and supervising /

monitoring the impacts to natural habitats, forests, physical cultural resources and pest management.

ESMF also describes the improved institutional mechanism, capacity building and cross learning of environmental actions at the National, State and Project levels, supervision and monitoring mechanisms and budget for ESMF implementation.

Since location and design information for conducting activity-specific ESIAs for some of the project activities are likely to be available only during project implementation, the ESMF defines the detailed process for the consultations, reviews, and clearances.

Draft ESMF will be disclosed in the website of NPMU / State PMUs inviting comments/suggestions, after completing the consultations with all States/UTs. This will also be disclosed in the website of the World Bank following applicable procedures.

ESMF will be adopted for both Plan preparation, Technical Assistance and implementation of projects. In addition, it is applicable for capacity building activities including improving the research facilities. The ESMF lays out the framework to identify and address environment and social impacts across screening, ESIA preparation, ESMP implementation, and site decommissioning.

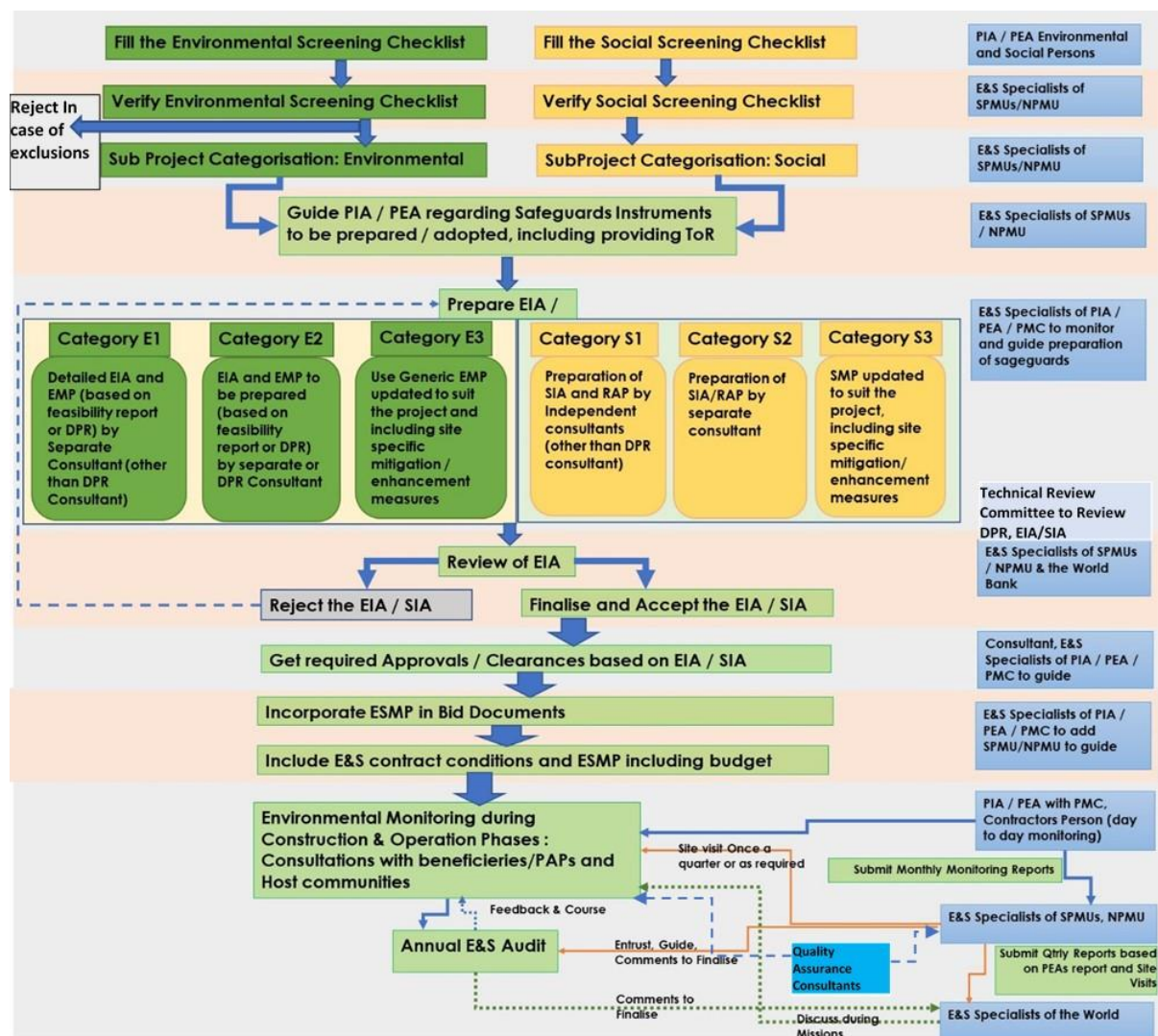


Figure B: Environmental and Social Requirements during Sub Project Cycle

Guidance for Sub Project ESIA's

ESMF provides guidance to prepare subproject ESIA's; as follows.

- Guidance on Project Screening, Impact Assessment, Institutional Framework for implementation and O&M stages, including ESMP in contract documents and overseeing implementation and reporting, and Audit for monitoring the effectiveness of subproject Environmental Management are provided in the ESMF,
- Indicative ESMPs are provided, which could serve as a guide for developing site specific ESIA's when project details are finalized,
- Guidance on Chance find procedures for Physical Cultural Resources, mitigation measures to be included in ESMPs,
- Guidance to include in ESMPs site specific measures to protect natural habitats, provision for monitoring and evaluation to provide feedback on conservation outcomes and to provide guidance for developing or refining appropriate corrective actions,

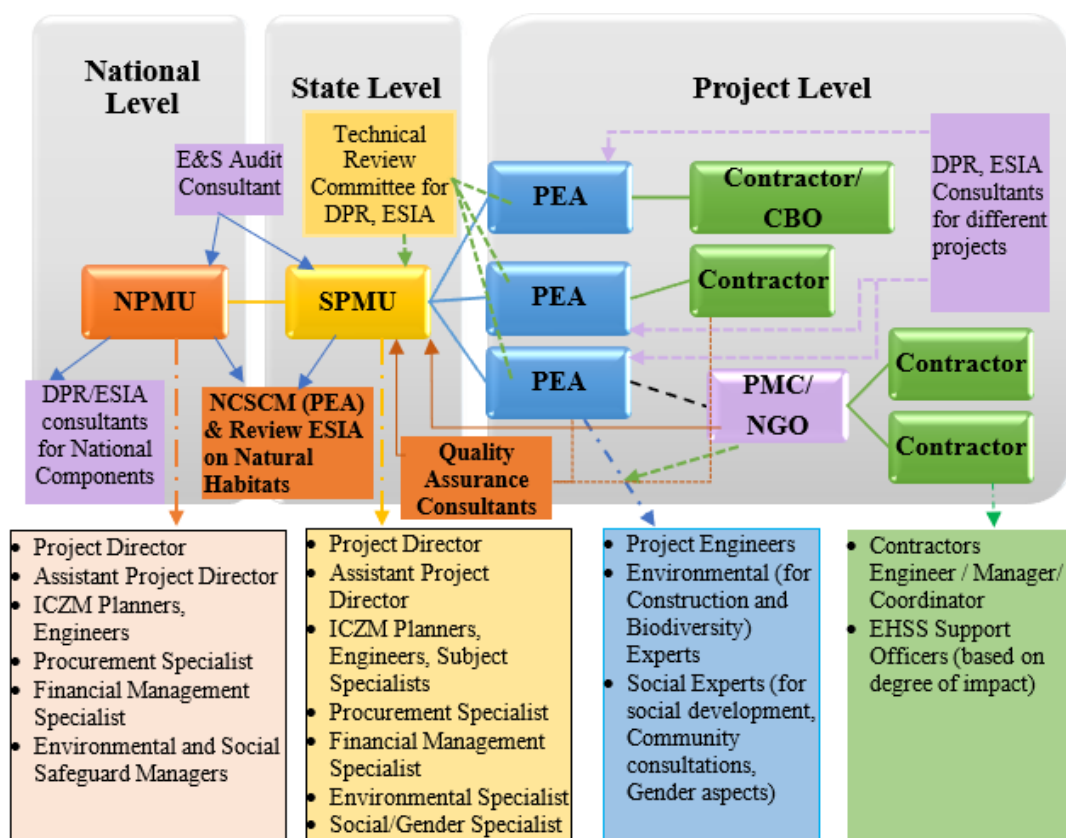
- Indicative Integrated Pest Management Plan and guidance on minimizing impacts due to use of fertilisers / herbicides is also included in the ESMF,
- Environmental Codes of Practice for various project activities are included in Volume II. ECoPs provides guidelines for environmental management of the certain project activities including which are seen to be of limited extent of impacts/risk, temporary and reversible, and readily managed with good practices during the implementation of the proposed project interventions. The Contractors can use these while preparing and implementing Contractors ESMP at work start,
- Guidance provided in ECoPs on how to minimize / avoid impacts in case of projects directly / indirectly related to Natural Habitats,
- Specific guidelines for the ESIA consultant firms to prepare (i) labour camp site and management plan, Waste and silt disposal plans, (ii) Occupational Health and Safety management plan and (iii) archaeological chance find procedure; which forms an integral part of all sub projects ESIA's falling in E1, E2 category.
- Sub project ESIA's would require assessing such potential issues linked to temporary project induced labour influx, the specific impacts can only be assessed once the contractor is appointed and decides to outsource labour. ESMF also provides guidance on Labour Management procedures. Labour Management Framework will ensure that the potential impacts associated with influx of labour on the host population and receiving environment are minimized through compliance with the national labour laws. It will also ensure provision of safe and healthy working conditions, and a comfortable environment for migrant labour. Contractor ESMP shall include a labour management Plan. Relevant clauses shall be included in the bid documents and provisions shall be made in the sub project ESMP.
- Resettlement and Rehabilitation Action Plan (RAP): In case the project involves land acquisition against compensation or loss of livelihood or shelter, the project shall ensure that a satisfactory RAP has been prepared under the ESIA and shared with the affected persons and the local community.
- The key objective of the Indigenous Peoples Plan (IPP) is to give special attention to the tribal issues and concerns during the implementation of the project. The IPP prepared based on the framework provided in the ESMF will be discussed with and disclosed to the key stakeholders. This be adopted on a full scale in the scheduled areas and as deemed necessary in the other areas.
- The affected communities will be able to voice concerns and grievances and have them addressed through the Grievance Redressal Mechanism. Effective Grievance Redressal Mechanism gives an opportunity to the organization to implement a set of specific measures to ensure good governance accountability and transparency in managing and mitigation of environmental and social issue of a particular project. This consists of defining the process for recording/receiving complaints and their redressal in respect of environmental and social aspects.
- ESIA and Project related information will be disclosed through public consultation and making relevant documents available in public locations. The SPMUs and associated

PEAs will provide relevant safeguards information in a timely manner, in an accessible place and in a form and languages understandable to affected person and other stakeholders.

G. Institutional Framework

Ever since ICZM Project (2010), NPMU has an established organizational support structure to ensure that the policy obligations and associated procedures in the ESMF are implemented. The implementation experience of ESMF in coastal management projects necessitate extension of the responsibility to respective SPMUs and Project Agencies / Project Executing Agencies (PEAs) to enhance safeguard arrangements at the implementation level, besides capacity building for continued incorporation of environmentally acceptable measures for all future coastal development activities. In addition, National Centre for Sustainable Coastal Management (NCSCM), under MoEFCC is capacitated to support NPMU in coastal management projects through its involvement in ICZM Project.

Proposed institutional framework at National, State and Project levels and suggested responsibilities for environmental and social safeguards is presented in the following ***Figure C***.



Legend:

NPMU: National Project Management Unit
 SPMU: State Project Management Unit
 PEA: Project Executing Agency
 PMC: Project Management Consultant
 E&S: Environmental and Social
 EHSS: Environment, Health, Safety and Social

NCSCM: National Centre for Sustainable Coastal Management
 NGO: Non-Governmental Organizations
 CBO: Community Based Organizations
 DPR: detailed Project Report
 ESIA: environmental and Social Impact Assessment

Figure C: Proposed Institutional Framework for Safeguards Management for ENCORE

Preparation of Subproject Safeguards Documents

Preparation of ESIA's will be co-ordinated by environmental and social specialists at SPMUs, based on the screening format prepared and submitted by PEAs. DPR Consultants or independent consultants would prepare ESIA's with stakeholder consultations. ESIA will be discussed and draft final report will be prepared with inputs from Technical Review Committee. Any clarifications on applicability of CRZ rules or technical and scientific aspects related to coastal, marine habitats and preparation of projects and / or special review of projects involving any natural habitats will be sent to NCSCM. After completion of review and finalisation by SPMU, subproject ESIA's will be forwarded to NPMU. NPMU will review ESIA's to ensure compliance with ESMF and E1 / S1 projects will be forwarded to the World Bank for review and approval. NPMU will also prepare ESIA's through independent / DPR consultants for National Components. These will be sent to the World Bank for review and approval. The final version of ESIA with ESMP and RAP/IPPF reports in English with a non-technical summary in local language, shall be disclosed in the websites of the NPMU/

SPMUs/LBs/PEAs/District Collectorate/relevant departments and will be made available in locations / notice boards easily accessible to the local people.

The applicable ESMPs will be made part of the bid documents and will be updated during the subproject implementation phase, as required. This ESMF applies to all the components under the project along with its linked or associated activities irrespective of Bank financing and will be subject to Bank supervision.

Implementation of Subproject ESMPs

A multi-layered institutional structure is presented for management of subproject environmental and social aspects during implementation phase.

Project/ Site Level

At the Project level, the contractor is responsible for ESMP implementation on ground and will maintain all site records. He will report on progress of ESMP implementation to the Environmental Specialist of the PEA or Project Management Consultant (PMC) appointed in case of complex projects. PEAs will have full-time, dedicated Environmental and Social experts with appropriate qualification and experience for a) ensuring ESMF compliance and implementation of all mitigation measures, b) maintain and follow up on the records submitted by the contractor, and c) submit relevant documents/reports to SPMUs monthly.

In case of complex projects to be managed by Local Bodies, PMCs will be hired by SPMUs to provide the necessary technical and project management support and will have environment and social specialists as part of core team. SPMU will hire technical support and project management consultants which include a full-time environment and social specialist to support in the following areas:

- Technical support and Advice on project design and construction methodology,
- Environment and social safeguards support, specifically ESIA review and appraisal, sub project ESMP compliance monitoring,
- Training to Contractors Staff and support agencies on Work safety and other guidance,
- Result monitoring and impact evaluation,
- Support to quarterly project reporting.

State Level

At State Level; SPMUs headed by Project Director and Assistant Project Director, will have dedicated environmental and social experts with appropriate qualification and experience for coordinating with PEAs (Urban Local Bodies / Respective Departments/others) for ensuring ESMF compliance, provide guidance, maintain records and submit the relevant documents/ reports to NPMU every quarter. SPMUs are already

in the process of hiring the Environmental Specialist and Rural Development / Social Specialist, who will jointly manage environmental and social aspects of sub-projects including:

- Stakeholder consultations and public engagement,
- Support PIAs in attaining all No-Objection Certificates (NOCs) and clearances required for sub-projects,
- Coordination with the line agencies / other officials in SPMU for preparing ESIAs with ESMPs, IPP and integrating environmental aspects in the DPR, bidding documents, tendering schedules, etc.,
- Ensure approval of all E2 category safeguard documents from NPMU, E1 category safeguard documents from the NPMU and the World Bank and disclosure of project documents,
- Site visits and inspection of projects under implementation,
- Appointment of technical assistance consultants and others safeguards management support to the implementing agencies,
- Quality assurance through appointing Quality Assurance Consultants and co-ordinating with third-party auditors,
- Maintaining Management Information System on subprojects and quarterly reporting, and
- Ensuring compliance with agreed implementation procedures and other World Bank requirements.

Construction Supervision and Quality Control Consultants will be hired by SPMUs, and will contain a dedicated Environment, Social, Health and Safety officer to look at ESMP implementation, labour management and occupational health and safety risks. For projects involving Natural Habitats, Quality Assurance Consultants will also monitor implementation of mitigation measures through their expert with specialisation in biodiversity conservation and management.

National Level

NPMU headed by Project Director and Assistant Project Director, will supervise and monitor implementation of social and environmental safeguards for select category E1, S1, E2, S2 sub-projects under ENCORE as per this ESMF through Environmental and Social Safeguard Nodal Officers already part of the team. Biodiversity officer at NPMU will also provide inputs to review and clear projects involving natural habitats. NPMU uses the Quarterly Progress Report submitted by SPMUs and sample site visits for progress monitoring. Detailed Management Information System linking project details, scheduling and documentation to EIA process and ESMF implementation will support the NPMU in effective preparation of safeguard instruments, supervision and monitoring.

H. Capacity Building

ESMF envisages capacity building on environmental and social safeguards, and technical aspects for NPMU, SPMUs, by organising annual sensitization programs, workshops, and training/capacity building in co-ordination with training institutions experienced in various aspects of coastal management/ infrastructure / area development projects and the World Bank.

NPMU also proposes enhancing capacity of staffs and environmental and social managers at all levels through orientation programs, trainings, exposure visits to similar projects implemented, courses and participation in both national and international training courses and seminars/workshops and cross-learning events/workshops where the States implementing the projects can learn from each other on operational issues and best practices. The proposed capacity building activities will be supported through appropriate Technical Assistance of ENCORE. The World Bank project task team, specifically the environmental specialists, will provide close supervision and necessary implementation support by reviewing and providing guidance on conducting screening, and the preparation of relevant safeguard instruments as well as providing training for SPMU/NPMU specialists.

I. Monitoring and Supervision

Provisions in the ESMF for supervision, monitoring and reporting include:

- Reporting on Safeguards / ESMPs: Monthly (or as and when required) Implementation Report, by Contractor to PEA; Monthly Supervision Report by PEA / PMC to SPMU, Quarterly report by SPMU to NPMU (based on monthly report by PEAs/PMCs, Monitoring report by Quality assurance Consultants and quarterly supervision by SPMU)
- Safeguards monitoring report by Quality Assurance Consultants along with monitoring of Civil Works when the works are ongoing and at work exit/operations. For projects involving Natural Habitats, Quality Assurance Consultants will also monitor implementation of mitigation measures through expert with specialisation in biodiversity conservation and management.
- Annual Environmental and Social Audit for select projects (both National and State - all E1, S1 and select E2, S2) by independent consultants e) capacity building for Environmental and Social Management
- NPMU will undertake annual audits to review the status of ESMF compliance of all E-1/S1 projects and sample E2/S2 projects. The audit will be carried out during June-July of every year for the activities completed until previous financial year. The draft report will be forwarded to the World Bank and upon approval the final audit report will be disclosed. All suggestions in the audit report will be implemented and suitable course corrections will be made on procedures for ESMF compliance.
- Detailed Management Information System linking project details, scheduling and documentation to EIA process and ESMF implementation will support the NPMU in effective preparation of safeguard instruments, real time supervision and monitoring.

J. Budget for ESMF Implementation

To effectively implement the environmental and social management measures suggested as part of the ESMF, necessary budgetary provisions will be made in the DPRs for the individual sub-projects. Tentative budget for each of the project should include the environmental management costs including good engineering practices and cost of environmental and resettlement monitoring. The budget for complying with the ESMP needs to be worked out for all mitigation measures suggested for each sub-project. Where this is not possible, provision of a minimum of 2 percent of the sub-project cost needs to be earmarked for implementing ESMP measures. In addition, provision for ESHS performance security as in the World Bank Procurement documents shall be made to ensure ESMP implementation.

All administrative costs for implementing the ESMF shall be budgeted for as part of budget for human resource and other facilities while preparing the budget for PEA and PMU establishment and operations.

Drawing from the project experience and current indicative costs of Category A projects a rough estimation of costs for safeguard management and ESMF implementation is expected to be Rs 170 Crores INR. All safeguards instruments have been inbuilt in to the project modality and will be financed via the project and detailed project cost tables will include the necessary costs accordingly. Updated cost tables will be prepared when the ESMF is updated during each Phase of this multi-phase project.

The associated cost to implement ESMPs as well as training for project staff, contractors etc. have been integrated into the project budget. The project will ensure that all works contracts will include the ESMP, and the cost of implementing the ESMP will be identified as an item in the Bill of Quantities.

K. Public Consultation during Sub-Project Preparation and Implementation

During sub-project preparation and implementation, besides the primary stakeholders, Local Bodies, NGOs and the public will also be consulted and their opinion on environmental and social aspects will be discussed. Bi-annual consultation meetings shall be organised at the project site and at the local bodies during the sub project design phase. Stakeholder consultation workshops with the participating departments and other stakeholders will be held regularly during implementation. The project monitoring/progress reports should also be made available online in the PEA and SPMU websites.

L. Consultations and Disclosure of this ESMF

The need for ESMF and its contents were presented to all participating States during various interactions during February – March 2019. NPMU also carried out one-to-one discussions with the NCSCM, SPMUs / State representatives during the process of finalisation of

respective Project Reports for ENCORE. List of stakeholders who attended these meetings / presentations are provided in *Annexure II* of Volume I.

Draft ESMF will be disclosed in the offices and website of NPMU (SICOM), and Department of Environment / Co-ordinating Departments of participating States inviting comments / suggestions of stakeholders. Draft ESMF will also be presented to the stakeholders during various State and National Level workshops / meetings and one-to-one discussions held during June 2019. All comments and suggestions (mainly clarifications) will be suitably incorporated in the document. Further, after incorporating the comments of stakeholders the ESMF will be finalised and redisclosed in NPMU / SPMU offices and websites and in World Bank's IDU following approval/procedural requirements.

The major outcomes of (final) stakeholder consultations are as follows: (to be filled in after completing SHC on draft ESMF and receiving all comments on draft ESMF disclosed)

a) Stakeholders discussed -----

b) Major issues raised by stakeholders due to project activities were on

c) Mitigation measures suggested by the stakeholders will be integrated in the project during ESIA preparation and implementation. This include

Outcome of ongoing Stakeholders Workshop (to be included)

M. Conclusion

This ESMF document for ENCORE, presented in two Volumes (Volume I and II) will act as the guidance document for management of environmental and social aspects and safeguards management for all components of the project. This is a living document and shall be updated, if required; following the consultations, approval and disclosure requirements of the World Bank.

The key performance indicators to be monitored for successful implementation of ESMF will be the following:

- Implementation of ESMP and (other social instruments) in time-bound manner,
- Number of accidents during the construction phase,
- Status of compliances with regulatory requirements and clearances,
- Work opportunity for willing local labourers,
- Labour management standards as per WB group guidelines,
- Number of complaints handled within the scheduled time,
- Disclosure of project information and public consensus on the project and locations/sites involved.

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

CHAPTER 1.

INTRODUCTION TO THE PROJECT

1.1 Program Description

ENCORE aims to strengthen integrated coastal zone management in all coastal States and Union Territories of India. The Project seeks to assist the Government of India (GoI) in enhancing coastal resource efficiency and resilience by building collective capacity (including communities and decentralized governance) for adopting and implementing integrated coastal management approaches. Recognizing Integrated Coastal Zone Management (ICZM) as a continuous process rather than a one-off investment action, ENCORE will build upon and draw from the experience of the ongoing World Bank-supported Integrated Coastal Zone Management Project (ICZMP), including the linkages between coastal conservation, climate resilience, and poverty reduction.

1.1.1 *Proposed Project Components*

Project activities considered for implementation in Seven (07) States / and Two (02) Union Territories (UTs) of coastal India relate to improving the coastal environment; leveraging the concepts of resource efficiency. Three coastal States, namely; Gujarat, Odisha and West Bengal have prepared ICZM Plans as part of ICZMP Project supported by the World Bank. During MPA Phase I, ICZM Plans would be prepared for the selected coastal stretches in other States/UTs under the program. In addition to priority projects for coastal pollution prevention, livelihood support and coastal resilience identified in these ICZM Plans, those investments which will inform effective coastal management solutions to guide ICZM Plan preparation in these States/UTs will also be taken up for pilot / demonstration purposes during MPA Phase I.

Institutional capacity building for effective coastal management, Mapping and Database creation, and Monitoring and Research Facilities would be supported under Phase I. Investments proposed by the States/UTs include a) mangrove afforestation / shelter beds, b) habitat conservation activities such as restoration of seagrass meadows, eco-restoration of sacred groves, development of hatcheries, rearing / rescue canters for turtles and other marine animals etc, c) creation of infrastructure for tourism, restoration and recharge of waterbodies, beach cleaning and development, other small infrastructure facilities. Livelihood improvement projects include demonstration of climate resilient or salinity resistant agriculture, water harvesting and recharge/storage, creation of infrastructure and facilities to support ecotourism, community-based; small-scale mariculture, seaweed cultivation, aquaponics, and value addition to other livelihood activities.

Exact locations of all project investment activities are not known at this stage. The Project investments are expected to enhance and support coastal resources, minimize

coastal pollution and improve the livelihoods of coastal communities. It is envisaged that the project would lead to positive impacts, including marine and coastal conservation, pollution prevention and effective utilization of coastal resources, and promotion of sustainable coastal livelihoods. In addition, the project is expected to provide a scientific basis and an effective coastal management framework (including institutional capacity) for resource efficient and integrated coastal management. The proposed project mandate subsumes safeguards management as an integral part of the project objectives and implementation. Rather than *ad hoc* placing and implementation of project investments in time and space without adequate planning considerations, the ICZM Plan which would be prepared as part of the project would set the stage for investments, with a scientific basis; considering the environmental, social and climate related sensitivities among others. Though siting of subprojects is taken care of by comprehensive ICZM Planning which prelude the subproject implementation in the coastal zone, environmental impacts may be expected in case the subprojects are designed without adequate care. Environmental impacts on sensitive areas though meagre may include those due to change in land use in or near environmentally sensitive coastal areas and impacts on environmental quality due to construction and related activities. The project will cause general construction stage impacts which include (i) increase in noise, dust, impacts on air quality or safety risks due to poor construction methods and inadequate operation and maintenance (O&M) of facilities; (ii) temporary water quality impacts resulting from possible drainage and sewage pollution; (iii) impacts related to movement of vehicles including increased congestion, and conflicts with pedestrian movements; iv) hindered access/temporary changes in access to, and the use of, public spaces during construction/excavation works; and (v) public health risks due to improper waste/debris, sludge, excavated silt/muck management, or lack of attention to labour management. Similarly, with project investments expected to spread along India's entire coast, including island territories, it is likely that some locations may have presence of indigenous population.

Project activities considered relate to improving the coastal environment; leveraging the concepts of resource efficiency. ICZM Plans would be prepared for selected coastal stretches. Those investments which will inform effective coastal management solutions to guide ICZM Plan preparation will be taken up for piloting / demonstration purposes during Phase I of this Multi-Phase Program. Investments proposed by the States/UTs include mangrove afforestation / shelter beds, waste management in the villages and towns in the watersheds of major rivers leading to the polluted coastal stretches, pollution monitoring activities, preparation of ICZM Plans, institutional development and capacity building, integrated farming mainly; saline agriculture and other demonstrations, embankment strengthening etc. The project investments or locations are not finalized yet. Considering the nature and spread of project activities, Safeguards Category is considered as "A" as per the World Bank's Safeguards Policy OP 4.01 Environmental Assessment; and hence an ESMF has been prepared by the borrower.

1.1.2 Environmental Characteristics of the Project Location

India's Coastal and Ocean Resources are rich in biodiversity; crucial for growth, food production and to mitigate risks due to climate change. Wide range of ecosystems including mangroves, seagrass beds, salt marshes, coral reefs, wetlands, lagoons, estuaries and other important coastal and marine habitats dot the coast. This coastal strip also houses 1093 small and big beaches. Areas falling under Coastal Regulation Zone (CRZ-I) are ecologically sensitive ecosystems, habitats and geomorphological features. Coastal ecosystem spanning over 7800 sq km includes corals (1400.92 sqkm), seagrass beds (516.6 sq km), saltmarshes (465.75 sq km), turtle nesting ground (184.87 sq km) and horse shoe crab habitats (72.35 sq km) among the few. Mangroves extending over 5,403.39 sq km can break up storm waves that can exceed 4 m in height during cyclones. Further mangroves double up as habitat for 4,011 species including 920 plants and 3,091 animal species. Geomorphological features along India's coasts include sand dunes and mudflats accounting for 5,868 sq km, Marine Protected Areas and the Coastal Reserved Forest of 12,800 sq km equivalent to around 5 percent of the territorial waters. CRZ notification has also identified 12 Critically Vulnerable Coastal Areas (CVCAs) along the coast; including magnificent wetlands. Coastal and marine areas are known to have higher potential to sequester carbon than land-based sources - equivalent to 0.2 Gt /year.¹

The fragile yet highly productive coastal ecosystems of India are under increasing demand due to rapid urbanization and development needs. Coastal India best exemplifies the 'Development versus Environment' conundrum. This area of interaction between the terrestrial and marine process faces high concentration of population, exploitation of renewable and non-renewable natural resources, solid waste, discharge of industrial effluents and municipal sewage from upland sources, marine plastic and oil pollution. Due to the aggressive development it witnessed over the past half century, today; India's 7517km coastline hosts 14.2 percent of its total population distributed in 78 districts of 9 States and 2 UTs. Coastal development in India is best explained by the existence of large number of coastal cities, including three megacities of the global south; namely; Mumbai, Kolkata and Chennai, 13 Major and 46 minor ports and associated economic hubs, 1511 marine fish landing centres and dedicated fishing ports. Change in landuses to accommodate industrialization, urban uses, fishing harbours and recreational activities cause altercations along the water edge with resultant erosion/accretion. Various landuses and activities are vying for coastal space with resultant degradation of coastal zones and associated ecosystems. Degradation and fragmentation of coastal ecosystems have negative implications for coastal communities who are dependent on these for their livelihoods. ENCORE Program seeks to assist the Government of India in enhancing coastal resource efficiency and resilience, by building collective capacity (including communities and decentralized

¹ All numbers quoted are from National Coastal Mission Document, prepared by Ministry of Environment, Forests and Climate Change, Government of India

governance) to leverage integrated coastal management approaches. It draws from the experience of the ongoing World Bank supported Integrated Coastal Zone Management Program and recognizes the link between poverty and adaptation with coastal conservation.

1.1.3 Key Environment and Social Issues

The project design of ENCORE subsumes good environmental and social management. It is designed to promote best environmental and social practices for the coastal space and has an inbuilt planning component; with strong base on studies and research. ICZM Plan is an essential pre-requisite to coastal planning as envisaged in ENCORE. Key subprojects will be identified on the basis of ICZM Plans and phased later in the implementation process. Those activities which are unavoidable in the coastal space; and are mostly beneficial to the environment are phased for immediate implementation. Project activities considered relate to improving the coastal environment; leveraging the concepts of resource efficiency. ICZM Plans would be prepared for selected coastal stretches. Those investments which will inform effective coastal management solutions to guide ICZM Plan preparation will be taken up for piloting / demonstration purposes during MPA Phase I.

Though siting of subprojects is taken care of by comprehensive ICZM Planning which prelude the subproject implementation in the coastal zone, environmental impacts may be expected in case the subprojects are designed without adequate care. Environmental impacts on sensitive areas though meagre may include those due to change in landuse in or near environmentally sensitive coastal areas and impacts on environmental quality due to construction and related activities. The project will cause general construction stage impacts which include (i) increase in noise, dust, impacts on air quality or safety risks due to poor construction methods and inadequate operation and maintenance (O&M) of facilities; (ii) temporary water quality impacts resulting from possible drainage and sewage pollution; (iii) impacts related to movement of vehicles including increased congestion, and conflicts with pedestrian movements; iv) hindered access/temporary changes in access to, and the use of, public spaces during construction/excavation works; and (v) public health risks due to improper waste/debris, sludge, excavated silt/muck management, or lack of attention to labour management. Similarly, with project investments expected to spread along India's entire coast, including island territories, it is likely that some locations may have presence of indigenous population.

No large scale significant or irreversible social impacts are envisaged. No private land acquisition is envisaged under the project. Mangrove plantations and small infrastructure in villages will be carried out on public land. Rehabilitation of assets will be in-situ and will not require any additional land. However, there are chances of encroachment of public land. During the construction phase, influx of large numbers of migrant workers in the project area is also not envisaged as assets to be created will be

small. Mangrove plantations and rehabilitation work will be carried out the local community. At the same time, the Project will benefit the community in general. However, inclusion and equity issues may remain a concern in accessing the benefits of the project.

Potential issues linked to temporary project induced labour influx, may be applicable in case the contractor decides to bring labourers from a location away from the Project area.

1.2 Need for an Environmental and Social Management Framework

The proposed financing mechanism of the World Bank (Investment Project Financing (IPF with DLIs)) for ENCORE requires the application of World Bank safeguard policies for the project.

ESMF² is an instrument that examines the issues and impacts associated when a project consists of a program and/or series of sub-projects, and the impacts cannot be determined until the program or sub-project details have been identified. Depending on the nature and location, the project initiatives such as coastal protection measures waste management, development of infrastructure facilities for livelihood support etc., are likely to result in positive and negative impacts on the project area during their construction and O&M phases. These impacts would assume importance when the project locations are in the proximity to sensitive areas. Hence, there is a need for systematic safeguards management with pre-defined framework for risk mitigation. As all project locations and activities are not finalized, in order to identify and manage associated environmental risks, it is required to prepare an ESMF for the project. The ESMF would also draw from the past experience of environmental safeguards management as part of implementation of the earlier World Bank funded ICZMP project in three Coastal States of Odisha, West Bengal and Gujarat and thus outlines well-informed mitigation measures and procedures for effective environmental management and safeguards.

1.3 Overview of the Environmental and Social Assessment and Framework

1.3.1 Purpose of the ESMF

ESMF is used as a safeguards instrument when a project consists of a program and/or series of sub-projects, and the impacts cannot be determined until the program or sub-project details have been identified. ESMF manages potential adverse impacts through a guide consisting of a set of methodologies, procedures and measures to facilitate

²As per WB policy 4.01, an ESMF is an instrument that examines the issues and impacts associated when a project consists of a program and/or series of sub-projects, and the impacts cannot be determined until the program or sub-project details have been identified. The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social impacts. It contains measures and plans to reduce, mitigate and/or offset adverse impacts and enhance positive impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project impacts

adequate environmental management (risk management and impacts) related to the works financed under the project and whose specific location is unknown or may change during project implementation.

The purpose of the ESMF is to describe a framework or a step-wise process for the management of the environmental issues including: (i) procedures for screening the environmental aspects related to the programs, (ii) identification of impacts, regulatory mechanisms and management/mitigation measures, (iii) details on the institutional roles and responsibilities for environmental management (including contract provisions and budget), (iii) strategy and plan for capacity building of key stakeholders, (iv) plan for monitoring the implementation of environmental safeguards, (v) strategy for public consultation.

Typically, ESMF includes the following:

1. Brief description of project components including description of type of activities eligible for financing,
2. Operating requirements (diagnosis of legal and institutional framework, applicable safeguards),
3. Environmental/social baseline at national/state level,
4. ESMF screening procedures (criteria, process, environmental and social due diligence process, EA/ESMP documentation),
5. Implementation arrangements,
6. Public consultation and disclosure process/procedures,
7. Environmental mitigation measures,
8. Monitoring and reporting arrangements,
9. Training and capacity building recommendations,
10. Various Annexures: Guidelines, Indicative ESMPs, Monitoring Formats etc.

1.3.2 The ESMF process

The ESMF is prepared based on the type of subprojects and activities which are expected and probable impacts considering the activities and project locations. It also considers the existing institutional set up for safeguards management and suggests improvements / additions required to follow the ESMF process. ESMF outlines the process to be adopted during each stage in the project cycle, to ensure the preparation of adequate guidance for safeguards management based on level of impacts and to agree and follow these during the implementation and Operation and maintenances stages.

1.3.3 Revision/Modification of the ESMF

The ESMF is a ‘live document’ enabling revision, as and when necessary to incorporate the changing project scenario. At a later date, with changing project contours and on-field necessities; it may deem necessary to incorporate certain provisions / considerations in the ESMF. In case of any such additional requirement or need for change in the future, it should be assessed, and appropriate management measures incorporated in to the ESMF. Unexpected situations and/or changes in the project or sub-component design would therefore be assessed and appropriate management measures will be incorporated by updating this ESMF. Such revisions will also cover and update any changes/modifications introduced in the legal/regulatory regime of the country/ state. Also, based on the experience of application and implementation of this framework, the provisions and procedures would be updated, as appropriate in consultation with the World Bank and the implementing agencies/departments.

1.3.4 Structure of the ESMF Report

ESMF for ENCORE Program is presented in two Volumes; Volume I and Volume II. The structure of the document is as follows:

Volume I

- Chapter 1 is the Introductory Chapter; describing ENCORE Program, its components and the need for a framework approach for environmental and social management,
- Chapter 2 presents the detailed Baseline and Assessment of Environmental and Social characteristics of coastal India; the program region,
- Chapter 3 presents the Regulatory Framework for the project; including National, State and local level regulations and policies in addition to applicable World Bank Safeguard policies,
- Chapter 4 is the Assessment of Probable Impacts due to Subprojects,
- Chapter 5 presents the ESMF for this project, proposed screening framework for categorization of projects, process for carrying out subproject environmental assessment, and preparation of ESMPs and monitoring plan,
- Chapter 6 presents the Resettlement Policy Framework,
- Chapter 7 presents the Indigenous Peoples Planning Framework which would be applicable in case of subprojects in locations with presence of Indigenous Population,
- Chapter 8 is the Gender Action Plan for the project,
- Chapter 9 presents the Labor Management Framework,
- Chapter 10 identifies the institutional mechanism and its budgetary requirements for implementing the ESMF, and

Chapter 11 details out the Grievance Redress Mechanism, Consultations and Information Disclosure for ESMF and Subprojects.

Volume II

- a) Documentation formats to be used for screening of projects
- b) Sample terms of references, for Impact Assessment and Specialists to manage ESMF and for auditing compliance to ESMF
- c) Guidance materials for licenses, permits, clearances under various regulations, site selection, public consultation and consensus, indicative environmental and social Management plans and monitoring plans for typical types of projects, grievance management. It also presents a comprehensive set of Environmental Codes of Practices for guiding various project types.

This Report is the Volume I of ESMF for ENCORE Program.

CHAPTER 2. ENVIRONMENTAL AND SOCIAL ASSESSMENT OF COASTAL INDIA

The baseline environmental and social data has been collated from available secondary sources including Census of India, Central and State Pollution Control Board (CPCB), MoEFCC, India Meteorological Department, various studies and publications. This section describes the baseline environmental characteristics of coastal India in terms of Physiography, socio-economic characteristics, coastal and marine ecosystems, vulnerable coastal resources, industries and infrastructure at the coast, natural disasters and climate change, existing institutional set up to manage the coast and science and information available for coastal management. Detailed description of each of the participating coastal state/UT in terms of demography, administrative divisions, natural resources, sensitive coastal land mass and features, archaeology, heritage, tourism, and natural disasters, is presented in *Annexure I*, while overall baseline description for the country is included in brief in *Annexure II*.

2.1 Geographic Location

The Indian sub-continent is mostly situated on the Indian Plate in south central Asia projecting southwards as a peninsula into the Indian Ocean from the Himalayas. India is the largest country in the Indian sub-continent and the seventh largest country in the world. India lies completely in the northern hemisphere with the mainland extending between latitudes 8° 4' and 37° 6' north and longitudes 68° 7' and 97° 25' east. From north to south, the country extends to about 3,214 km while it is about 2,933 km from east to west. It covers 32,87,263 sq. km, extending from the snow-covered Himalayan heights to the tropical rain forests of the south. There are two island territories – the Andaman and Nicobar Islands in the Bay of Bengal and the Lakshadweep in the Arabian Sea. The country has a land frontier of about 15,200 km while the total length of the coastline of the mainland and its island territories is 7,516.6 km.

2.2 Physical Characteristics

Physical characteristics of coastal India can be explained well only by discussing its evolution during the geological time scale. The origin of Indian Subcontinent dates to 180 million years back with the breakup of Pangaea, the supercontinent into Gondwana and Laurasia as a consequence of plate tectonic movement which started about 125 million years ago. During the Upper Cretaceous of the geological time scale, the north-moving Indo-Australian plate was moving at about 15 cm per year. About 50 million years ago, the fast-moving Indo-Australian plate (a fragment of Gondwana), completely closed the Tethys Ocean and began colliding with Eurasian plate. Since both plates were composed of low-density continental crust, they were thrust faulted and folded into a mountain; the present-day Himalayas (*Figure 2.1*).

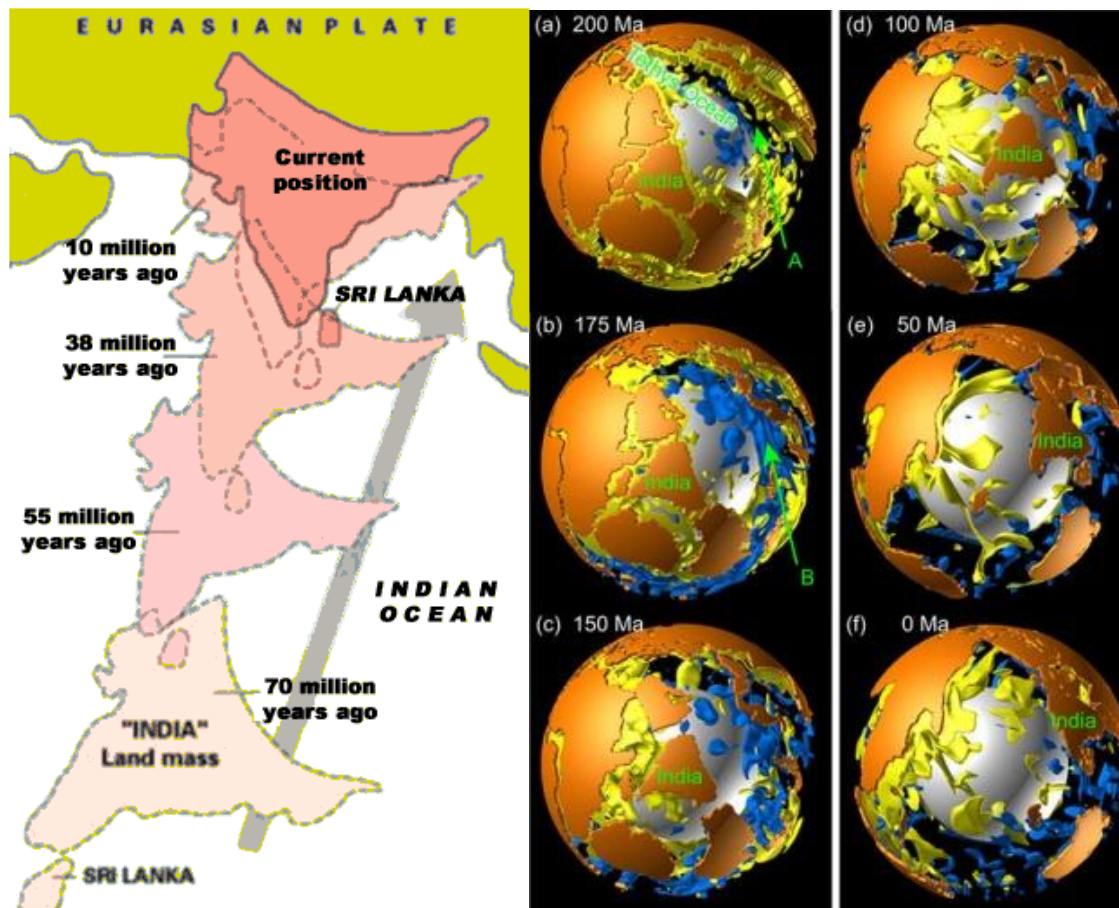


Figure 2.1: a) Temporal drift of Indian Plate before its collision with Asia (Eurasian Plate), b) Time sequence of 3-D views of mantle convection and drifting continents

Significant tectonic alterations are observable along the Indian coast; the geomorphology of west coast being different from the east coast. Much of the west coast falls in Dharwar Craton with rocky features whereas east coast is tectonically East Coast Mobile belt, mainly made up from the deltaic formation from the rivers of Peninsular India. Southern part of the Indian coastline is termed as “Southern Granulite” separated from Dharwar Craton by Bhavani–Palghat Mobile Belt. Furthermore, Gujarat coast (and Rann of Kachchh) is considered as the upliftment of the shallow region of Arabian Sea.

The coast along Indian mainland comprises nearly 43 percent sandy beaches, 11 percent rocky coast with cliffs, and 46 percent mud flats with marshy environment. Some of the beaches regain their original profiles by the months of March/April annually. Nearly half of the remaining beaches which do not regain their original shape over an annual cycle undergo net erosion.

2.2.1 Continental Shelf and slope

The continental shelf³³ extends seaward from the shore with an average gradient of 1 in 500. Its outward limit is set where the gradient increases to about 1 in 20 on an average to form the continental slope increasing with depth until the deep-sea bottom. The shelf has an average width of 65km. The demarcation between the shelf and slope is based on the break-in-slope as one examines a vertical cross-section of the sea bottom from the shore outward. The average depth at the shelf break is about 130m. Being a highly productive zone, most of the world's fisheries are located on the continental shelf. The continental slope averages about 400m vertically from the shelf to the deep-sea bottom, but in some places can extend as much as 9000m vertically, in relatively short horizontal distance. The continental slope is considerably steeper than the slope from landward to coastal hinterland. The material in the slope is predominantly mud, with some occasional rock outcrops.



Figure 2.2: Continental shelf and slope along the Indian coast

The west coast of India has a sea front extending from Cape Comorin in the south to Rann of Kachchh in the north. The continental shelf of India is more prominent along the west coast compared to the east coast. A large-scale turbulence that involves upwelling and wind-driven effects on the south-west coast of India facing the Arabian Sea contributes to this region being one of the most productive fishing grounds in the world. About three-fourths of the Indian seafood production is accounted for from the west coast. The continental shelf along the east coast is narrow with an exception in the head Bay region, whereas along the west coast, the width of the shelf varies from about

³³ A continental shelf is a portion of a continent that is submerged under an area of relatively shallow water known as a shelf sea.

340 km in the north to less than about 60 km in the south (*Figure 2.2*). Bathymetry map for the Indian coast is given in *Figure 2.3*.

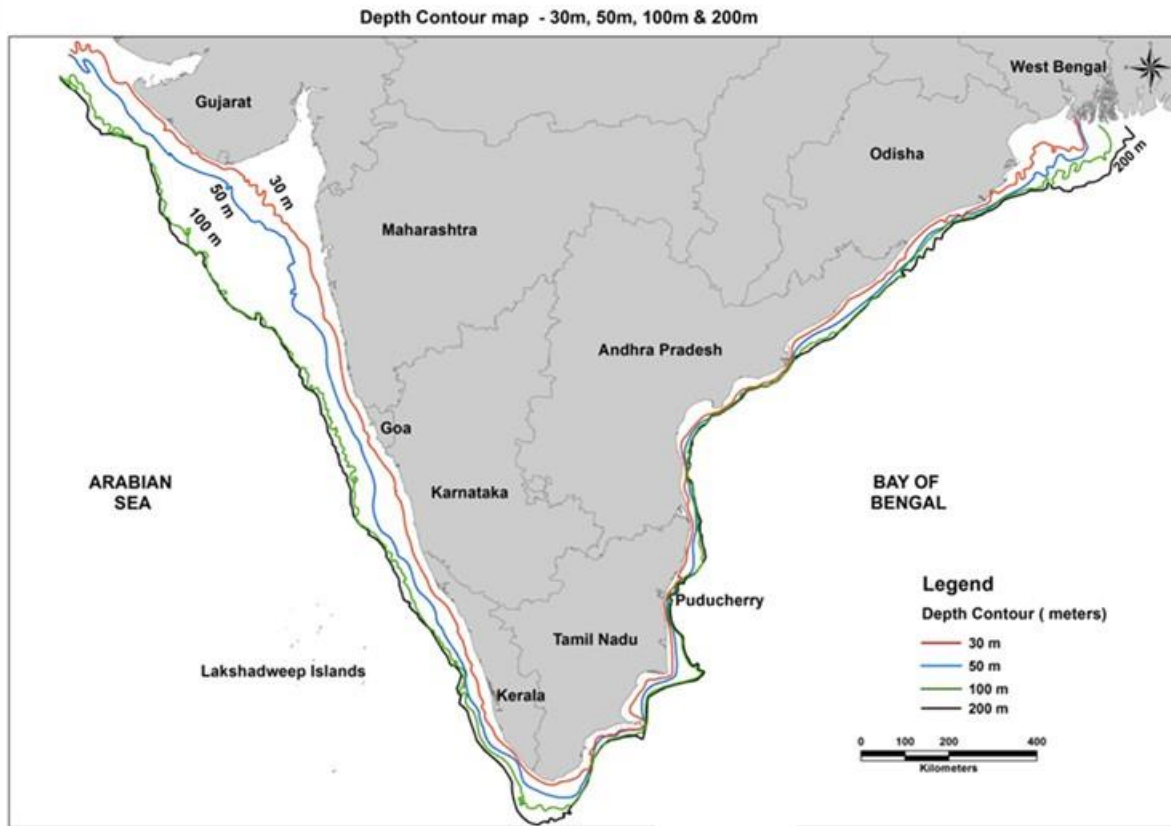


Figure 2.3: Depth contour map for the Indian coast

2.2.2 Sediment Transport

The sediment movement in the coastal region is a natural process accounted for by currents. Rivers are identified as the major sources of sediment along the Indian coast, among which the Ganges and Brahmaputra contributes a major share of suspended sediments to the Bay of Bengal, and the Indus to the Arabian Sea. Sediment discharge through the Indian rivers into the sea is estimated to be about 1.2×10^{12} kg/yr. Deposits in the gulf, tidal marshes, bays, beach deposits and aeolian inland transports are found to be the primary sinks for sediments moving along the Indian coast. Several researchers have worked on the sediment transport mechanisms and estimation of budgets. The studies revealed that sediment transportation along coastal Tamil Nadu, particularly at the southern tip of India varies from 82000 to 40000 cubic meter towards the north and west. Similarly, for the Visakhapatnam coast, it varies from 0.4 to 0.6 million m³/yr. Previous studies reveal that sediment transport of about 1670 million tons/yr occurred from the Ganges River into the Bay of Bengal during the year of 1983. The annual gross sediment transport rate is high (1.5×10^6 m³ to 2.0×10^6 m³) along the coasts of north Kerala, north Karnataka and south Gujarat. The annual net transport is towards the south along Karnataka and north Kerala coasts. The Maharashtra coast experiences negligible quantity of annual net transport.

2.3 Climate

The climate of India can broadly be classified as tropical monsoon; the entire country has a tropical climate marked by relatively high temperatures and dry winters. There are four seasons:

- winter (December-February)
- summer (March-June)
- south-west monsoon season (June-September)
- post monsoon season (October-November)

2.4 Geology and Soils

The various types of soil found in India include Alluvial soil, Laterite soil, Red soil, Black soil, Desert soil, and Mountain soil. The Indian Council of Agricultural Research (ICAR) divides the Indian soils into eight major groups. (i). Alluvial Soils, (ii). Black Soils, (iii). Red Soils, (iv). Laterite Soils, (v). Forest and Mountain Soils, (vi). Arid and Desert Soils, (vii). Saline and Alkaline Soils and (viii). Peaty and Marshy Soils.

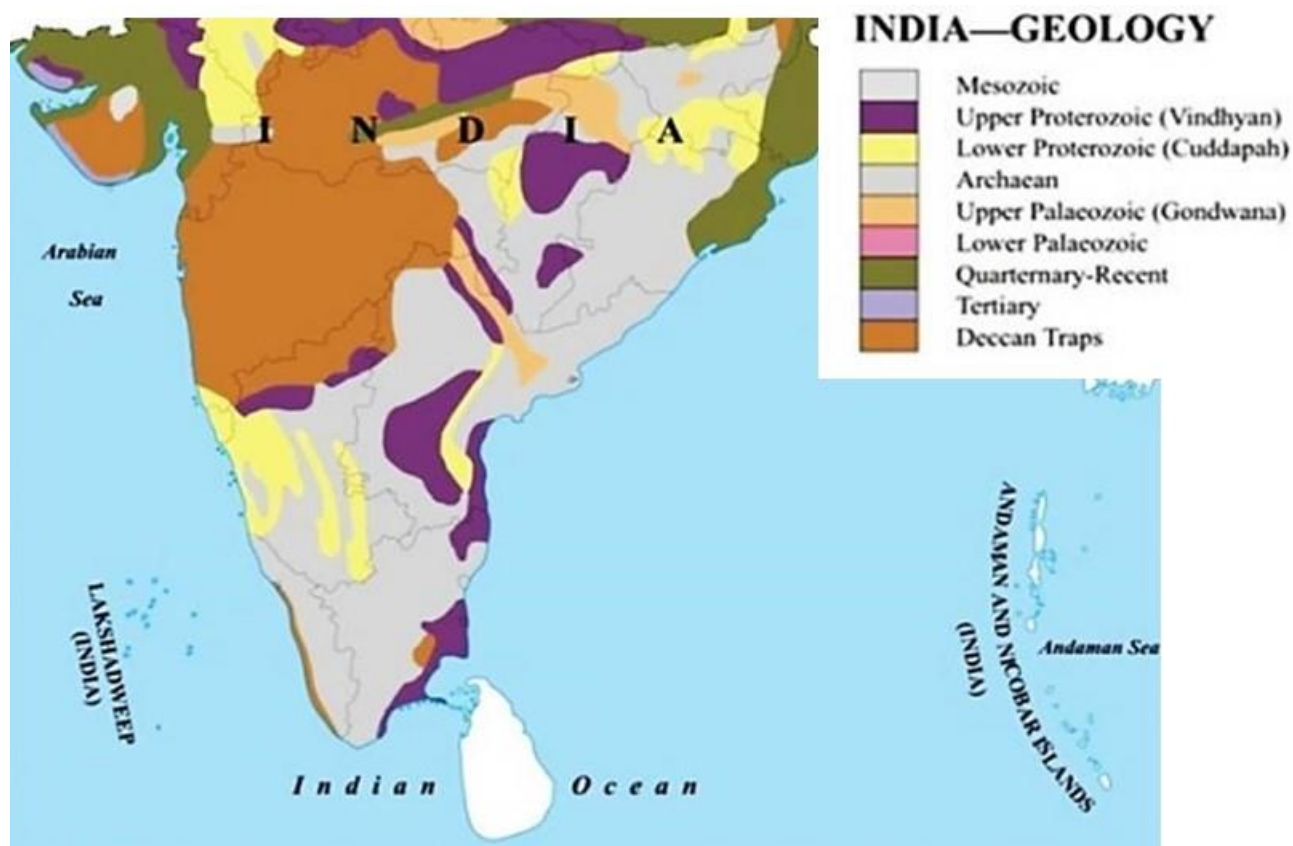
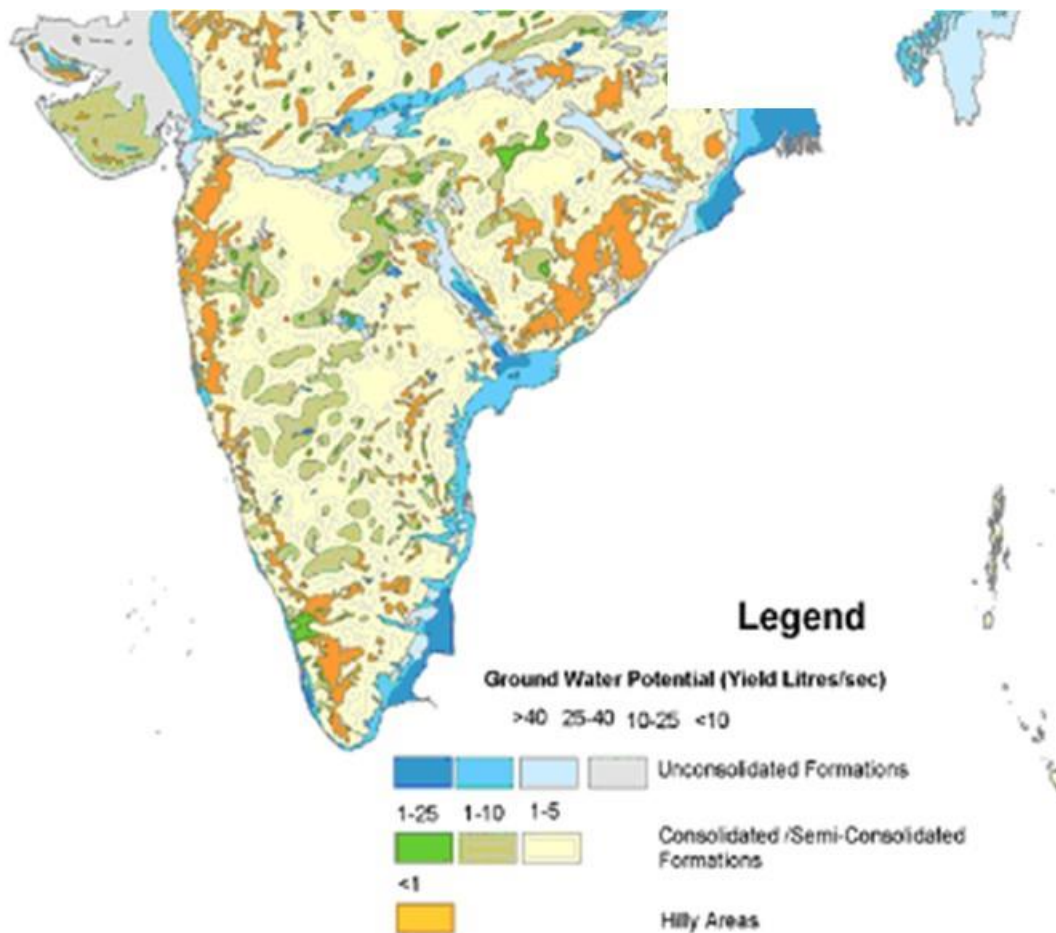


Figure 2.4: Geological Map of Coastal India ⁴

⁴ P. R. Reddy, N. Venkateswarlu, P. Koteswara Rao and A. S. S. R. S. Prasad, Crustal structure of Peninsular Shield, India from DSS studies. *Current Science*, Dec 1999

2.5 Hydrology

The main source of freshwater in the coastal regions of India is either surface water or ground water. As there has been rapid increase in the population density of the coastal regions, freshwater resources are placed on a stressed limit and consequently several areas are facing scarcity. Salinity intrusion in surface and ground water sources is a pressing problem in coastal areas. Since the demand for the surface water sources are ever- increasing, the sustainable management of the resource necessary.



Source: Central Ground Water Board, Government of India

Figure 2.5: Hydrogeological Map of India

Coastal aquifers occur both in unconfined and confined condition and belong to unconsolidated sediments of Quaternary and Upper Tertiary age, deposited under various sedimentary environments. The Cenozoic sedimentary formations constitute the regionally extensive coastal aquifers in Malabar and Coromandel coasts (artesian aquifers encountered down to a depth of 400 m) and coastal fringes in Kachchh and Saurashtra. Alluvial and Deccan Trap formations also form part of west coast aquifers. In eastern coasts, the coastal belts constitute a narrow elongated crescent shaped area, formed in the outfall regions of the major rivers like Mahanadi, Godavari, etc., where the groundwater is saline down to a depth of 100-135 metres.

2.6 Rivers and Estuaries

A network of 14 major, 44 medium and numerous small rivers criss-cross the coast of India. The largest delta in the world is formed by the combination of Ganga, Brahmaputra and Meghna lies between India and Bangladesh. Rivers as they approach the sea form estuaries. An estuary is a semi-enclosed coastal body of water, which has a free connection with the open sea and within which sea water is measurably diluted with fresh water derived from 'land drainage'. Estuaries depend upon fresh-water flow from upland rivers in order to maintain their characteristic processes. The following section describes some of the important estuarine systems in India.

2.6.1 Hooghly estuarine system

The Hooghly estuary, the first deltaic offshoot of the Ganges is a coastal plain estuary and is associated with the world's largest mangrove forest, the *Sundarbans*. It is one of the major estuaries of the Ganges, the largest as well as longest river of Indian subcontinent. It forms part of the world's largest delta, the Ganges-Brahmaputra delta, which lies partly in Bangladesh and India. This low-lying fertile plain is one of the world's most densely populated areas.

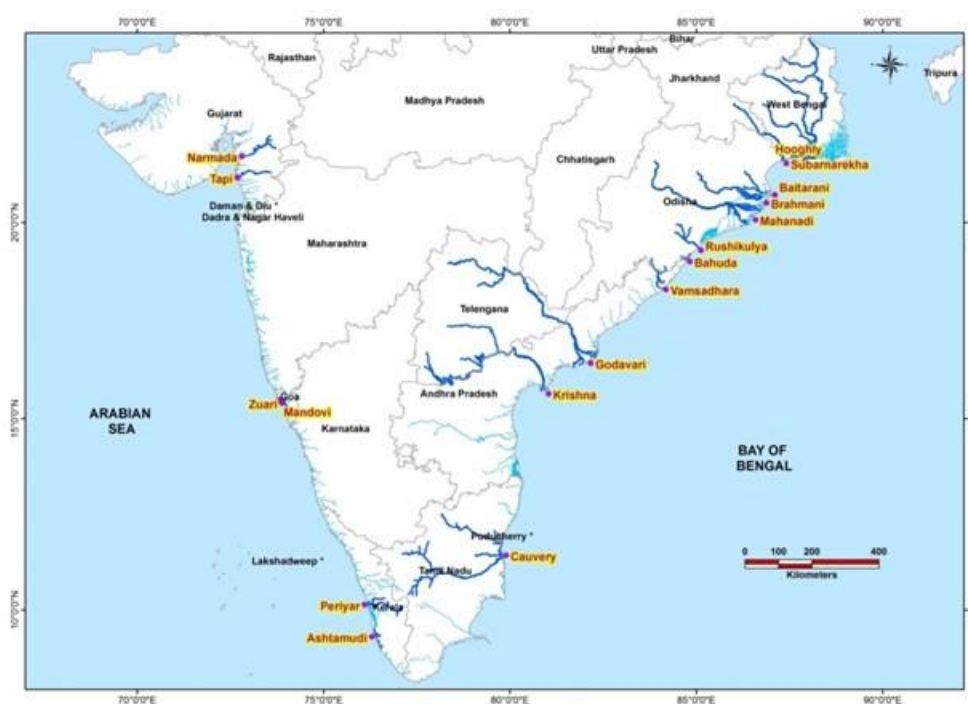


Figure 2.6: The major estuaries along the coast of India

The breadth at the mouth is 25 km (with cross sectional area of 156250 km²) which decreases to 6 km at the head end⁵. Sagar Island, the largest island of the Sundarbans, is positioned at the mouth of the estuary and bifurcates it into two channels, the western channel is retained as Hooghly and eastern is named as Mooriganga. Mixing zones of the estuary extend up to Diamond harbour, about 80 km upstream. It receives 4 small

⁵ http://nio.org/userfiles/file/events/P_Mukhopadhyay.pdf

ivers: Damodar and Rupnarayan at its head and Haldi and Rasulpur in the middle. Geomorphologically, it can be classified as coastal plain estuary. The important morphotypes are tidal island, tidal bars, beaches, mudflats, sandflats, coastal dunes, creeks, inlets and mangrove swamp.

2.6.2 *Estuaries of Peninsular India*

Peninsular India is drained by five major river estuarine systems in the east coast: Mahanadi, Godavari, Krishna, Penneru and Cauvery. The estuaries on the west coast are smaller compared to the major east coast estuaries.

Estuaries of the East Coast

Mahanadi Estuarine system

The Mahanadi estuarine system is one of the major estuaries in India and the largest estuary in Orissa ⁶. It is spread over a wide area in the Cuttack and Puri districts for about 165 km of the coast line along the Bay of Bengal from the northern end of Hukitola lake in the north in Cuttack district, to the north-eastern extremity of Chilika Lake in the south in Puri District.

Mahanadi divides into two main distributaries, Devi River and Mahanadi proper. Other tributaries such as Kathajodi, Kuakhaee, Daya, Bhargavi and others arise from this. The main river opens into the Bay of Bengal at Paradeep in Cuttack District. Devi River opens into the sea near Astaranga in Puri District. Some tributaries meet the main river, Devi River and Chilika Lagoon and the other tributaries directly open into Hukitola Lake, which is 15 kms away from the main river mouth at Paradeep. The entire area is full of mangrove vegetation together with mud flats traversed by a network of tidal creeks except some areas like Paradeep mouth region and Astaranga mouth region which have sandy shoreline.

Godavari estuarine system

Godavari is the largest of Indian peninsular rivers. Upon reaching the eastern coastal plain, downstream of the dam at *Dowleswaram* (near Rajahmundry), the river divides into two main distributaries *Gautami* and *Vasishta* that give rise to a sprawling estuarine deltaic system fringed with tidal creeks and dense mangrove forests before reaching the Bay of Bengal. Along the delta, the position and orientation of ancient beach ridges reveal sea level fluctuations and delta progradation. At the river mouth, circulation pattern changes rapidly with tide, local winds and sea breeze. Littoral current that is directed up coast (northerly long-shore current) during pre-monsoon and monsoon causes erosion of the bottom that results in formation and accretion of the sand spit (Godavari point) and the northwest trending sandbar. The enclosed Kakinada Bay measuring 150 km² is a stratified water body in dry season when the salinity can go up to 34 psu and pH to 8.3. The Godavari estuary is well mixed with the tidal effect dominating in the lean season.

⁶ <http://faunaofindia.nic.in/PDFVolumes/ess/003/index.pdf>

Krishna River Estuarine system

Krishna estuary is about 45 km in length and the estuarine system of Krishna River covers an area of about 320 sq.km with all its four distributaries⁷. The tidal portion extends up to 39 km upstream near Penumudi in the river. It is essentially shallow; with a mean width of 1.2 km and an average depth of 5-7 m. The estuary has a well-developed sandy coast that experiences long-shore drift, build-up spits and barriers across river mouths creating a coastal lagoon.

It is a meso-tidal estuary with a tidal range of 2-3 m and strong tidal current of 1.2 m sec⁻¹. Dissolved and particulate loads of the Krishna River are derived from a variety of igneous, metamorphic and sedimentary rocks in their catchment areas. In addition to this, estuarine system is fringed with extensive mangrove vegetation.

Cauvery River Estuarine system

The Cauvery Estuary, located along the east coast of India, is a part of the Cauvery River basin, encompassing about 80,000 ha. The upper reaches of the estuary start from Grand Anaicut (a dam near Trichy), where it bifurcates into two large branches, the Coleroon and Cauvery. Below the Anaicut, the river flows in an almost flat plain, having a gentle slope from west to east. The formation of this estuary has taken place over the surface of an area that emerged from the sea. Emergence of this land caused the river to drain further east, resulting in the formation of the estuary.

It is a vertically well mixed estuary with a shallow average depth of less than 1 m, a minimum width of 50 m, and a maximum width of 1,500 m. From the Coleroon, the sea faces run straight southward for about 129 km to Point Calimere, where it makes a right-angled bend and runs west for 48 km. The northern part of the eastern face of the estuary is heavily affected by erosional processes and destruction due to the northeast monsoons. In the Cauvery estuary, the rocks range in age from Archean crystallines to quaternary sediments. The climate of the region is semi-arid where northeast monsoons dominate. Areas surrounding the estuary are dominated by agricultural use.

West Coast Estuaries

The West coast of India stretches from Cape Comorin (8°N) in the south to Kuchchh (22°N) in the north. The Narmada (watershed area: ~105 km²) and Tapti (~104 km²) are the two major rivers estuaries in this region along with numerous small rivers, flowing into the eastern Arabian Sea. The sediment load by westward flowing rivers on the Indian subcontinent is 9 x 10¹² g yr⁻¹, excluding the Indus (Central Water commission (CWC), 2012)⁸. Information on land use patterns within individual river catchments is sparse for this region.

⁷ [http://nopr.niscair.res.in/bitstream/123456789/10019/1/IJMS%2039\(2\)%20248-256.pdf](http://nopr.niscair.res.in/bitstream/123456789/10019/1/IJMS%2039(2)%20248-256.pdf)

⁸ CWC, 2012. *Integrated Hydrological Data Book (Non-classified river basins)*. Ministry of Water Resources, Hydrological Data Directorate Information systems Organization Water Planning & Project Wing, Central Water Commission, New Delhi, 680 pp.

Estuaries in Gujarat

In the context of Gujarat, estuaries are formed mainly along the eastern bank of Gulf of Khambhat and South Gujarat coasts. A total of nine rivers drain their water to form estuaries near the coast. These rivers include (from north to south): Sabarmati, Mahi, Narmada, Kim, Tapi, Purna, Ambika, Auranga and Daman Ganga. These estuaries are under considerable tidal influence that generally increases northward. The spring tidal range in some is as high as 5.6 m in the mouth region of the estuary. High tidal influence generates strong tidal currents with current speeds exceeding 1 m s^{-1} during spring tides, which signify good mixing and flushing of estuaries.

Estuaries in Maharashtra

Maharashtra state has about 720 km long indented coastline, which is marked by the presence of major estuaries and narrow creeks. It comprises the coastal districts of Thane, Raigad, Greater Bombay, Ratnagiri and Sindhudurg. The tidal range (2.5 to 5 m) influenced the mouth segment of the estuaries/creeks along the coast by providing good potential for dilution during flood tide for the dispersal of contaminants entering this zone.

Estuaries in Goa

The Mandovi-Zuari estuarine complex situated at latitude $15^{\circ}25' - 15^{\circ}30'N$ and longitude $73^{\circ}45' - 73^{\circ}59'E$ is one of the unique tropical estuarine systems along the west coast of India. The influence of southwest monsoon results in dramatic changes in the overall function of these estuarine ecosystems. The estuarine flow propagated by the tide (semi-diurnal with a range 0.2 – 2 m), at the mouth, becomes the sole driving force of transport into the estuarine network. This initiates different hydrodynamic processes between dry (non-monsoon) and wet (monsoon) seasons, resulting in the formation of homogenous, salt-wedge and partially mixed estuaries during pre-monsoon (February – May), monsoon (June – September) and post-monsoon (October – January) seasons respectively ⁹.

Estuaries in Karnataka

There are 26 estuaries with more than 70,000 Ha. of water-spread area and 8000 Ha of brackish water area, making the three coastal districts of Karnataka very rich in marine, estuarine and riverine biodiversity. The tides travel long distances, even 20-30 kms interior, through many of these estuaries, making the saline aquatic habitat suitable for several marine and estuarine organisms. Among these, the Kali and the Aghanashini river estuaries in Uttara Kannada district are the two major estuaries in Karnataka and known for their rich mangrove and aquatic biodiversity.

Estuaries in Kerala

Kerala has as many as 32 small to medium estuaries, sprawling along the entire coastal length play a crucial role in the socio-economic development of the state, owing to their

⁹ Qasim, S.Z., 2003. *Indian Estuaries*. Allied Publishers Pvt. Ltd., New Delhi.

potentialities for aquaculture, navigation, commercial fishery, recreation and tourism. The major estuaries of the state are Ashtamudi, Korapuzha, Beypore and Periyar.

Cochin Backwaters: A chain of brackish lagoons and lakes lying parallel to the Malabar Coast in Kerala are called Backwaters of Kerala or the Cochin Estuary. This is the largest estuarine system along the west coast of India. The estuary is characterized by its major axis lying parallel to the coastline, with several small islands and interconnected waterways, and it covers a surface area of about 300 sq.km. The width of the estuary varies from 450 m to 4 km and the depths range from 15 m at Cochin inlet to 3 m near the head with an average depth of 1.5 m (depths are reduced to chart datum - 15 tum). Tides in the estuary are mixed, predominantly semi-diurnal type with an average tidal range of 1 m¹⁰.

2.7 The Coast of India

The Indian subcontinent is a peninsular projection into the Indian Ocean. The East Coast is characterised by a large number of deltas built by the rivers flowing into the Bay of Bengal while the west coast is often rocky with pocket beaches interlaced with fast flowing rivers forming estuaries flowing into the Arabian Sea. A summary of the key features of the Indian east and west coasts is presented in *Table 2.1* below.

Table 2.1: Key Characteristics of the West and East Coasts

Aspects	West coast	East coast
Length	3495 km	2620 km
Vegetation	Mostly deciduous	Fertile Deltaic Region Supports the largest stand of mangroves and seagrass meadows
Geomorphology	Mainly Coast of submergence (except Malabar)	East coast is an emergent coast
Environmental Processes	Coastal upwelling process	Heavy freshwater discharge
Population coastal districts	8,74,88,379	10,24,04,145
Population Density	119/km ²	158/km ²
Vulnerability	Erosion, pollution, storm surge, sea level rise, coastal flooding, population density, Landuse and Land Classification (LULC) change etc	Tropical cyclone, erosion, pollution, sea level rise, coastal flooding, population density, LULC change

The Western Coastal Plain is a narrow strip of land between the Western Ghats and the Arabian Sea, ranging from 50 to 100 km in width. It starts from Gujarat in the north and extends through Maharashtra, Goa, Karnataka, and Kerala. The rivers along the west coast mostly originate in

¹⁰ Qasim, S. Z. and Gopinathan, C. K.: Tidal cycles and the environmental features of Cochin backwater (a tropical estuary), P. Indian Acad. Sci., Bangalore, 1969.

the Western Ghats and are fast-flowing. Major rivers flowing into the sea are the Tapi, Narmada, Mandovi and Zuari. West Coast Rivers form estuaries and carry limited amount of fresh water and sediments compared to the East Coast Rivers ($0.3 \times 10^{12} \text{ m}^3 \text{ y}^{-1}$ or about 1/3rd of that by Ganges and Brahmaputra discharges; Shankar and Shetye, 1997). Vegetation in this coastal area is mostly deciduous, but the moist forests of the Malabar Coast constitute a unique eco-region.

The Coastal Plain in the eastern part of the country is a wide stretch of land lying between the Eastern Ghats and the Bay of Bengal. The width of the coastal plain varies between 100 and 130 km. The coast stretches from Tamil Nadu in the south to West Bengal in the east. The Ganges, Mahanadi, Godavari, Krishna and Kaveri rivers drain these plains. The region receives both the northeast monsoon and southwest monsoon rains. Annual rainfall in this region ranges between 1,000 and 3,000 mm.

2.8 Islands

India has 1382 offshore Islands including 289 islands rocks or rocky islets. The size of the islands ranges from 0.0001 to 1250.25 km². Apart from the islands along the mainland coast, India has two island territories viz., Andaman and Nicobar Groups of Islands and Lakshadweep islands. Some of the islands have been inhabited by aboriginals (e.g. Nancowry and Katchall islands of Andaman and Nicobar Islands).

The total number of offshore islands along the mainland of India is 514 of which 421 are present along the west coast and 93 islands are present along the east coast. States/Union territories on the west coast of India which have islands are Gujarat (144 islands), Daman & Diu (9), Maharashtra (124), Goa (43), Karnataka (94) and Kerala (7). The islands on the east coast are found along the coast of Odisha (11), Tamil Nadu (28), Andhra Pradesh (32) and West Bengal (22). Among the mainland islands, 22.18 percent are inhabited, comprising of 97 islands along the west coast and 17 on the east coast. A total of 260 islands (212 on west coast and 48 on east coast) are uninhabited. Among the 514 islands, 107 islands (68 on the west coast and 39 on the east coast) are fully protected either as marine national parks, wild life sanctuaries, reserved forests, protected forests under the Wildlife Protection Act (1972) or Indian Forest Act (1927). About 14 percent of the mainland offshore islands (72 islands) are unprotected but have been reported to have ecologically sensitive areas (ESAs) such as coral reefs, seagrass, mangroves, salt marshes, archaeological sites etc.

2.9 Extreme Events

2.9.1 Tropical cyclones

Cyclone is one of the most devastating weather phenomena over the coastal regions in the world in terms of loss of life and property. The increasing of death toll and property damage due to the cyclones depend on the three major factors such as strong winds, storm surge and floods resulting from heavy rainfall. The coastal states along the eastern and western coasts of India suffer regularly from tropical cyclones (Alam et al.

2003¹¹) due to the geographical structure, densely populated coastal region, shallow bathymetry and poor socio-economic conditions. According to a report published by the National Disaster Management Authority (NDMA) of India, 80 percent of the coastal areas are vulnerable to cyclones specifically the East Coast States (ECS) of India (NDMA 2008). The topographic characteristics being exposed to Bay of Bengal and the bathymetry of the eastern coast make the ECS a naturally vulnerable zone (Dube et al., 1997¹²; Dube et al., 2000¹³).

The formation of cyclones with high intensity is observed as the primary maximum in the post-monsoon season (October to December) and secondary maximum during the pre-monsoon season (April and May). The ratio of the frequency of occurrence of Tropical Cyclones in the Bay of Bengal (BoB) and Arabian Sea (AS) is about 4:1 (Dube et al. 1997). The peak frequency of formation of cyclones over North Indian Ocean is in the months of May and November of the year (Mohanty et al. 2010). In Northern Indian Ocean, on average, one severe cyclone is expected to form in November every year, and these generally move westwards to west-north-westwards and strike the Andhra Pradesh or Tamil Nadu coasts of India; and they account for the highest number of natural disaster deaths in India and Bangladesh (Singh et al. 2001). To reduce the impacts, especially to save lives, it is necessary to predict the movement and landfall of cyclones very precisely to enable early warning and evacuation of people likely to be affected.

Subsequent to the 1999 Super cyclone that hit Odisha, steps have been taken to improve early warning and prediction. While property damage and crop losses cannot always be avoided, saving lives through early evacuation to safe shelters (cyclone shelters), implementing appropriate building codes, moving power and telephone lines underground, increasing coastal bio shields and applying standard operating procedures (SOP) for relief and response have been made possible through various programmes and projects including the National Cyclone Risk Mitigation Project.

2.9.2 Storm surge

During cyclones, storm surges are generated by a combination of meteorological forces of the wind friction and low air pressure due to a storm and oscillate in the period range of a few minutes to a few days. In the ocean, local wind waves can add to the water level, and the storm surge can be amplified by interference with the strictly regular astronomical tides. In addition, wind driven waves can be superimposed on the storm tide. This rise in sea level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the high tides.

¹¹ Alam, M. M., Hossain, M. A. and Shafee, S., 2003: Frequency of Bay of Bengal cyclonic storms and Depressions crossing different coastal zones, *Int. J. Climatol.*, 23, 1119-1125.

¹² Dube, S. K., A. D. Rao, P. C. Sinha, T. S. Murty, and N. Bahulayan (1997), Storm surge in the Bay of Bengal and Arabian Sea: The problem and its prediction, *Mausam*, 48, 283-304.

¹³ Dube, S & Chittibabu, Padala & Rao, A & C. Sinha, P & S. Murty, T. (2000). Sea Levels and Coastal Inundation Due to Tropical Cyclones in Indian Coastal Regions of Andhra and Orissa. *Marine Geodesy*. 23. 10.1080/01490410050030643.

In the context of Indian coastal regions, the frequency of tropical cyclones is very high in the Bay of Bengal region compared to the Arabian Sea. It would be the high stratification of the Bay of Bengal and riverine discharge in the Bay. From 2010 onwards, the Indian Meteorological Department (IMD) began posting on the annual reviews of tropical cyclones including storm surge on its website. The Indian coast has been classified based on probable maximum storm surge as well as wind speeds into different risk zones.

2.9.3 Tsunami

Tsunami waves are considered the most dangerous natural hazard affecting the population of the world living near the coastal belts. With the increasing intensity of economic exploitation of coasts there is also an increase in socio-economic consequences resulting from the hazardous action of tsunami waves generated from submarine seismic activity and other causes. On 26 December 2004, the countries within the vicinity of East Indian Ocean experienced the most devastating tsunami in recorded history. This tsunami was triggered by an earthquake of magnitude 9.0 on the Richter scale at 3.4°N, 95.7°E off the coast of Sumatra in the Indonesian Archipelago at 06:29 hrs IST (00:59 hrs GMT).

Following the event, India started its own interim tsunami warning centre in the first quarter of 2005 to issue tsunami bulletins generated from seismic information. The interim services were succeeded by setting up of a state-of-the-art Indian Tsunami Early Warning System (ITEWS) at the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad, under the Earth System Sciences Organization (ESSO), Govt. of India. The system implemented in phases became a full-fledged 24X7 operational early warning system in October 2007.

2.10 Climate Change and Sea Level Rise

Climate change in the oceans occurs in the form of ocean warming, ocean acidification and sea level rise. Sea level rise occurs mainly by ocean warming, which causes the thermal expansion of the ocean and melting of glaciers and ice sheets. Besides, other activities such as construction of dams etc. alter land-water storage, which also contributes to the sea level changes. Impacts at the coast occur due to sea-level rise and extreme events, such as storm surges and waves. Sea-level rise causes inundation at the coast, particularly of low-lying areas and adds to the impact of extreme events, including storm surges and waves.

The east coast of India is particularly vulnerable due to its low-lying nature and also due to the occurrence of cyclones and storm surges. Even in the context of current cyclone statistics, storm surges will have a greater impact because of the increasing sea level. Moreover, deltaic regions undergo land subsidence, which adds to the sea-level rise. The cumulative effect of these two processes produces greater impact along the north-eastern coast of India and Bangladesh.

Sea-level rise trends along the Indian coasts

As reported in earlier studies (Unnikrishnan et al., 2007¹⁴, INCCA, 2010¹⁵ and the second NATCOM, 2012¹⁶), analysis of long historical tide gauge records along the Indian coasts indicate an average sea level rise trend of 1.3 mm/year during 20th century, except for the deltaic region off the northeast coast, where the observed trends are about 5.00 mm/year, (Unnikrishnan et al., 2007¹⁷). Nandy and Bandyopadhyay (2011)¹⁸ also found large similar trends in stations along the Hoogly estuary. Unnikrishnan et al. (2015)¹⁹, studied Sea-level-rise trends in the north Indian Ocean during historical period using tide-gauge data and recent period with satellite altimeter data show that the rate of sea-level rise has been much higher during the last two decades (1993-2012), which has been estimated to be about 3.2 mm/year, as estimated using satellite altimeter data and available tide-gauge data. These findings are consistent with global estimates of 3.2 mm yr⁻¹ for the period of 1993-2012. However, it is not clear whether the increased sea level rise trend in recent decades is partly caused by aliasing with natural variability or directly caused by global warming.

Sea-level-rise trends for stations having the longest records are presented in **Table 2.2** below. The trends are corrected for Glacial Isostatic Adjustment (GIA) using results of the Ice model (Peltier, 2012²⁰).

Table 2.2: Sea Level Rise at Selected Tide Locations

Station	Period of analysis	Number of years of data availability	Trends in relative sea-level rise (mm yr ⁻¹)	GIA Correction (mm yr ⁻¹)	Net sea-level-rise trend (mm yr ⁻¹)
Mumbai	1878-1993	113	0.77±0.08	-0.31	1.08
Kochi	1939-2007	56	1.45±0.22	-0.36	1.81
Visakhapatnam	1937-2000	53	0.69±0.28	-0.24	0.93
Diamond Harbour (Kolkata)	1948-2010	61	4.61±0.37	-0.35	4.96

¹⁴ Unnikrishnan, A.S. and Shankar D. (2007) Are sea-level-rise trends along the coasts of north Indian Ocean coasts consistent with global estimates? *Global and Planetary Change*, 57, 301-307

¹⁵ Indian Network for Climate Change Assessment (INCCA). 2010. *Climate Change and India: A 4x4 Assessment - A Sectoral and Regional Analysis for 2030s*, Ministry Of environment, Forests and Climate Change, Government of India. (Online)

Available at: <http://www.indiaenvironmentportal.org.in/files/fin-rpt-incca.pdf>.

Accessed on: April 2019

¹⁶ MOEF, 2012. *India. Second National Communication to the United Nations Framework Convention on Climate Change*, Government of India. Available at: <https://unfccc.int/resource/docs/natc/indnc2.pdf>, Accessed on : March 2019

¹⁷ Unnikrishnan A.S. 2007. *Op.Cit*

¹⁸ Nandy and Bandyopadhyay. 2011. Trends of sea level change in Hoogly estuary, India, *Indian Journal of Geo-marine Sciences*, Vol 40 (6), December 2011: pp.802-812

¹⁹ Alakkat, Unnikrishnan & Gangan, Nidheesh & Lengaigne, Matthieu. (2015). Sea-level-rise trends off the Indian coasts during the last two decades. *Current science*. 108. 966 -971.

²⁰ Peltier, W. R., Drummond, R., and Roy, K. (2012), Comment on "Ocean mass from GRACE and glacial isostatic adjustment" by D. P. Chambers et al., *J. Geophys. Res.*, 117, B11403, doi:10.1029/2011JB008967.

The trend-estimation period for Mumbai and Visakhapatnam was restricted up to 1993 and 2000 respectively, due to extensive data gaps at the end of the records. Diamond Harbour record shows a large sea-level-rise trend of about 5.00 mm/year, which is partly attributed to the subsidence of the Indo-Gangetic delta. The rate of subsidence of about 4.00 mm/year has been reported in earlier studies based on sedimentological analysis.

Sea-level-rise projections for 2100

Projections of sea level rise have been mostly in the global context and vary according to the scenarios. For the highest emission scenario, RCP 8.5, the likely ranges are 0.45 and 0.82 m for 2100. Location-specific projections are currently not available. However, the fifth assessment report of the IPCC provided regional projections (Church et al., 2013²¹). **Figure 2.7** shows the observed data from tide gauge and altimeter for two stations.

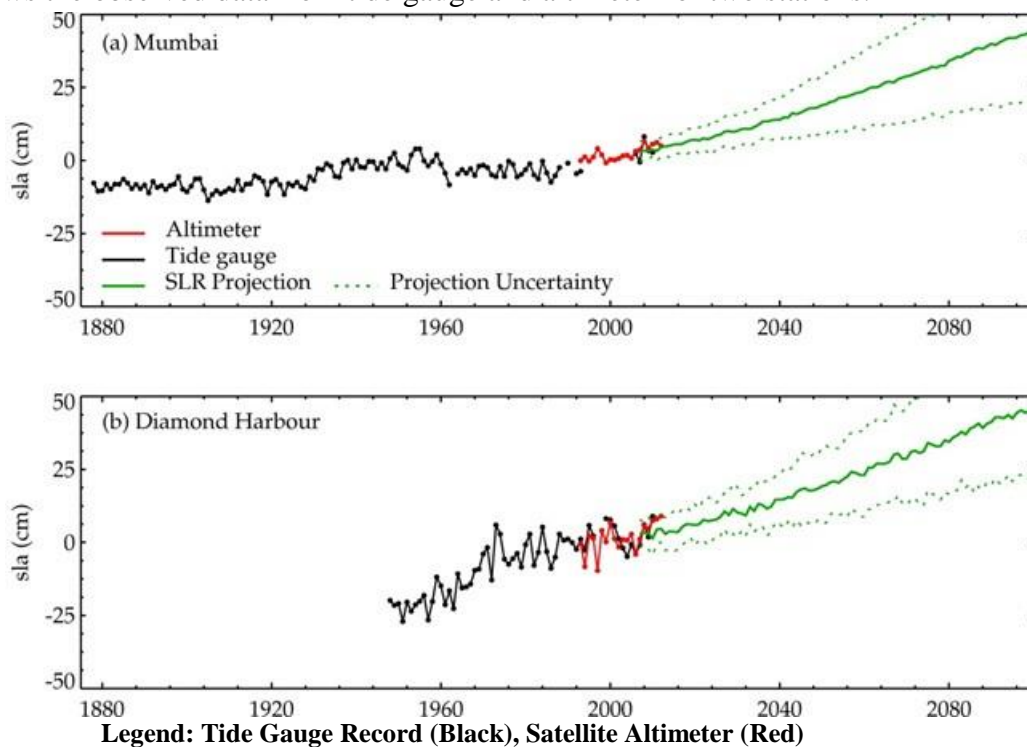


Figure 2.7: Observed Data: Tide Gauge Record and Satellite Altimeter

- (a) Mumbai and (b) Diamond Harbour (Kolkata). The points for altimeter data are offshore points. The projections are drawn using for the regional projections for the scenario, RCP4.5 (Church et al., 2013). Dotted lines show uncertainty limits of the projection.

²¹ Church, J.A., P.U. Clark, A. Cazenave, J.M. Gregory, S. Jevrejeva, A. Levermann, M.A. Merrifield, G.A. Milne, R.S. Nerem, P.D. Nunn, A.J. Payne, W.T. Pfeffer, D. Stammer and A.S. Unnikrishnan, 2013: Sea Level Change. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

To make regional projections, contributions due to glacial isostatic adjustment, atmospheric loading (due to inverse barometric effects) and redistribution of heat and glacier melt by ocean currents are added to global projections.

2.11 Coastal and Marine Ecosystems

Depending on the geomorphology and coastal processes, a variety of ecosystems can be identified along the coast. Most prominent of these are the mangrove wetlands including the Sundarbans (shared between India and Bangladesh) which form the largest single stand of halophytic mangroves, but there are also stretches of sandy beaches and mudflats. The west (Arabian Sea) coast is different from the east (Bay of Bengal) coast. The west coast is largely rocky with many pocket beaches and backwaters while the east coast has a number of large deltas. The two major coastal lagoons are the Chilika and the Pulicat while the Vembanad Kol is located on the west coast.

2.11.1 Coastal Ecosystems

There are sixteen types of forests in India (Champion and Seth, 1968²²) (**Figure 2.8**) and the ones relevant to the coastal region are the Littoral and Swampy forests (Wet tropical forests), which include the beach forests and the tidal forests or mangrove forests.

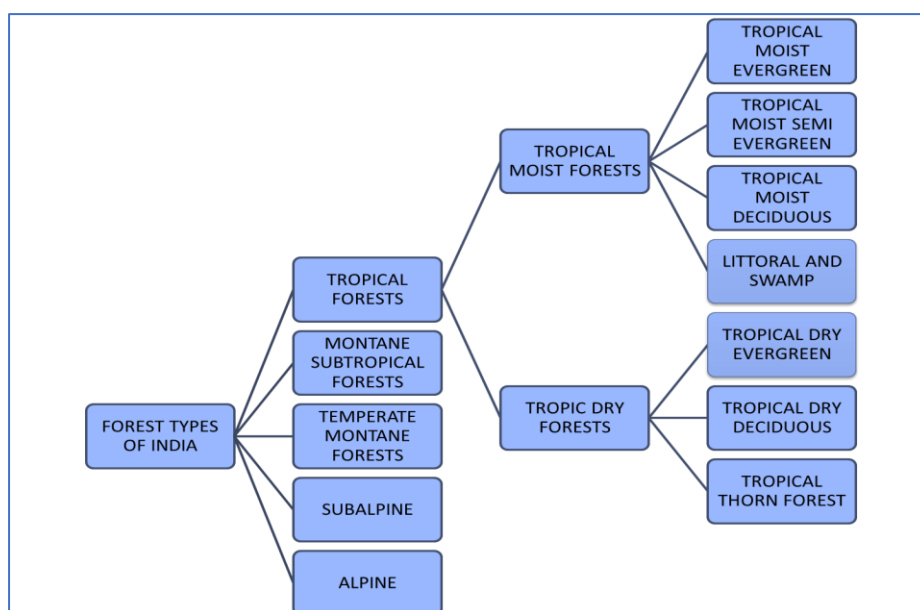


Figure 2.8: Classification of forest types in India highlighting forest types found in coastal areas

According to Champion and Seth (1968), littoral forests consist of evergreen species of varying densities and height, usually associated with mesic habitats. These forests occupy an area of 0.7 million ha along the coast. These forests are mostly in their

²² Champion, H. G. and Seth, S. K. (1968). *A Revised Survey of Forest Types of India*, Govt. of India Press, New Delhi, p. 404

developmental stage and are seral in nature; they occur throughout the country, wherever wet and waterlogged conditions prevail. The littoral and tidal forests (mostly mangroves) occur along the coast, the latter being especially associated with deltas of larger rivers. Swamp forests occur in north-east India along major river systems.

2.11.2 Coastal Terrestrial Ecosystems

These forests are found in a relatively small area on the east coast, which receives little or no summer rainfall. The forests are low but often dense with hard-leaved evergreen trees in which thorny species predominate. The characteristic species are *Memecylon edule*, and *Maba buxifolia*. It may be noted that the remaining true tropical dry evergreen forests (those not degraded to thorny scrub types) occur presently in the form of sacred groves or 'temple forests' i.e. patches of natural climax forests preserved as a result of religious belief of the local people^{23,24}.

2.11.3 Mangrove Forests and Coastal Wetlands

Mangroves are coastal trees or shrubs that are adapted to estuarine or even saline environment. In India, they are of three types: tide dominated (e.g. Sunderbans, Mahanadi delta), river dominated (Godavari, Krishna, Pichavaram, Muthupet), drowned river-valley (Gujarat). The actual forest cover in mangrove forests may be much less than the total area of the mangrove wetland as it includes creeks, estuaries etc. Indian mangroves cover about 6956 km², with about 57 percent on the east coast, 23 percent on the west coast and about 20 percent in the Andaman and Nicobar Islands²⁵. Indian mangroves are distributed in about 5403 km² as per the recent study conducted by NCSCM.

Major mangrove areas in India include the following:

East coast:

- West Bengal: Sunderbans
- Odisha: Mahanadi delta e.g. Bhitarkanika, Rushikulya
- Andhra Pradesh: Coringa – Godavari; Krishna
- Puducherry: Ariankuppam
- Tamil Nadu: Pichavaram, Muthupet (Cauvery delta)
- Island Mangroves (Andaman and Nicobar Islands in the Bay of Bengal)

West Coast:

- Gujarat: Gulf of Kachchh, Gulf of Khambat

²³ Mani S, Parthasarathy N. (2005). *Biodiversity assessment of trees in five inland tropical dry evergreen forest of peninsular India. Systematics and Biodiversity*, 3, 1–12.

²⁴ Parthasarathy, N. and R. Karthikeyan, 1997. *Plant biodiversity inventory and conservation of two tropical dry evergreen forests on the Coromandel coast, south India. Biodiversity and Conservation* 6, 1063±1083 (1997)

²⁵ *State of Forest Report, (2015) Forest Survey of India, Ministry of Environment & Forests, Dehradun, India*

- Maharashtra: River mouths of Savithri, Dharmtar, Vashisthi, Panvel, Vasai, Thane, Kundalika
- Goa: Mandovi and Zuari
- Karnataka: Karwar, Kumta,
- Kerala: Vembanad Estuary (Trisur to Alleppey – Kottayam, including Kochi), Kannur, Kozhikode

The mangrove ecosystems of the Sundarban and Bhitarkanika are tide dominated allochthonous type of mangroves. The tidal range is high with strong bidirectional current as well as the main river channels are funnel shaped with extensive tidal flats, colonized by mangroves. Coringa mangroves of Andhra Pradesh (Godavari) and Pichavaram-Muthupet mangroves of Tamil Nadu (Cauvery delta) are river dominated allochthonous type, with characteristic rapid deposition of terrigenous material. Mangroves of Gujarat (Gulf of Kachchh and Khambhat) are a peculiarly bedrock valley type, drowned by rising sea level. The relatively small delta area could be seen at the head of the valley. Carbonate platform on low energy coasts type of mangroves are present in Andaman and Nicobar Islands and they are slowly accreting due to the accumulation of marl (calcareous) and peat, coral reef or sand. Fringe mangrove growth is luxurious in the shallow water area of these islands.

Table 2.3: Extent of Mangroves in India

Coast	State/ UT Name	Mangrove Area (km ²)
West Coast States	Gujarat	1339.41
	Maharashtra	307.24
	Goa	33.01
	Karnataka	16.50
	Kerala	20.80
	Daman & Diu UT	4.09
East Coast States	Tamil Nadu	119.13
	Andhra Pradesh	408.02
	Odisha	276.37
	West Bengal	2206.67
	Puducherry UT	4.72
Islands	Andaman & Nicobar Islands UT	667.43
	Lakshadweep Islands UT	ND
Total		5403.39
<i>Source: NCSCM 2018</i>		

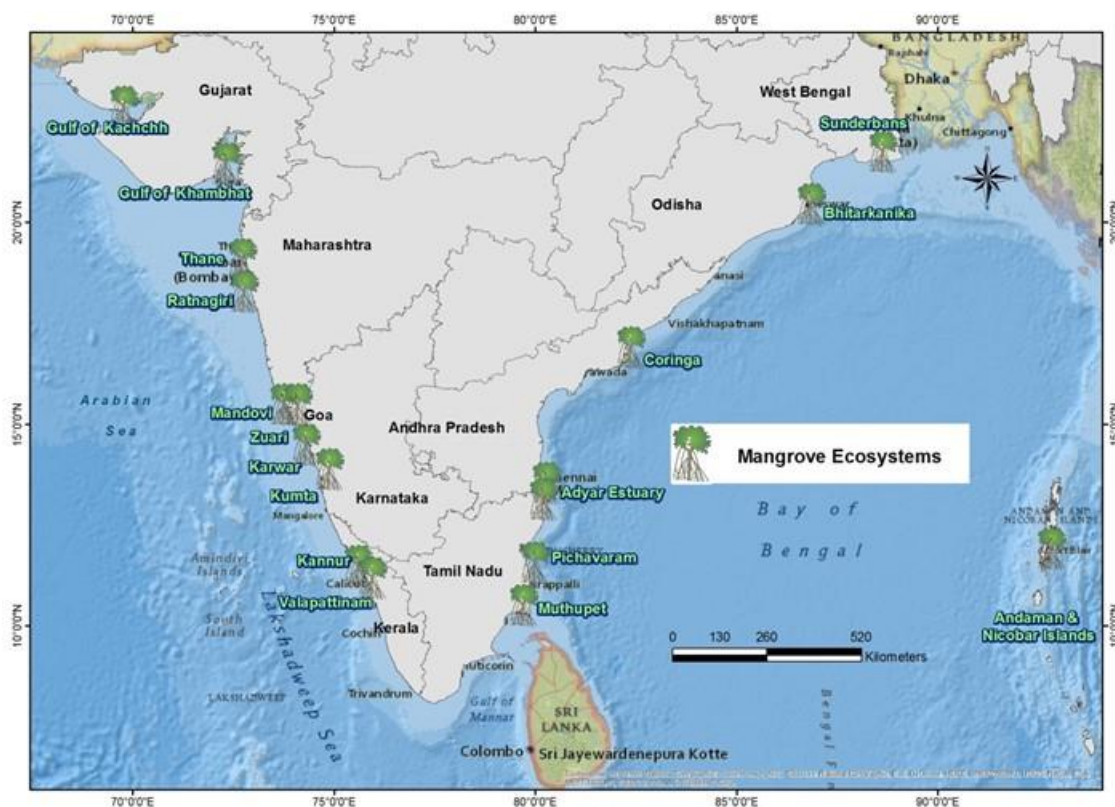


Figure 2.9: Mangrove Forests of India

2.11.4 Salt Marsh

Salt marsh is a community of organisms dominated by plants that are tolerant of wet, saline soils, generally found in low-lying coastal habitats which are periodically wet and unusually saline to hyper-saline. The term salt marsh summarizes the saline conditions of the habitat as well as the emergent vegetation which dominates it. Plants which grow in salt marshes are thus tolerant of two conditions: salinity and wetness.

The Great Rann of Kachchh, is a seasonal salt marsh located partly in the Thar Desert in the Kachchh District of Gujarat, India. During the summer monsoon, the flat desert of salty clay and mudflats, which average 15 meters above sea level, gets filled with standing waters. The greatest extent between the Gulf of Kachchh on the west and the Gulf of Khambhat on the east get united during the monsoon. Although most of the marsh is in protected areas, the habitats are vulnerable to cattle grazing, firewood collection and salt extraction operations, all of which may involve transportation that disturbs wildlife. There are several wildlife sanctuaries and protected reserves on the Indian side - in the Rann of Kachchh region.

2.12 Marine Ecosystems

2.12.1 Coral Reefs

Coral reef is defined as a mound or ridge of living coral organisms, coral skeletons, and calcium carbonate deposits from other organisms such as calcareous algae, molluscs,

and protozoans. Most coral reefs form in warm, shallow sea waters and rise to or near the surface, generally in the form of a barrier reef, fringing reef or atoll. Coral reefs grow upward from the sea floor as the polyps of new corals cement themselves to the skeletons of those below and in turn, provide support for algae and other organisms whose secretions serve to bind the skeletons together. The resulting structure provides a critical habitat for a wide variety of fish and marine invertebrates. Coral reefs also protect shores against erosion by causing large waves to break and lose some of their force before reaching the land.

The total area of coral reefs in India is estimated to be 5,790 sq.km, distributed between four (4) major regions: Lakshadweep, Gulf of Mannar, Gulf of Kachchh, and Andaman and Nicobar Islands. The mainland coast of India has two widely separated areas containing fringing reefs: the Gulf of Kachchh in the northwest, which has some of the most northerly reefs in the world and Palk Bay and Gulf of Mannar in the south east. There are patches of reef growth on the west coast, e.g. at Malvan (Malvan Coral Reef Sanctuary). Scattered patches of coral have been seen in the intertidal and subtidal areas along the west coast especially at Gaveshani Bank about 100 km offshore from Mangalore, Ratnagiri and Rede Port.

2.12.2 Seagrass Beds

Seagrasses are marine flowering plants forming extensive beds or meadows, which can be either monospecific (made up of a single species) or in mixed beds where more than one species coexist. They occur in the infra-tidal and mid-tidal zones of shallow and sheltered localities of sea, gulf, bays, backwaters and lagoons. Seagrasses are often found in association with coral reef areas, especially in the Palk Bay and Gulf of Mannar (Tamil Nadu), Chilika Lagoon (Odisha) and off the coast of Maharashtra (Malvan). They form a habitat for rare and endangered animals such as marine turtles and dugongs, apart from economically important species of fish and shellfish.

2.12.3 Seaweeds

About 770 species of seaweeds are reported to be distributed along the India coast. Of these 184 species are green, 166 are brown and 420 are red algae. The estimated standing stock (wet weight) is about 541,340 Tons. Seaweeds are excellent breeding grounds for marine organisms, and are important as food for humans, feed for animals, fertilizer for plants, and for pharmaceutical purposes. Collection of wild seaweeds by the coastal population has reduced the seaweed cover over the years. Farming of seaweeds has become popular and is livelihood for coastal population in the Palk Bay and Gulf of Mannar (southeast coast of India)²⁶.

²⁶ Bhatt, JR and E. Vivekanandan, 2013. *Coastal and Marine Biodiversity Conservation in India. Regional Symposium on Ecosystem Approaches to Marine Fisheries & Biodiversity, October 27-30, 2013, Kochi*

2.12.4 Sandy Shores: Turtle Nesting Sites

India has five of the seven species of known sea turtles. Mass nesting occurs along sandy beaches on the west and east coast. Female turtles come ashore on sandy beaches where they were born, dig a nest and bury their eggs in it. After hatching the turtles find their way back to the sea. The world's largest Olive Ridley rookery is in Odisha. Some of the important turtle nesting sites in West and East Coast of India are as in **Table 2.4**. The sites for nesting are reported as shifting due to various reasons such as shifting of river mouth and loss of beaches.

Table 2.4: Major turtle nesting sites in India

Location	Species	Confirmed nesting	Nesting beaches
West Coast	Green, Olive Ridley and Leatherback	Green and Olive Ridley	Gujarat: Mandavi in Kachchh, Sea beach between Okay and OkhaMadhi, Bhaidar, Beyt, Nora and Chank Islands. Maharashtra: Gorai, Khim, Manowrie and Versova Goa: Morjim in North Goa, Galgibag and Agonda in South Goa
East Coast	Olive Ridley, Green Hawskbill, Leatherback and Loggerhead	Olive Ridley	Tamil Nadu: Gulf of Mannar, Point Calimere, and 50 km coastline south of Madras. Andhra Pradesh: Kakinada coast, sea beach near the mouth of Godavari and Krishna and near Visakhapatnam Odisha: All along the coast south of Dhamra river mouth. Two mass nesting beaches at Gahirimatha and Rushikulya West Bengal: In the sandy beaches of Sunderbans

2.12.5 Intertidal Zone- Mud flats and Horseshoe Crab Habitats

Mudflats are usually found in backwaters, estuaries and mangrove areas formed from silt brought by rivers, tides and gentle wind waves. Mudflats are not vegetated but are important coastal systems subjected to tidal flooding and exposed during ebb tides, i.e. the flat is submerged and exposed approximately twice daily. They are extremely important as feeding grounds for aquatic birds as well as important habitats for certain species of crustaceans, molluscs and fish. They are found in sheltered areas such as bays, lagoons, and estuaries.

Horseshoe crabs (family Limulidae, order Xiphosura or Xiphosurida) are arthropods that live primarily in and around shallow ocean waters on soft sandy or muddy bottoms. They are found only on the eastern coasts of the world. *Tachypleus gigas* (Muller) and *Carcinoscorpius rotundicauda* (Latreille) are found within Indian limits, the former in north-east coast of Odisha (especially Balramgari) and the latter in the Sunderbans area of West Bengal. Complete information on this is not available and International Union for Conservation of Nature (IUCN) has declared it a 'data deficient category'. The vernacular names of horseshoe crabs are Lakshanpatia (West Bengal), Ramlekhami and Ramalakhana (Orissa), Kuthirailata njantu / Sanyasi Njandu (Tamil, Malayalam). Used locally for medicinal purposes (rheumatic disease), mostly in homeopathy branch of

medicine. The blood of this variety of crabs, which turns blue on contact with air has copper and is found useful for treating osteoporosis, diabetes and cancer. The animals generally occur in pairs. Mangroves and mudflats are suitable habitat for *Carcinoscorpius rotundicuda* while sandy beaches are suitable for *Tachypleus gigas*. It has been included In Schedule IV of Wildlife Protection Act, 1972. Migration of these crabs is linked with the earth's magnetic field. Threats faced by these animals include fishing (getting trapped in fishing net); coastal erosion and loss of habitat; development of fishing harbours and jetties and other coastal development that reduces their habitat.

2.12.6 Protected Areas

These include those declared under the Wildlife Protection Act, 1972, the Forest (Conservation) Act, 1980, the Environment (Protection) Act, 1986 and the Biodiversity Act, 2002.

Protected Areas under Wild Life (Protection) Act, 1972

National Parks: National Park is an area having adequate ecological, faunal, floral, geomorphological, natural or zoological significance. It is declared for the purpose of protecting, propagating or developing wildlife or its environment, like that of a Sanctuary. The difference between a Sanctuary and a National Park mainly lies in the vesting of rights of people living inside. Unlike a Sanctuary, where certain rights can be allowed, in a National Park, rights are not allowed. Grazing of any livestock shall not be permitted inside a National Park while in a Sanctuary, the Chief Wildlife Warden may regulate, control or prohibit it. In addition, while any removal of wildlife or forest produce from a Sanctuary requires the recommendation of the State Board for Wildlife, such activity in a National Park requires recommendation of the National Board for Wildlife.

Marine Parks: When the area covered is in the marine realm, it is a marine national park.

Marine National Parks in India

Sundarbans, West Bengal. 1330 km²

Bhitarkanika, Odhisha. 145 km²

Gulf of Mannar, Tamil Nadu, 560 km² (MNP)

Gulf of Kachchh, Gujarat, 162.89 km² (MNP)

Box 2.1: Marine National Parks in India

Sanctuaries: Sanctuary is an area which is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance. It is declared for the purpose of protecting, propagating or developing wildlife or its environment. Certain rights of people living inside the Sanctuary could be permitted. Further, during the settlement of claims, before finally notifying the Sanctuary, the Collector may, in consultation with the Chief Wildlife Warden, allow the continuation of any right of any person in or over

any land within the limits of the Sanctuary. The following are important Sanctuaries in India located along the coast.

Important Sanctuaries along the Indian coast

Sunderbans, West Bengal
 Sanjana Khali, West Bengal, 362.04 km²
 Lothian, West Bengal, 38 km²
 Halliday, West Bengal, 5.95 km²
 Bhitarkanika, Odisha, 672 km²
 Gahirmata, Odisha, 1435 km²
 Nalaban (Chilika), Odisha, 15.53 km²
 Coringa, Andhra Pradesh, 235.7 km²
 Krishna, Andhra Pradesh, 194.81 km²
 Pulicat, Andhra Pradesh and Tamil Nadu, 500 km²
 Point Calimere, Tamil Nadu, 17.26 km²
 Malvan, Maharashtra, 29.12 km²
 Gulf of Kachchh, Gujarat, 295.3 km²

Box 2.2: Important Sanctuaries along the Indian Coast

Protected Areas under Forest Act

Reserve Forests: ‘Reserved Forest’ (also called ‘reserve forest’) and ‘protected forest’ are terms under the Indian Forest Act, 1927 used for forests accorded a certain degree of protection. Land rights to forests declared to be Reserved forests or Protected forests are typically acquired (if not already owned) and owned by the Government of India. Unlike national parks of India or wildlife sanctuaries of India, reserved forests and protected forests are declared by the respective state governments. As of present, reserved forests and protected forests differ in that rights to all activities like hunting, grazing, etc. in reserved forests are banned unless specific orders are issued otherwise. *Wildlife habitats:* Section 2b of The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, defines 'Critical Wildlife Habitat' as such areas of National Parks and Sanctuaries that are required to be kept as inviolate for the purposes of wildlife conservation as determined and notified by the MoEFCC, after open process of consultation by an Expert Committee, on a case by case basis following scientific and objective criteria²⁷. Thus many of these are likely to be already under protected status.

2.12.7 Other Protected Areas

Conservation Reserves can be declared by the State Governments in any area owned by the Government, particularly the areas adjacent to National Parks and Sanctuaries

²⁷ MoEFCC, 2011. *Guidelines for notification of critical wildlife habitats including functions of expert committee, scientific information required and resettlement and matters incidental thereto*. F. No. 1-39/ 2007 WL-1 (pt) dated 7th February 2011. <http://moef.nic.in/downloads/public-information/rev-gdlns-CWH.pdf> accessed July 19, 2013

and those areas which link one Protected Area with another. Such declaration should be made after having consultations with the local communities. Conservation Reserves are declared for the purpose of protecting landscapes, seascapes, flora and fauna and their habitat. The rights of people living inside a Conservation Reserve are not affected. Community Reserves can be declared by the State Government in any private or community land, not comprised within a National Park, Sanctuary or a Conservation Reserve, where an individual or a community has volunteered to conserve wildlife and its habitat. Community Reserves are declared for the purpose of protecting fauna, flora and traditional or cultural conservation values and practices. As in the case of a Conservation Reserve, the rights of people living inside a Community Reserve are not affected.

Biosphere reserves

Biosphere Reserve (BR)²⁸ is an international designation by UNESCO for representative parts of natural and cultural landscapes extending over large area of terrestrial or coastal/marine ecosystems or a combination thereof. BRs are designated to deal with one of the most important questions of reconciling the conservation of biodiversity, the quest for economic and social development and maintenance of associated cultural values. BRs are thus special environments for both people and the nature and are living examples of how human beings and nature can co-exist while respecting each-others' needs. These areas are internationally recognized within the framework of UNESCO's Man and Biosphere (MAB) programme, after receiving consent of the participating country. The world's major ecosystem types and landscapes are represented in this network. BRs in coastal India include:

- Sunderbans (9630 km²) declared on 29.3.1989. Part of delta of Ganges & Brahmaputra river system in West Bengal.
- Gulf of Mannar (10500 km²) 18.2.1989 India part of Gulf of Mannar extending from Rameswaram island in the North to Kanyakumari in the South of Tamil Nadu.
- Great Nicobar, Southernmost Island of Nicobar Islands archipelago. Covers 103870 Ha.

²⁸ *Protection, Development, Maintenance and Research in Biosphere Reserves in India, Guidelines and Proforma*, MoEFCC, GoI, 2007. http://moef.nic.in/divisions/csurv/BR_Guidelines.pdf accessed March 18, 2013

Protected area categories ²⁹

The following **Table 2.5** presents the various categories of protected areas in India.

Table 2.5: Categories of Protected Areas

Name	Objectives	Features	Zone
National Parks	Conservation of species of a habitat with minimal or very low intensity of human activity.	No human resides in the Park, other than a public servant on duty and permitted persons by the Chief Wild Life Warden.	Core
Sanctuaries	Conservation of species and habitats by manipulative management.	No human resides in the Sanctuary, other than a public servant on duty and permitted persons by the Chief Wild Life Warden.	Core, Buffer and Restoration
Biosphere Reserves	Conservation of the natural resources and for the improvement of the relationship between man and the environment therein.	Both natural and human-influenced ecosystems; substantial human settlements (rural).	Core, Buffer, Restoration and Cultural

Marine Protected Areas in India (mainland)³⁰

Category I: Marine Protected Areas as per IUCN criteria are where marine areas are in focus with boundaries marked in the seaward side or intertidal/subtidal areas. They include coral reefs, seagrass beds, mangroves, mangrove creeks, backwaters, lagoons, swamps, marshy/saline lands, estuaries, turtle nesting sites/ beaches (where trawling or fishing regulations are required in the sea) etc.

- Gulf of Kachchh Marine National Park, Jamnagar, Gujarat Marine Sanctuary, Gulf of Kachchh, Jamnagar, Gujarat
- Gulf of Mannar Marine National Park, Ramanthapuram, Tuticorin, Tamil Nadu.
- Malvan Marine Sanctuary, Sindhudurg, Maharashtra
- Gahirmatha Marine Sanctuary, Kendrapara, Odisha
- Coringa Wildlife Sanctuary, East Godavari, Andhra Pradesh
- Sunderbans National Park and Tiger Reserve, North and South 24 Parganas, West Bengal
- Chilika (Nalabana) Wildlife Sanctuary, Kundra, Puri, Ganjam, Orissa
- Pulicat Lake (Bird) Sanctuary, Thiruvallur, Tamil Nadu
- Sajna Khali Sanctuary, South 24 Parganas, West Bengal

Category II: Protected Areas where the current area of focus is terrestrial, including islands – and boundaries confined to land – however have important marine biodiversity areas

²⁹ <http://ces.iisc.ernet.in/envis/sdev/parks.htm>

³⁰ Extracted from Venkatraman, K., Rajkumar Rajan, Ch. Satyanarayana, C. Raghunathan and C. Venkatraman, 2012. *Marine Ecosystems and Marine Protected Areas of India: 1-296* (Published by the Director, Zool. Surv. India, Kolkata)

adjoining their territories which require marking boundaries in the seaward side, and substantial in size to the Protected Areas in focus (This category Protected Areas have the potential to be brought under Category I, if amalgamated into clusters and the seaward boundaries notified).

- Halliday Island Sanctuary, Sunderbans, West Bengal
Category III: Pas where areas in focus are primarily terrestrial, however these are coastal sites and islands and have important marine areas in the fringes (usually smaller in size to the area of PA).
- Bhitarkanika Wild Life Sanctuary, Odisha
- Point Calimere Sanctuary, Tamil Nadu
- Lothian Island sanctuary, Sunderbans, West Bengal

Box 2.3: Marine Protected Areas in India (mainland)

Under Environment (Protection) Act, 1986

Under Clause (v) of Sub-section (2) of Section 3 of the Environment Protection Act (1986), several ecological sensitive areas have been designated (various terminologies have been employed over time). Only two coastal areas have been designated so far as eco-sensitive areas.

Dahanu Taluka (Maharashtra) (1991): Dahanu Taluka, District Thane (Maharashtra) was declared as an ecologically fragile area and restrictions imposed on the setting up of industries which have detrimental effect on the environment vide S.O. No. 80 (E), dated 8 February, 1991 and Corrigendum (S.O. 147 (E) issued on 27 February, 1991). Guidelines for permitting/ restricting industries and industrial units in the Taluka classify them into three categories (green, red and orange)³¹.

Murud-Janjira³² (1989): Ban on location of all industries, carrying on of operations or processes in a belt of one kilometer from the high tide mark from the Revdanda Creek (lat 19° 35') upto Devgarh Point (near Shrivardhan) (lat 18° 0') as well as in a one kilometre belt along the banks of the Rajpuri Creek upto Mhasla, except those industries, operations of processes which are in connection with the promotion and development of Tourism and those which are permitted by the Central Government after examining the environmental impact.

India has taken several steps to achieve the National Biodiversity Target no 6 and Aichi Biodiversity Target no 11 which aim to conserve a substantial portion of the coastal and marine areas in the country and world respectively³³. Towards achieving these two targets, 106 coastal and marine sites have been identified and prioritized as 'Important

³¹ <http://www.moef.nic.in/legis/eia/dtepauth.html>

³² <http://www.moef.nic.in/legis/eia/murud.html>

³³ Important Coastal and Marine Biodiversity Areas (ICMBAs). <http://wiienviis.nic.in> accessed 14 April, 2016

Coastal and Marine Areas' (ICMBAs) by the Wildlife Institute of India. Sixty two ICMBAs have been identified along the west coast of India, and 44 have been identified along the east coast. Of these, 22 ICMBAs have been prioritized for immediate conservation actions and proposed to be upgraded as Protected Areas under categories such as Conservation or Communities Reserve to increase participation of the local communities in governance.

2.13 Marine Fauna

2.13.1 Marine Mammals

Twenty-five species of marine mammals are found in Indian waters and belong to two orders Cetacea and Sirenia. Sea cow *Dugong dugon* occurs in the nearshore waters of Gulf of Mannar, Gulf of Kachchh and the Andaman and Nicobar Islands³⁴. One species belonging to the order Sirenia, namely the dugong, and 30-34 species of cetaceans (dolphins, whales and porpoises) including the Ganges river dolphin, are found in the waters of the Indian subcontinent³⁵. All species of marine mammals along the Indian coasts are protected under the Indian (Wildlife) Protection Act (1972). However, they continue to be affected by incidental capture in fishing operations. The population of dugong has reduced to low levels over the years³⁶.

2.13.2 Birds

A number of birds fly through India's coastal areas as part of their annual migration patterns either in search of feeding grounds or to escape the severe winter of their native habitat. The nesting of birds occurs in masses at isolated locations which are called as nesting grounds. Some of them have been declared as bird sanctuaries but there are other habitats where mass nesting occurs during specific seasons.

Table 2.6: Major bird sanctuaries in India's coastal states

West Coast	Bird Sanctuaries	East Coast	Bird Sanctuaries
Gujarat	Nalsarovar Bird Sanctuary Porbandar Bird Sanctuary Khijadia Bird Sanctuary Thol Bird Sanctuary Jamnagar salt pans	Tamil Nadu	Vedanthangal Bird Sanctuary Pulicat Lake Bird Sanctuary Kunthakulam Bird Sanctuary Point Calimere
Maharashtra	Jaykwadi Bird Sanctuary Aurangabad Karnala Bird Sanctuary Raigad	Andhra Pradesh	Kolleru Bird Sanctuary Pulicat lake bird sanctuary Manjira Bird Sanctuary Nelapattu Bird Sanctuary

³⁴ Venkataraman, K and M. Wafar, 2005. Coastal and Marine Biodiversity of India. *Indian J. Marine Sci.*, 34(1)57-75.

³⁵ Marine Mammal Conservation Network of India. <http://www.marinemammals.in/> accessed on 18 April, 2019

³⁶ Bhatt, JR and E. Vivekanandan, 2013. Coastal and Marine Biodiversity Conservation in India. *Regional Symposium on Ecosystem Approaches to Marine Fisheries & Biodiversity*, October 27-30, 2013, Kochi

West Coast	Bird Sanctuaries	East Coast	Bird Sanctuaries
	Nandurmadhmeshwar Bird Sanctuary, Nashik Vengurla Rocks		Rollapadu Bird Sanctuary (Great Indian Bustard)
Goa	Salim Ali Bird Sanctuary	Odisha	Chilika Lake Bird Sanctuary Nalabana Bird Sanctuary
Karnataka	Ranganathittu Bird Sanctuary Ghataprabha Bird Sanctuary Gudavi Bird Sanctuary Mandagadde Bird Sanctuary	West Bengal	Rasikbil Bird Sanctuary Sajnakhali Bird Sanctuary Chintamani Kar Bird Sanctuary Kulik Bird Sanctuary (Raigunge)
Kerala	Kumarakom Bird Sanctuary Kadalundi Bird Sanctuary Thattekad Bird Sanctuary		

2.13.3 Marine turtles

Of the seven species of turtles that occur in the world five breed along the Indian coasts. These include the Leatherback sea turtle *Dermochelys coriacea*, Green turtle *Chelonia mydas*, Olive Ridley *Lepidochelys olicacea*, the Hawksbill turtle *Eretmochelys imbricata* and the Loggerhead *Caretta caretta*. Among these, mass nesting of Olive Ridley occurs along Odisha coast (east coast of India) every year. Government of India is taking strict actions to protect the marine turtles under the Indian Wildlife (Protection) Act (1972), and in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna & Flora. Fishing is prohibited during the mass nesting period of the Olive Ridley along the Odisha coast. Beach hatcheries are also found in a few locations³⁷.

2.13.4 Sharks

Whaleshark³⁸: Until 2000, the whaleshark was exploited by unregulated and unsustainable fisheries to meet international trade demands for shark fins, liver oil, skin and meat. In July 2001, the whale shark was included in Schedule I of Indian Wildlife (Protection) Act, 1972, thus giving whaleshark protection and making it the first marine fish to be listed in the aforesaid Act. The whaleshark campaign has spread awareness on the species and the protected status in Gujarat (northwest coast of India). It helped convert the fishermen into protectors of the fish and brought about a change in the perception and attitude of local people.

³⁷ Bhatt, JR and E. Vivekanandan, 2013. Coastal and Marine Biodiversity Conservation in India. Regional Symposium on Ecosystem Approaches to Marine Fisheries & Biodiversity, October 27-30, 2013, Kochi

³⁸ Bhatt, JR and E. Vivekanandan, 2013. Coastal and Marine Biodiversity Conservation in India. Regional Symposium on Ecosystem Approaches to Marine Fisheries & Biodiversity, October 27-30, 2013, Kochi

2.13.5 Sea Cucumber

As sea cucumbers³⁹ were collected in large numbers and exported, the government prohibited the activity under Schedule I of the Wild Life (Protection) Act 1972. Central Marine Fisheries Research Institute has developed breeding techniques for sea cucumbers, enhancing the potential for sea ranching the seed for stock improvement as well as for establishing commercial hatcheries. A summary of marine taxa reported so far is presented in *Table 2.7*.

Table 2.7: Marine flora and fauna in Indian waters ⁴⁰

Plantae		Animalia			
Taxon	Number	Taxon	Number	Taxon	Number
		Proifera	486+	Hemichordata	12
Diatoms	200+	Cnidaria	842+	Protochordata	119+
Dinoflagellates	90+	Ctenophora	12+	Pisces	2546
Macroalgae	844	Platyhelmintha	350	Reptilia	35
Seagrasses	14	Annelida	338	Mammalia	25
Mangroves	39	Chaetognatha	30+		
		Sipuncula	35		
Protista		Echiura	33		
Protozoa	532+	Gastrotrocha	75		
Foraminifera	500+	Kinorhyncha	10		
Tintinnids	32+	Tardigrada	10+		
		Crustacea	3498		
		Mollusca	3370		
		Bryozoa	200+		
		Echinodermata	765		

2.14 Fish Resources

There are about 2000 marine species that are caught from the Indian seas. The following are the top resources by quantity that are caught off Indian waters⁴¹.

- 1 Oil sardine
- 2 Penaeid prawns
- 3 Indian mackerel
- 4 Croakers
- 5 Ribbon fishes

³⁹ Bhatt, JR and E. Vivekanandan, 2013. *Coastal and Marine Biodiversity Conservation in India. Regional Symposium on Ecosystem Approaches to Marine Fisheries & Biodiversity, October 27-30, 2013, Kochi*

⁴⁰ Wafar M, Venkataraman K, Ingole B, Ajmal Khan S, LokaBharathi P (2011) *State of Knowledge of Coastal and Marine Biodiversity of Indian Ocean Countries. PLoS ONE 6(1): e14613. <https://doi.org/10.1371/journal.pone.0014613>*

⁴¹ Sathianandan, T.V., 2013. *Status of Marine Fisheries Resources in India – An Overview. Winter School on ICT-oriented Strategic Extension for Responsible Fisheries Management*

- 6 Non-Penaeid prawns
- 7 Threadfin breams
- 8 Bombay Duck
- 9 Other sardines
- 10 Catfishes

2.15 Socioeconomic Characteristics

2.15.1 Demographics

India's population, as on 1 March 2011 stood at 1,210,193,422 (623.7 million males and 586.4 million females), with a sex ratio of 940 females for 1000 males. The average annual exponential growth rate stood at 1.64 percent during 2001-2011. According to the 2011 census, the literacy rate in the Country stood at 74.04 percent, 82.14 percent for males and 65.46 percent for females.

The coastal areas are divided into 13 administrative units comprising of 9 states and 4 Union territories including the Island territories. There are nine maritime states and two union territories are located in the mainland coast of India. Total coastal population in India is 225 million. **Table 2.8** presents the coastal population and population density (ie. no. of people per sqkm of area) in various coastal districts. Accordingly, there are 78 coastal districts occupying about 394,147 sq.km of land area with an average population density of 513 persons/sq.km.

Table 2.8: Population of India's Coastal Districts

Sl.No	District	Population-2001	Population-2011	Area in (sq.km)	Population density-2001	Population density-2011
West Bengal						
1	North Twenty Four Parganas	8934286.00	10082852.00	12286.59	727.16	820.64
2	South Twenty Four Parganas	6906689.00	8153176.00	4647.73	1486.03	1754.23
3	Purba medinipur	9610788.00	11037538.00	5021.70	1913.85	2197.97
	Total	25451763.00	29273566.00	21956.02	1159.22	1333.28
Odisha						
4	Baleshwar	2024508.00	2317419.00	5021.70	403.15	461.48
5	Bhadrak	1333749.00	1506522.00	5021.70	265.60	300.00
6	kendrapara	1302005.00	1439891.00	2818.47	461.95	510.88
7	Jagatsinghapur	1057629.00	1136604.00	1979.84	534.20	574.09
8	Puri	1502682.00	1697983.00	4037.03	372.23	420.60
9	Khordha	1877395.00	2246341.00	3131.66	599.49	717.30
10	Ganjam	3160635.00	3520151.00	9604.18	329.09	366.52
11	Gajapati	518837.00	575880.00	4571.07	113.50	125.98
	Total	12777440.00	14440791.00	36185.64	353.11	399.08

Sl.No	District	Population-2001	Population-2011	Area in (sq.km)	Population density-2001	Population density-2011
Andhra Pradesh						
12	East Godavari	4901420.00	5151549.00	11945.69	410.31	431.25
13	Srikakulam	2537593.00	2699471.00	7072.47	358.80	381.69
14	Vizianagram	2249254.00	2342868.00	6242.14	360.33	375.33
15	Visakhapatnam	3832336.00	4288113.00	12691.29	301.97	337.88
16	West Godavari	3803517.00	3934782.00	8531.80	445.80	461.19
17	Krishna	4187841.00	4529009.00	9366.55	447.11	483.53
18	Guntur	4465144.00	4889230.00	12477.18	357.86	391.85
19	Prakasam	3059423.00	3392764.00	19204.68	159.31	176.66
20	Nellore	2668564.00	2966082.00	14072.24	189.63	210.78
	Total	31705092.00	34193868.00	101604.04	312.05	336.54
Tamil Nadu						
21	Thrivallur	2754756.00	3725697.00	3538.82	778.44	1052.81
22	Chennai	4343645.00	4681087.00	187.77	23132.67	24929.77
23	Kancheipuram	2877468.00	3990897.00	4749.45	605.85	840.29
24	Viluppuram	2960373.00	3463284.00	7555.17	391.83	458.40
25	Cuddalore	2285395.00	2600880.00	3881.68	588.76	670.04
26	Nagappattinam	1488839.00	1614069.00	2559.38	581.72	630.65
27	Thiruvavur	0.00	3728104.00	2171.45	0.00	1716.87
28	Thanjavur	2216138.00	2402781.00	3769.59	587.90	637.41
29	Pudukkottai	1459601.00	1618725.00	4837.91	301.70	334.59
30	Ramanathapuram	1187604.00	1337560.00	4357.47	272.54	306.96
31	Thoothukudi	1572273.00	1738376.00	4775.45	329.24	364.02
32	Tirunelveli	2723988.00	3072880.00	7006.74	388.77	438.56
33	Kanyakumari	1676034.00	1863174.00	1736.55	965.15	1072.92
	Total	27546114.00	35837514.00	51127.43	538.77	700.94
Kerala						
34	Kasargod	1204078.00	1302600.00	2072.73	580.91	628.45
35	Kannur	2408956.00	2525637.00	3108.28	775.01	812.55
36	Kozhikode	2879131.00	3089543.00	2444.26	1177.91	1264.00
37	Malappuram	3625471.00	4110956.00	3725.18	973.23	1103.56
38	Thrissur	2974232.00	3110327.00	3149.22	944.43	987.65
39	Ernakulam	3105798.00	3279860.00	2501.81	1241.42	1311.00
40	Alappuzha	2109160.00	2121943.00	1469.12	1435.67	1444.37
41	Kottayam	1953646.00	1979384.00	2288.52	853.67	864.92
42	Kollam	2585208.00	2629703.00	2564.92	1007.91	1025.26
43	Thiruvananthapuram	3234356.00	3307284.00	2243.23	1441.83	1474.34
	Total	26080036.00	27457237.00	25567.28	1020.06	1073.92
Karnataka						
44	Uttara Kannada	1353644.00	1436847.00	10964.34	123.46	131.05
45	Udupi	1112243.00	1177908.00	4112.18	270.48	286.44
46	Dakshin Kannada	1897730.00	20883625.00	4856.70	390.74	4299.96
	Total	4363617.00	23498380.00	19933.21	218.91	1178.86

Sl.No	District	Population-2001	Population-2011	Area in (sq.km)	Population density-2001	Population density-2011
Goa						
47	South Goa	589095.00	639962.00	2104.60	279.91	304.08
48	North Goa	758573.00	817761.00	1820.65	416.65	449.16
	Total	1347668.00	1457723.00	3925.24	343.33	371.37
Maharashtra						
49	Thane	8131849.00	11054131.00	10783.50	754.10	1025.10
50	Mumbai Suburban	0.00	2105604.00	509.68	0.00	4131.22
51	Mumbai	3338031.00	3145966.00	167.74	19900.56	18755.52
52	Raigarh	2207929.00	2635394.00	8000.74	275.97	329.39
53	Ratnagiri	1696777.00	1612672.00	9109.22	186.27	177.04
54	Sindhudurg	868825.00	848868.00	5526.53	157.21	153.60
	Total	16243411.00	21402635.00	34097.40	476.38	627.69
Gujarat						
55	Kachchh	1583225.00	2090313.00	22113.08	71.60	94.53
56	Rann of Kachchh	0.00	0.00	28031.34	0.00	0.00
57	Rajkot	3169881.00	3799770.00	8926.23	355.12	425.69
58	Morvi (Movbi)	0.00	0.00	4209.84	0.00	0.00
59	Jamnagar	1904278.00	2159130.00	7396.82	257.45	291.90
60	Devbhumi Dwarka			4817.91	0.00	0.00
61	Porbandar	536835.00	586062.00	2652.09	202.42	220.98
62	Junagadh	2448173.00	2742291.00	6467.07	378.56	424.04
63	Gir Somnath	0.00	0.00	3723.83	0.00	0.00
64	Amreli	1393918.00	1513614.00	8494.05	164.11	178.20
65	Bhavnagar	2469630.00	2877961.00	7535.26	327.74	381.93
66	Ahmedabad	5816519.00	7208200.00	9170.37	634.27	786.03
67	Anand	1856872.00	2090276.00	4074.48	455.73	513.02
68	Bharuch	1370656.00	1550822.00	5520.31	248.29	280.93
69	Surat	4995174.00	6079231.00	8536.25	585.17	712.17
70	Nasari	1229463.00	1330711.00	2545.79	482.94	522.71
71	Valsad	1410553.00	1703068.00	3446.95	409.22	494.08
	Total	30185177.00	35731449.00	137661.69	219.27	259.56
Andaman & Nicobar						
72	Andaman	314084.00	343125.00	5693.66	55.16	60.26
73	Nicobar	42068.00	36819.00	1691.74	24.87	21.76
	Total	356152.00	379944.00	7385.41	48.22	51.45
Pondicherry						
74	Karikal	170791.00	200314.00	159.96	1067.74	1252.31
75	Pondicherry	735332.00	946600.00	312.41	2353.77	3030.02
	Total	906123.00	1146914.00	472.36	1918.28	2428.04
Lakshadweep						
76	Lakshadweep	60650.00	64429.00	477.07	127.13	135.05
	Total	60650.00	64429.00			

Sl.No	District	Population-2001	Population-2011	Area in (sq.km)	Population density-2001	Population density-2011
Diu & Daman						
77	Daman	113989.00	190855.00	84.14	1354.80	2268.38
78	Diu	44215.00	52056.00	33.41	1323.32	1558.00
	Total	158204.00	242911.00	117.55	1345.85	2066.46
		Population-2001	Population-2011			
Total Coastal districts and UT population of India		177181447.00	225127361.00			
Growth Rate 2.70603468						

2.15.2 Cities and Towns

As per the Census data of 2011, there are 486 census towns along the coast of India, accounting for a population of 41.7 million constituting 20.7% of the total coastal population. Of the 486 towns, 42 are classified as Class-I towns that have a population of > 100,000 persons. **Table 2.9** below gives the classification of settlements based on their population.

Table 2.9: Classification of cities based on population

Population Classification	Population
Tier-1	100,000 and above
Tier-2	50,000 to 99,999
Tier-3	20,000 to 49,999
Tier-4	10,000 to 19,999
Tier-5	5,000 to 9,999
Tier-6	Less than 5000

The following table; **Table 2.10** presents the state-wise different classes towns in India.

Table 2.10: State-wise number of different classes of towns

State Name	Number of Class-I Towns	Number of Class-II Towns	Number of Class-III Towns	Number of Class-IV Towns	Number of Class-V Towns	Number of Class-VI Towns	Total Number of Census Towns
Gujarat	7	14	24	32	20	10	107
Diu & Daman	0	1	2	4	1	0	8
Maharashtra	6	4	1	7	12	1	31
Goa	0	3	4	18	31	8	64
Karnataka	2	2	5	9	10	4	32
Kerala	6	9	49	16	9	1	90
Tamil Nadu	5	2	28	18	5	0	58
Puducherry	2	2	4	3	0	0	11
Andhra Pradesh	7	7	4	5	6	2	31

State Name	Number of Class-I Towns	Number of Class-II Towns	Number of Class-III Towns	Number of Class-IV Towns	Number of Class-V Towns	Number of Class-VI Towns	Total Number of Census Towns
Odisha	3	1	0	2	9	4	19
West Bengal	4	3	8	12	37	8	72
Total	42	48	129	126	140	38	523

2.15.3 Urban Agglomerations

Census of India defines Urban Agglomerations as ‘a continuous urban spread comprising one or more towns and their adjoining out growth(s)’ where outgrowth refers to areas around a core city or town, such well recognized places, like, Railway colony, university campus, port area, etc., lying outside the limit of town. Many towns have grown during the last few decades due to rapid industrial development. Some of these have also reached megacity status (more than 10 million population). India has two coastal megacities apart from a number of cities with more than one million population (**Table 2.11**) located on the coast. Many of these cities are port cities or have major industries. Apart from these, there are several towns and cities located along the coast where agriculture and fishing are major livelihoods.

Table 2.11: Coastal cities/UAA with million plus population ⁴²

Sl.No.	Coastal City	State	Population
1	Greater Mumbai UAA	Maharashtra	18,414,288
2	Chennai UAA	Tamil Nadu	8,696,010
3	Surat UA	Gujarat	4,585,367
4	Kochi UA	Kerala	2,117,990
5	Kozhikode UA	Kerala	2,030,519
6	Vadodara	Gujarat	1,817,191
7	Vishakhapatnam	Andhra Pradesh	1,730,320
8	Puri	Orissa	1,697,983
9	Thiruvananthapuram UA	Kerala	1,687,406
10	Kannur UA	Kerala	1,642,892
11	Vasai Virar City (M Corp.)	Maharashtra	1,221,233
12	Kollam UA	Kerala	1,110,005

2.15.4 Fishing Villages

There are 3,288 marine fishing villages distributed among the nine maritime states and two union territories. There are 42,53,451 people belonging to 8,64,550 marine fishermen households. Of these, 90 percent belong to traditional fisher families. Tamil

⁴²

http://censusindia.gov.in/2011-prov-results/paper2/data_files/india2/Million_Plus_UAs_Cities_2011.pdf

Nadu has the largest population of marine fishers (8.02 lakhs), followed by West Bengal (6.34 lakhs) and Kerala (6.10 lakhs). Nearly 61 percent of the fishermen families are under BPL category. The average family size was 4.63 and the overall sex ratio was 928 females per 1000 males. Almost 58 percent of the fisher folk were educated with different levels of education. About 38 percent marine fisher folk were engaged in active fishing with 85 percent of them having full time engagement. About 63.6 percent of the fisher folk were engaged in fishing and allied activities. Among the marine fishermen households, nearly 76 percent were Hindus, 15 percent were Christians and 9 percent were Muslims. Marine fishermen households belonging to Scheduled Caste/Scheduled Tribes (SC/ST) was 17 percent (CMFRI census 2010).

2.15.5 Ethnicity

Many of the traditional fishermen living in coastal areas belong to specific caste groups. A list of such groups is given in *Table 2.12*.

Table 2.12: Major marine fishing Communities of India ⁴³

State	Major fishing Communities
Tamil Nadu	Pattinavars, Mukkuvar, and Paravas
Andhra Pradesh	Vadabalijas, Jalaris, Pattapu, and Palles
Odisha	Jalaris, Vadabalijas, Kaibartas, Khandayats, and Rajbhansis
West Bengal	Kaibartas
Gujarat	Kharvas, Kolis and Macchiyaras
Maharashtra	Kolis
Karnataka	Mogaveeras
Kerala	Mukkuvar, Anjootty, Dheevera, and Pooislan

Tribes of Andaman & Nicobar Islands

Andaman and Nicobar Islands are the homelands of six tribal populations of which the particularly vulnerable groups are:

- Great Andamanese of Strait Island
- Onges of Little Andaman
- Jarawas of South and Middle Andaman
- Sentinelese of Sentinel Islands
- Shompens of Great Nicobar

While these groups continue largely to be hunter-gatherers, the sixth group, the Nicobarese have settled in cities.

⁴³ Fishing Communities <http://indianfisheries.icsf.net/en/page/613-Fishing%20Communities.html> accessed 23 Sep 16

2.16 Economic Activities

2.16.1 Employment

The working population and work participation rate highlight the occupational distribution of a region. The number of total workers in the country has almost doubled in the 30 years period from 1981 to 2011. The corresponding increase in rural workers and urban workers is 77 percent and 182 percent respectively (*Table 2.13*).

Table 2.13: Worker Participation Rate in India

Years	Rural	Urban	Total	Percentage Distribution		
				Rural	Urban	Total
1981	244,604,986	197,308,289	47,296,697	36.8	38.9	30
1991	314,131,370	249,028,944	65,102,426	37.5	40	30.2
2001	402,234,724	309,956,070	92,278,654	39.1	41.7	32.3
2011	481,888,868	348,743,092	133,145,776	39.8	41.8	35.3

2.16.2 Agriculture

Agriculture, with its allied sectors, is the largest livelihood provider in India, especially in the rural areas. Gross Value Added by agriculture, forestry and fishing is estimated at Rs 18.53 trillion (US\$ 271.00 billion) in FY 2018. During 2017-18 crop year, food grain production is estimated at record 284.83 million tonnes. In 2018-19, Government of India is targeting food grain production of 285.2 million tonnes. Milk production was estimated at 165.4 million tonnes during FY17, while meat production was 7.4 million tonnes. As of September 2018, total area sown with kharif crops in India reached 105.78 million hectares. India is the second largest fruit producer in the world. Production of horticulture crops is estimated at record 314.7 million tonnes (mt) in 2018-19 as per third advance estimates⁴⁴.

Agricultural productivity depends on various factors such as the availability and quality of agricultural inputs such as land, water, seeds and fertilizers, access to agricultural credit and crop insurance, assurance of remunerative prices for agricultural produce, and storage and marketing infrastructure, among others. Key issues affecting agricultural productivity have been identified as decreasing sizes of agricultural land holdings, continued and high dependence on the monsoon, inadequate access to irrigation, imbalanced use of soil nutrients resulting in loss of fertility of soil, uneven access to modern technology in different parts of the country, lack of access to formal agricultural credit, limited procurement of food grains by government agencies, and failure to provide remunerative prices to farmers⁴⁵.

⁴⁴ Agriculture in India: Information About Indian Agriculture & Its Importance. <https://www.ibef.org/industry/agriculture-india.aspx> accessed 23 April 2019

⁴⁵ State of Agriculture in India. <https://www.prsindia.org/policy/discussion-papers/state-agriculture-india> accessed 23 April 2019

Because of the many deltas along the east coast and good water availability due to the monsoon along the west coast, agricultural activities are prominent along the coast. However, coastal regions are prone to rising sea levels and other impacts of climate change including changes in temperature and precipitation patterns. The INCCA 4x4 assessment ⁴⁶ predicts that yields of irrigated rice are projected to decrease by 10 to 20 percent in many coastal locations. However, rain fed rice yields are projected to increase along the west coast and decrease along the east coast. Impacts of climate change are likely to increase vulnerability of livestock in coastal areas.

In coastal areas, salinization is a major problem and is associated with overexploitation of groundwater which lowers the groundwater table leading to sea water intrusion

2.16.3 Fisheries

With over 2.4 lakh fishing crafts operating along the coast, 7 major fishing harbours, 75 minor fishing harbours and 1,537 landing centres are functioning to cater to the needs of over 4.0 million fisher folks. Marine capture fisheries production is greater in waters off the west coast of India due to the large continental shelf in the Arabian Sea. The upwelling phenomenon is more active off the west coast which increases the nutrients in our west coast waters. Around 70 percent of India's marine catch currently is taken off the west coast and around 30 percent is caught off the east coast though the proportion changes each year. Most fish caught in India are destined for domestic consumption. However, the volume of seafood products destined for export continues to grow, both in terms of marine capture and aquaculture products.

As a part of efforts to protect marine resource stocks and encourage sustainable fishing, the government enforces seasonal fishing bans on important fishing grounds and has tightened up the issuing of fishing boat licenses to prevent the national fleet size from growing any further for the moment. Seasonal bans to protect fish stocks include a 61 day ban on fishing along India's west coast from 1 June to 31 July, which has replaced the former 46-day fishing ban. Meanwhile, fishing along India's east coast is prohibited from 15 April to 14 June each year.

India's marine fish production in 2017 registered 5.6 percent increase compared to the previous year. The total marine fish landings in India (excluding Andaman & Nicobar and Lakshadweep islands) in 2017 was 3.83 million with Gujarat remaining at the top position for the fifth consecutive year with contributing 7.86 lakh tonnes (20.5 percent of total landings) followed by Tamil Nadu and Kerala. Revival of oil sardine in the western coastal states especially in Kerala played a major role in improving the country's marine fish production this time. However, the east coast witnessed a decline in the oil sardine catch with 83 percent drop in Andhra Pradesh and 36 percent in Tamil Nadu compared to 2016. A total of 788 marine fish species were landed this time along

⁴⁶ INCCA 2010 *op.cit*

the Indian coast with maximum numbers landed along the Tamil Nadu coast followed by Kerala and Maharashtra⁴⁷.

Over 81 percent of the total landings was from mechanized sector whereas the motorized sector contributed 17 percent and the contribution from the traditional non-mechanized sector was only 2 percent. Mechanized trawl nets accounted for 58 percent of the total marine fish landings whereas mechanized gillnets and outboard ring seines contributed 8 percent each. The total number of species found in the landings along the Indian coast during 2016 is 817 where as it was 730 in 2015⁴⁸.

2.16.4 Aquaculture

Coastal aquaculture collectively includes land based and water based brackish and marine aquaculture. This contributes significantly to the coastal economy while providing livelihood and employment to rural coastal population in addition to promoting other ancillary industries and contributing to exports. The Coastal Aquaculture Authority established by an Act of Parliament viz. “The Coastal Aquaculture Authority Act, 2005” is responsible for promoting sustainable, regulated development of coastal aquaculture in the notified areas, i.e., 2 km. from the High Tide Line. While shrimp has been the mainstay of coastal aquaculture, introduction of Specific Pathogen Free (SPF) *Litopenaeus vannamei*, the exotic white shrimp, has helped prevent mass outbreak of shrimp diseases. The Coastal Aquaculture Authority (CAA) carries out registration of shrimp farms in the country. The details of number of farms for which certificates were issued between December 2005 and March 2016⁴⁹ is presented in **Table 2.14** below.

Table 2.14: Coastal Aquaculture farms as of 2014

Sl No:	States / UTs	No: of Farms under various area categories					Total no: of Farms	Area of farm	
		0-2	2.01-5	5.0-10	10.01-40	>40.01		TFA(ha)	WSA(ha)
1	West Bengal	2,248	165	6	0	0	2,419	2,638	1,776
2	Odisha	6,141	424	30	17	0	6,612	8,611	5,483
3	Andhra Pradesh	15,373	1,059	128	60	9	16,629	24,337	17,213
4	Tamil Nadu	930	631	131	19	1	1,712	5,026	3,470
5	Puducherry	33	1	0	0	0	34	60	45
6	Kerala	943	215	18	5	1	1,182	2,423	1,635
7	Karnataka	258	42	2	2	0	304	419	320
8	Goa	22	15	2	2	0	41	138	97

⁴⁷<https://timesofindia.indiatimes.com/business/india-business/sign-of-revival-in-indias-marine-fish-production-catch-increased-by-5-6/articleshow/64749228.cms> accessed June 26, 2018

⁴⁸ Sathianandan, T.V. Marine Fish Production in India, present status. Summer School on Advanced Methods for Fish Stock Assessment and Fisheries Management, 2017

⁴⁹ <http://www.caa.gov.in/uploaded/doc/annualreport/AnnualReport-2015-2016.pdf> accessed 22 April 2019

9	Maharashtra	93	123	25	18	6	265	2,075	1,305
10	Gujarat	146	603	8	1	2	760	3,450	2,461
11	Daman & Diu	0	12	0	0	0	12	60	38
12	A&N Islands	3	1	0	0	0	4	22	5
	Total	26,126	3,347	351	131	19	29,974	49,259	33,848

Source: CAA Annual Report, 2015-16

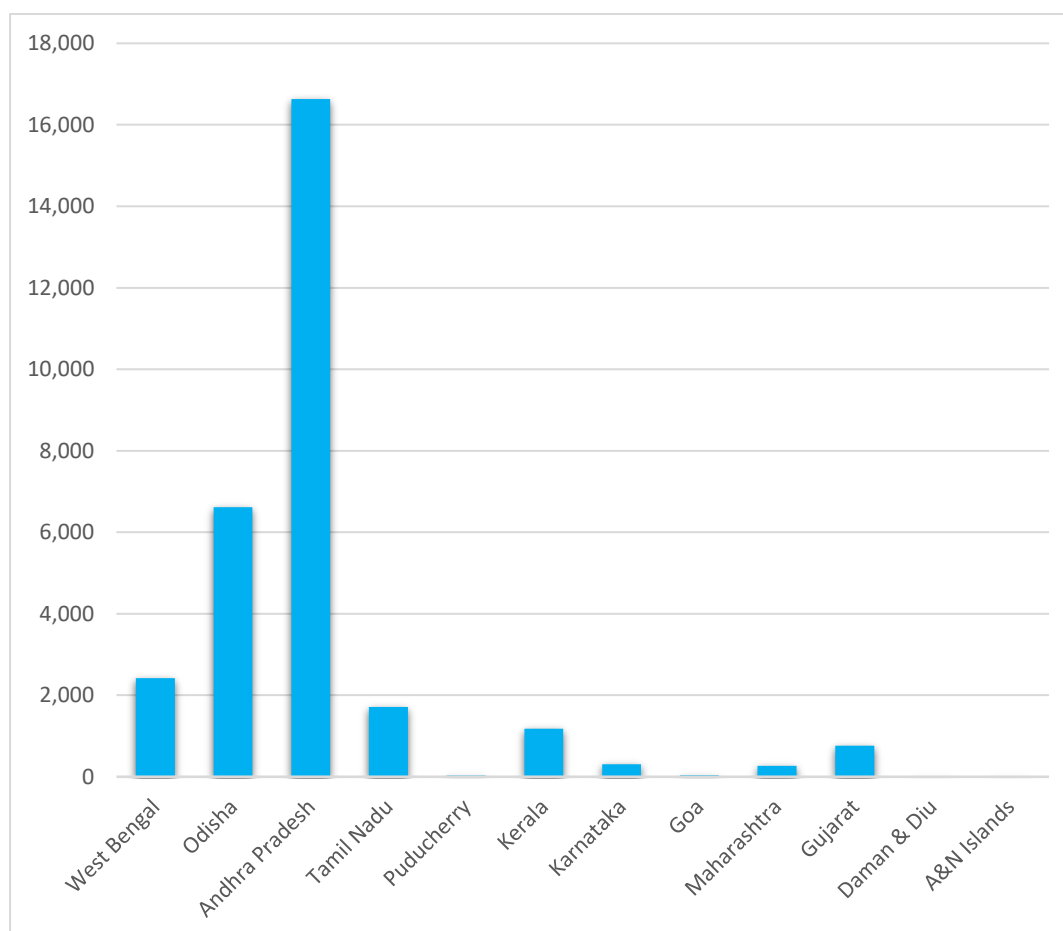


Figure 2.10: State-wise Registered Aquaculture Farms

2.16.5 Tourism and recreation

The coastal areas worldwide are major destinations for tourism, which represents the fastest growing sector of the global economy. Tourism could also have harmful effects, leading to unsustainable coastal development as infrastructure is built on the shoreline to accommodate tourism. Coastal tourism activities may be consumptive or non-consumptive types. The consumptive type includes fishing, shell-fishing and shell collection while swimming, diving, boating, surfing, bird-watching, snorkelling etc., come under the non-consumptive type. Other classifications are based on type of coastal destination; namely beach or resort/homestay or time/duration of stay (day or night tourism). Tourism in India today has a contribution of 6.23 percent to the national GDP and 8.78 percent of the total employment in India and there is greater potential for enhancing tourism along the mainland and Island coasts of India.

2.16.6 Ports and Harbours

Over 70 of India's important cities and towns are located on the coast; many of them developed as port cities. India has twelve major ports (including one corporate port) with two more on the anvil which are administered by the Ministry of Shipping, Government of India. There are also 190 other ports which come under the jurisdiction of the State where they are located. In 2013-14, the major ports handled cargo throughput of 555.487 million tonnes with Kandla ranked at the top⁵⁰. Non-major ports handled a total traffic of 470.87 million tonnes in 2014-15 up from 11.02 million tonnes in 1990-91 and 86.90 million tonnes in 2000-01.

Table 2.15: State wise number of ports in India

East Coast			West Coast		
State	Major Port	Non-major Port	State	Major Port	Non-major Port
West Bengal	1	01	Gujarat	1	42
Odisha	1	02	Daman & Diu	-	02
Andhra Pradesh	1	12	Maharashtra	2	43
Tamil Nadu	3	15	Goa	1	05
Puducherry	-	02	Karnataka	1	10
Andaman & Nicobar Islands	1	23	Kerala	1	13
			Lakshadweep	-	10
Total	7	55		6	125

Source: Data on Non-major ports from Indian Ports Association (<http://www.ipa.nic.in/index1.cshhtml?lsid=39> as on 28/10/2014)

With increasing globalization, port cities have attracted industries and have undergone rapid urbanization. In fact, ports are rarely stand-alone units as they are usually associated with manufacturing hubs (industrial estates), petroleum and chemical complexes and special economic zones / export processing zones.

2.16.7 Fishing ports and harbours

A number of fishing harbours and fish landing centres dot the long coast. The major fishing harbours at major ports⁵¹ are:

- Visakhapatnam
- Chennai
- Cochin
- Kolkata (Roychowk)
- Paradip
- Mumbai (Sasson Dock)

⁵⁰ IPA News: <http://www.ipa.nic.in/index1.cshhtml?lsid=146> accessed 22 August 2016

⁵¹ Handbook on Fisheries Statistics 2014. <http://www.dahd.nic.in/documents/handbook-fisheries-statistics-2014> accessed 23 Aug. 16

State wise list of fishing harbours is presented in **Table 2.16**.

Table 2.16: States / UT-wise Number of Major, Minor Fishing Harbours and Fish Landing Centres Commissioned / Under Construction till 2011-12 ⁵²

Sl. No.	State/ Union Territory	Major Fishing Harbours Commissioned	Minor Fishing Harbour - Commissioned	Minor Fishing Harbour - Under Construction	Fish Landing Centres - Commissioned	Fish Landing Centres - Under Construction
1	Andhra Pradesh*	1	4		17	4
2	Goa				4	1
3	Gujarat		5	2	21	
4	Karnataka		8	4	13	
5	Kerala	1	7	9	25	2
6	Maharashtra	1	2	3	35	1
7	Orissa	1	4	1	25	3
8	Tamil Nadu	1	8	3	20	1
9	West Bengal	2	5		13	
10	A & N Island*		1		1	4
11	Daman & Diu				2	
12	Lakshadweep				3	
13	Puducherry		1	3	1	
	Total	7	45	25	180	16

2.17 Essential Services in Coastal India

Water supply

With 2.4 per cent of the world's land area, India is home to about 17 percent of the total world population but has only about 4 per cent of the world's renewable freshwater resources (Ministry of Water Resources, 2012). In a country like India which is densely and relatively uniformly populated, the growing water demand and the resultant search for newer sources of water is bound to come face-to-face with ecological limits. While per capita renewable water resource availability in 1951 was 5,177 cubic meters (cu.m) per capita per year, this became 1,588 cu.m by 2010, placing the country well within the water-stressed category (CWC, 2010). According to the widely used Falkenmark water stress index, out of the 22 major river basins of India for which there is good quality data, four are water-stressed, 11 are water-scarce and four are facing absolute water scarcity. Only three river basins out of 22 are not facing any level of water stress or scarcity. In addition, ground water is depleting in some parts of the country. According to a study, out of 5,842 numbers of assessed administrative units, 802 units were overexploited, 169 units were critical, and 523 units were semi-critical (CGWB, 2012).

⁵² States / Union Territories-wise Number of Major, Minor Fishing Harbours and Fish Landing Centres Commissioned / Under Construction till 2011-12 <https://data.gov.in/catalog/fishing-harbours-fisheries-statistics-2014> accessed 22 August 2016

The growing water needs of urban areas shall be seen within this context of reducing water availability. Since 2011, the coverage of habitations with over 40 liters per capita per day (LPCD) rural water supply has however increased to 78 percent, in line with supplying all habitations with sustainable and sufficient drinking water by 2030 as a part of the Sustainable Development Goals. Of these, 57 percent of the population is also covered by Piped Water Supply through public stand posts.

Climate change might further reduce the availability of water for urban areas. Salinity intrusion on water sources in coastal areas also necessitates the need for alternate options than ground water. Major issues related to water quality encountered in the coastal aquifers include salinity and presence of chemical constituents such as iron, nitrate etc. Documented cases of sea water ingress in coastal aquifers are restricted to Minjur near Chennai, Puducherry and Tuticorin in Tamil Nadu and Mandvi-Mundra and Okha Madhavpur areas of Kachchh and Saurashtra coasts of Gujarat. Freshwater-saline water interface has been demarcated in the Saurashtra coast along Okha Maliya (Gulf of Kachchh), which was 10-20 km inland parallel to the coastline in 2004, while along Okha Madhavpur section, it was 10-12 km inland. In Madhavpur-Una section (Saurashtra coast), it was 2 to 10 km inland and in Una-Bhavnagar section (Gulf Khambhat), it was close to coast. In Minjur area near Chennai, the fresh water-saline water interface is currently about 16 km inland, due to over-exploitation ground water from alluvial deposits near the coast. Localized contamination of ground water due to industrial effluence has also been reported from the coastal areas of West Bengal, Tamil Nadu and Kerala.⁵³

Sanitation

India's sanitation coverage has gone up from 39 percent in 2014 to more than 80 percent in 2018.⁵⁴ All states except Bihar, Odisha, Puducherry and Uttar Pradesh records more than 70 percent coverage by individual household latrines. However, wide coverage of poorly designed septic tanks / toilet pits and disposal of faecal sludge is more of an issue; mainly in denser coastal areas.

2.18 Pollution of Rivers, Marine and Coastal Areas

Increasing levels of organic and inorganic pollution in the coastal waters is a cause of concern; due to reduced DO and increased microbial concentration levels; the two important indicators of health of coastal waters and affecting aquatic organisms. Some of the major sources of pollution include sewage, municipal waste, aquaculture wastes, industrial waste / waste water, ship building/ship breaking yard wastes, port and harbour wastes, dumping of waste, ballast water and oil spill and bilge, waste and waste water from fish processing industries/salt pans, and tourist resorts. Critical species including coral reefs are undergoing rapid destruction due

⁵³ <http://cgwb.gov.in/WQ/Costal%20Report.pdf>

⁵⁴ Iyer, P. 2018. *Infrastructure and Investments in Water and Sanitation in India: Background Note*, Ministry of Finance, Government of India
Accessible at: http://ris.org.in/pdf/aiib/31May2018/Background_Note.pdf
Accessed on: April 2019

to destructive fishing techniques and reef mining for calcium carbonate production, overfishing by small boats, siltation as a result of deforestation, sedimentation, marine pollution and contaminants, sewage and solid waste disposal, irresponsible tourism and fresh water dilution.

Polluted River stretches

In 2015, CPCB identified 302 polluted river stretches in the country. Under National water quality monitoring Programme, 445 rivers are being monitored at 1275 locations and organic pollutants are identified as predominant cause of water pollution. In 2017, CPCB identified 351 as polluted, and in need of restoration of river water quality.⁵⁵

The assessment of water quality for identification of Polluted River Stretches in 2017⁵⁶ has found that there are 31 States and Union Territories having rivers and streams not meeting water quality criteria. The state of Maharashtra has highest number of 53 polluted river stretches followed by the Assam, Madhya Pradesh, Kerala, Gujarat, Odisha, West Bengal, Karnataka, Uttar Pradesh, Goa, Uttarakhand, Mizoram, Manipur, Jammu & Kashmir, Telangana, Meghalaya, Jharkhand, Himachal Pradesh, Tripura, Tamil Nadu, Nagaland, Bihar, Chhattisgarh, Andhra Pradesh, Sikkim, Punjab, Rajasthan, Puducherry, Haryana and Delhi.

Sewage

It is estimated that 13 coastal states/UTs generate more than 33,215 MLD of sewage. Often, raw sewage disposed directly into coastal waters reduces the DO levels much below the prescribed 5 mg per litre, affecting larvae and juveniles which are very sensitive to DO levels for their survival. Sewage treatment facilities are developed for less than a third of the total sewage generated by coastal cities. Major portion of the sewage is channelized through rivers, streams, creeks and rivulets, which runs across and along the coastal regions to finally drain into the sea. To reduce the sewage load in to Gulf of Kachchh, 70 MLD Sewage Treatment Plant for Jamnagar District has been undertaken as part of ICZMP. National Coastal Mission aims to enhance treatment capacity of an estimated 7,500 MLD and 12,000 MLD of sewage and industrial effluent discharge respectively into the sea.

Solid Wastes and Marine Plastics

Studies on Solid Waste Management in India shows that only around a third of the total waste generated in the country is treated⁵⁷. The rate of generation of hazardous wastes in India was 7.467 million tonnes/year as in 2016. Total waste handling capacities (disposal capacity) of Hazardous Waste Treatment facilities in India, is 15,00,568 million tonnes/year which is much less than the present generation of 27,28,326 MTA of land-disposable hazardous wastes.

⁵⁵ <http://cpcb.nic.in/wqm/PollutedStretches-2018.pdf>

⁵⁶ *Ibid*

⁵⁷ [http://www.uncrd.or.jp/content/documents/5688\[1121\]%20India.pdf](http://www.uncrd.or.jp/content/documents/5688[1121]%20India.pdf)

Litter disposal and accumulation in the marine environment is one of the fastest-growing threats to the health of the world's oceans (Pham et al., 2014⁵⁸). Marine debris, also known as marine litter, has been defined by UNEP (2009)⁵⁹ as “*any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment*”. Coastal litter impacts in multiple ways, the most importantly they degrade the quality and health of our oceans, damage coastal and marine habitats and harm marine biota. It is estimated that about 6.4 million tons of marine litter are being disposed in to the seas annually (UNEP, 2009⁶⁰) and that the annual rate of production of plastic has touched 300 million tons in 2010 itself (Thompson et al., 2009⁶¹). Plastics enter into the coastal and marine ecosystem either directly by illegal dumping or accidental loss of debris during fishing /cargo operations and oil rigs or indirectly by way of wind, rivers, streams, and storm drains. A study conducted on the beach litter the coastal states of India⁶² showed that Odisha coast has the lowest (0.31 g/m²) quantity and Goa coast (205.75 g/m²) the highest quantity of beach debris. Archipelagic coasts of Andamans and Lakshadweep recorded values higher than Kerala, Tamil Nadu, Andhra Pradesh, Odisha and West Bengal. Samples of debris collected from beaches revealed that all the items were domestic and anthropogenic discards. Plastic litters such as single use carry bags and sachets of soft drinks, edible oils, detergents, beverages, cases of cosmetics, toothpaste, PET bottles, ice cream containers etc., recorded highest mean of 25.47g/m² from Goa coast and the lowest (0.08 g/m²) from Odisha. As per a study conducted by National Institute of Ocean Technology (NIOT), Chennai; in Kerala, microplastics were found in all sediment samples of Vembanad Lake (a Ramsar site); while in Daman & Diu, plastic particles were found in the stomach of a Longman's Beaked Whale. Fishes and clams are the major source of protein to the local population. Presence of microplastics in these is hence a severe threat, which contaminates the food web of this lake. The analysis of sediment samples from a remote coral island in the Indian Ocean indicates presence of macro, meso and microplastics. Micro-plastics containing toxic chemicals is among the biggest components in marine litter. In 2012, 'Manila Declaration of Furthering the Implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities' was adopted to develop policies to reduce and control waste water, marine litter and pollution from fertilizers.

⁵⁸ Pham, C. K., Ramirez-Llodra, E., Alt, C. H. S., Amaro, T., Bergmann, M., Canals, M., et al. (2014). *Marine litter distribution and density in European Seas, from the shelves to deep basins*. PLoS ONE, 9, e95839.

⁵⁹ UNEP, 2009. *Marine Litter: A Global Challenge*. Nairobi: UNEP. 232 pp.

⁶⁰ *Ibid*

⁶¹ R.C. Thompson, C.J. Moore, vom Saal, F.S. and Swan, S.H. *Plastics, the environment and human health: current consensus and future trends*, *Philos. Trans. R. Soc. B*, 364 (2009), pp. 2153-2166

⁶² Kaladharan et al, 2014. *Prevalence of marine litter along the Indian beaches : A preliminary account on its status and composition*, CMFRI, Kochi

Available at:

http://eprints.cmfri.org.in/12330/1/JMBAI_59_1_2017_Kaladharan%20P_Prevalence%20of%20marine%20litter%20along.pdf

Accessed on: April 2019

2.19 Institutional Baseline

This section discusses the major institutions involved in managing the coastal environment in India.

2.19.1 Ministry of Environment, Forests and Climate Change

The Ministry of Environment, Forest and Climate Change (MoEFCC)⁶³ is the nodal agency in the Government of India for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes relating to conservation of the country's natural resources and prevention and abatement of pollution. While implementing these policies and programmes, the Ministry is guided by the principle of sustainable development and enhancement of human well-being.

The Ministry also serves as the nodal agency in the country for the United Nations Environment Programme (UNEP), South Asia Co-operative Environment Programme (SACEP), International Centre for Integrated Mountain Development (ICIMOD) and for the follow-up of the United Nations Conference on Environment and Development (UNCED). The Ministry is also entrusted with issues relating to multilateral bodies such as the Commission on Sustainable Development (CSD), Global Environment Facility (GEF) and of regional bodies like Economic and Social Council for Asia and Pacific (ESCAP) and South Asian Association for Regional Co-operation (SAARC) on matters pertaining to the environment.

The Ministry has ten regional offices, seven subordinate offices, six autonomous organizations, four authorities/boards and two institutes including NCSCM functioning under it. In 1986, the Environment (Protection) Act (EPA, 1986) came into existence as an Umbrella Act to protect the environment. Subsequently, the MoEFCC introduced the Coastal Regulation Zone (CRZ) Notification in 1991 under the Environment Protection Act, 1986; subsequently reissued in 2011 and 2019. The National and State Coastal Zone Management Authorities (NCZMA and SCZMAs) have been delegated with powers to manage the coastal zones of the country. Two organisations, Society of Integrated Coastal Management (SICOM) and NCSCM have been formed under the aegis of MoEFCC as part of Integrated Coastal Zone Management Project (supported by the World Bank).

MoEFCC is the nodal ministry of the Government of India for ICZMP and ENCORE Programs.

2.19.1.1 Society of Integrated Coastal Management

SICOM, under MoEFCC; is the National Project Management Unit for ICZMP and ENCORE Programs. SICOM has been established under the aegis of the MoEFCC,

⁶³ Introduction <http://moef.gov.in/about-the-ministry/introduction-8/> accessed 23 Apr. 19

Government of India with a vision for vibrant, healthy and resilient Coastal and Marine Environment for continuous and enhanced outflow of benefits to the Country and the Coastal Community. Objectives and functions of SICOM are⁶⁴:

- To Support implementation of the Integrated Coastal Zone Management (ICZM) activities in India.
- To promote Research & Development (R&D) and stakeholder participation in management of the Coastal areas in India.
- To support to check violations to CRZ through improved technology-enabled enforcement, strengthened institutions, and regulatory and legal reform.
- SICOM is the National Project Management Unit of India in strategic planning, management, execution, monitoring and successful implementation of the ICZMP-Phase-I.
- Based on the success of the Phase-I of the ICZM project SICOM is entrusted to implement and extend the project to all the 13 Coastal States/UTs under Phase-II of the ICZM Project. An in-principle approval from DEA, Ministry of Finance, is obtained to extend the ICZM Project to all the 13 Coastal States/UTs (Maharashtra, Gujarat, Odisha, West Bengal, Andhra Pradesh, Tamil Nadu, Goa, Puducherry, Kerala, Karnataka, Daman and Diu, Andaman and Nicobar Island, Lakshadweep). Preparatory activities for the Phase-II (ENCORE) is in progress.
- SICOM has also embarked upon the Pilot Project Blue Flag Beach programme first time in India, identifying one beach each in all 13 Coastal States/UTs. The main objective programme is to promote sustainable development in coastal regions of India for the beach management authorities to strive to achieve high international standards in four categories of:
 - Environmental Management including cleanliness, solid waste management in beaches.
 - Environment Education.
 - Safety & Security of Beachgoers.
 - Bathing Water Quality Standards.
- SICOM has initiated the above process in 13 pilot beaches (one pilot beach in every Coastal States/UTs) under this programme and in line with Swachh Bharat Abhiyan.
- To undertake any additional work or function as may be assigned by MoEFCC from time to time in the areas of coastal management and other related activities.

2.19.1.2 National Centre for Sustainable Coastal Management

NCSCM, under MoEFCC; Government of India has the following vision and mission that would aid in the better protection, conservation, rehabilitation, management and policy design of the coast. It would promote integrated and sustainable management of coastal and marine areas in India and advise the Union and States/ Union Territory

⁶⁴ <http://sicom.nic.in/about-us/about-sicom>

Governments and other associated stakeholders on policy, and scientific matters relating to ICZM.

Vision:

Promote sustainable coasts through increased partnerships, conservation practices, scientific research and knowledge management for the benefit and well being of current and future generations

Mission and Role:

Support integrated management of coastal and marine environment for livelihood security, sustainable development and hazard risk management by enhancing

- Knowledge
- Research and Advisory Support
- Partnerships and Network
- Coastal Community Interface

Consortium Partner Institutions:

Fourteen institutions from coastal states have formed a consortium with NCSCM and signed the Anna University Declaration on 21 June 2010

Scientific Divisions of NCSCM

- Coastal Environmental Impact Assessment (CIA)
Cumulative Environmental Impact Assessment (CESIA) & real-time, long-term monitoring of critical coastal ecosystems
- Integrated Island Management (IIM)
Framework for development of Island Management Plan for conservation and socio-economic sustainability of India's islands
- Coastal and Marine Resources Conservation (CMR)
Conservation of Ecologically Sensitive Areas (ESAs) and demarcation of Critically Vulnerable Coastal Areas
- Integrated Social Sciences and Economics (ISE)
Community and livelihood issues, valuation of coastal ecosystem goods and services to support Integrated Coastal Zone Management
- Futuristic Research (FTR)
Measurement of Blue Carbon sequestration & real-time greenhouse gas emission from coastal ecosystems to develop long-term climate change scenarios
- Knowledge, Governance and Policy (KGP)
Preparation of ICZM Plan and knowledge management for coastal governance and policy. Develop capacity in coastal zone management for all stakeholders
- Geospatial Sciences (GEO)
Development of science-based decision support using state-of-art technology in Remote Sensing and Geographic Information System (GIS)

2.19.1.3 National Coastal Zone Management Authority

The National Coastal Zone Management Authority (NCZMA) is constituted by the Central Government exercising powers conferred by sub-sections (1) and (3) of section 3 of the Environment (Protection) Act, 1986 (29 of 1986) for the purposes of protecting and improving the quality of the coastal environment and preventing, abating and controlling environmental and social pollution in the coastal areas. The Authority has been tasked with dealing with all environmental and social issues relating to coastal regulation zone which may be referred to it by the Central Government. The Authority was constituted last on 6th October 2017 and has a term of two years. The major functions of the NCZMA are:

- co-ordinating the actions of the State (S) and Union Territory (UT) Coastal Zone Management Authorities (CZMA)
- examine the proposals for changes or modifications in the clarification of Coastal Zone Areas and in the Coastal Zone Management Plans received from the State/UT CZMA
- review cases involving violations
- provide technical assistance and guidance to concerned authorities in the matters relating to protection and improvement of the coastal environment
- examine and accord its approval to area specific management plans, integrated coastal zone management plans and modifications thereof submitted by the State/ UT CZMA

As per the Coastal Regulation Zone 2019, the following also come under the purview of the NCZMA:

- In the case of CRZ – II, for any change in the norms for the Floor Space Index (FSI) or Floor Area Ratio (FAR), the request has to be made through the state/UT CZMA. The NCZMA will examine various aspects like availability of public amenities, environmental protection measures, etc., and take a suitable decision on the proposal.

The CRZ 2019 has also delegated responsibility to accord clearance for permissible and regulated activities in the CRZ. Paragraph 7 of the Notification states that “All development activities or projects in CRZ-I and CRZ-IV areas, which are regulated or permissible as per this notification, shall be dealt with by Ministry of Environment, Forest and Climate Change for CRZ clearance, based on the recommendation of the concerned Coastal Zone Management Authority”. In case of projects in the CRZ-II or CRZ-III which also happen to be traversing through CRZ-I or CRZ-IV areas or both, “CRZ clearance shall, however be considered only by the Ministry of Environment, Forest and Climate Change, based on recommendations of the concerned Coastal Zone Management Authority”.

2.19.1.4 State and District Coastal Zone Management Authorities

The State/ Union Territory Government constitutes the District Coastal Zone Management Authorities (DCZMA) with Collector of the District as its Chairman, to monitor, enforce and implement the provisions of Coastal Regulation Zone at the district level. Proposals seeking clearance under Coastal Regulation Zone Notification are first scrutinized by the DCZMA and then submitted to State Coastal Zone Management Authority (SCZMA). The DCZMA assists the State Coastal Zone Management Authority in discharging the expected duties apart from attending to the local issues concerned with the Coastal Regulation Zones.

The SCZMA is designated as having the power to take various measures for protecting and improving the quality of the coastal environment and preventing, abating and controlling environmental pollution in areas of the respective State/UT. These include:

- examination of proposals for changes/ modifications in classification of Coastal Regulation Zone areas and in the Coastal Zone Management Plan (CZMP) received from the State Government and
- making specific recommendations to the National Coastal Zone Management Authority
- inquiry into cases of alleged violation of the provisions of the said Act
- identify ecological sensitive areas
- identify areas vulnerable to erosion/degradation in the CRZ and
- formulate area specific plans for their management etc.

2.19.2 Science and information available for evidence-based decision making

2.19.2.1 Coastal Hazard Line for Coastal Planning

CRZ Notification 2019⁶⁵ explains Coastal Hazard Line as follows: “A ‘Hazard line’ has been demarcated by the Survey of India (SOI) as part of ICZMP, taking into account the extent of the flooding on the land area due to water level fluctuations, sea level rise and shoreline changes (erosion or accretion) occurring over a period of time. The hazard line mapped by SOI has been shared with the coastal States or Union territories through NCSCM. The hazard line shall be used as a tool for disaster management for the coastal environment, including planning of adaptive and mitigation measures. With a view to reduce the vulnerability of the coastal communities and ensuring sustainable livelihood, while drawing the CZMP, the land use planning for the area between the Hazard line and High Tide Line (HTL) shall take into account such impacts of climate change and shoreline changes.

⁶⁵ MoEFCC 2019. CRZ Notification; Annexure IV, Guidelines for Preparation Of Coastal Zone Management Plans

2.19.2.2 Demarcation of High Tide Line and Low Tide Line

MoEFCC has authorised eight (8) agencies of national importance to demarcate the HTL and Low Tide Line (LTL) in the CRZ. The Coastal State Governments and Union Territory administrations are requested to take up demarcation of HTL and LTL along the CRZ with assistance of any of the 8 agencies which include:

- i) Space Application Centre, Ahmedabad
- ii) Centre for Earth Science Studies, Thiruvananthapuram
- iii) Institute for Remote sensing, Anna University, Chennai
- iv) Institute for Wetland Management and Ecological Design, Calcutta
- v) Naval Hydrographer's Office, Dehradun
- vi) National Institute of Oceanography, Panaji, Goa
- vii) National Institute of Ocean Technology, Chennai
- viii) NCSCM, Chennai

CRZ Notification 2019⁶⁶ explains that *Demarcation of HTL and LTL as carried out by NCSCM for the entire coastline of the country, has been made available to the Coastal States or Union territories and only such demarcation of HTL and LTL shall be applicable for all purposes of this notification.*

2.19.2.3 Eco-Sensitive Areas

The Coastal Regulation Zone Notification, 2011 under the Environment (Protection) Act, 1986 has listed various coastal ecosystems, including Mangroves, corals and coral reefs and associated biodiversity, turtle and bird nesting grounds, horseshoe crab habitats, sea grass beds, geomorphological features (sand dunes, sandy beaches, biologically active mud flats), and other areas such as archaeological and heritage sites, national parks, sanctuaries and reserve forests, salt marshes, as Ecologically Sensitive Areas (ESAs). As per CRZ Notification 2019; (i) All ESAs shall be identified and boundary delineated by NCSCM using satellite data, (ii) The State Governments or Union territory Administrations through the authorised agencies shall prepare CZMP as per the guidelines contained in this notification highlighting the conservation and protection of the ESAs, (iii) Those activities permissible under the notification shall be included in the CZMP.

A framework has been developed for identification and demarcation of Highly Sensitive Zones within the coastal ecosystems using scientific criteria. The sensitivity thresholds would aid in preparation of location-specific Conservation Management Plans. A Digital Architecture for hosting the spatial, ecological and health data of coastal ecologically sensitive areas has been developed to serve as a National Knowledge System on coastal ESAs.

⁶⁶ Ibid

2.19.2.4 Critically Vulnerable Coastal Areas (CVCAs)

CRZ, 2011 Notification identified 12 sites along the coast of India as CVCAs for conservation ecologically sensitive areas involving the community. As per CRZ Notification, 2019; CVCAs shall be accorded special consideration for the purpose of protecting the critical coastal environment and difficulties faced by local communities. Sundarban region of West Bengal and other ecologically sensitive areas identified as under Environment (Protection) Act, 1986 such as Gulf of Khambat and Gulf of Kutchh in Gujarat, Malvan, Achra-Ratnagiri in Maharashtra, Karwar and Koondapur in Karnataka, Vembanad in Kerala, Gulf of Mannar in Tamil Nadu, Bhitarkanika in Odisha, Coringa, East Godavari and Krishna in Andhra Pradesh shall be treated as Critical Vulnerable Coastal Areas (CVCAs) and managed with the involvement of coastal communities including fisher folk who depend on coastal resources for their sustainable livelihood.

This baseline assessment presents the environmental and social sensitivities, challenges and opportunities for coastal development in India. Coastal India is rich in its resources and economic potential; which if appropriately and sustainably utilised could support its economic development and livelihoods. This explains the need for integrated planning based on the comprehensive strategic environmental and social assessment approach to take care of placement and suitability of projects in the coastal space. ICZM Plan; which is a strategic plan based on comprehensive environmental and social assessments and consultations is hence a necessity for coastal planning. In addition, moderate to low risks/impacts on the environmental and social components during project implementation shall be taken care of by developing appropriate mitigation measures and monitoring mechanisms arrived at through project level environmental and social assessments. It is important to have appropriate institutional structure to implement and monitor the mitigation measures during various project stages.

The Environmental Management Framework is “... an instrument that examines the risks and impacts when a project consists of a program and/or series of sub-projects, and the risks and impacts cannot be determined until the program or sub-project details have been identified. The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social risks and impacts. It contains measures and plans to reduce, mitigate and/or offset adverse risks and impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project risks and impacts, including on its capacity to manage environmental and social risks and impacts”.

Applicable National and State regulations and the World Bank Operational Policies need to be considered for effective management of environmental and social aspects; including siting criteria, environmental pollution control requirements, need for institutional mechanisms, occupational health and safety requirements, resource utilisation and considerations for cultural and social aspects.

3.1 Environmental Laws / Regulations Applicable for ENCORE

There are several laws and policies applicable to ENCORE subprojects in the coastal areas. Highlights of some of the key laws and policies are given in **Figure 3.1**. Prohibited/regulated/permitted activities under various environment acts in India is presented in **Annexure III**.

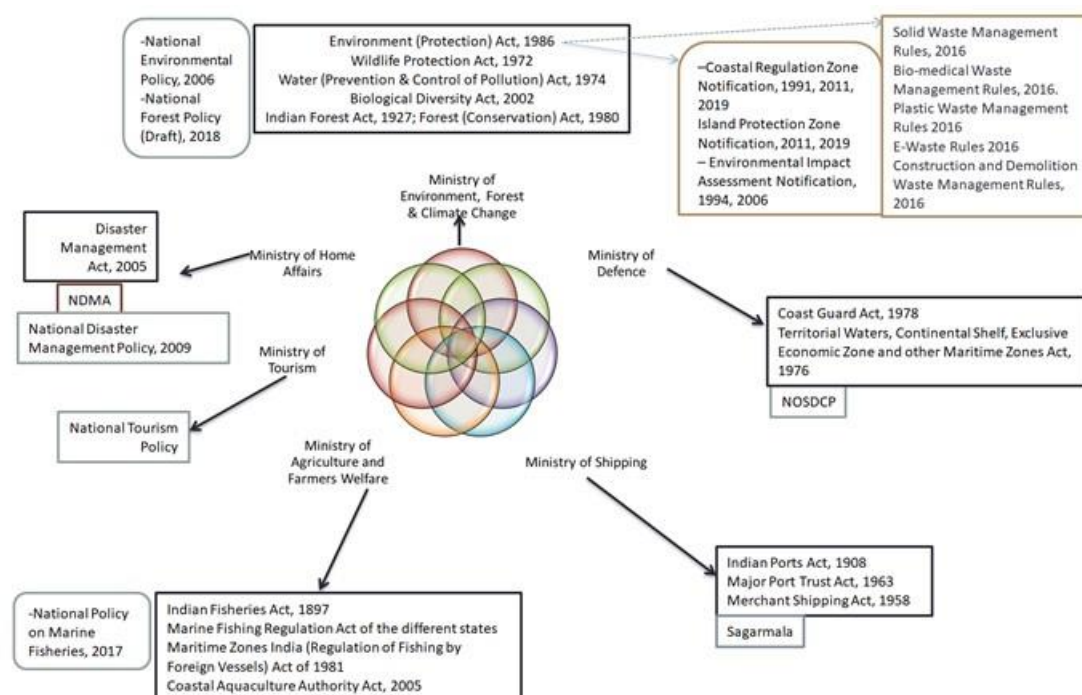


Figure 3.1: Legislation and Policy Instruments directly / indirectly Applicable to some Subprojects

3.1.1 National Environment Policy, 2006

In 1986, India brought out a National Environment Policy (NEP, 2006). The section on Coastal Resources in this policy refers to the diverse set of natural and manmade assets that provide habitats for marine species, which, in turn comprise the resource base for livelihoods of coastal communities and sustainable tourism, and also serves as protection from extreme weather events. The document also highlights the increasing degradation of coastal resources, indicating the causative factors as poor planning, improper location of industries and infrastructure, pollution from industries and settlements, and overexploitation of living natural resources and indicates the potential adverse impacts of sea level rise due to climate change in the future.

According to the NEP, the deeper root causes of the problems were inadequate institutional capacities and poor participation by local communities in the formulation and implementation of coastal management plans. Hence, though developmental activities are regulated by means of the Coastal Regulation Zone notification and management plans made under them, *there is need to ensure that the regulations are firmly founded on scientific principles, including the physical, natural, and social sciences. This is necessary to ensure effective protection to valuable coastal environmental resources, without unnecessarily impeding livelihoods, or legitimate coastal economic activity, or settlements, or infrastructure development* (NEP 2006, 5.1.3.ii). The NEP also recommended a re-visitation of the CRZ 1991 to ensure a more holistic approach and called for the preparation of CZM Plans with a strong scientific base and extensive local participation towards both formulation and implementation.

3.1.2 National Policy on Marine Fisheries, 2017

The overarching goal of the National Policy on Marine Fisheries, 2017 is to ensure the health and ecological integrity of the marine living resources of India's Exclusive Economic Zone (EEZ) through sustainable harvests for the benefit of present and future generations of the nation. The objective of this policy is to ensure sustainable harvest for securing the benefits of present and future generations. This policy will safeguard the health and ecological integrity of the marine living resources of India's Exclusive Economic Zone (EEZ). Some of the fisheries management strategies include fishing effort management; fleet size optimization; mainstreaming biodiversity conservation in production processes; species-specific and area-specific management plans, including conservation of Ecologically and Biologically Significant Areas and Vulnerable Marine Ecosystems; protection of iconic, endangered and threatened species. The Government will also undertake review and periodic evaluation of the existing marine protected areas for providing legislative support to ensure that tenure rights of the traditional fishermen are secured, and their livelihoods not impacted by such conservation measures. With a focus on actions against overexploitation of marine resources certain measures will be undertaken such as input and output controls such as fleet size, fishing

days, area of operation, engine horsepower, gear size, maximum sustainable yield (MSY), minimum mesh size, minimum legal size, diverting effort to areas which are relatively less harvested, fleet plans, and creating fisheries management areas to ensure that resource depletion is contained. To incorporate the rights of all stakeholders existing measures such as Territorial Use Rights for Fisheries will be promoted. The Ecosystem Approach to Fisheries Management (EAFM) will consider the integrated wellbeing of the marine and coastal resources and stakeholders. Further, participatory management or co-management in fisheries will be promoted.

3.1.3 *National Policy on Disaster Management, 2009*

The National Policy on Disaster Management (NPDM) was approved on 22 October 2009 with the vision “To build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response”. NPDM provides for an integration approach for management with emphasis on building strategic partnerships at various levels.

The primary responsibility for management of disaster rests with the State Government concerned. The institutional mechanism put in place at the Centre, State and District levels help states to manage disasters in an effective manner. The National Policy on disaster management puts in place an enabling environment for all.

India is also signatory to the Sendai Framework for Disaster Risk Reduction, 2015-2030 which identifies investing in Disaster Risk Reduction for resilience and to build back better in reconstruction as priorities for action towards reducing disaster risk. Goal Nine (9) of the Sustainable Development Goals (SDGs) recognizes disaster resilient infrastructure as a crucial driver of economic growth and development.

3.1.4 *Environment Protection (Act) 1986*

The Environment (Protection) Act was enacted in 1986 with the objective of providing for the protection and improvement of the environment. It empowers the Central Government to establish authorities (under section 3(3)) charged with the mandate of preventing environmental pollution in all its forms and to tackle specific environmental problems that are peculiar to different parts of the country. The Act was last amended in 1991. The Environment (Protection) Rules, 1986 set the standards for emissions or discharge of environmental pollutants, prohibitions and restrictions on the location of industries and the carrying on processes and operations in different areas and related activities. The powers conferred by the Environment Protection Act are followed under various heads including:

- Coastal Regulation Zone
- Eco-marks Scheme

- Eco-sensitive Zone
- Environmental Clearance – General
- Environmental Standards
- Hazardous Substances Management
- Noise Pollution
- Ozone Layer Depletion
- Water Pollution

The Environment (Protection) Act also allows areas to be designated with varying degrees of protection when designated as ecologically sensitive zones/ eco-sensitive zones, though as of now, no such designation has been made with specific reference to climate change. Two areas along the coast that have been designated as eco-sensitive zones are Dahanu and Murud-Janjira in Maharashtra.

3.1.5 Coastal Regulation Zone Notification

The CRZ Notification was first issued in 1991 and has since been reissued twice, in 2011 and 2019. CRZ, 1991 declared ‘the 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 HTL and the land between the LTL and the HTL as Coastal Regulation Zone’. The definition was expanded in 2011 to include the territorial waters (upto 12 nautical miles).

The CRZ is further divided into four classes. In 1991, CRZ IV referred to the island territories but in 2011 and 2019, a separate notification has been issued for managing coasts of islands.

The four classes in CRZ, 2019 are:

CRZ I:

IA: areas are environmentally most critical including ecologically sensitive areas (ESA) and the geo-morphological features which play a role in maintaining the integrity of the coast

IB: intertidal areas

CRZ II: developed land areas up to or close to the shoreline, within the existing municipal limits or in other existing legally designated urban areas, which are substantially built-up with a ratio of built-up plots to that of total plots being more than 50 per cent and have been provided with drainage and approach roads and other infrastructural facilities, such as water supply, sewerage mains, etc.

CRZ III: Land areas that are relatively undisturbed (viz. rural areas, etc.) and those which do not fall under CRZ-II

CRZ IIIA: areas with population density more than 2161 per square kilometre as per 2011 census base.

CRZ IIIB: areas with population density less than 2161 per square kilometre as per 2011 census base.

CRZ IV: Water Area

CRZ IVA: water area and the sea bed area between the LTL up to twelve nautical miles on the seaward side

CRZ IVB: 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, i.e., salinity of five parts per thousand (ppt) during the driest season of the year.

In addition to the four classes, the CRZ 2019 also includes areas that require special consideration in the CRZ. These include:

- Critically Vulnerable Coastal Areas (CVCA)
- CRZ for inland Backwater islands and islands along the mainland coast
- CRZ falling within municipal limits of Greater Mumbai

3.1.6 Island Protection Zone Notification

In 2011, along with the reissued CRZ Notification, a notification was issued that declared the coastal stretches of Middle Andaman, North Andaman, South Andaman and Greater Nicobar and entire area of the other islands of Andaman and Nicobar and the Lakshadweep and their water area upto territorial water limit as the Islands Protection Zone (IPZ) restricting setting up and the expansion of any industry, operations, processes etc., except in the manner provided in the Island Coastal Regulation Zone (ICRZ) and Integrated Islands Management Plans (IIMP).

The notification reissued in 2019 declared the coastal stretches of the ten bigger oceanic islands in Andaman & Nicobar viz., Middle Andaman, North Andaman, South Andaman, Great Nicobar, Baratang, Havelock, Little Andaman, Car Nicobar, Neil and Long islands and the water area up to territorial water limits of the country, as the Island Coastal Regulation Zone (ICRZ).

There are four classes under ICRZ:

- ICRZ-I: includes ecologically sensitive areas and the geo- morphological features which play a role in the maintaining the integrity of the coast; the intertidal zone,
- ICRZ-II: the developed land areas up to or close to the shoreline, within the existing municipal limits or in other existing legally designated urban areas, which are substantially built-up with a ratio of built up plots to that of total plots being more

than 50 percent and have been provided with drainage and approach roads and other infrastructural facilities, such as water supply and sewerage mains etc.,

- ICRZ-III: Land areas that are relatively undisturbed (viz rural areas etc) and those do not fall under ICRZ-II, shall constitute ICRZ –III,
- ICRZ-IV: water area and the sea bed area between the LTL up to twelve (12) nautical miles on the seaward side and 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, i.e., salinity of five parts per thousand (ppt) during the driest season of the year.

3.1.7 EIA Notification

This notification was first issued in 1994. It was reissued with greater details in 2006 (and is further in the process of amendment in 2018) and states that construction of new projects or activities or the expansion or modernization of existing projects or activities listed in the Schedule to this notification entailing capacity addition with change in process and or technology shall be undertaken in any part of India only after the prior environmental clearance from the Central Government (Category A projects) or as the case may be, by the State Level Environment Impact Assessment Authority (Category B Projects). Where state level authorities have not been constituted, the clearance would be provided by the MoEFCC.

Obtaining Prior Environmental Clearance is a four-step process (**Figure 3.2**).

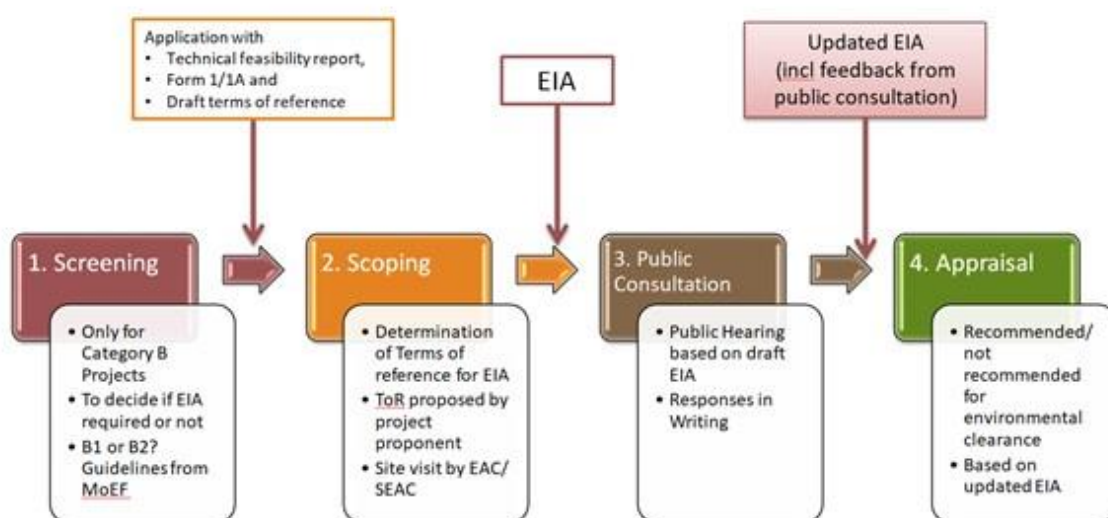


Figure 3.2: Overview of the EIA Process in India

As per the CRZ 2019 Notification, ‘Projects or activities which attract the provisions of this notification as also the provisions of EIA notification, 2006 number S.O. 1533(E), dated the 14 September, 2006, shall be dealt with for a composite

Environmental and CRZ clearance under EIA Notification, 2006 by the concerned approving Authority, based on recommendations of the concerned Coastal Zone Management Authority. In the case of Category A projects, it would be the MoEFCC and in the case of Category B projects, it would be the state/ UT Environmental Impact Assessment Authority (SEIAA). In the case of projects in CRZ areas, the Infrastructure and Miscellaneous Projects + CRZ committee is tasked with appraisal of projects.

3.1.8 *Wildlife Protection Act, 1972*

The Wildlife (Protection) Act, 1972 provides for both species-specific and spatial conservation strategies. Specifically, Chapter IV of the Act provides details of the declaration of sanctuaries, national parks and closed areas. Under the Act, currently, there are 24 Marine Protected Areas in peninsular India and more than 100 Marine Protected Areas in the country's islands. The 24 Marine Protected Areas of the mainland have a total area of about 8214 km², which is about 5 percent of the total protected area network of India and represents 0.25 percent of the total geographic area of the country (Sivakumar et al., 2014). Some of the important designated Marine protected Areas in mainland India are the Gulf of Kachchh Marine National Park, the Gulf of Mannar Marine National Park, Bhitarkanika National Park, Coringa Wildlife Sanctuary, Chilika Wildlife Sanctuary and Sundarban National Park. Since these are also included under CRZ-I of the CRZ 2011 Notification, development regulations apply to these too.

3.1.9 *Forest Act*

The Forest Conservation Act, 1980 prevents conversion of forest land for other purposes except through permission of the Central Government. The Biological Diversity Act, 2002, contains provisions that aim at preserving biodiversity as well as establishing a system for equitable sharing of benefits arising from the use of traditional biological resources and knowledge. Biodiversity Heritage Sites may be declared under this Act (Section 37) and Biodiversity Management Committees shall be constituted not only for biodiversity conservation but also for documentation and chronicling of biodiversity related knowledge. With respect to climate change, this would refer to knowledge on land races, cultivars etc., that can be used under different climate regimes.

Several laws are enacted at the State level; and these may vary from state to state. For example; regulations such as Floor space Index (FSI) and Floor Area Ratio (FAR) of buildings are overseen by Town and Country Planning Agencies and Local Bodies (Building Rules) and vary from state to state. Similarly, in the case of marine fisheries, each state has enacted its version of the Marine Fishing Regulation Act based on a framework provided.

The environmental safeguards framework aims at incorporating environmental considerations into the project design and development process to make the projects sustainable. The

important and relevant environmental legislations in India and their applicability to ENCORE is presented in tabular form in *Annexure III*.

3.2 Social Laws / Regulations Applicable for ENCORE

3.2.1 National Policy for Women

In 2016, Government of India in its Ministry of Women and Child Development formulated a draft women policy. The policy was formulated decade after the formulation of National Policy for the Empowerment of Women (2001). The objectives of the policy look at (1) creating a conducive socio-cultural, economic and political environment for women, (2) mainstreaming gender in all-round development processes / programmes, (3) a holistic and life cycle approach to women's health, (4) improving and incentivizing access of women / girls to universal and quality education, (5) improving participation of women in workforce etc. Different priority areas are identified in the policy that are contextually relevant for women, such as (a) health, food security and nutrition, (b) education, (c) economy (includes agricultural activities; poverty reduction; industry, labour and employment, service sector engagement etc.), (d) governance and decision making, (e) violence against women. In the line of National Policy for Women, the Government of Maharashtra has prepared a State policy on Women to protect their rights and entitlement.

3.2.2 Tribal Development and Tribal Sub-Plan (TSP) Approach

The tribal situation varies by states where some areas have high tribal concentration while in other areas, the tribals form only a small portion of the total population. The Constitution of India provides a comprehensive framework for the socio-economic development of Scheduled Tribes and for preventing their exploitation by other groups of the society. A detailed and comprehensive review of the tribal problems was taken on the eve of the Fifth Five Year Plan and the Tribal Sub-Plan strategy took note of the fact that an integrated approach to the tribal problems was necessary in terms of their geographic and demographic concentration. The tribal areas in the country were classified under three broad categories, i.e., (1) category 1: States and Union Territories having a majority Scheduled Tribes population, (2) Category 2: States and Union Territories having substantial tribal population but majority tribal population in particular administrative units, such as block and tehsils, and (3) Category 3: States and Union Territories having dispersed tribal population.

In the light of the above approach, for the second category of States and Union Territories, tribal sub-Plan approach was adopted after delineating areas of tribal concentration. To look after the tribal population coming within the new Tribal Sub-Plan (TSP) strategy, in a coordinated manner, Integrated Tribal Development Projects were conceived during Fifth Five Year Plan. During the Sixth Plan, Modified Area

Development Approach (MADA) was adopted to cover smaller areas of tribal concentration and during the Seventh Plan, the TSP strategy was extended further to cover even more smaller areas of tribal concentration and thus cluster of tribal concentration was identified. At the time of delineation of project areas under the TSP strategy, it was observed that the ITDPs/ITDAs are not co-terminus.

At present, Scheduled Areas have been declared in the States of Andhra Pradesh (including Telangana), Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha and Rajasthan. As per the provisions contained in the Fifth Schedule of the Constitution, various enactment in the forms of Acts and Regulations have been promulgated in the states for the welfare of scheduled tribes and their protection from exploitation.

The TSP strategy is having twin objectives, i.e., Socio-economic development of Schedule Tribes and protection of tribal against exploitation, the Government of India in August, 1976 had decided to make the boundaries of Scheduled Areas co-terminus with TSP areas (ITDP/ITDA only) so that the protective measure available to Scheduled Tribes in Scheduled Areas could be uniformly applied to TSP areas for effective implementation of the development programmes in these areas. Accordingly, the TSP areas have been made co-terminus with Scheduled Areas in the State.

3.2.3 Right to Fair Compensation and Transparency in Land Acquisition, Resettlement and Rehabilitation (RFCTLAR&R) Act, 2013

The Right to Fair Compensation and Transparency in Land Acquisition, Resettlement and Rehabilitation (RFCTLAR&R) Act, 2013, enacted by the Government of India is the latest legislation. This is in force and supersedes all other old acts for land acquisition and to determining R&R activities throughout the country. The act shall apply, when the Government acquires land for its own use, hold and control, including for Public Sector Undertakings and for public purpose.

This act specifies that the process of obtaining the consent shall be carried out along with the Social Impact Assessment (SIA) study. The act also has the provision that no land shall be transferred by way of acquisition, in the Scheduled Areas in contravention of any law (including any order or judgment of a court which has become final) relating to land transfer, prevailing in Scheduled Areas.

The act defines (1) "affected area" as such area as may be notified by the Government for the purposes of land acquisition; (2) "affected family" includes a family whose land or other immovable property has been acquired; a family which does not own any land but a member or members of such family may be agricultural labourers, tenants including any form of tenancy or holding of usufruct right, share-croppers or artisans or who may be working in the affected area for three years prior to the acquisition of the land, whose primary source of livelihood stand affected by the acquisition of land; (3) the Scheduled Tribes and other traditional forest dwellers who have lost any of their

forest rights recognised under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 due to acquisition of land (4) family whose primary source of livelihood for three years prior to the acquisition of the land is dependent on forests or water bodies and includes gatherers of forest produce, hunters, fisher folk and boatmen and such livelihood is affected due to acquisition of land.

The act further specifies that a member of the family who has been assigned land by the State Government or the Central Government under any of its schemes and such land is under acquisition; and a family residing on any land in the urban areas for preceding three years or more prior to the acquisition of the land or whose primary source of livelihood for three years prior to the acquisition of the land is affected by the acquisition of such land. This Act also provides institutional mechanism for conducting social impact studies and conducting consultations. Detail provision of the act with regard to compensation, rehabilitation and resettlement are discussed in the section for Resettlement Policy Framework. Some of the State Acts / Rules in this regard are as follows:

<i>West Bengal</i>	
Memorandum of the Government of West Bengal, 2016	This memorandum vide Gazette Notification is to ensure the optimal utilization of public funds and early implementation of projects where direct land purchase from land-owners may become necessary. This memorandum discusses the procedure of the same including publication of notice, fund allocation to the local administrative bodies or department for purchase of land and price determination.
<i>Odisha</i>	
Odisha RFCTLARR Rules, 2015	Following the National RFCTLARR Act, 2013, this State Act explains the process of land acquisition ensuring fair compensation and satisfactory rehabilitation and resettlement. This Act includes processes such as informing the public, settling of land right dues, consultations and SIA study, preparation of social impact management plan with R & R entitlement matrix, publication of all the reports and obtaining consent. This Act also specifies the process for determining the price and compensation, also the parties eligible for compensation, preparation of the draft R & R scheme, public hearings, allocation of land. See also, Land Rights to Slum Dwellers Act, 2017, Odisha direct purchase guideline 2016, Government Order of allotment of homestead land to eligible landless persons 2016
<i>Andhra Pradesh</i>	
Andhra Pradesh Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, 2014	This set of rules provides instructions regarding land acquisition, resettlement and compensation for the State of Andhra Pradesh. It includes the processing of requisition for land acquisition, social impact assessment, public hearing, declaration of land acquisition and compensation. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules of Andhra Pradesh also has provision if an acquired land remains unused for more

	than five years then it shall be returned to original owner or to the land bank by a notice.
Provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (PESA) applicable to Andhra Pradesh	<p>The salient feature of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (PESA) and the modalities worked out to grant rights to tribals in the country are:</p> <ol style="list-style-type: none"> 1. Legislation on Panchayats shall be in conformity with the customary law, social and religious practices and traditional management practices of community resources; 2. Habitation or a group of habitations or a hamlet or a group of hamlets comprising a community and managing its affairs in accordance with traditions and customs; and shall have a separate Gram Sabha. 3. Every Gram Sabha to safeguard and preserve the traditions and customs of people, their cultural identity, community resources and the customary mode of dispute resolution. 4. The Gram Sabhas have roles and responsibilities in approving all development works in the village, identify beneficiaries, issue certificates of utilization of funds; powers to control institutions and functionaries in all social sectors and local plans. <p>Gram Sabhas or Panchayats at appropriate level shall also have powers to manage minor water bodies; power of mandatory consultation in matters of land acquisition; resettlement and rehabilitation and prospecting licenses/mining leases for minor minerals; power to prevent alienation of land and restore alienated land; regulate and restrict sale/consumption of liquor; manage village markets, control money lending to STs; and ownership of minor forest produce.</p>
	<p>Other acts which may be applicable to this project:</p> <p>Andhra Pradesh Agricultural Land (Conversion for Non-Agricultural Purposes) (Amendment) Act, 2012; Andhra Pradesh Ancient and Historical Monuments and Archaeological sites and Remains (Amendment) Act, 2001; Andhra Pradesh Farmers Management of Irrigation Systems Act, 1997</p>
Tamil Nadu	
Tamil Nadu Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, 2017	This set of rules comprises of instructions regarding land acquisition, resettlement and compensation for the State of Andhra Pradesh. It includes the processing of requisition for land acquisition, social impact assessment, public hearing, declaration of land acquisition and compensation. Other instructions are such as infrastructural amenities in resettlement area, provision of additional compensation and fishing rights in case of irrigation or hydel projects.

3.2.4 Panchayati Raj Act

As per the 73rd constitutional amendment act, 1992, the panchayats as the local self-government are empowered to plan execute and monitor certain activities as per the activity mapping. As per the status of devolution, 11 subjects have been fully devolved in the State of Maharashtra and 18 subjects / schemes are implemented by the PRIs. The act strengthens the decentralized governance system and promotes bottom-up planning. As per the act, the Gram Panchayat level plans are to be prepared in Gram Sabha which is having an important bearing on the planning process of the proposed project. The act is having both mandatory and discretionary provisions and of the

mandatory provisions of the Panchayati Raj Act, the most critical are those that strengthen the structure of representative democracy and political representation at the local level. Some of the salient features of the mandatory provisions of the Act are;

- The establishment in every state (except those with populations below 2 million) of rural local bodies (panchayats) at the village, intermediate and district levels (Article 243B)
- Direct elections to all seats in the panchayats at all levels (Article 243C)
- Compulsory elections to panchayats every five years with the elections being held before the end of the term of the incumbent panchayat in the event that a panchayat is dissolved prematurely, elections must be held within six months, with the newly elected members serving out the remainder of the five-year term (Article 243E)
- Mandatory reservation of seats in all panchayats at all levels for Davits and Advises in proportion to their share of the panchayat population (Article 243D)
- Mandatory reservation of one-third of all seats in all panchayats at all levels for women, with the reservation for women applying to the seats reserved for Davits and Advises as well (Article 243D)
- Indirect elections to the position of panchayat chairperson at the intermediate and district levels (Article 243C)
- Mandatory reservation of the position of panchayat chairperson at all levels for Davits and Advises in proportion to their share in the state population (Article 243D)
- Mandatory reservation of one-third of the positions of panchayat chairperson at all three levels for women (Article 243D)
- In addition, the act mandates the constitution of two state-level commissions: an independent election commission to supervise and manage elections to local bodies, much as the Election Commission of India manages state assembly and parliamentary elections (Article 243K); and a state finance commission, established every five years, to review the financial position of local bodies and recommend the principles that should govern the allocation of funds and taxation authority to local bodies (Article 243I).

The Article 243ZD, mandates the constitution of District Planning Committees to consolidate the plans prepared by both rural and urban local bodies. In order to facilitate. This is an essential pre-requisite for each tier of the Panchayati Raj system to prepare plans for its areas, as defined through Activity Mapping, and then for all these plans, along with plans of municipalities, to be "consolidated" by the District Planning Committees (DPC) as mandated by Article 243 ZD of the Constitution.

3.2.5 *Panchayats (Extension to the Scheduled Areas) Act, 1996*

Following the recommendations of the Bhuria Committee, the Parliament extended the provisions of 73rd Amendment Act to the Scheduled Areas by passing Provisions of Panchayats (Extension to the Scheduled Areas) Act, 1996.

The Panchayat (Extension to the Scheduled Areas) Act, 1996, commonly known as PESA, legally recognizes Scheduled Tribe's own systems of self-governance. The Gram Sabha of the village becomes the focal institution, endowed with significant powers. Under section 4(d) of PESA: "every Gram Sabha shall be competent to safeguard and preserve the traditions and customs of the people, their cultural identity, community resources and the customary mode of dispute resolution." PESA legally recognizes the right of tribal communities to govern themselves through their own systems of self-government and also acknowledges their traditional rights over natural resources.

The salient feature of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (PESA) and the modalities worked out to grant rights to tribals in the country are:

- Legislation on Panchayats shall be in conformity with the customary law, social and religious practices and traditional management practices of community resources;
- Habitation or a group of habitations or a hamlet or a group of hamlets comprising a community and managing its affairs in accordance with traditions and customs; and shall have a separate Gram Sabha.
- Every Gram Sabha to safeguard and preserve the traditions and customs of people, their cultural identity, community resources and the customary mode of dispute resolution.
- The Gram Sabhas have roles and responsibilities in approving all development works in the village, identify beneficiaries, issue certificates of utilization of funds; powers to control institutions and functionaries in all social sectors and local plans.
- Gram Sabhas or Panchayats at appropriate level shall also have powers to manage minor water bodies; power of mandatory consultation in matters of land acquisition; resettlement and rehabilitation and prospecting licenses/mining leases for minor minerals; power to prevent alienation of land and restore alienated land; regulate and restrict sale/consumption of liquor; manage village markets, control money lending to STs; and ownership of minor forest produce.
- The provisions of Panchayats with certain modification and exceptions have been extended to the Schedule V areas.

In line with the PESA Act, the Government of Andhra Pradesh has introduced Panchayats Extension to Scheduled Areas (PESA) Rules, 2011. Similarly, Maharashtra has formulated rules for the Panchayats (Extension to Scheduled Areas) Act in 2014.

3.2.6 *Constitution (Seventy Forth Amendment) Act, 1992*

This Act is also known as the Nagarpalika Act which came into force in 1993. This Act empowers the urban local bodies by giving them constitutional status. This acts as a pillar for decentralization of urban governance in India. Article 243Q provides for establishment of 3 kinds of Municipalities such as Nagar Panchayat, Municipal council and Municipal Corporation. The municipal area will be divided in wards and all the members of the municipality will be elected by the people of the municipality. There shall be ward committees comprising of one or more wards. Reservation of the seats for the Scheduled castes and scheduled tribes in every municipality corporation will be in proportion to their population. Similarly, the reservation of seats for women will be not less than one-third of the total number of seats including seats reserved for women belonging to SC/ST category. The municipal corporations are entrusting with all the basic local level activities which will establish them as local self-governing units.

The municipalities will have functions related to –

- i) the preparation of plans for economic development and social justice;
- ii) the performance of functions and the implementation of schemes as may be entrusted to them including those in relation to the matters listed in the Twelfth Schedule;

The Legislature of a State may, by law, -(a) authorise a Municipality to levy, collect and appropriate such taxes, duties, tolls and fees in accordance with such procedure and subject to such limits; (b) assign to a Municipality such taxes, duties, tolls and fees levied and collected by the State Government for such purposes and subject to such conditions and limits; (c) provide for making such grants-in-aid to the Municipalities from the Consolidated Fund of the State; and (d) provide for constitution of such Funds for crediting all moneys received, respectively, by or on behalf of the Municipalities and also for the withdrawal of such moneys therefrom. as may be specified in the law (243X).

There shall be a committee for district level planning constituted in every State at the district level a District Planning Committee to consolidate the plans prepared by the Panchayats and the Municipalities in the district and to prepare a draft development plan for the district as a whole (243 ZD).

Following functions are the additions after the introduction of 12th Schedule;

1. Urban planning including town planning.
2. Regulation of land-use and construction of buildings.
3. Planning for economic and social development.
4. Roads and bridges.
5. Water supply for domestic, industrial and commercial purposes.
6. Public health, sanitation conservancy and solid waste management.
7. Fire services.
8. Urban forestry, protection of the environment and promotion of ecological aspects.
9. Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded.
10. Slum improvement and upgradation.
11. Urban poverty alleviation.
- 12.

Provision of urban amenities and facilities such as parks, gardens, playgrounds.13. Promotion of cultural, educational and aesthetic aspects.14. Burials and burial grounds; cremations, cremation grounds and electric crematoriums.15. Cattle pounds; prevention of cruelty to animals.16. Vital statistics including registration of births and deaths.17. Public amenities including street lighting, parking lots, bus stops and public conveniences.18. Regulation of slaughter houses and tanneries.

3.2.7 Forest Rights Act, 2006

This Act, “Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act”, 2006 grants legal recognition to the rights of traditional forest dwelling communities and makes a beginning towards giving communities and the public a role in forest and wildlife conservation. The Act secures the individual or community tenure or both and gives forest rights of forest dwelling Scheduled Tribes and other traditional forest dwellers on all forest lands, namely:- (a) right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers; (b) community rights over forest; (c) right of ownership, access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries. The scope of the Act also covers the following rights that are placed on the forest dwelling communities.

1. Community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access of nomadic or pastoralist communities;
2. Community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities;
3. Rights in or over disputed lands under any nomenclature in any State where claims are disputed;
4. Conversion of leases or grants issued by any local authority or any State Government on forest lands to title;
5. Settlement and conversion of all forest villages, old habitation unsurveyed villages and other villages in forest, whether recorded, notified, or not, into revenue villages;
6. Protect, regenerate, or conserve or manage any community forest resource, which they have been traditionally protecting and conserving for sustainable use;
7. Rights which are recognised under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribal under any traditional or customary law of concerned tribes of any State;
8. Access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity;
9. Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers, as the case may be, which are not

mentioned in clauses (a) to (k) but excluding the traditional right of hunting or trapping or extracting a part of the body of any species of wild animal;

10. In-situ rehabilitation, including alternative land in cases where the Scheduled Tribes and other traditional forest dwellers have been illegally evicted or displaced from forest land of any description without receiving their legal entitlement or rehabilitation prior to the 13th of December 2005.

3.2.8 Constitutional Safeguard for Scheduled Tribes

"Scheduled Tribes" means such tribes or tribal communities or parts of or groups within such tribes or tribal communities as are deemed under article 342 to be Scheduled Tribes for the purposes of the Constitution. As it is stipulated in the constitution, the President (President of India) may with respect to any State or Union Territory, and where it is a State, after consultation with the Governor thereof, by public notification, specify the tribes, or tribal communities or parts of or groups within tribes or tribal communities which shall for the purposes of this Constitution be deemed to be Scheduled Tribes in relation to that State or Union Territory, as the case may be. With regard to inclusion or exclusion, Parliament may by law include in or exclude from the list of Scheduled Tribes specified in a notification, any tribe or tribal community or part of or group within any tribe or tribal community.

Prohibition of Discrimination

As per this provision, the States shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them. Other provisions are;

1. No citizen shall, on grounds only of religion, race, caste, sex, place of birth or any of them, be subject to any disability, liability, restriction or condition with regard to (a.) access to shops, public restaurants, hotels and places of public entertainment; or (b.) the use of wells, tanks, bathing Ghats, roads and places of public resort maintained wholly or partly out of State funds or dedicated to the use of general public.
2. Nothing (clause (2) of article 29) shall prevent the State from making any special provision for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes and the Scheduled Tribes.
3. Nothing (sub-clause (g) of clause (1) of article 19) shall prevent the State from making any special provision, by law, for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes or the Scheduled Tribes in so far as such special provisions relate to their admission to educational institutions including private educational institutions, whether aided or unaided by the State, other than the minority educational institutions referred to in clause (1) of article 30.

3.2.9 *Equality of Opportunity in Matters of Public Employment*

There shall be equality of opportunity for all citizens in matters relating to employment or appointment to any office under the State. No citizen shall, on grounds only of religion, race, caste, sex, descent, place of birth, residence or any of them, be ineligible for, or discriminated against in respect of, any employment or office under the State. The Central and State Governments can make provision for the reservation of appointments or posts in favour of any backward class of citizens which, in the opinion of the Centre/State, is not adequately represented in the services under the State.

Protection of Rights

All citizens shall have the right (a) to freedom of speech and expression; (b) to assemble peaceably and without arms; (c) to form associations or unions; (d) to move freely throughout the territory of India; (e) to reside and settle in any part of the territory of India; and (g) to practise any profession, or to carry on any occupation, trade or business.

3.2.10 *The SCs and the STs (Prevention of Atrocities) Act, 1989*

The act was passed in 1989 to prevent Scheduled Castes and Scheduled Tribes from atrocities. The act suggests Precautionary and Preventive Measures. under which State Government shall identify the area where it has reason to believe that atrocity may take place or there is an apprehension of reoccurrence of an offence under the Act: The state shall order the concerned officer to visit the identified area and review the law and order situation. If deem necessary, in the identified area cancel the arms licenses of the persons, not being member of the Scheduled Castes or Scheduled Tribes, their near relations, servants or employees and family friends and get such arms deposited in the Government Armoury. The act suggests constitution of a high-power State-level committee, district and divisional level committees or such number of other committees as deem proper and necessary for assisting the Government in implementation of the provisions of the Act; The act has made provision to set-up a vigilance and monitoring committee to suggest effective measures to implement the provisions of the Act. The state can set-up Awareness Centres and organise Workshops in the identified area or at some other place to educate the persons belonging to the Scheduled Castes and the Scheduled Tribes about their rights and the protection available to them under the provisions of various Central and State enactments or rules, regulations and schemes framed there under. Under the act, Non-Government Organisations are encouraged for establishing and maintaining Awareness Centres and organizing Workshops and provide them necessary financial and other sort of assistance;

As per the provision of the act, the State Governments shall set up a Scheduled Castes and the Scheduled Tribes Protection Cell at the State head quarter under the charge of Director General of Police/Inspector General of Police. This Cell shall be responsible for (i) conducting survey of the identified area; (ii) maintaining public order and

tranquillity in the identified area; (iii) recommending to the State Government for deployment of special police force or establishment of special police post in the identified area; (iv) making investigations about the probable causes leading to an offence under the Act; (v) restoring the feeling of security amongst the members of the Scheduled Castes and the Scheduled Tribes; (vi) informing the nodal officer and special officer about the law and order situation in the identified area; (vii) making enquiries about the investigation and spot inspections conducted by various officers; (viii) making enquiries about the action taken by the Superintendent of Police in the cases where an officer in-charge of the police station has refused to enter an information in a book to be maintained by that police station; (ix) making enquiries about the wilful negligence by a public servant.

Annexure III presents sector wise regulations / Acts applicable for ENCORE with description of its provisions, applicability to the project and procedures to be followed.

3.2.11 *International Treaties*

At the global level, India has been proactive in contributing to international deliberations towards conservation and management of ecosystems, biological diversity and sustainable utilisation of resources. India is a signatory to various conventions related to environment (**Table 3.1**) and in this context, India has also enacted and implemented appropriate legislations and action plans for carrying out its international commitments.

Table 3:1 International Environmental Agreements

International Treaties	Details
The Ramsar Convention on Wetlands of International Importance, 1971	<p>The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands i.e. to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value.</p> <p>According to the Ramsar list of Wetlands of International Importance, As of February 2019, there are 27 Ramsar Sites in India which are required to be protected. Activities undertaken in the proximity of these wetlands should follow the guidelines of the convention.</p>
Vienna Convention for the Protection of the Ozone Layer	<p>Adopted in 1985, convention sets the framework for efforts to protect the globe's ozone layer by means of systematic observations, research and information exchange on the effects of human activities on the ozone layer and to adopt legislative or administrative measures against activities likely to have adverse effects on the ozone layer.</p>

International Treaties	Details
Montreal Protocol on Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer)	The original Montreal Protocol was agreed on 16 September 1987 and entered into force on 1 January 1989. It is designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. This treaty also requires controlling emissions of substances that deplete ozone.
United Nations Framework Convention on Climate Change (UNFCCC (1992))	This framework came into force on 21 March 1994 and aims to achieve stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level low enough to prevent dangerous anthropogenic interference with the climate system.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)	This convention came into force in 1992 and aims to reduce the amount of waste produced by signatories and regulates the international traffic in hazardous wastes.
Stockholm Convention on Persistent Organic Pollutants (POPs)	Treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment. Signed in 2001 and effective from May 2004
Rotterdam Convention on Prior Informed Consent (PIC) for certain Hazardous Chemicals and Pesticides in International Trade	To promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals to protect human health and the environment from potential harm; covers pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons.
UNEP Minamata Convention on Mercury	Adopted on 10 October 2013, this global treaty aims to protect human health and the environment from the adverse effects of mercury.
Strategic Approach to International Chemicals Management (SAICM)	SAICM's overall objective is the achievement of the sound management of chemicals throughout their life cycle so that by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health.
Convention on Biological Diversity (CBD), commonly Biodiversity	International legally binding treaty opened for signature at the United Nations Conference on Environment and Development (UNCED) in 1993. The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
Convention on the Conservation of Migratory Species (CMS or Bonn Convention)	Intergovernmental treaty, concluded under the aegis of the UNEP, concerned with the conservation of wildlife and habitats on a global scale. It is the only global convention specializing in the conservation of migratory species, their habitats and migration routes. The treaty aims to conserve terrestrial, aquatic and avian

International Treaties	Details
	migratory species throughout their range. India entered the force of CMS on 1.11.1983.
Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA)	<p>An independent international treaty developed under the auspices of the UNEP's Convention on Migratory Species. India is a party to this agreement.</p> <p>Aims to establish coordinated conservation and management of migratory water birds throughout their entire migratory range. It covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle.</p>
Convention concerning the Protection of the World Cultural and Natural Heritage	<p>WHC sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage. The States Parties: integrate the protection of the cultural and natural heritage into regional planning programmes, set up staff and services at their sites, undertake scientific and technical conservation research and adopt measures which give this heritage a function in the day-to-day life of the community. It explains how the World Heritage Fund is to be used and managed and under what conditions international financial assistance may be provided. States Parties to report regularly to the World Heritage Committee on the state of conservation of their World Heritage properties and to strengthen the appreciation of the public for World Heritage properties and to enhance their protection through educational and information programmes</p> <p>Date of Adoption was 16 Nov 1972</p> <p>This came into force on 17 Dec 1975</p> <p>India signed the convention on 14 Nov 1977</p>
Convention on International Trade in Endangered Species of Wild Fauna and Flora	<p>CITES is a multilateral treaty to protect endangered plants and animals. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild, and it accords varying degrees of protection to more than 35,000 species of animals and plants.</p> <p>Date of Adoption was 3 Mar 1973</p> <p>This came into force on 1 Jul 1975</p> <p>India signed the convention on 20 Jul 1976</p>
United Nations Convention on the Law of the Sea	<p>UNCLOS; the Law of the Sea Convention defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources.</p> <p>Date of Adoption was 10 Dec 1982</p> <p>This came into force on 16 Nov 1994</p>

International Treaties	Details
	India signed the convention on 10 Dec 1982
United Nations Fish Stocks Agreement	<p>UNFSA aims to ensure the long-term conservation and sustainable use of straddling and highly migratory fish stocks within the framework of UNCLOS.</p> <p>Date of Adoption was 4 Aug 1995</p> <p>This came into force on 11 Dec 2001</p> <p>India signed the convention on 19 Aug 2003 (accession)</p>
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	<p>PIC is a multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals. The convention promotes open exchange of information and calls on exporters of hazardous chemicals to use proper labelling, include directions on safe handling, and inform purchasers of any known restrictions or bans. Signatory nations can decide whether to allow or ban the importation of chemicals listed in the treaty, and exporting countries are obliged to make sure that producers within their jurisdiction comply.</p> <p>Date of Adoption was 10 Sep 1998</p> <p>This came into force on 24 Feb 2004</p> <p>India signed the convention on 24 May 2005 (accession)</p>
International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto	<p>MARPOL is short for maritime pollution and 73/78 short for the years 1973 and 1978) is one of the most important international marine environmental conventions. It was developed by the International Maritime Organization in an effort to minimize pollution of the oceans and seas, including dumping, oil and air pollution. The objective of this convention is to preserve the marine environment in an attempt to completely eliminate pollution by oil and other harmful substances and to minimize accidental spillage of such substances. All ships flagged under countries that are signatories to MARPOL are subject to its requirements, regardless of where they sail and member nations are responsible for vessels registered on their national ship registry.</p> <p>Date of Adoption was 2 Nov 1973</p> <p>This came into force on 2 Oct 1983</p> <p>Ratified Annexes I - VI</p>

3.2.12 Other Statutory Clearances Required

The project needs to comply with the various existing statutory requirements and it is envisaged that certain permission/s and clearance/s will be obtained from the competent authority/authorities as part of sub-project preparation and/or execution. This will depend mainly on the area, type, size and scope of the sub-project. The broad requirements envisaged at this point of time are summarized below:

Table 3:2 Key Statutory Clearances Required for Project Activities

Sl. No.	Clearance/ Authorization	Relevant Act	Competent Authority	Responsibility
1	Tree Cutting Permission	Forest Conservation Act, 1980	State Forest Department or Local Bodies / District Committee/Revenue Officials as the case may be (it is different in different states)	SPMU/PEA
2	Plants such as Crushers and/or Batching Plants	Air (Prevention and Control of Pollution) Act, 1981 and Noise Pollution (Regulation and Control) Rules, 2000	State Pollution Control Board	Concerned Contractor
3	Storage, handling and transport of hazardous material/s	Hazardous Waste (Management and Handling) Rules, 1989 and Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989	State Pollution Control Board	Concerned Contractor
4	Location/ layout of workers camp, equipment and storage yards	Environment Protection Act, 1986 and Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989	State Pollution Control Board	Concerned Contractor
5	Discharges from Labour Camp	Water (Prevention and Control of Pollution) Act, 1974	State Pollution Control Board	Concerned Contractor
6	Permission for sand mining from river bed	Environment Protection Act, 1986; CRZ 2019	State Mines and Geology Department (Mining Plan), Revenue Department / Local Bodies	Concerned Contractor

Environmental, health and safety issues during construction stage generally involve equity, safety and public health issues. The construction agencies require complying with laws of the land, which include inter alia, the following:

- Payment of Wages Act, 1936: It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers;
- Equal Remuneration Act, 1979: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees;

- Child Labour (Prohibition and Regulation) Act, 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry;
- Minimum Wages Act, 1948: The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act;
- The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act; the employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace, etc.;
- Workmen's Compensation Act 1923: The Act provides for compensation in case of injury by accident arising out of and during the course of employment;
- Contract Labour (Regulation and Abolition) Act, 1970: The Act provides for certain welfare measures to be provided by the contractor to contract labourers
- Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979: The inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home to the establishment and back, etc.;
- The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 and Rules, 1996
- Hazardous Wastes (Management and Handling) Rules, 1989: Occupiers generating hazardous wastes given in the list shall take all practical steps to ensure that such wastes are properly handled, i.e. collection, reception, treatment, storage, and disposed of without any adverse effects to human health and environment (Rule 4 Such occupier shall apply for authorization in prescribed format to the State Pollution Control Board).
- These are indicative and there may be more clearances required based on area / project activities. Hence, for each project, the agency conducting Environmental Assessment or Project Executing agency shall ascertain the list of all clearances required as per National, State, Local rules / regulations and requisite permissions and clearances shall be taken prior to start of the projects.

3.2.13 Applicability of World Bank Operational Policies and Guidelines to ENCORE

Since ENCORE Program is funded under Investment Project Financing (IPF) instrument of the World Bank, its operational policies (OPs) and bank procedures (BPs) are applicable for the project.

In addition to being an IPF, ENCORE also aims to use Development Linked Indicators (IPF + DLIs)⁶⁷ and as under regular IPF, environmental and social requirements apply to all activities for which Bank support is sought by the Borrower⁶⁸, whether they are financed by the Bank or from another source.⁶⁹ In addition, Bank Standards also apply to ‘associated activities’ – defined as facilities or activities that are not funded as part of the project, but are ‘directly and significantly related’ to the project, carried out or planned to be carried out, contemporaneously with the project, and necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.⁷⁰ Likewise, the scope of the environmental assessment includes the ‘area of influence’ of Bank-financed activities, which may span an entire sector or region. In each case the Bank policies are applied and compliance with them is verified at the same level.

Project Concept Note Review for ENCORE Program was before 01 October 2018 and hence World Bank Safeguard policies are applicable to the project. World Bank’s Environmental and Social Framework (ESF) is applicable to all project financing prepared post the 1st of October 2018. The policies will be applicable to the Phase I of this Multi-Phase Program. During the preparation of Phase II of the program, the safeguards instruments will be reassessed in line with the ESF as and when they are prepared for approval by the World Bank’s Board of Directors. The following summary presents an introduction to the World Bank’s ESF.

The World Bank Environmental and Social Framework sets out the World Bank’s commitment to sustainable development, through a Bank Policy and a set of Environmental and Social Standards that are designed to support Borrowers’ projects, with the aim of ending extreme poverty and promoting shared prosperity. This Framework comprises the following:

⁶⁷ IPF-DLI is a form of Investment Project Financing (IPF) and the IPF Policy, Directive and Procedure apply to it, as they do to regular investment lending. An IPF-DLI operation is subject to the same procurement, financial management, environmental and social, and anti-corruption requirements that govern any regular investment operation.

⁶⁸ as defined in the project’s legal agreement between the Borrower and the Bank

⁶⁹ The environmental and social requirements applicable to IPF operations with Concept Decision or equivalent before October 1, 2018, are set out in OPs 4.00, 4.01, 4.03, 4.04, 4.09, 4.10, 4.11, 4.12, 4.36, 4.37, 7.50 and 7.60. Those applicable to IPF operations with Concept Decision, or equivalent, on or after October 1, 2018, are set out in the Environmental and Social Policy and Environmental and Social Standards, or OP/BP 4.03, as appropriate, and OP 7.50 and 7.60. It is possible that environmental or social consequences might follow from an action supported under a DLI without being triggered by any underlying expenditures – for example, a change in legislation to allow the privatization of state-owned mines or industries. IPF environmental and social requirements apply in this case as they do to eligible expenditures.

⁷⁰ See ESS 1, paragraph 11.

- A Vision for Sustainable Development, which sets out the Bank’s aspirations regarding environmental and social sustainability;
- The World Bank Environmental and Social Policy for Investment Project Financing, which sets out the mandatory requirements that apply to the Bank; and
- The Environmental and Social Standards, together with their Annexes, which set out the mandatory requirements that apply to the Borrower and projects.

The World Bank Environmental and Social Policy for Investment Project Financing sets out the requirements that the Bank must follow regarding projects it supports through Investment Project Financing.

The Environmental and Social Standards set out the requirements for Borrowers relating to the identification and assessment of environmental and social risks and impacts associated with projects supported by the Bank through Investment Project Financing. The Bank believes that the application of these standards, by focusing on the identification and management of environmental and social risks, will support Borrowers in their goal to reduce poverty and increase prosperity in a sustainable manner for the benefit of the environment and their citizens. The standards will: (a) support Borrowers in achieving good international practice relating to environmental and social sustainability; (b) assist Borrowers in fulfilling their national and international environmental and social obligations; (c) enhance non-discrimination, transparency, participation, accountability and governance; and (d) enhance the sustainable development outcomes of projects through ongoing stakeholder engagement.

The ten (10) Environmental and Social Standards establish the standards that the Borrower and the project will meet through the project life cycle, as follows:

1. Environmental and Social Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
2. Environmental and Social Standard 2: Labor and Working Conditions;
3. Environmental and Social Standard 3: Resource Efficiency and Pollution Prevention and Management;
4. Environmental and Social Standard 4: Community Health and Safety;
5. Environmental and Social Standard 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
6. Environmental and Social Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
7. Environmental and Social Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
8. Environmental and Social Standard 8: Cultural Heritage;
9. Environmental and Social Standard 9: Financial Intermediaries; and
10. Environmental and Social Standard 10: Stakeholder Engagement and Information Disclosure.

Description of Applicable WB Safeguard Policies to Phase I

The World Bank has a set of OPs relating to environmental, social and legal aspects of projects. A policy is considered to have been triggered if the project activity relates to the content of any of the safeguard policies. Various actions and instruments to ensure that the requirements of those applicable policies will be satisfied in the further development of the project are guided through the ESMF.

The Multiphase program of ENCORE is categorized as an Environmental Category A project based on the potential risks associated with project interventions. While the overall program is environmentally beneficial as the major investments aim at improving coastal management through better planning, science informed interventions and most appropriate interventions; the construction activities environmental impacts that will need to be mitigated across the detailed design and implementation phases of the investments. The following environmental safeguard policies are applicable for the ENCORE Program.

Table 3.3: World Bank Safeguard Policies applicable for the Project

Sl No	WB Safeguard Policies	Safeguard Policies Triggered by ENCORE	
		Yes	No
1	Environmental Assessment (OP/BP 4.01)	√	
2	Natural Habitats (OP/BP 4.04)	√	
3	Pest Management (OP 4.09)	√	
4	Physical Cultural Resources (OP/BP 4.11)	√	
5	Involuntary Resettlement (OP/BP 4.12)	√	
6	Indigenous Peoples (OP/BP 4.10)	√	
7	Forests (OP/BP 4.36)		√
8	Safety of Dams (OP/BP 4.37)		√
9	Projects in Disputed Areas (OP/BP 7.60)		√
10	Projects on International Waterways (OP/BP 7.50)	TBD	

Detailed description of WB environmental safeguard policies applicable to ENCORE are presented in the **Table 3.4** here:

Table 3:4 Detailed description of Considerations in ESMF for applicable World Bank Safeguard Policies

Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/BP 4.01	Yes	<p>The focus of Phase I of ENCORE program (MPA) includes: Improved Capacity for Decentralized Coastal Management as Component 1, improved protection and pollution prevention and abatement in coastal areas under Component 2, and supported by strong Project Management, Evaluation and Monitoring. The investments under these components have been grouped in to 3 broad categories: (i) Integrated Coastal Zone Management and Marine Spatial Planning (ICZM/MSP), and capacity building to ensure the plans are effectively implemented; (ii) Conservation and protection of coastal and marine resources, especially ESAs and CVCAs by involving coastal communities and also establishing models for sustainable coastal livelihoods; and (iii) Coastal erosion and pollution management and related infrastructure improvement.</p> <p>Subprojects considered for implementation in Seven (07) States / and Two (02) Union Territories (UTs) of coastal India relate to improving the coastal environment leveraging the concepts of resource efficiency. In case of Gujarat, Odisha and West Bengal states, by and large the investments will be based on ICZM Plans which are already in place. For example, the investments specific to coastal/erosion protection shall necessarily be taken up only in areas where shore line management plans are place (as part of ICZM Plans). Such an inclusive approach will minimize safeguard risks. In addition, investments for coastal pollution prevention, livelihood support and coastal resilience identified in the ICZM Plans in these three project States will be taken up on priority.</p> <p>In case of new states, the MPA Phase I will primarily focus on preparing ICZM Plans for the priority coastal stretches. Parallely, the . investments which will inform effective coastal management solutions to guide ICZM Plan preparation would also be taken up for pilot / demonstration purposes. Such investments shall be no-regret, low to moderate risk, and high value for environmental enhancement – for example, mangrove plantation in the areas identified under ICZM Project for ecological restoration (by following the exclusion principles, and standard operating protocols).</p> <p>The typical investments under the project include: a) coastal protection activities such as mangrove afforestation and shelter belt plantations, b) habitat conservation activities such as restoration of seagrass meadows, coral reef restoration, eco-restoration of sacred groves and islands, development of hatcheries, rearing / rescue centers for turtles and other marine animals etc, c) converting / developing the existing beaches in to</p>

Safeguard Policies	Triggered?	Explanation (Optional)
		<p>“Blue Flag” category beaches, derisking the coastal tourism from EHSS perspective by improving the infrastructure, restoration and recharge of waterbodies, integrated infrastructure facilities for solid and liquid waste management in coastal small towns. In addition, the investments also includes sustainable coastal erosion and protection works. Such works will be carried out only in areas where Shore Line Management Plans have already been prepared (after detailed analysis of coastal processes where cumulative impacts of physical interventions have been studied) under ICZM Project. .</p> <p>The Project investments are expected to enhance and support coastal resources, minimize coastal pollution and improve the livelihoods of coastal communities. It is envisaged that the project would lead to positive impacts, including marine and coastal conservation, pollution prevention and effective utilization of coastal resources, and promotion of sustainable coastal livelihoods. In addition, the project is expected to provide a scientific basis and an effective coastal management framework (including institutional capacity) for resource efficient and integrated coastal management. Rather than adhoc placing and implementation of project investments in time and space without adequate planning considerations, the ICZM Plan which would be prepared by each State as part of the project would set the stage for investments, with a scientific basis; considering the environmental, social and climate related sensitivities among others. Thus, the proposed project mandate subsumes safeguards management as an integral part of the project objectives and implementation.</p> <p>While the ICZM Project has established exclusion areas such as ESAs and CVCAs (with protection, conservation, and management framework), and the the need and siting of subprojects is taken care of by comprehensive ICZM Planning which act as a prelude to subproject identification and implementation in the coastal zone, the safeguards risks will be low to moderate. However, temporary and localized environmental impacts during implementation of different investments across the coastal areas will arise. These impacts would be due to construction and related activities and the typical impacts include: (i) increase in noise, dust, impacts on air quality or safety risks due to poor construction methods and inadequate Operation and Maintenance (O&M) of facilities; (ii) temporary water quality impacts resulting from possible drainage and septage pollution from facilities created under the project or due to labor camps; (iii) impacts related to movement of vehicles including increased congestion, and conflicts with pedestrian movements; iv) hindered access/temporary changes in access to, and the use of, public spaces during construction/excavation works; and (v) public health risks due to</p>

Safeguard Policies	Triggered?	Explanation (Optional)
		<p>improper waste/debris, sludge, material storage, excavated silt/muck management, or lack of attention to labor camps and facilities for laborers. Some interventions may require civil works, and shifting of existing public utilities (telecommunication, power supply, water supply, and sewerage lines etc.), causing temporary disturbance and restriction of access to the communities. Desilting, dewatering and excavation activities required for water body improvement and civil works may pose issues related to storage space for odorous silt / muck, disturbances to the communities in terms of temporary blockage of accessways and common properties, disturbance to livelihood activities, dust and disturbance during transportation and disposal of silt, localized flooding, and temporary blockage of water channels. There may be temporary impacts due to migrant laborers in case the contractor decides to use them. Similarly, with project investments expected to spread along India's entire coast, including island territories, it is likely that some locations may have presence of indigenous population. Hence, there is a need for systematic safeguards management with pre-defined framework for risk mitigation, complying with World Bank and national requirements.</p> <p>The proposed project interventions would not lead to large scale, significant and/or irreversible impacts due to the proposed project interventions. This is also confirmed from the implementation experience of ICZM Project. However, to ensure minimization of safeguards risks, the program is designed to undertake activities that will enhance the quality of natural habitats with no conversion or negative impacts on sensitive environmental receptors. Activities that may have cumulative/regional impacts or large scale construction / Operation and Maintenance (O&M) stage impacts (such as hard coastal protection structures) will be taken up for implementation only if its necessity is established and guided by ICZM Plans. While the overall program is environmentally beneficial, some activities like construction and upgradation of infrastructure and facilities for coastal protection and pollution prevention, and certain livelihood support activities are likely to result in impacts that can effectively be managed across the detailed design and implementation phases of the investments.</p> <p>Many of the proposed activities under ENCORE have already been implemented on pilot scale under ICZM Project and the lessons learnt from the previous project reflect the the environmental and social benefits are significant and the risks and/or impacts are low to moderate and are temporary in nature. For example, ICZM Project has implemented mangrove plantation of local sepcies in 16,500 Ha. in degraded areas involving local communities. Prior to plantation, a detailed site suitability analysis was done and exclusion areas have been</p>

Safeguard Policies	Triggered?	Explanation (Optional)
		<p>identified. This has facilitated win-win opportunity where the Ecological value of degraded mangrove patch has increased and importantly community ownership of mangroves has been established. Similarly, a 70 mld STP constructed at Jamnagar city has ensured mitigating significant impact of discharging untreated sewage in coral areas in the west coast. This activity had limited, localized and temporary impacts during construction stage which was addressed through effective implementation of EMPs and EHS measures at site. Another example relate to livelihood improvement of fishermen on east coast in Odisha state where fishing activities are prohibited for about 7 months due to ecological sensitivities and mass annual congregation/nesting of olive ridley turtles. The project interventions have significantly reduced the illegal fishing and poaching activities.</p> <p>Thus, the proposed project investments pose low to moderate safeguards risks which are manageable. Further, to ensure that the spread of project activities all along the coast do not pose a higher level of cumulative risk, a well designed institutional mechanism of decentralized state level management of activities through State Project Management Units (SPMUs) with sufficient capacity are proposed to be established under the project. The SPMUs are in turn supported by a centre of excellence - National Centre for Sustainable Coastal Management.</p> <p>Considering the type and nature of investments and its spread in multiple coastal States, Safeguards Category for ENCORE Project is assigned as Category A</p> <p>While the nature of investments and the locations are broadly known, the exact site details are being worked out as part of DPR preparations. Considering this, in order to integrate environmental and social considerations in multiple subprojects proposed in different coastal States and effective safeguards management, in Phase I of MPA program, the borrower has prepared a Draft Environmental and Social Management Framework (ESMF) complying with World Bank requirements. ESMF describes screening process to decide the inclusion of proposed subprojects in the program and to categorize these based on defined criteria also following the WB safeguard policies and national regulations. ESMF describes the process for managing and mitigating anticipated impacts by a) following Strategic Environmental and Social Assessments (SESA) process as integral part of regional / sectoral plan preparation activities including ICZM Planning, b) Environmental and Social Impact Assessments (ESIA) and ESMPs for moderate risk projects; and c) using Generic ESMPs for low risk projects. In addition, set of Environmental Codes of Practice are also</p>

Safeguard Policies	Triggered?	Explanation (Optional)
		<p>included in the ESMF to guide integration of environmental aspects in planning and project related activities.</p> <p>ESMF directs the use of the World Bank Group Environmental Health and Safety (EHS) Guidelines on cross-cutting environmental and social, health, and safety issues potentially applicable to construction and other projects. Further, ESMF provides guidance on screening, assessing, planning and implementing mitigation measures, and supervising / monitoring the impacts to natural habitats, physical cultural resources and pest management.</p> <p>ESMF also describes the improved institutional mechanism, capacity building and cross learning at the National, State and Project levels, supervision and monitoring mechanisms and budget for ESMF implementation.</p> <p>Since location and design information for conducting activity-specific ESIAs for some of the project activities are likely to be available only during project implementation, the ESMF defines the detailed process for the consultations, reviews, and clearances.</p> <p>ESMF has been prepared after consultations with stakeholders to explain the need for impact/risk management framework for environmental and social aspects of ENCORE program, and the proposed framework to manage safeguards. National level consultations on ESMF will be conducted to take feedback of wider stakeholders before finalization of ESMF. The consultations will be continued during the implementation phase of the project.</p> <p>The draft ESMF will be disclosed both in country as well as on the Bank's IDU by July 5, 2019. Consultations on the draft ESMF are being co-ordinated by the National Project Management Unit (SICOM). This will be reviewed and approved by the WB safeguards team and disclosed as Draft in-country prior to appraisal prior to Board date in the website of NPMU, State PMUs and the World Bank (IDU) following applicable procedures. In addition, ESIAs for the projects which would be implemented during the first two years; will also be prepared and disclosed in the websites of NPMU and respective States following applicable procedures.</p>
Performance Standards for Private Sector Activities OP/BP 4.03	No	Considering the proposed program and its focus, the Private Sector activities are not envisaged and hence OP/BP 4.03 is not triggered.
Natural Habitats OP/BP 4.04	Yes	Project activities will not cause any conversion or degradation of natural habitats; but support their conservation and management. This policy is triggered as some of the project activities may

Safeguard Policies	Triggered?	Explanation (Optional)
		<p>have negative and minimal short term, implementation stage impacts which are temporary and reversible impacts on natural habitats (including rivers, streams, islands, sacred groves, mangrove forests).</p> <p>Important eco-sensitive areas (ESAs) and Critically Vulnerable Coastal Areas(CVCAs) and islands along the coast (CRZ I areas) have already been demarcated and conservation management mechanisms including preparation of Integrated Management Plans (IMPS) and Integrated Island Management Plans (IIMPs) are required as per CRZ notification 2019. Till such time the IMPs are approved and notified, activities shall be permitted on a case to case basis, by the Coastal Zone Management Authority with due regard to the views of coastal communities including fisher folk. Any activity in such sensitive areas thus need to be environmentally and socially most appropriate and without externalities and due considerations to safeguards as per national regulations as well.</p> <p>ESMF describes specific measures to mitigate potential impacts on these. While no significant conversion/degradation of this natural resource is expected to occur, screening mechanism in the ESMF enables early identification of such issues to exclude them. Subprojects involving natural habitat areas will need standalone Environmental Assessment with expertise to plan such projects and implement them, review ESMPs, supervise and monitor through stakeholder participation; so that they become part of the IMPs/IIMPs for the area when prepared. A set of ECoPs including CVCAs also have been included in the ESMF to describe specific considerations to be incorporated at planning / design stage to ensure conservation and management of natural habitats.</p>
Forests OP/BP 4.36	No	<p>Subprojects would not involve conversion or degradation of critical forest areas or any forest based commercial activities or logging. The locations proposed by two States (Odisha and Kerala) for establishment and sustainable management of environmentally appropriate, socially beneficial, coastal mangrove and shelter belt plantations for coastal protection are in and around designated coastal forests. While these activities do not in any way affect the designated forests, it is important to take precautionary measures to rule out any impacts. In this regard, the screening mechanism in the ESMF enables early identification of issues which may affect forests. ESMF includes detailed due diligence requirements to exclude the projects which involve conversion or degradation of forest areas and to mitigate any identified impacts to forested areas. ESMF highlights the need for joint planning between NPMU, SPMUs, PEAs and Forest Department of the State and communities while planning projects in and around natural habitat areas including coastal forests. The project ECoPs provided in the Draft ESMF,</p>

Safeguard Policies	Triggered?	Explanation (Optional)
		for use by contractors to prepare site specific ESMPs also suggest the use of only most appropriate native species; in consultation with the host communities and forest department; thus avoiding probable risks due to invasive / alien species.
Pest Management OP 4.09	Yes	<p>In some States, in order to improve the adaptive capacity of the local communities certain subprojects are included to revive traditional agriculture, improved agriculture using salt resistant species and floating farms/aquaponics have been proposed on pilot basis for demonstration benefit. Such projects /pilots/ demonstration activities are designed to follow sustainable agricultural practices excluding the use of synthetic pesticides. However, the practical aspects may demand use of such pesticides for controlled experiments with or without pesticides and hence suggestive of the need for incorporating pest management strategies; triggering OP 4.09 Pest Management.</p> <p>ESMF prepared by the borrower describes the need and process for preparing Integrated Pest Management Plan for such projects and due diligence on use of certain types of Pesticides. ENCORE would support the use of an Integrated Pest Management Plan for such subprojects. The project would disallow procurement of any banned pesticides. Management of soil nutrient content using traditional farming principles would be considered while planning agriculture / horticulture related projects. Such projects would invest in training of farmers in procurement, storage, use and disposal of pesticides (which are not banned) and necessitates use of ESMP with detailed Integrated Pest Management Plan, prepared based on the framework presented in the ESMF. In addition, de-weeding (weed removal from canals, waterbodies) activities will be performed mechanically, without the use of weedicides.</p>
Physical Cultural Resources OP/BP 4.11	Yes	<p>The policy on Physical Cultural Resources (OP 4.11) is of relevance as the Indian coastal areas have several Physical and Cultural Resources, the presence of such areas in proposed project interventions cannot be ruled out, especially based on implementation experience of ICZM Project – for example, . some project activities may be adjacent to certain cultural assets of interest to local communities including grave yards, places of worship, routes followed for religious activities commonly encountered in both urban/rural areas. Some activities may result in relocation of cultural assets or temporary access restrictions. In some cases traditional religious pathways through fields / rural areas, festivities etc, may be affected temporarily during construction works. Hence OP/BP 4.11 has been triggered.</p> <p>The ESMF includes criteria for screening locations of archaeological importance, and specific provisions to assess the potential impacts on resources considered to have historical or cultural significance prior to any activities being undertaken on</p>

Safeguard Policies	Triggered?	Explanation (Optional)
		the ground. The ESMF describes the process to be followed to prepare Physical Cultural Resources Management Plan including consultations to discuss associated issues with the communities. It also lays out provisions for the treatment of physical cultural resources that may be discovered during project implementation (chance finds).
Indigenous Peoples OP/BP 4.10	Yes	Since the project investments spread along India's entire coast, including island territories, some locations may have indigenous population and this aspect will be ascertained at sub-project level on a case to case basis. The ESMF includes IPPF that will guide preparation of IPP if required
Involuntary Resettlement OP/BP 4.12	Yes	Since the project interventions will be on public land, private land acquisition is not envisaged under this project. However, there are chances of encroachment of public land and therefore project has prepared RPF that will help prepare appropriate instruments such as RAP / ARAP if required..
Safety of Dams OP/BP 4.37	No	This project is not envisaged to involve any activity related to Safety of Dams as per OP/BP 4.37 and hence this policy is not triggered. Any subproject which would involve the construction or would concern the safety of the dams would be excluded from the project at the screening stage; using the screening criteria provided in the ESMF.

The World Bank Group's Environmental Health and Safety Guidelines

The World Bank Group's Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental and social assessment in which site-specific variables, such as host country context, assimilative capacity of the region. Defined as the exercise of professional skill, diligence, prudence and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying

levels of financial and technical feasibility. Applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental and social assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The World Bank Group General EHS Guidelines contain information on cross-cutting environmental and social, health, and safety issues potentially applicable to construction and can be downloaded via the following link.

https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

4.1 Subproject Typology

Project activities considered for implementation in Seven (07) States / and Two (02) Union Territories (UTs) of coastal India relate to improving the coastal environment; leveraging the concepts of resource efficiency. Three coastal States, namely; Gujarat, Odisha and West Bengal have prepared ICZM Plans as part of ICZMP Project supported by the World Bank. During MPA Phase I, ICZM Plans would be prepared for the selected coastal stretches in other States/UTs under the program. In addition to priority projects for coastal pollution prevention, livelihood support and coastal resilience identified in these ICZM Plans, those investments which will inform effective coastal management solutions to guide ICZM Plan preparation in these States/UTs will also be taken up for pilot / demonstration purposes during MPA Phase I.

Institutional capacity building for effective coastal management, Mapping and Database creation, and Monitoring / Research and laboratory Facilities would be supported under Phase I. Investments proposed by the States/UTs include a) mangrove afforestation / shelter beds, b) habitat conservation activities such as restoration of seagrass meadows, sand dune stabilisation using soft / green cover, eco-restoration of sacred groves, development of hatcheries, rearing / rescue centers for turtles and other marine animals etc, c) creation of infrastructure for tourism including interpretation and training centres, restoration and recharge of waterbodies, beach cleaning and development, use of renewable energy, other small infrastructure facilities (including shifting of power lines underground, improving post-harvest technology, fish landing/berthing facilities, works associated with restoration of rivers/streams). Livelihood improvement projects include demonstration of climate resilient or salinity resistant agriculture, water harvesting and recharge/storage, creation of infrastructure and facilities to support ecotourism and fisheries, community-based; small-scale mariculture, seaweed cultivation, aquaponics, and value addition to other livelihood activities. Phase I will also support watershed management plans, biodiversity conservation plans, fisheries assessment etc.

4.1.1 Impact Assessment Methodology

The project design of ENCORE subsumes good environmental and social management. It is designed to promote best environmental and social practices for the coastal space and has an inbuilt planning component; with strong base on studies and research.

Impacts due to a project / component or activities under a project can be positive (beneficial) and/or negative (adverse). Also, its repercussions or area of influence or spread may be local (limited in area/spread) or regional (wide area where the impact transcends or affects). Impacts may be limited or extensive in its magnitude (high/low impacts) and duration (short/long time frame). It may also be significant or insignificant

depending on the sensitivity of the parameters it affects (such as impact on endangered / not so adaptive species).

The criteria for determining significance are generally specific for each environmental and social aspect but generally the magnitude of each potential impact is defined along with the sensitivity of the receptor. Generic criteria for defining magnitude and sensitivity are summarized in the following subsections.

4.1.1.1 Magnitude and Duration of Impacts

The assessment of magnitude shall be undertaken in two steps. Firstly, the key issues associated with the ENCORE are categorized as beneficial or adverse. Secondly, potential impacts shall be categorized as High, Average, Low or negligible based on consideration of the parameters such as:

- Temporal extent (duration) and likelihood of the potential impact;
- Spatial extent of the potential impact;
- Reversibility of the Impact;
- Legal standards and established criteria.

The magnitude of potential impacts of ENCORE shall be identified according to the categories outlined in *Table 4.1* below.

Table 4:1 Aspects for Determining the Magnitude of Impacts

Aspects	High	Average	Low	Negligible/Nil
Duration of potential impact	Long term (more than 20 years)	Medium Term Lifespan of the Program (5 to 10 years)	1 to 2 years or Less than the lifespan of the program	Temporary with no detectable potential impact
Spatial extent of the potential impact	Regional – much beyond project boundaries	Beyond immediate Program components, site boundaries or local area	Within program boundary	Specific location within program component or site boundaries with no detectable potential impact
Reversibility of potential impacts	Potential impact (including positive impact) is effectively permanent, requiring considerable intervention to return to baseline	Potential impact requires a year or so with some interventions to return to baseline	Baseline returns Naturally or with limited intervention within a few months	Baseline remains constant
Legal standards and established	Against national/approved	Complies with limits given in national	Meets minimum national standard limits or	Not applicable

Aspects	High	Average	Low	Negligible/Nil
professional criteria	standards and or international guidelines/obligations	standards but not confirming to international lender guidelines in one or more parameters	international guidelines	
Likelihood of potential impacts occurring	Commonly occurs under typical operating or construction conditions (Certain)	Usually seen occurring under most situations (Likely)	Occurs under abnormal, exceptional or emergency conditions (Occasional)	Unlikely to occur

4.1.1.2 Sensitivity of Receptor

The sensitivity of a receptor shall be determined based on review of the population (including proximity/ numbers/ vulnerability) and presence of features on the site or the surrounding area. Criteria for determining receptor sensitivity of the program's potential impacts are outlined in the *Table 4.2* below.

Table 4:2 Criteria for Determining Sensitivity

<i>Sensitivity Levels</i>	<i>Description</i>
Very Severe	Vulnerable receptor with little or no capacity to absorb proposed changes or minimal opportunities for mitigation.
Severe	Vulnerable receptor with little or no capacity to absorb proposed changes or limited opportunities for mitigation.
Mild	Vulnerable receptor with some capacity to absorb proposed changes or moderate opportunities for mitigation
Low/Negligible	Vulnerable receptor with good capacity to absorb proposed changes or/and good opportunities for mitigation

4.1.1.3 Significance of the impact

Significance of potential impacts are established using the impact significance matrix shown in *Table 4.3* below.

Table 4:3 Assessment of Significance of Impacts

		<i>Sensitivity / Vulnerability / Importance of Resource / Receptor</i>		
		Low	Medium	High
<i>Magnitude of Impact</i>	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

4.1.1.4 Potential Key Environmental Impacts

The Project investments are expected to enhance and support coastal resources, minimize coastal pollution and improve the livelihoods of coastal communities. It is envisaged that the project would lead to positive impacts, including marine and coastal conservation, pollution prevention and effective utilization of coastal resources, and promotion of sustainable coastal livelihoods. In addition, the project is expected to provide a scientific basis and an effective coastal management framework (including institutional capacity) for resource efficient and integrated coastal management. Rather than adhoc placing and implementation of project investments in time and space without adequate planning considerations, the ICZM Plan which would be prepared by each State as part of the project would set the stage for investments, with a scientific basis; considering the environmental, social and climate related sensitivities among others. Thus, the proposed project mandate subsumes safeguards management as an integral part of the project objectives and implementation.

The assessment reveals no large scale, significant and/or irreversible impacts due to the proposed project interventions. The program will avoid undertaking any activities that will cause significant conversion or negative impacts on natural habitats and sensitive environmental receptors. Activities that may have cumulative/regional impacts or large scale construction / Operation and Maintenance (O&M) stage impacts (such as waste management, coastal protection structures) will be taken up for implementation only if its necessity is established and guided by ICZM Plans. The mechanism to predict the potential and mostly typical impacts on the key environmental and social parameters of sub-project areas is presented here. This is based on the baseline physical, environmental and social conditions, assessment of project components/sub-components and activities *viz a viz* the baseline and sensitivities.

Though siting of subprojects is taken care of by comprehensive ICZM Planning which act as a prelude to subproject identification and implementation in the coastal zone, environmental impacts may be expected in case the subprojects are designed without adequate care. Environmental impacts on sensitive areas though meagre may include

those due to change in landuse in or near environmentally sensitive coastal areas and impacts on environmental quality due to construction and related activities. The project will cause general construction stage impacts which include (i) increase in noise, dust, impacts on air quality or safety risks due to poor construction methods and inadequate operation and maintenance (O&M) of facilities; (ii) temporary water quality impacts resulting from possible drainage and septage pollution from facilities created under the project or due to labor camps; (iii) impacts related to movement of vehicles including increased congestion, and conflicts with pedestrian movements; iv) hindered access/temporary changes in access to, and the use of, public spaces during construction/excavation works; and (v) public health risks due to improper waste/debris, sludge, excavated silt/muck management, or lack of attention to labor management. Similarly, with project investments expected to spread along India's entire coast, including island territories, it is likely that some locations may have presence of indigenous population. Hence, there is a need for systematic safeguards management with pre-defined framework for risk mitigation.

The potential impacts of the program on the key environmental and social parameters are listed in **Table 4.4**. Significance of each impact based on the criteria defined above is also presented. In the subsequent sections, these impacts are discussed and framework to manage these have been included. ESIA studies for each subproject should modify and further detail out this analysis as applicable, based on site / project studies, professional judgment and public consultations. A preliminary categorization of the project components/sub-components based on their environmental and social assessment requirement.

A. Significant Environmental Impact Related to Project Siting

Land Cover and Land Use Changes:

Plans prepared under the project will determine the future landuse of the project areas. Construction of different infrastructure facilities may change existing land use and land cover at the local level; but spread across these Coastal States / UTs.

Loss of natural vegetation and trees/mangroves

Siting of proposed infrastructures may require cutting of trees and clearing / removal of natural vegetation.

Loss of aquatic / coastal / marine habitat

Siting of proposed infrastructures, specially the construction of small jetties, sheds, fish markets, offices, landing sites, and livelihood activities may impact some habitats. Siting of mariculture area or similar activities related to marine biodiversity may have indirect impacts on surrounding coastal and marine habitats in case of increased activities. Conservation and enhancement measures for the natural habitat shall be made

part of the project. Large mariculture / aquaculture activities will not be supported by the project.

Siltation, drainage congestion and water logging

Some of the proposed construction activities may cause drainage congestion and water logging at the local area, if not properly planned / designed.

However, it is important to note that major construction activities near to the coast or its sensitive resources would be planned only based on Integrated Coastal Zone Management Plans; which takes into consideration all sensitivities and science. Hence, these impacts could be assumed as well manageable.

B. Environmental Impacts during Project Implementation

Air Pollution

Construction of small buildings / civil works for markets, fish landing sites, canal desilting and repairing of sluice gates may generate emissions from excavation equipment, other machinery and construction traffic. The emissions may also include greenhouse gases (GHGs) from engine fuel combustion (exhaust emissions) and evaporation and leaks from vehicles (fugitive emissions) and other emissions. The emissions from construction activities will deteriorate the ambient air quality and affect the public health; more so in densely populated areas. In addition, dust generated from the above activities will also have impacts on crops and livestock.

Noise Pollution

Noise will be produced by vehicular movement, excavation machinery, concrete mixing, and other construction activities. Sensitive receptors such as hospitals, schools, religious places and crowded market areas are particularly vulnerable to increased noise levels.

Water Pollution

Implementation phase of infrastructure or activities closer to water bodies, can potentially cause some localized increase in water turbidity. However, this increase in turbidity being localized and temporary, is not likely to cause any significant impact on overall water quality and the aquatic fauna. The construction camps and other site facilities such as offices and warehouses will also generate considerable quantities of waste effluents. Other possible causes of land or water contamination include accidental leakage or spillage of fuels, oils, and other chemicals, and waste effluents released from construction sites. These effluents can potentially contaminate the drinking water sources of the area and can also be harmful for the natural vegetation, cultivation fields, water bodies, and aquatic flora and fauna.

Soil Contamination

Soils (including top soil) in the construction area and agricultural / grazing land will be prone to pollution from the construction sites, workers camps and other material storage areas. Fuel and hazardous material storage for certain construction / operation activities and their handling are also the potential sources for soil and water pollution. Improper siting, storage and handling of fuels, lubricants, chemicals and hazardous materials, and potential spills from may result in hazards and severely impact the soil and water quality.

Generation of Solid Waste and Hazardous Waste

Waste generated during the construction phase includes Construction and Demolition (C&D) Wastes, excess construction material such as sand and soil, faulty/damaged parts, metal scraps, cardboard boxes and containers, and cotton swaths from workshops, and domestic solid waste from construction offices and camps. In addition to the above, small quantities of hazardous waste may also be generated mainly from the vehicle and facility maintenance activities (liquid fuels; lubricants, hydraulic oils; chemicals, such as anti-freeze; contaminated soil; materials used to absorb oil and chemical spillages for spill control; machine/engine filter cartridges; oily rags, spent oils and filters, contaminated soil, sharps as in broken tools and others). It is imperative that such waste is responsibly disposed to avoid adverse environmental and social, human health and aesthetic impacts. Inappropriate disposal of these wastes can lead to soil and water contamination as well as health hazards for the local communities, livestock, and aquatic and terrestrial fauna/flora.

Impacts on aquatic habitat

Deepening of ponds, desilting of canals, repairing of sluice gates and construction of large mariculture farms may potentially disturb the aquatic habitat by increasing the water turbidity. Some sensitive and important habitats exist in the coastal areas and rivers/wetland / estuaries. However, any accidental leakage, spillage of contaminants, or dumping of solid waste/ debris on land or in water bodies can potentially affect these habitats. During construction or operation of large mariculture facilities / ocean based facilities, there is a potential risk of conflicts with fish and other aquatic species. This can cause injuries and even fatalities to these species.

Site Clearance and Restoration

After the completion of the construction activities, the left-over construction material, debris, spoils, scraps and other wastes from workshops, and camp sites can potentially create hindrance and encumbrance for the local communities in addition to blocking natural drainage and or irrigation channels.

Occupational Health and Safety

Construction activities will involve small to medium scale excavation, operation of construction machinery (sometimes large and mechanized) and vehicular traffic. These activities may pose health and safety hazards to the workers at site especially due to hazardous substances, lifting and handling of heavy equipment, operating machinery and electrical equipment, working near water / slush (common in coastal marshy areas/areas near wetlands) or at height and more. The program will need fuels, oils, and asphalt during the construction phase. Inappropriate handling or accidental spillage/leakage of these substances can potentially lead to safety and health hazards for the construction workers as well as the local community.

Occupational health and safety hazards related to demolition and decommissioning of existing structures as well as construction activities include the following: exposure to asbestos, dusts including silica and lead, chemicals, sunlight, diesel engine exhaust emissions, fire, frequent exposure to loud noise and heat, use of vibrating tools, frequent or excessive manual handling of loads, stress and fatigue. Potential accident hazards for workers include accidents due to worker - vehicular conflicts in the construction site including uncontrolled movement of vehicles, heavy moving parts of large mechanized equipment and vehicles; falls (from heights); trench collapse; scaffold collapse; sinking in slushy earth, accidents due to sharp tools and electric tools strewn around on site, unmanaged construction material and wastes on site as a result of poor housekeeping, electric shock and arc flash/arc blast; failure to use proper personal protective equipment; and repetitive motion injuries.

Impacts due Labor influx on the Environment

Due to the absence of local workforce and higher wages, the contractors mostly resort to migrant laborers in many parts of the country. Hence, it becomes necessary often for the contractors to provide camps / labor accommodation in *insitu* labor camps or rented premises near to construction sites. Often, such camps are in the form of minimal living areas with less ventilation, light, amenities, health care or emergency facilities made of cheap materials with less climate adaptability or resilience. Without adequate facilities for healthy living, such camps end up as breeding grounds of pests and disease vectors. Population pressure due to labor influx may lead to expanded use of natural resources, such as forests and aquatic resources. Influx may induce increased localized deforestation / disturbance to mangroves / shelterbelts for collection of fuel wood, or forest conversion as newcomers seek land for housing or agriculture. There may also be impacts on biodiversity and wildlife from increased hunting and foraging or the siting of work camps in sensitive areas. Changing land use patterns may result in increased demand on water resources or introduction of invasive species. Changes in land and resource use may in turn affect local food systems and nutritional outcomes. Worker camps, without appropriate wastewater discharge, may pollute nearby water

sources. Potable water needs of worker camps can result in increased pressure on freshwater resources in the project or camp area.

Impacts due to extraction of construction materials

Impacts due to borrow areas and other material sourcing related impacts are important. The World Bank Group ESH Guidelines for Construction Materials Extraction is also applicable to the project and used as key guidance provided to contractors on the management of environmental health and safety during construction material extraction. These guidelines includes information relevant to construction materials extraction activities such as aggregates, limestone, slates, sand, gravel, clay, gypsum, feldspar, silica sands, and quartzite, as well as to the extraction of dimension stone. It addresses stand-alone projects and extraction activities supporting construction, civil works, and cement projects. Although the construction materials extraction guidelines emphasize major and complex extraction schemes, the concepts are also applicable to small operations and should be used for guidance. These guidelines can also be downloaded via the link here:

https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

C. Environmental Impacts during Post Project Period / O&M Period

Potential Changes in Water Courses

The potential desilting activities on water courses may include stabilization and deepening resulting in localized bed changes. These changes are mostly positive in nature, likely to take place over a long period of time and need to be regularly monitored.

Loss of Ecological Connectivity

Construction of some infrastructure may disconnect local wetland / habitat connectivity that would have potential negative impact on fish and other aquatic species. Detailed baseline survey and careful designs are needed for such activities. However, ICZM Plans would consider these sensitivities, with proper consultations to derive best local knowledge and opinions and propose the best siting frameworks.

Impact on marine habitat

Activities like improvement of coastal defense (where feasible) by mangrove rehabilitation, cultivation of sea grass / livelihood activities based on other species and promoting large scale mariculture in potential coastal area may alter surrounding marine habitats. However, these will have positive impacts once they are sustained in the area. However, **large scale** mariculture activities may cause water pollution and

alter the beach ecosystem due to the artificial infrastructure. It may cause loss of staging and feeding ground of coastal avifauna.

Loss of Vegetation

Infrastructures those will be constructed under the proposed project would be the sites of human access, which may lead to loss or disturbance to nearby vegetation (herbs, shrubs and trees due to human footprint (including increased footfall, light, air, water noise pollution, latent heat increase / heat island effect due to various activities, competition for resources etc.).

Generation of Solid Waste

Routine maintenance of facilities created may result in construction / demolition wastes. Solid waste will be generated from markets, landing sites, packaging units and also during regular operation and maintenance activities of the facilities. There may be small quantities of packaging wastes, hazardous / e-wastes wastes from batteries, generators, office/ communication facilities. This waste including plastics and hazardous wastes if not appropriately disposed has a potential to contaminate soil and water resources, thus negatively affecting communities as well as natural habitats and contributing to more of marine litter. Beach cleaning activities would lead to collection of solid wastes including plastics, which if not properly treated and disposed creates impacts on biotic and abiotic components.

Air Pollution

Emissions from local road traffic along the markets, landing sites and other infrastructures may affect the ambient air quality. Road traffic will be increase due to construction of these infrastructure at the project area.

Noise Generation

During operation, noise levels along the access roads, markets, tourism facilities/interpretation centers/parks, landing sites, will be high due to the higher traffic volumes and more human footfall. Traffic noise will be a significant nuisance to the sensitive receptors such as ecologically sensitive areas, hospitals, schools and religious places and also to the children and aged persons.

Increased Water Runoff and Pollution

Construction activities increases the amount of impermeable surface area, which increases the rate of surface water runoff. Increased storm water flow rates can lead to stream erosion and flooding downstream; cause soil erosion, channel modification and siltation of streams and wetlands. During the operation phase, some localized increase in turbidity may take place during any maintenance works of the constructed sites.

Similarly, the maintenance works can also generate a limited quantity of waste effluents.

Changes in Land Use Pattern

Markets, tourism infrastructure, landing sites, access roads, mangrove plantation, oyster/ sea grass beds (at suitable sites) may change local land use pattern upon getting popularity during the operation period, which will replace existing use such as agriculture and vegetation in terrestrial area and natural aquatic system/ beach ecosystem in the marine area.

Table 4.4: Summary of Potential Environmental Impacts and their Significance.

Potential Impacts	Duration of Impact	Spatial Extent	Reversible or not	Likelihood	Magnitude	Sensitivity	Significance Prior to Mitigation	Significance after Considerations in the Long-Term Plan/ Mitigation
Environmental Impacts related to project siting								
Land cover and land use changes	Long term	Local	No	Certain	Low	Medium	Moderate negative	Minor negative
Loss of natural vegetation and trees/mangroves	Long term	Local	Yes	Certain	Medium	Low	Moderate negative	Minor negative
Loss of aquatic habitat	Long term	Local	No	Likely	Small	Low	Moderate negative	Negligible negative
Loss of coastal/marine habitats	Long term	Local	No	Likely	Medium	Medium	Moderate negative	Minor negative
Drainage congestion and water logging	Long term	Local but beyond project foot print	Yes	Likely	Medium	Low	Moderate negative	Minor negative
Loss of agriculture land	Long term	Local	No	Likely	Small	Medium	Moderate negative	Minor negative
Environment impacts during project implementation phase								
Air pollution	Short term	Local	Yes	Certain	Medium	Low	Moderate negative	Minor negative
Noise	Short term	Local	Yes	Likely	Medium	Low	Moderate negative	Negligible negative
Water pollution	Long term	Local but beyond project foot print	No	Certain	Medium	Medium	Moderate negative	Minor to moderate negative
Soil contamination	Short term	Local	Yes	Certain	Medium	Low	Moderate negative	Minor negative
Solid wastes and hazardous wastes	Short term	Local	Yes	Certain	Medium	Low	Moderate negative	Minor negative

Potential Impacts	Duration of Impact	Spatial Extent	Reversible or not	Likelihood	Magnitude	Sensitivity	Significance Prior to Mitigation	Significance after Considerations in the Long-Term Plan/ Mitigation
Impacts on aquatic habitat (coastal/char land)	Long term	Local but beyond project foot print	No	Certain	Medium	Medium	Moderate negative	Minor negative
Site clearance and restoration	Short term	Local	Yes	Certain	Medium	Low	Moderate negative	Minor negative
Occupational health and safety	Short term	Local	Yes	Certain	Medium	Medium	Moderate negative	Minor to Moderate negative
Environmental impacts post-project operational period								
Changes in water courses	Long term	Local	No	Likely	Small	Medium	Low negative	Minor negative
Loss of ecological connectivity	Long term	Local	No	Certain	Medium	Medium	Moderate negative	Minor negative
Impact on marine habitat	Long term	Local	Yes	Likely	Medium	Medium	Medium negative	Minor negative
Loss of vegetation	Long term	Local	Yes	Likely	Medium	Medium	Moderate negative	Minor negative
Generation of solid waste	Long term	Local	Yes	Certain	Medium	Medium	Moderate negative	Minor negative
Air pollution	Long term	Local	Yes	Likely	Medium	Low	Moderate negative	Minor negative
Noise generation	Long term	Local	Yes	Likely	Small	Low	Moderate negative	Minor negative
Water pollution	Long term	Local	No	Certain	Medium	Medium	Moderate negative	Minor to moderate negative
Changes in land use pattern	Long term	Local	No	Certain	Medium	Medium	Moderate negative	Minor negative

4.1.1.5 Potential Key Social Impacts

The activities under the project are unlikely to involve private land acquisition. However, there could be temporary relocation of residences / business establishments for construction or restoration works. In case of such exigencies, the management framework will be applied and implemented. Possible impacts of the project can be categorized in three broad groups, i.e., (1) loss of immovable assets i.e. agricultural land, homestead land, cattle sheds, trees, community infrastructure etc.; (2) loss of livelihood or income opportunity on account of loss of business establishments; and agricultural land; and (3) impact on the community in terms of loss of common property resources or access to such resources, such as grazing land, other land used by commons etc. The impacts can be either temporary (for the duration of construction activities) or permanent.

Though it is envisaged that subprojects will involve very generic social issues that are manageable, there might be some subproject activities proposed in due course, that may carry a higher social risk and/ or disruptions and/or impacts. The possibility of such issues arising in the subproject sites will be identified during the subproject screening process. The broad categories of social project interventions considered under this project are such as diversification of livelihood; trainings and community owned interventions for coastal and marine resource management. Since there are construction activities involved such as coastal protection structure for erosion or developing infrastructure such as solid waste management or sewage as well as livelihood activities, there will be considerable involvement of the concerned communities and impact on them.

Following are the major anticipated impacts of the projects as per the phases:

<i>Construction/Rehabilitation/Restoration Phase</i>
Loss of private land: Most of the project activities require little or no land. However, some construction/plantation/restoration and other interventions might have minimal land requirement for which only public land has been considered. In spite of the strict consideration that the project will not acquire any private land parcel, legislative procedure and support for compensation and resettlement have been explained in this ESMF.
Relocation of structures: Structures, such as street vendor stalls, may need to be moved or relocated for implementation of projects such as restoration of built heritage or natural coastal resources (such as mangrove)/infrastructure (solid waste management and sewage)/eco-tourism activities/ beach cleaning/ livelihood activities/ protection of coastal structures or any other activities.

Removal/displacement:

Displacement of vendor stalls/small businesses/ small informal establishments such as fisherman hut/informal fish- landing sites/ may have adverse impacts with regards to security of the concerned people. This can especially impact women vendors/ small business owners/traditional small fisherman or traditional farmers. This will require action at the subproject level

Loss of and/or access to public land or common property:

Fences may need to be erected to protect coastal resources (sand-dunes, turtle nesting sites and others), or temporarily be erected for construction works (coastal protection structures), and they could block access to people's lands or public spaces like a part of a beach. Vendor stalls may need to be moved to be outside or inside the fence (which could reduce the customer base of the vendor).

Inconvenience during construction:

There could be temporary impacts during construction activities including dust, noise and increased vehicle traffic, and lighting during night-time hours.

Loss of livelihood or sources of livelihood:

There may be negative economic impacts on small businesses/traditional and small scale fisherman/ farmers/ individuals informally working in the structure/site/area to be rehabilitated. Vendors or small businesses removed or displaced from their original locations may be unable to return to these once they have been rehabilitated, thus facing significant loss of income. This requires action to avoid adverse impacts, or to restore livelihoods under the applicable resettlement instrument.

Impact on host community due to labour influx:

Since there are construction activities involved, there may be issues related to use of local resources by the migrant labour or interference with the local community leading to conflict with the community. Other issues could be securing labour rights related to minimum wage rate, safety at construction sites and provision of basic facilities to labours and their families during construction.

Conflict with the Community:

During the implementation phase, there might be conflict with the local community despite having the consultation meetings. These can happen due to the apprehension of inconvenience, influx of workers or fear of loss or inaccessibility to the common resources such as beach or mangrove.

Operation and Maintenance Phase

Unequal benefits from the subprojects to the detriment of women, youth and other vulnerable and cultural groups, potentially resulting in intra-community conflict and conflict between construction workers and the community

Increase in violence and harassment in public areas which can negatively impact economic activity of women, youth and other vulnerable and cultural groups.

Health issues if solid waste from construction is not properly disposed of; emissions from construction equipment; noise and dust during construction.

Inconvenience to the community if traffic flow is not managed during implementation
Additional impact on community infrastructure due to influx of labour force.
Due restoration and resettlement there can be denial of access to all types of natural and cultural property formerly used by community.
After the construction of permanent structures there can be damage to aesthetics of scenic landscapes.
Change in the dynamics of community-resources relationship. With the interventions related to coastal resources management including conservation of endangered species, and livelihood activities, the tradition communities might have some adjustment problems with the new approach. Though the outcome will only result in securing their livelihood in sustainable way and protect the coastal resources from degradation.

CHAPTER 5. ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

The Environmental and Social Management Framework (ESMF) will help identify and address the potential environmental and social concerns or impacts of a project throughout the project cycle. The objective of ESMF is to help project in taking informed decisions and mainstream environmental and social concerns in the project design.

Objective of the Environmental and Social Management Framework (ESMF) is to:

- Support the integration of environmental and social aspects into the decision-making process at all stages related to planning and design by identifying, avoiding and/or minimizing adverse social impacts early-on in the project cycle.
- Enhance the positive/sustainable social outcomes through improved/appropriate planning, design and implementation.
- Build the capacity of PEA and SPMU to take-up and coordinate responsibilities related to the application and implementation of the ESMF with the NPMU, including preparation of Environmental and Social Assessment and Management Plans.
- Provide guidelines and procedures for further consultations during project implementation.
- Provide a systematic guidance to address potential risks and to enhance quality, targeting, and benefits to the neighbouring communities.
- Ensure that stakeholders, irrespective of whether they benefit from or are adversely affected by the project interventions, are well informed and are able participate in the decision-making process.
- Support compliance with applicable legal/regulatory requirements of GoI and State governments; as well as with the requirements set forth in the relevant Bank policies.
- Minimize adverse impacts on the environment, community, cultural property and other common property resources.

ESMF is a tool for ENCORE Program to screen the subprojects to decide on including / excluding them; to categorise based on defined criteria and to decide on how to manage these using either full-fledged ESIAs and ESMPs or using Generic ESMP. ESMF describes the process, institutional mechanism and budget to undertake screening, scoping, assessing and incorporation of mitigation measures during the project cycle involving a) Sub-project Initiation, b) Sub-project Preparation, c) Sub-Project Implementation, d) Monitoring and Evaluation. This also includes guidance on (i) Resettlement Policy Framework; (ii) Indigenous Peoples Planning Framework (IPPF); (iii) Gender Action Plan (GAP); labour Management Framework and (iv) Consultation framework.

5.1 ESMF Adoption Framework

The ESMF adoption framework is presented in the following **Figure 5.1**; which is discussed in detail in the following sub-sections.

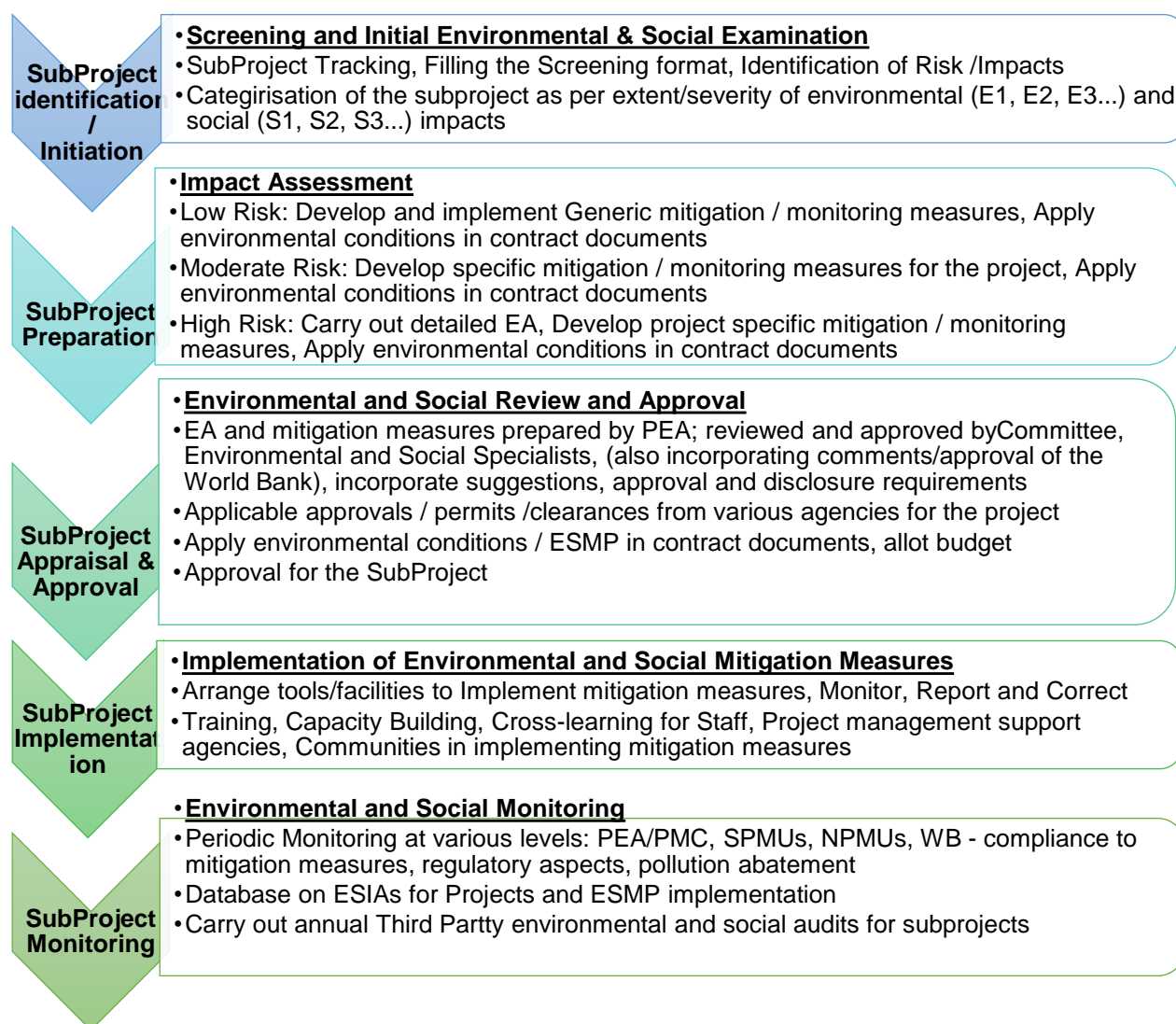


Figure 5:1 Environmental and Social Management Framework for ENCORE

5.2 Sub-project Identification and Initiation

5.2.1 Project Environmental and Social Screening

Stage 1: Exclusions to be considered during Sub-Project Identification Stage

ENCORE **will not** support sub-projects which will involve the following:

Table 5.1: List of Non-permissible Activities under ENCORE

Sl.No.	Non-Permissible Activities under ENCORE
A.	Any activity that converts or leads to conversion and/or degradation of significant areas of critical natural habitats (areas officially protected) and/or Sites of Conservation Importance and designated forest areas; including extraction of raw materials from such areas
B.	Purchase or use of pesticides (or any activity involving pesticides that are banned by the Government of India and World Health Organisation), insecticides, herbicides and other dangerous chemicals; asbestos (e.g., Asbestos Cement pipes for irrigation, Asbestos Cement sheets for roof) and other investments detrimental to the environment
C.	Any activity that violates the provisions of applicable National ⁷¹ including Coastal Regulation Zone Notification, 2019 of MoEFCC and EP Act and State / Local body laws
D.	Construction of any new large water storage structures - such as weirs, barrages and dams or any activity directly or indirectly related to the safety of dams, new large irrigation canals, new branch canals and new offtake structures
E.	The introduction of any new exotic marine species (note: this provision does not apply to any native and/or naturalized species, or any micro-algae that is imported as live feed)
F.	Construction of permanent buildings within the wetlands or walls in or around wetlands which will interrupt water flow, tidying of wetlands or mangroves by the removal of dead wood that serves as habitat for multiple fish species Filling of wetlands within protected areas and outside, in strategic landscapes.
G.	Establishing aquaculture / mariculture activities in close proximity to designated protected marine/terrestrial habitats; or projects involving large scale mariculture / aquaculture activities.
H.	The use of artificial Reefs, soft and hard structures may contribute to stabilizing the coast, but they can also generate significant unintended downstream impacts. Hence, they should be considered only if strong scientific basis is established following on the preparation of Shoreline Management Plans (SMPs)
I.	Involuntary land taking leading to loss of shelter, livelihood or sources of livelihood
J.	Any waste management project (solid or liquid) which do not consider it in an integrated manner – without proper plan from source till disposal and / or for large cities/towns

Such projects will be excluded during Project Identification stage itself. PEA/ Line Department shall scrutinise the project for any of the above activities / components and avoid taking up such subprojects for implementation. PEA should maintain a record of such subprojects excluded from ENCORE following this Stage 1: Exclusions List.

⁷¹ In case of archaeological sites/monuments, the prohibited area is 100 m and the regulated area is 200 m as per AMASR Act, GoI

Stage 2: Initial Environmental and Social Examination (IESE)

The main objective of initial environmental and social examination of sub-projects will be to (a) determine the anticipated environmental/social impacts, risks and opportunities of the sub-project (ii) determine if the anticipated impacts and public concern warrant further environmental/ social analysis, and if so to recommend the appropriate type and extent of assessments needed. The purpose of screening is to get an overview of the nature, scale and magnitude of the issues in order to determine the scope of the detailed ESIA that would be subsequently carried out. When a subproject is proposed for initiation, PEA through its environment (and biodiversity depending on the type of project) and social (and gender) specialists would undertake the environmental and social screening using the Screening Format (separate formats for Environmental and Social Aspects) provided in Volume II. Key risks and impacts would be identified at this stage, through analysis of on-field data and consultations/discussions with stakeholders. Screening format shall be duly filled and signed and submitted to SPMU / NPMU (as the case may be – for State Level Components or National Level components) for concurrence.

After identifying issues, the applicability of the Bank's environment and social safeguard policies is established along with Government of India's regulatory requirements. Based on this, boundaries and focus areas for the ESIA along with the use of specific instruments and additional institutional support required for the sub-project planning, implementation and supervision are determined.

The key steps involved in the process are briefly outlined below.

- Step 1: Ascertain presence of any environmentally sensitive areas as detailed in screening criteria section and with respect to CRZ notification during site identification.
- Step 2: Confirm applicability of regulations and whether any of the sub-projects are prohibited as per the existing law / regulations in the proposed sites. Wherein the proposed activity is restricted and change has been made in project design to avoid such prohibitions, Step 1 needs to be performed again.
- Step 3: Conduct reconnaissance site visits for ground truthing to incorporate additional information.
- Step 4: Revisit the screening check list and ascertain outcomes of the screening checklist. Undertake the detailed screening process for all investments in consultation with the line department/s.
- Step 5: Determine the requirement of an ESIA study, its scope and other applicable rules /regulations and clearances. This will determine the Project Categorisation.

It is necessary that the PEAs and Line Departments have detailed topographic maps of all the proposed subproject sites with coastal regulation zones identified along with details of ecologically sensitive areas, habitat areas, Reserve Forest, Wildlife Sanctuary

at a suitable scale to undertake the screening tasks. Clarifications if any shall be sought from respective SCZMA, NCZMA and NCSCM. For this; it is important to have a special cell constituted in NCSCM to advise PEA/NPMU, SPMUs and NCZMA/SCZMAs on the applicability of CRZ notification to various sites, activities and subprojects. The cell shall also guide PEAs on the procedures to be followed and timelines. This will establish NCSCMs function in this sphere; also mandated by CRZ 2019).

It is advisable for the PEA (and/or SPMU) to organise a meeting with all the Line Departments and the concerned officials of the State Environment & Forest Department, SCZMA and agencies like the Pollution Control Board before starting the process to gain a better understanding of the clearance process.

The outcome of this screening process will help prioritize the various investments and where required, start the clearance process in a timely manner e.g. project sites (in particular requiring Forest / CRZ / other clearances). Projects for which clearance process may be longer can be sequenced / phased later in overall project implementation plan. However, the clearance processes for such projects/sites shall be initiated at the earliest. This shall help ensure that no subprojects are impacted due to delay in the clearance procedures.

PEA shall submit duly checked and signed forms to Safeguards Specialists at SPMU. Based on the initial environmental and social examination undertaken, details provided by PEA and discussions with various agencies concerned, Environmental and Social Specialists of the SPMU would undertake project categorisation.

5.2.2 Categorisation of the Projects

Depending on the type of investments and nature of activities, proposed subprojects will have varying impacts on the environment. Hence, the type and extent of environmental and social assessment to be carried out to identify and mitigate the impacts also largely depends upon the complexities of project activities and exact locations. It is important to identify the probable impacts and plan for mitigation measures early on, to manage them effectively. In order to facilitate effective screening, under ENCORE Program, the subprojects are grouped into different categories – E1, E2 and E3 linked to extent and severity of impacts (depending on type of activities and locational characteristics) and regulatory requirements.

So, based on the screening process undertaken, Environmental and Social Specialists of the SPMU would undertake project categorisation. They would classify subproject into E1, E2, E3 as per severity and extent of environmental impacts and S1, S2 and S3 based on social impacts.

The E1, E2 and E3 categories are defined as follows:

- a. Subprojects which may have major environmental impacts; thus, necessitating Environmental Impact Assessment (ESIA) are categorised as E1. Proposed subproject is classified as E1 if it is likely to affect Sensitive Environmental Components (SEC) such as those mentioned in **Table 5.2** below. The projects which will involve major activities / components in CRZ I and IV (such as ESAs, CVCAs, Intertidal areas, area between LTL and 12nm) also qualifies the locational criteria to be categorised as E1. Those projects/activities, which require CRZ and / or environmental clearance as per the CRZ 2019 notification and EIA notification published by Ministry of Environment, Forests and Climate Change will also be categorized as E1. Any subproject involving any activity related to a critical natural habitat as per WB Policy OP 4.04 will also be categorised as E1.

Such subprojects would require detailed site and activity specific Environmental Assessment, project impact identification and specific mitigation measures to take care of anticipated negative impacts in addition to improving environmental performance, ensure environmental sustainability and climate resilience / adaptation.

Table 5:2 Sensitive Environmental Components

Sl.No	Sensitive Environmental Components
1	ESAs, CVCAs, other sensitive coastal areas rich in corals, mangroves, breeding grounds of specific species
2	Gulf areas, creeks, canals
3	Estuaries rich in mangroves, breeding ground of specific species
4	Religious, heritage historic sites and cultural properties
5	Archaeological monuments/sites
6	Scenic areas, Hill /mountains
7	Biosphere reserves
8	National park and wildlife sanctuaries and reserves
9	Natural lakes, swamps Seismic zones tribal Settlements
10	Areas of scientific and geological interests
11	Defence installations, especially those of security importance and sensitive to pollution
12	Border areas (international)
13	Airport (for solid waste management projects)
14	Tiger reserves/elephant reserve/turtle nestling grounds
15	Habitat for migratory birds
16	Lakes (except irrigation tanks, devoid of natural habitats), reservoirs, dams
17	Streams/rivers/estuary/seas, waterways

- b. Subprojects which are expected to have only moderate environmental issues are categorised as E2. A project is categorized as E2 if its potential adverse environmental impacts are less adverse (in spread and severity) than those of E1

projects. These impacts are mostly generic in nature and in most cases, mitigation can be designed more readily than for E1 projects. Although the scope of assessment for an E2 project is project specific and examines the project's potential negative and positive environmental impacts, it recommends measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

- c. Sub Projects which are expected to have no environmental issues are categorised as E3 projects. Hence no environmental assessment is required for an E3 project beyond screening. However, it is expected that design of these subprojects also incorporate measure to improve environmental performance.

Sample / Generic ESMPs provided in Volume II can be used as guidance for preparing / adopting mitigation or management measures under all three categories.

Table 5:3 Environmental Categorization of Projects

Proposed Subproject Categories	Description		Type of project
	Extent of Environmental impacts	Management measures	
E1	Major environmental issues expected	<p>Project specific EA preferably by an independent agency. In case the DPR consultant undertakes the ESIA for better alignment with project details; the ESIA will be reviewed by independent consultant.</p> <p>Specific mitigation/monitoring measures including those to improve environmental performance, ensure environmental sustainability and climate resilience / adaptation.</p>	<p>- Projects impacting sensitive environmental components including natural habitats</p> <p>- Projects requiring CRZ Clearance (National Level) as per CRZ Notification 2019 and /or Environmental Clearance as per EIA Notification 2006, of MoEFCC</p>
E2	Moderate environmental issues expected	<p>Project specific EA along with the DPR. ESMP including measures to improve environmental performance, sustainability and climate resilience / adaptation.</p>	<p>- Projects with impacts less adverse (in intensity and spread) than E1 category and mostly generic in nature.</p> <p>- Projects requiring only CRZ clearance (State Level) and/ or Environmental Clearance (State Level)</p>
E3	No environmental issues expected	<p>Generic ESMP. These will also consider measures to improve</p>	<p>- Projects which would improve the environment</p>

Proposed Subproject Categories	Description		Type of project
	Extent of Environmental impacts	Management measures	
		environmental sustainability resilience / adaptation as part of overall design / plan	performance, and climate impacts as part of - Research and Capacity building activities

Specialists shall apply adequate experience and expertise-based judgment to determine the category of subprojects. Guidance on indicative categorization of projects is provided in **Table 5.4**. For projects not listed in the guidance tool, categorization will be done based on its environmental sensitivity. Any upward/ downward scaling of categories such as from E2 to E1 and vice versa requires proper justification, concurrence of NPMU and shall be in compliance with the national regulations and safeguard policies of the Bank.

Table 5:4 Indicative Environmental and Social Category of Subproject Types

Sl No	Type of Projects	Probable Categorization *	
		Environmental	Social
A.	Conservation of Coastal Resources		
	1. ICZM Plan Preparation, Marine Spatial Planning, Coastal Process Study, Biodiversity Assessments/Mapping, Conservation plans of marine habitats (marine national park, biosphere reserve, lake sanctuaries), Assessment of Fishing Zones	E-2	S-2
	2. Protection for erosion, sand accretions and measures to manage salinity – both soft and hard methods (shall be taken up only if advised by Shoreline Management Plan / ICZMP)	E-1	S-2
	3. Conservation and management of coral reefs, sea-grass, sea turtles, dolphins and migratory birds and other marine biodiversity	E-1	S-2
	4. Eco-restoration of sacred groves and coastal forests, wetlands, lagoons/estuaries	E-1	S-2
	5. Mangrove restoration, shelterbelt plantation and stabilization/protection of sand dunes	E-2	S-2
	6. Establishing Real time marine and coastal eco-system monitoring	E-3	S-3
	7. Beach infrastructure development	E-2	S-2
	8. Database and capacity building for Biodiversity conservation, Documentation of marine and coastal diversity	E-3	S-3

Sl No	Type of Projects	Probable Categorization *	
B.	Coastal Pollution Management and Related Infrastructure Upgrade		
	1. Integrated Solid Waste Management		
	a. Landfill Sites	E-1	S-2
	b. Compost Yard / other type of Composting Facilities (including small scale)	E-1	S-2
	c. Solid Waste Management including Collection & Transportation Vehicles (allowable only in case there is existing Treatment and Disposal facility, acceptable as per National Regulations/standards)	E-2	S-2
	d. Any other Treatment and Disposal Facilities (including Waste to Energy)	E-1	S-2
	2. Sewerage / Sanitation / Drainage		
	a. Only Sewer Net Work (linked to existing Sewage Treatment Plant (STP) as per National Standards / regulations)	E-2	S-2
	b. Sewerage Network and Pumping Stations (linked to existing STP)	E-2	S-2
	c. Sewerage Network, Pumping Station and Treatment Plant	E-1	S-2
	d. Public convenience, Pay & use latrines	E-2	S-2
	e. Septic tanks	E-2	S-2
	f. Septage Treatment Plants/ Faecal Sludge Management/Tertiary Sewage Treatment	E-1	S-2
	g. Decentralised Waste Water Management	E-1	S-2
	h. Constructed wetlands for septage / sewage treatment	E-1	S-2
	i. Storm Water drainage	E-2	S-2
	3. Pilot projects on clean and renewable energy (small scale, portable)	E-2	S-2
	4. Pilot projects on alternate/renewable energy (large scale, offshore)	E-1	S-2
	5. Environmental parameters monitoring	E-3	S-3
	6. Marine litter and micro plastic management (Collection and Transport)	E-2	S-3
	7. Marine litter and micro plastic management (Treatment)	E-1	S-2
	8. Clean beach program/Beach cleaning	E-2	S-2
	9. Environmentally Sustainable Fish Landing Site	E-1	S-2
C.	Livelihood security		
	1. Hatchery and Sea ranching	E-1	S-2
	2. Alternative Livelihood opportunities for inland fisherman community and Coastal Communities (portable devices, marketing etc.)	E-3	

Sl No	Type of Projects	Probable Categorization *	
3.	Sustainable coastal Eco-tourism development (infrastructure and training)	E-2	S-2
4.	Sustainable coastal Eco-tourism development (training)	E-3	S-3
5.	Energy generation using renewables (only installation of appliances) for livelihood support	E-2	S-3
6.	Improving livelihood generation facilities (Landing site, Fish Auction Hall, Work Shelters jetties and chill room)	E-2	S-2
7.	Coir Production	E-2	S-3
8.	Demonstration of salt resistant cultivation	E-2	S-3
9.	Development of Smart-Eco Villages	E-2	S-2
10.	Development of Microenterprises for Women SHGs of Coastal Villages	E-3	S-3
D. Others			
1.	Strengthening of environmental monitoring systems	E-3	S-3
2.	Studies including experiments with chemical / biological systems	E-3	S-3
3.	Other studies / research activities on sensitive / critical marine habitats	E-3	S-3
4.	Installation of Laboratories, Purchase of Laboratory equipment	E-3	S-3
5.	Purchase of other equipment for investigation	E-3	S-3

* Note: This is only an indicative categorisation based on project types. However, actual categorisation shall consider project activities / components (as it would differ based on requirements), and its impact and spread in the environment, locational sensitivities / and regulatory requirements. In addition, in case a subproject has more than one among these subcomponents, the higher category applicable for any subcomponent would be considered as the category for the subproject as a whole.

Social categorisation of subprojects would be based on the following criteria.

Table 5:5 Social Categorization of Projects

Category	Level of Issue	Management Measure	Type of Projects
S1	Serious social issues expected	SIA and RAP	<ul style="list-style-type: none"> - If it involves acquisition of private land with major impacts (people lose more than 20 % of the productive assets) - If it involves physical displacement. - Restricted access to natural resources

S2	Moderate social issues expected	SIA and Abbreviated RAP	<ul style="list-style-type: none"> - If impacts are limited to less than 200 Persons or about 50 families of minor nature (people lose less than 20 percent of the productive assets). - Loss of community property
S3	No social issues expected; hence socially benign	Social Screening Report	<ul style="list-style-type: none"> - No private land acquisition or no impacts to PAPs.

In addition to addressing environmental and social issues, NPMU commits itself to explore opportunities for environmental and social enhancement in various sub-projects. A sample list of enhancement opportunities is listed out in **Table 5.6**. NPMU encourages the States / SPMUs/ / PEAs to identify such opportunities and include the same as part of project planning and implementation. This shall be communicated to the PEAs for inclusion while preparing the project details; along with the communication on screening and Terms of Reference (ToR) for environmental and social assessment.

Table 5:6 Potential Environmental Enhancement Opportunities in SubProjects *

Sl NO	Project / Sub-Project	Enhancement Opportunities
A.	Area Development	<ul style="list-style-type: none"> ▪ Greening the area & Development of greenbelt (using natural / local plant varieties) for Environmental Improvement ▪ Energy efficient buildings / devices ▪ Green energy: Solar Power / Rain Water harvesting ▪ Eco-friendly solid and liquid waste management ▪ Systems approach to projects ▪ Total Sanitation ▪ Top soil management ▪ Development of Greenways, Importance to transport options ▪ Conservation and enhancement of archaeological and environmental features like hills, slopes, lakes/waterbodies and others ▪ Design considerations to protect from extreme climatic events ▪ Use Natural materials, reuse alternate materials, local design features ▪ Soft measures for remediations/environmental improvement ▪ Public participation and awareness building (IEC) ▪ Reduce/Reuse/Recycle
B	Coastal Protection	<ul style="list-style-type: none"> ▪ Use of Natural Materials and enhanced techniques for coastal protection; preferably soft methods (based on Shoreline Management plan)
C	Plantations	<ul style="list-style-type: none"> ▪ Use of saplings which are grown with developed roots, good maintenance preferably through community support
D	Buildings	<ul style="list-style-type: none"> ▪ Adopting traditional features well suited to climate ▪ Reduce the use of glass, prohibit the use of asbestos or hazardous materials ▪ Ensure water and sanitation facilities including for the disabled (or people of determination) ▪ Fire safety and emergency response facilities to be integrated in design ▪ No cutting of trees or disturbance to slopes on site

Sl NO	Project / Sub-Project	Enhancement Opportunities
		<ul style="list-style-type: none"> Climate resilient buildings Universal access Reuse of materials Development and implementation of Rainwater Harvesting measures Development of greenbelt along the boundary Reusing waste water generated Use natural locally available or alternate construction materials Energy efficiency
E	Sewerage and Sanitation	<ul style="list-style-type: none"> Development of greenbelt for Environmental Improvement, odour control Design of units and pipelines to withstand flood situation / high water table Reuse of treated effluent Energy efficient pump sets Proper management of process rejects (even if minimal quantities) Reuse of rejects/wastes
F	Solid Waste Management	<ul style="list-style-type: none"> Development of Green belts Treatment of leachate and landfill gases Energy generation from waste Recovery and Recycling of wastes Develop green parks, open up city green space Reclaim possible part for treatment / sorting / other facilities
G	Inland Waterways / Lakes, Waterbodies	<ul style="list-style-type: none"> Development of Parks and Recreational Facilities for eco-tourism and Environmental Improvement Protection of boundaries Reuse / recycle of weeds / silt in case of cleaning / dewatering / desiltation; and proper disposal of wastes

** Note: Enhancement opportunities may not be limited to this. PEAs are encouraged to follow additional enhancement measures to support project sustainability. ECoPs provided in Volume II also describes better environmental practices which can be adopted.

5.3 Project Preparation

5.3.1 Preparation of Terms of Reference for Environmental and Social Assessment

NPMU / SPMUs utilizes Technical Assistance funds to plan, develop and implement sustainable projects and studies for coastal management posed for funding under ENCORE Program by providing design and supervision management support services, awareness campaign programmes and strengthening managerial capacity of the SPMUs. SPMUs will utilise the financial assistance available under this component for preparation of Detailed Project Reports (DPRs), and Environmental and Social Impact Assessments (ESIAs) in line with ESMF for impacts associated with the projects, through appointment of consultants.

Based on subproject categorisation, SPMUs will provide the PEAs, the draft Terms of Reference (ToR) for undertaking the Environmental Assessment. PEAs will identify

experienced consultants for preparation of ESIA along with DPR for E2 projects; and for specialised EA for E1 category projects. Generic ESMP modified suitably by the PEA with SPMUs guidance, based on project details (Refer Volume II) will be used for E3 category projects. The ESMPs shall be included in the bid documents and guide the contractor to prepare Contractors ESMP at the start of implementation for effective environmental management of the subproject and reporting.

5.3.2 *Need for Strategic Environmental and Social Assessment (SESA) Approach*

In addition to being an IPF, ENCORE also aims to use Development Linked Indicators (IPF + DLIs)⁷². and as per WB guidance note, the scope of the environmental and social assessment includes the ‘area of influence’ of Bank-financed activities, which may span an entire sector or region. Hence, wider stakeholder consultations using SESA approach shall be followed for environmental and social analysis of plans (such as ICZM Plan), policies, and projects of regional or sectoral importance; the outcomes of which are important for the overall success of the program.

A SESA approach to plan preparation is not an alternative to ESIA and it does not replace the need to do project specific environmental assessment. However, this is not mandatory as per Indian regulations. This can reduce the scope of ESIA within its geographical scope and make it limited to specific project level issues and will identify opportunities to minimize the range of issues that will have to be dealt at the project level. Such an approach to plan preparation activities would complement the environmental impact assessment. The main difference is that such an approach applies in an earlier stage of decision making than the ESIA and at a broader, national level. While the ESIA is employed only in the case of the approval of proposed environmentally significant projects, the SESA approach is followed at national planning level. Important strategic decisions with environmental significance are often made already in the course of national planning and programming (BMUB 2013)^[6]. Thus, while the ESIA analyses specific projects the Strategic Environmental and Social Assessment (SESA) focuses on strategic directions which are incorporated in (public) **plans and programs**. It thereby ensures that potential impacts are “fully included and appropriately addressed at the earliest appropriate stage of decision-making” (Sadler & Verheem, 1996).

The results obtained from the SESA approach are primarily relevant for national plans and programs and set the basis for strategic decisions. This addresses the coordination between different sectors, the appraisal of sectorial interests and objectives, as well as the ranking of priorities to establish coherent national policies. This can, for example,

⁷² IPF-DLI is a form of Investment Project Financing (IPF) and the IPF Policy, Directive and Procedure apply to it, as they do to regular investment lending. An IPF-DLI operation is subject to the same procurement, financial management, environmental and social, and anti-corruption requirements that govern any regular investment operation.

include prioritization of individual technologies and their regional allocation. Compared to ESIA, the search for “reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme” is important. While both ESIA and SESA are instruments for impact assessment, the scope of SESA is enlarged in order to adequately cover large scale developments or regional approaches that cannot be represented by single ESIA.

Hence, it is recommended that ICZM plan preparation, and other strategic plan preparation activities shall follow the SESA process to facilitate identification of its cumulative / regional impacts through stakeholder consultations, and to guide alternate development scenarios. It shall have provisions to identify such impacts early on; specially on natural resources, natural habitats including forests and plan for alternatives based on extensive stakeholder consultations.

5.3.3 Environmental and Social Impact Assessment (ESIA)

- ESIA evaluates a project's potential environmental and social risks and impacts in the project area of influence, examines the alternatives (minimum three; including no project scenario), identifies measures to mitigate the environmental and social impacts and improvement of benefits throughout project implementation. Wherever feasible, preventive measures would be undertaken. (also refer guidance on EIA by MoEFCC).
- The borrower is responsible for carrying out the ESIA as outlined in the ESMF and national regulations. ESIA shall start by the preparation of draft project documents (DPRs)/ Feasibility Report (after pre-feasibility report) ideally, so that the findings / mitigation measures can be incorporated early on into the design.
- Consultants are required to carry out ESIA with household surveys, consultation and focus group discussions with the general public and other stakeholders at different stages to invite suggestions and feedback. In case of E1 and S1 projects, the environment and social assessment may be entrusted to consultants other than DPR consultants based on an agreed ToR to ensure independence in assessment of the impacts. In case the EA for E-1 projects are being undertaken by DPR consultants for better integration with project design or considering the lack of available additional firms/expertise for certain type of projects; it is recommended to employ independent consultants (suitably selected as per expertise required considering the subproject details; this may be from another government agency as well) to review the same before approval and to ensure that all critical issues of environmental and social management are addressed in the project. Based on the outcome of consultations and survey result, mitigation plans as needed depending upon the nature and scale of impact will be prepared. The outcome of consultations will be incorporated in the mitigation plan or designs. The draft mitigation plans will be disclosed, and consultation will be held with the stakeholders including communities to explain a) the proposal, b) alternatives considered, c) expected impacts, d) content of the mitigation plans, e) process involved in the implementation of mitigation plans,

f) responsibility of various institutions involved, g) grievance mechanisms, h) explanations on their comments/queries. Minutes of the stakeholder consultations would be presented in the ESIA.

- The opinion of the stakeholders and public shall be incorporated in the project through specific public consultations (preferably two public consultations; one at the start of the EA process and other; on the Draft Report) with prior notice.
- In addition, the draft ESIA shall be made available in a public place in English and local language well; accessible to affected groups and local NGOs.
- Implications of the available legislations and regulatory requirements and the requirements of the operational policies of the World Bank are also to be reviewed as part of the ESIA. The ESIA report shall meet the requirements of national and state level legislations and disclosure requirements of the World Bank. Necessary clearances shall be obtained for ESIA, as applicable.
- ESIA report shall include an Executive summary, Introduction / Project background, Project Description including review of (three) alternatives (including no-project scenario), Review of Legislations, Baseline environmental and social conditions, Impact Evaluation, Public consultation details, Management and Monitoring Plan, implementation ESIA Budget.
- The project DPR/ESIA will be reviewed at different stages by a technical review committee formed for the purpose of reviewing the reports submitted by the Consultants with support from environment and social specialists of SPMU / NPMU. The Review Committee shall comprise of representatives from SPMU/NPMU and other participating departments and other experts as suitable.
- Draft final reports along of the ESIA along with observations / comments of the Technical Review Committee will be forwarded to the NPMU / World Bank for its review, comments and clearance as applicable (in case it is for State projects, E-1 and E-2 subprojects will be sent to NPMU and highest category /special projects (E1 and some E2 if applicable) will be forwarded to the World Bank for review; but for National Projects handled directly by NPMU; E-1, E-2 projects will be sent to the World Bank for review). The consultant's contract shall have adequate provisions to ensure that they would incorporate all the comments of the review committee, SPMU, NPMU and the World Bank and finalise the ESIA report.
- The final version of ESIA and ESMP and RAPs reports in English with a non-technical summary in respective local language, shall be disclosed as per applicable disclosure policy; in the websites of the NPMU/SPMU/PEAs/relevant departments and will be made available in places accessible to the local people.

5.3.4 Environmental Social Management Plan (ESMP)

- The management plan shall consider various activities proposed under the project and provide management measures to be followed for different phases of implementation, along with the responsibility allocation for implementation and Monitoring plan.

- Apart from addressing the issues, management measures shall also explore enhancement opportunities and their inclusion in project components shall be ensured.
- The management measures identified shall be made part of the project components and shall be included in the bid documents appropriately.
- Generic Environmental and Social Management Plans for various subprojects / activities expected are provided in Volume II.
- The cost for implementation of the management measures, the institutional arrangements for monitoring, etc shall be included in the project cost.
- Various good practices in the form of Environmental Codes of Practice (ECOPs) to guide the preparation of ESMPs is presented in Volume II.
- For construction / EHS impacts; guidance includes The World Bank Group General EHS Guidelines contain information on cross-cutting environmental and social, health, and safety issues potentially applicable to construction and can be downloaded via the following link.

https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

Tabulated summary of key Environmental impacts and mitigation / management measures for probable types of subprojects / project components are provided in Volume II. This is just indicative and shall be updated and used as per probable impacts linked to project details and locational characteristics.

5.3.5 Cost for Mitigation Measures including Monitoring Plan

The ESMP Cost shall be integrated into the Detailed sub-Project Report (DPR) and sub-project bid documents. This shall include cost for all mitigation measures, and monitoring required during various stages of the project. Details on including these costs for mitigation measures in the cost tables of the contract shall be presented in ESIA. SPMU environmental specialist has to discuss this in detail with PEA to ensure preparation and implementation of Contractors-ESMP and inclusion of ESMP cost in contract documents.

5.3.6 Proposed Institutional Mechanism and Reporting Requirements for Subprojects

Successful implementation of safeguards in subprojects can be ensured by defining the role of various officials in its implementation. ESMP should present the institutional responsibilities and time frame for implementation of mitigation measures and monitoring.

5.4 Project Appraisal

During the Project Appraisal, Environmental and social aspects will be cross-checked against the standards set in the ESMF for the type of environmental and social issues:

- a. Review of project designs, DPR, Cost Estimates and ESIA to check the adequacy of environmental and social assessment and management measures provided,
- b. Scope for enhancement opportunities
- c. Compliance with regulatory requirements and clearances
- d. Integration of environmental measures in to the design where ever relevant
- e. Arrangements for implementation of ESMP, including institutional capacity and contractual provisions
- f. Inclusion of management measures with provisions in the project cost
- g. Inclusion of ESMP provisions in the bid document
- h. Need for any legal covenant to address any specific environmental and social risks including regulatory risks (this could be an input to the sanction letter)
- i. Review of ESIA and mitigation plans (ESMP/RAPs) and their adequacy to response to ESMF provisions and magnitude and nature of impacts.
- j. Disclosure of project information and Public consensus on the project and locations/sites involved. (Guidelines for disclosure and public consultation is provided as Volume-II)
- k. Readiness of the sites required for the project. The guidelines for selection of sites for various projects in provided in in Volume-II.

5.5 Project Implementation

Project Implementation starts with bidding procedures. Right from pre-bid stage, it is important to incorporate environmental and social conditions, so that the contractors are aware of and are prepared with adequate finances and institutional set up to ensure implementation of environmental and social enhancement measures and safeguards.

5.5.1 *Incorporating ESMP/GESMP into Contract Documents*

This subsection provides guidelines on the integration of the ESMP / GESMP documents into the contract documents. With the revision to the World Bank's Standard Bidding Documents in January 2017, Environmental and Social Health and Safety (ESHS) requirements are well defined in the bid documents. In addition, an ESHS Performance Security has been incorporated into the requirements from potential bidders for implementation of works under project financing. This revision incorporates changes to enhance environmental, social, health and safety performance during all stages of the subproject.

ESHS Performance Security

Depending on the associated risk of the subprojects, an ESHS Performance Security, of 1-3% of the total contract value shall be maintained as per the Guidance provided supplementing the World Bank's Standard Bidding Document. The total performance security for contracts will typically be 10 percent of the total contract value of which 3 percent should be allocated to the ESHS performance security, while; where a contract has a performance security of 20 percent the ESHS performance security is to be maintained at a maximum of 5 percent of the total contract value.

The Environmental and Social Specialists and procurement team of the NPMU/SPMUs will be required to liaise to ensure that the following guidance is incorporated accordingly. Detailed Management Information System linking project details, scheduling and documentation to EIA process and ESMF implementation will support the NPMU in effective preparation of safeguard instruments, supervision and monitoring.

All sections of the bid documents are to be reviewed in detailed and cross reference will need to be made to the safeguards policies and instruments relevant to the specific subprojects which have been prepared as per the requirements of this ESMF. Where required the SPMU Environmental and Social specialists may be required to update recommendations in the respective EA/ESMP to match the language in the Bid Document where major discrepancies have been noted to facilitate consistency in all documents.

In projects where safeguards documents for environment and social are prepared independently, it is recommended that the Environmental and Social specialists of SPMU and PEAs, work together to ensure that social safeguard requirements are incorporated and Social Management Plans (SMPs) and EMPs are merged and represented as ESMP. This ESMF already includes guidance for ESMPs that incorporate the requisite measures for labor management, labor working conditions, worker health and safety, public health and safety and grievance redressal are incorporated in line with the projects parallel social safeguards instruments.

The budget for complying with the ESMP needs to be worked out for each sub-project by working out the cost of implementing each ESMP mitigation measure. Where this is not possible, provision of a minimum of 3 percent of the sub-project cost needs to be earmarked for complying with the ESMP. The contractor is required to provide a costing at minimum within this amount in his BOQ, listing itemized values for ESMP implementation. The language should indicate that the contractor will be required to provide an itemized costing with the BOQ within this allocation.

For large scale contracts that are assessed as high risk during environmental and social screening, it is also requested for the contractors to have the following certifications in the Eligibility and Qualifications Subsection, in Section III of the Standard Bidding Documents, under Contractor Requirements.

- Registration with ISO 14001 (Environmental Management)
- Registration with ISO 45001/ OSHAS 18000/ or equivalent on (Occupational Health and Safety Management)
- If not already registered, must be willing to register as such prior to requesting mobilization amount or any other payment for the contract

Guidance to incorporate Environmental and social requirements in contracts is provided here for easy reference:

Environment requirements in the pre-bid documents

1. PEA issues pre-bid documents to shortlist contractors, based on their expression of interest and capability. It will be useful to mention that the contractor's environmental and social management capability or experience is expected to be good.

Incorporating ESMP in the bid document

2. The PEA issues the bid documents to the pre-qualified contractors. ESHS requirements, performance security and ESMP should be included in the relevant locations of the bid documents in the following way:
 - Mitigation/enhancement measures & monitoring requirements tables: The cross-reference to these tables should be included in the “conditions of particular application (COPA)”, which is a part of the General Conditions of Contract (e.g. Section IV, Item 19.1 of the ICB). As a standard practice, there is an overall reference to the laws that have to be followed in this section/item. The relevant laws need to be mentioned here. In addition, the adherence to the mitigation/enhancement measures and monitoring requirements tables should be included. The two tables will have to be added as Annexes or the ESMP (without cost) as a whole should be attached. Either the Annexes or the appropriate section in the ESMP should be cross-referred in the description of this item.
 - Modifications/additions to the technical specifications: Due to the mitigation/enhancement measures included in the ESMP, there may be (a) additions/alterations required to the applicable specifications and (b) some new specifications. These are to be referred in the section on “Supplementary Specifications” in the Technical Specifications Volume of the bid documents. Generally, the GoI applicable specifications are taken as followed and are not repeated in the bid documents. Changes and additions to these specifications are made through the inclusion of a section “Supplementary Specifications.” This section should also include additional technical specifications related to the ESMP or should provide a cross-reference to the specific section of the ESMP.
 - Cost table: All the items in the ESMP cost table relevant to the contractor have to be referred in the Bill of Quantities (BoQ) table, which is a separate volume of the bid documents. It is to be noted that the BoQ table in the bid documents includes the various tasks to be done by the contractor under different categories. Against each task, the contractor will have to indicate a unit rate while completing the bid documents.
 - Drawings: Due to the mitigation / enhancement measures included in the ESMP, there may be (a) changes required to the drawings, and (b) new drawings. All of these drawings are to be reflected in the Bid documents under the separate Drawings Volume. If the drawings are included in the ESMP, then a cross-reference should be provided in the Drawings Volume.

Developing the ESMP to suit the bid / contract documents

As one of the intentions is to integrate the ESMP requirements into the bid documents/contract Agreement, the ESMP should be developed keeping the following in mind:

- 1) Mitigation/enhancement measures table – description: In the Mitigation/Enhancement Measure table, the text describing each measure should not include/repeat what is already covered under the technical specification, which is being cross-referred. The text should be short, clear and succinct. The description should focus on “what” and “where” of the mitigation / enhancement measure as the “how” of the measure is covered under the specification.
- 2) Monitoring requirements table: There are certain monitoring requirements for the contractor. While developing the Monitoring Requirements table, those that pertain to the contractor should be clearly separated.
- 3) Technical specifications: The modifications to the specifications and the additional specifications should be separately listed. These should be included as Annexes in the ESMP. The (added or modified) technical specifications should be adequately detailed to avoid problems (including that of interpretations) at site.
- 4) Drawings: The modifications to the drawings and the additional drawings should be included as Annexes in the ESMP. It is important to note that all drawings included / added should be “execution drawings” detailed as per requirement of the particular item so as to execute at site with adequate quality control and workmanship. (Also, it is important to note that the quality of BoQ [or cost estimate] and technical specifications part of the contract document depends on the degree of detailing in the drawings).
- 5) Cost table: The items pertaining to the contractor should be clearly separated from those that are to be incurred by the PEA, supervision consultant or any other agency organization.
- 6) Timing for finalizing ESMP: It is best to finalize the ESMP before the finalizing the bid documents. This is required to fully reflect the sections of the ESMP relevant to the contractor in the bid documents and to ensure full integration.
- 7) Variation orders: Once the completed bids have been received from prospective contractors, the PEA takes a decision based on the costs and the technical merit of the bids. Following the decision, the implementing agency and the chosen contractor sign and counter-sign the completed bid documents. It becomes the contract agreement thereafter. If issues have been missed in the bid documents, it cannot be amended at the time of signing the contract agreement stage unless there is a really strong justification for the same. If there is an ESMP cost item that is not reflected in the BoQ of the signed contract agreement, the PEA may issue a variation order. Contractor will quote a rate and the task will be implemented. This issue of variation orders is a standard practice and is generally used. However, the intent of the good contracting practices is to minimize variation orders.

5.5.2 Onsite implementation of ESMP

The contractor shall implement all the ESMP measures applicable for the project right from project inception. This shall be discussed with site engineers and workers and

record on its implementation shall be maintained. In case PEA requires the support of PMC (with experienced subject specialists) considering the specialised needs of the project, SPMU may appoint PMC for the same. PEA, with or without the support of PMC will monitor the implementation of ESMP measures during implementation monitoring and report to SPMU.

5.6 Monitoring and Evaluation

5.6.1 Sub-Project Monitoring

NPMU / SPMU shall monitor all projects that it finances to ensure conformity to standards during construction, operation and maintenance. Monitoring of Environmental and Social components will be carried out through environmental and social compliance reports that form part of Quarterly Progress Reports. Based on verification of progress reports and field visits, these compliance reports and compliance to other loan disbursement conditions, subsequent instalments will be disbursed.

NPMU shall ensure that the SPMUs makes adequate internal arrangements to monitor the ESMP/SMP implementation quarterly, receive regular monitoring and progress reports from PEAs/PMCs and in turn submit regular progress reports including environmental and social compliance reports to NPMU. This monitoring requirement will be described in the ESMPs. The model format for preparation of ESMF compliance report is provided in Volume-II. SPMU will undertake quarterly field visits to those projects which are under implementation to review implementation of environmental and social safeguards and the findings will be shared with respective implementing agencies for their follow-up. The non-compliance and their remedial measures will be highlighted in these reports which will be communicated and followed-up.

5.6.2 Construction Supervision and Quality Control

Construction Supervision and Quality Control Consultants will also be hired by SPMUs to supervise work quality. They will also have a dedicated Environment, Social, Health and Safety officer to monitor ESMP implementation, labour management and occupational health and safety risks. For projects involving Natural Habitats, Quality Assurance Consultants will also monitor implementation of mitigation measures through expert with specialisation in biodiversity conservation and management.

5.6.3 Annual Environmental and Social Audit

NPMU will undertake annual audits of its portfolio to review the status of ESMF compliance. The audit will focus on the process followed for categorization and approval of E & S reports, disclosures and related aspects. The audit will also be based on field visits to all ongoing E-1, and S-1 projects and sample E-2 and S-2 projects to verify the implementation on the ground and solicit feedback from the affected people

and other stake holders. The audit will be carried out every year for the activities completed until previous financial year. The draft report shall be forwarded to the World Bank for review and suggestions; and upon approval after incorporating the comments, the final audit report will be disclosed. The Terms of Reference for ESMF Audit is presented in Volume-II.

The Auditors shall:

- Support the SPMU / NPMU in preparing the audit plan.
- Prepare compliance report for sub-project activities in line with ESMF guidelines and other statutory requirements as applicable through scheduled or unscheduled audits.
- Conducting random field visits and review compliance, especially at the environmentally or socially sensitive areas.
- Review the performance of the project through an assessment of periodical monitoring reports submitted by the line departments and SPMUs.
- Share audit findings with the SPMUs / NPMU to aid in timely decision making and adopting appropriate mitigation action/s, if necessary.

NPMU will review these audit reports and identify technical, managerial, policy or regulatory issues with regards to the compliance of the ESIA and ESMP reports. The identified technical issues will be duly incorporated in the subsequent projects, policy and regulatory issues will be debated internally by the NPMU and determine the need for appropriate interventions. These interventions / action plans will be communicated to SPMUs for actions. These interventions may include appropriate revision of institutional aspects, monitoring mechanism, revision / updation of ESMF document or suitable analytical studies to influence policy or programs of the State. The audit observations/recommendations will be complied and followed-up as part of monitoring by SPMU / NPMU.

This, ESMF ensures following monitoring and reporting requirements:

- Reporting on Safeguards / ESMPs: Monthly (or as and when required) Implementation Report by Contractor to PEA; Monthly Supervision Report by PEA / PMC to SPMU, Quarterly report by SPMU to NPMU (based on monthly report by PEAs/PMCs, Monitoring report by Quality assurance Consultants and quarterly supervision by SPMU)
- Annual visit to sample sites by NPMU (including accompanying the World Bank Missions)
- Safeguards monitoring report by Quality Assurance Consultants along with monitoring of Civil Works when the works are ongoing and at work exit/operations.
- Annual Environmental and Social Audit for select projects (all E1, S1 and select E2, S2) by independent consultants.

- Detailed Management Information System linking project details, scheduling and documentation to EIA process and ESMF implementation will support the NPMU in effective preparation of safeguard instruments, supervision and monitoring.

5.7 Public Consultation and Stakeholder Participation

Public consultation shall be carried out at various stages of the project preparation. As part of environment and social assessment, consultations will be carried out by using appropriate instruments including Focus Group Discussions (FGDs), stakeholder consultations, etc. Specific consultations will be held near the sites proposed to seek opinions / suggestions of the hosts and the communities involved. The outcome of consultations will be incorporated as appropriate in the designs and mitigation plans. As part of such consultations, the draft Mitigation Plans will also be presented and explained to the people on the content and process of the implementation of the plans. This would ensure ‘buy in’ for the projects by the host communities, project affected / involved communities, all line departments and other agencies concerned; and lead to foster project ownership by them, which is essential for the success of the subprojects. Public consultation requirements, process to be followed, reporting mechanism and other relevant details are provided in this ESMF. The PEAs shall also hold consultations at district, block and community level to facilitate involvement of stakeholders and solicit feedback on sub-project identification/selection, preparation/design, implementation plans and other such key elements of project delivery. Key stakeholders such as project affected persons, opinion makers, experts, and different department personnel shall be consulted. Stakeholder involvement mechanisms are/will be central to the design and implementation of the project and provide opportunities for information sharing, consultation and collaboration measures. While consultations during the planning stage ensures participation in site selection and design, consultations during the implementation phase encourages community feedback for a more participatory monitoring. Guidance for this purpose has been laid out in this ESMF; to ensure proper consultation and involvement of key stakeholders during key stages of sub-project preparation and implementation.

5.7.1 Public Disclosure

The following documents shall be disclosed in the Offices and websites of the NPMU, SPMU and PEAs.

- a. ESMF for ENCORE
- b. Approved ESIA reports in English
- c. A non-technical summary of ESIA and ESMF in local languages of the place of implementation,
- d. ESMP/RAP/ARAP/TPP other safeguards documents
- e. Annual E & S Audits

5.7.2 ESMF and Technical Assistance (TA) activities

Applicability of ESMF for Technical Assistance (TA) undertaken with support from World Bank Loan: Many preparatory studies / research activities are expected to be undertaken under ENCORE, which may be financed / implemented outside or within the ENCORE Program. Wherever feasibility or DPRs are prepared, the corresponding ESIA/SIA and RAP/ESMP/TPP preparation will be undertaken in accordance with the policy provisions. The outputs and reports of these studies will be submitted for Bank's review and endorsement. These will be approved by the competent authorities and disclosed. These will be prepared in a manner consistent with ESMF for ENCORE sub-projects. However, the implementation of these RAPs / ESMPs/TPPs will be taken up as and when they are implemented depending upon the circumstance and are not subject to the Bank's supervision.

Subproject Cycle and environmental and Social Safeguard requirements, with institutional responsibility and tools to be used is depicted in the following **Figure 5.2**.

Thus, Provisions in the ESMF for safeguards management include:

- Dedicated Environmental and Social Specialists at all levels: Contractor, PEA, PMC, SPMUs, NPMU for ESIA preparation, approval, disclosure, supervision and reporting,
- Reporting on Safeguards / ESMPs: Monthly (or as and when required) Implementation Report, by Contractor to PEA; Monthly Supervision Report by PEA / PMC to SPMU, Quarterly report by SPMU to NPMU (based on monthly report by PEAs/POMCs, Monitoring report by Quality assurance Consultants and quarterly supervision by SPMU),
- Safeguards monitoring report by Quality Assurance Consultants along with monitoring of Civil Works when the works are ongoing and at work exit/operations,
- Annual Environmental and Social Audit for select projects (all E1, S1 and select E2, S2) by independent consultants, and
- Capacity building and cross learning for Environmental and Social Management.

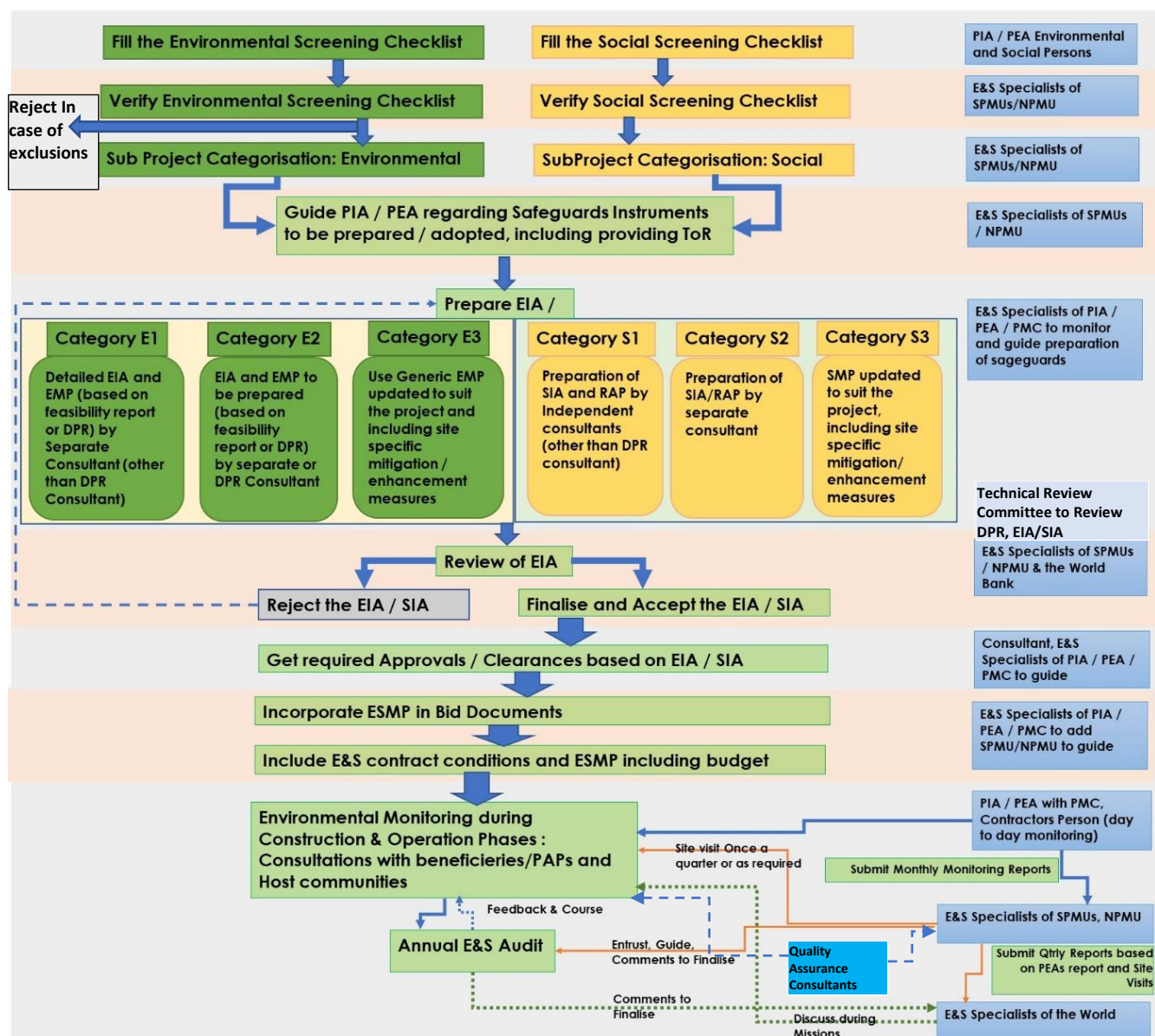


Figure 5:2 Environmental and Social Requirements during Sub Project Cycle

CHAPTER 6. RESETTLEMENT POLICY FRAMEWORK

The Project Authority will undertake a survey for identification of the persons and their families likely to be affected by the project. Every survey shall contain the following municipality / ward or village-wise information of, the project affected families:

- Members of families who are residing, practicing cultivation, any trade, or any other vocation in the project affected area;
- Project Affected Families who are likely to lose their house, commercial establishment, agricultural land, employment or are alienated wholly or substantially from the main source of their trade occupation or vocation or losing any other immovable property.
- Agricultural labourers and non-agriculture labourers.
- Losing access to private property or common property resources
- Loss of common property resources

The project on completion of the survey will disseminate the survey results among the affected community. Based on the social impact assessment survey, will prepare an action plan to mitigate or minimize the adverse impacts as identified during the survey. The draft mitigation plan in form of resettlement action plan (RAP) will be again disseminated among the affected individuals / community. The feedback received from the affected groups will be incorporated to the extent possible before finalization of the RAP.

6.1 Resettlement Policy Framework

This project has been primarily designed ensuring that any chance of land acquisition has been avoided. Only public land is to be used in projects which will require land. This is in line with the objective of the policy and Government of India's RFCTLARR Act 2013 and World Bank OP 4.12 that involuntary resettlement will be avoided and minimised by exploring different design options. In other words, exploring various options and considering the best option which has minimum or no impact. However, since there are multiple interrelated interventions across fourteen States and UTs which are at the planning stage, a Resettlement Policy Framework (RPF) is required because the extent of resettlement cannot be known at this appraisal stage. This framework provides for any situation that may arise where need for temporary or permanent land acquisition or resettlement and rehabilitation is inevitable. Resettlement and compensation activities should be conceived and executed in a sustainable manner. The RPF is intended for use as a practical tool, to guide the preparation of the Resettlement Action Plan (RAP) depending upon the scale and severity of impacts.

The objective of the RPF is to ensure that the Project Affected Persons (PAPs) if there are any, get compensation for their loss, are offered resettlement measures, and are supported in improving or at least restoring their levels of living and income after the project impact to pre-project levels. The RPF is intended to safeguard the interests of the population impacted by the

project, especially the poor and vulnerable. The RPF is based on applicable Policies of GOI, State governments and World Bank.

The nature and magnitude of social impact will be assessed through Social Impact Assessment and Resettlement Plan (RP) or Resettlement Action Plan (RAP) will be prepared and implemented to mitigate the adverse impacts to assist the affected people to improve their living standards. The RP/RAP shall be prepared in compliance with the Social Safeguards provided in this ESMF. Prior to the project implementation, the measures available in the RP /RAP shall be implemented. The broad categories of economic and social impacts that would be mitigated are:

- a) Loss of land and assets
- b) Loss of shelter or homestead lands
- c) Loss of income or means of livelihood
- d) Loss of access to productive resources, shelter/residences, recreational spaces
- e) Loss of collective impacts on groups such as loss of community assets, common property resources and others.

6.2 Broad Principles

The Policy aims to resettle and rehabilitate the affected persons on account of its sub projects in a manner that they do not suffer from adverse impacts and shall improve or at the minimum retain their previous standard of living, earning capacity and production levels. It is also the endeavour of the project that the resettlement shall minimize dependency and be sustainable socially, economically and institutionally. Special attention will be paid for the improvement of living standards of marginalized and vulnerable groups.

This policy recognizes that involuntary resettlement dismantles a previous production System and a way of life, all such rehabilitation programs will adopt a developmental approach rather than the welfare approach. These guidelines detail out the assistance in re-establishing the homes and livelihoods of the Project Affected People (PAP) during the course of projects.

- All information related to resettlement preparation and implementation will be disclosed to all concerned, and community participation will be ensured in planning and implementation.
- The principles of mutual consent and negotiated settlement will also be used for land acquisition as required.
- The persons affected by the project who does not own land or other properties but who have economic interest or lose their livelihoods will be assisted as per the broad principles brought out in this policy.
- Before taking possession of the acquired lands and properties, compensation and R&R assistance will be made to those who are available and willing to receive the entitlements in accordance with this policy.

- There would be no/or minimum adverse social, economic and environmental effects of displacement on the host communities but if needed specific measures would be provided.
- Broad entitlement framework of different categories of project-affected people has been assessed and is given in the entitlement matrix. Provision will be kept in the budget. However, anyone moving into the project area after the cut-off date will not be entitled to assistance.
- Three tier appropriate grievance redress mechanism has been established at project level to ensure speedy resolution of disputes.
- All activities related to resettlement planning, implementation, and monitoring would ensure involvement of women. Efforts will also be made to ensure that vulnerable groups are included.
- All consultations with PAPs shall be documented. Consultations will continue during the implementation of resettlement and rehabilitation works.
- As required, a Resettlement Action Plan will be prepared including a fully itemized budget and an implementation schedule.

The broad principles of the Resettlement and Rehabilitation (R&R) policy are as given below;

- All negative impacts including displacement should be avoided or minimized wherever feasible by exploring all viable alternative project designs.
- Where negative impacts are unavoidable, efforts should be made either to improve the standard of living of the affected persons or at least assist them in restoring their previous standard of living at no cost to them.
- Ensure people's participation during the course of the project cycle.
- Effort should be made towards the enhancement of the positive impact of the projects.

The project will broadly have three impacts that require mitigation measures. These are:

- Loss of immovable assets viz., land, house, commercial establishments wells, ponds etc.
- Loss of livelihood or income opportunities viz, for agriculture labours, helping hands in commercial establishments etc.
- Impact on the community in terms of loss of common property resources.

The first two categories represent direct impacts on an identified population. The people likely to be affected will be surveyed and registered, and project monitoring and evaluation will compare long term impacts against baseline socio economic data.

The third category represents a group impact, where gains and losses of a group-oriented nature are not quantifiable in terms of impact on the individual. Mitigation and support mechanism will be collectively oriented, and the monitoring will focus on impact on such groups.

The provisions of Rights to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 and in case the State Governments has specific policies for mutual consent and negotiated settlement, the provisions of such policy could be

used subject to their adherence to the provisions are within the broad framework of the Act and the World Bank Safeguard Policies.

- Support will be extended under the broad principles of this policy to meet the replacement value of the assets and loss of livelihood.
- The policy further recognizes extension of support to non-titleholders for the loss of livelihood and replacement value for assets other than land.
- The common property resources will be replaced as far as feasible and if not, then assistance will be provided at replacement value to the group.

The construction and installation works would involve transportation of equipment and machinery during the installation phase and all efforts will be made during implementation to minimize any disturbance in the daily activities of the local people.

Before taking possession of the acquired lands and properties, all compensation, resettlement and rehabilitation would be made in accordance with this policy.

In case of displacement, resettlement sites will be developed as part of the project. In such circumstances care should be taken so that there is no/or minimum adverse social, economic and environmental effects of displacement on the host communities and specific measures would be provided in the Resettlement and Rehabilitation Action Plan (RAP) to mitigate any such impacts.

- Before taking possession of acquired land, sufficient time would be provided to harvest the crop.
- The implementation of the R&R Action Plan will be synchronized with the execution of works under the project.
- The project will ensure that no civil works are initiated before compensation and assistance to affected population has been provided in accordance with this policy.

6.3 Resettlement Action Plan (RAP)

In case the project requires involves land acquisition against compensation or loss of livelihood or shelter, the project shall ensure that a satisfactory RAP has been prepared under the ESIA study and shared with the affected person and the local community. The contractor shall not start the works until compensation and assistance has been made available in accordance with the framework.

RAP document provides a link between the impacts identified and proposed mitigation measures to realize the objectives of involuntary resettlement. The RAPs will consider magnitude of impacts and accordingly prepare a resettlement plan that is consistent with this framework for Bank approval before the project activities are accepted for Bank financing.

In case project affects more than 200 people due to involuntary land taking and/or physical relocation and where a full Resettlement Action Plan (RAP) must be produced and in case affected persons are less than 200 people, project will require an abbreviated RP (Resettlement Plan).

The above plans will be prepared as soon as component wise project activities are finalized, prior to Bank's approval of corresponding civil works bid document.

Projects that are not expected to have any land acquisition or any other significant adverse social impacts; on the contrary, significant positive social impact and improved livelihoods are exempted from such interventions.

Every Resettlement Action Plan (RAP) prepared shall contain the following particulars.

Baseline:

1. Village-wise or municipality-wise list of project affected families and likely number of displaced persons by impact category.
2. Family-wise and the extent and nature of land and immovable property in their possession indicating the survey numbers thereof held by such persons in the affected zone.
3. Socio-economic survey of affected people including income/asset survey of PAPs.
4. Information on vulnerable groups or persons for whom special provisions may have to be made

Impact:

1. The extent of area to be acquired for the project, the name(s) of the corresponding village(s) and the method employed for acquiring land with the relevant documentation.
2. Adverse impact on common property resources including cultural properties
3. Impact on host community due to labour influx
4. Any indirect impact

Quantification of impacts in terms of number of

1. agricultural labourers in such area and the names of such persons whose livelihood depend on agricultural land to be acquired;
2. persons who have lost or are likely to lose their employment or livelihood or who have been alienated wholly and substantially from their main sources of occupation or vocation consequent to the acquisition of land and / or structure for the project;
3. occupiers on the government land, if any;
4. number of public utilities, government buildings, cultural properties which are likely to be affected.

Mitigation Measures and Entitlements:

1. Comprehensive list of benefits and packages which are to be provided to project affected families by impact category.
2. Measures to address impact on host community due to influx of migrant labour.
3. Gender Action Plan

Relocation:

1. Details of the extent of land available which may be acquired in settlement area for resettling and allotting of land to the project affected families.
2. Details of the basic amenities and infrastructure facilities which are-to be provided for resettlement.

Consultation Results and incorporation of community suggestions / feedback in project design

Implementation Arrangements

1. Institutional mechanism for RAP implementation.
2. Consultation strategy; a disclosure plan and a capacity building plan
3. Grievance redressal mechanism
4. The time schedule for shifting and resettling the displaced families in resettlement zones
5. Monitoring and Evaluation
6. Mechanism for internal monitoring
7. Mechanism for external evaluation
8. Indicators for monitoring and evaluation; and
9. Budget

The RAP will be developed based on the Right to Fair Compensation and transparency in land Acquisition, Rehabilitation and Resettlement Act, 2013; State Acts (*Refer Annexure III*) and World Bank Operational Policy 4.12 on involuntary resettlement.

6.4 R & R Benefits for Project Affected People

The resettlement and rehabilitation (R&R) benefits shall be extended to all the Project Affected Families (PAF) whether belonging to below poverty line (BPL) or non-BPL. The details have been provided in the entitlement matrix. Contractor will ensure that access to residences or business or agricultural land is not blocked during construction or subsequently.

For tribal the following provisions will be adhered to:

1. Each Project Affected Family of ST category shall be given preference in allotment of land.
2. Tribal PAFs will be re-settled close to their natural habitat in a compact block so that they can retain their ethnic/linguistic and cultural identity
3. The Tribal Land alienated in violation of the laws and regulations in force on the subject would be treated as null and void and-the R&R benefits would be available only to the original tribal land owner.

Table 6.1: Entitlement Matrix

S. No.	Applic ation	Definition of Entitled Unit	Entitlement	Details
A. Loss of Private Agricultural, Home-Stead & Commercial Land				
1	Land for the Project	Titleholder and families with traditional land Right	Compensation at Market value, Resettlement and Rehabilitation	<ol style="list-style-type: none">a) Land for land, if available. Or, Cash compensation for the land at replacement value, which will be determined as provided under section 26 of RFCTLARR Act 2013.b) The land if allotted will be in the name of both husband and wife.c) If post-acquisition, residual land is economically unviable, the land owner will have the choice of either retaining or sell off rest of the land.d) Refund of stamp duty and registration charges incurred for replacement land to be paid by the project; replacement land must be bought within a year from the date of payment of compensation to project affected persons.

S. No.	Applic ation	Definition of Entitled Unit	Entitlement	Details
				e) Subsistence allowance of Rs. 36000 as one-time grant f) One-time grant of Rs. 500,000 or annuity g) Compensation at market value for loss of crops if any
	Residu al land	Titleholder family and families with traditional land Right	Compensation at replacement value, Resettlement and Rehabilitation	In case residual land is found to be economically unviable, PAPs have the choice of: a) selling off the residual land at the market value to the project b) take 25% of the compensation value and retain the land parcel.
B. Loss of Private Structures (Residential/Commercial)				
2	Loss of Structu re	Title Holder/ Owner	Compensation at Market value, Resettlement & Rehabilitation Assistance	a) Cash compensation for the structure at Market value which would be determined as per as per section 29 of the RFCTLARR Act 2013. House under Indira AwasYojana in rural area or Rs 50000 in lieu off and house under RAY in urban area or Rs 100,000 in lieu off. The house if allotted will be in the name of both husband and wife. b) Right to salvage material from the demolished structures. c) Three months' notice to vacate structures. d) Refund of stamp duty and registration charges for purchase of new alternative houses/shops at prevailing rates on the market value as determined in (a) above. Alternative houses/shops must be bought within a year from the date of payment of compensation. e) In case of partially affected structures and the remaining structure remains viable, additional 10% to restore the structure. In case of partially affected structures and the remaining structure becomes unviable additional 25% of compensation amount as severance allowance. f) Subsistence allowance equivalent to Rs. 36000 as one-time grant. g) Each affected family getting displaced shall get a one-time financial assistance of Rs 50,000 as shifting allowance. h) Each affected family that is displaced and has cattle, shall get financial assistance of Rs 25,000/- for construction of cattle shed. i) One-time grant of Rs. 50,000 as resettlement assistance j) Each affected person who is a rural artisan, small trader or self-employed person and who has been displaced (in this project owner of any residential-cum commercial structure) shall get a one-time financial assistance of Rs 25,000/-for construction of working shed or shop. k) One-time grant of Rs. 500,000
3	Structu re	Tenants/ Lease Holders	Resettlement & Rehabilitation Assistance	a) Registered lessees will be entitled to an apportionment of the compensation payable to

S. No.	Applic ation	Definition of Entitled Unit	Entitlement	Details
				structure owner in case the lessee has erected any art of1 the structure as per applicable local laws. b) In case of tenants, three months written notice will be provided along with Rs 50,000 towards shifting allowance.
C. Loss of Trees and Crops				
4	Standin g Trees, Crops	Owners and beneficiaries (Registered/ Un-registered tenants, contract cultivators, leaseholders & sharecroppers	Compensation at market value	a) Three months advance notice to project affected persons to harvest fruits, standing crops and removal of trees. b) Compensation to be paid at the rate estimated by: i) The Forest Department for timber trees ii) The State Agriculture Extension Department for crops iii) The Horticulture Department for fruit/flower bearing trees. c) Registered tenants, contract cultivators & leaseholders & sharecroppers will be eligible for compensation for trees and crops as per the agreement document between the owner and the beneficiaries. d) Un-registered tenants, contract cultivators, leaseholders & sharecroppers will be eligible for compensation for trees and crops as per mutual understanding between the owner and the beneficiaries.
D. Loss of Residential/ Commercial Structures to Non-Titled Holders				
5	Structur es on Govern ment land	Owners of Structures or Occupants of structures identified as per Project Census Survey	Resettlement & Rehabilitation Assistance	a) Non-vulnerable encroachers shall be given three months' notice to vacate occupied land b) Vulnerable encroachers will be provided cash assistance at replacement cost for loss of structures as described in section 29 of the RFCTLARR Act 2013. c) Any encroacher identified as non-vulnerable but losing more than 25% of structure used will be paid cash assistance at replacement cost for loss of structures. The amount will be determined as per section 29 of the RFCTLARR Act 2013. d) All squatters to be paid cash assistance for their structures at replacement costs which will be determined as mentioned in section 29 of the RFCTLARR Act 2013. e) All squatters (other than kiosks) will be eligible for one-time grant of Rs 36000 as subsistence allowance. f) All squatters other than Kiosks will be given shifting allowance of Rs 50,000 per family as one-time grant for a permanent structure and Rs. 30,000 for a semi-permanent structure and Rs. 10,000 for a temporary structure. g) Each affected person who is a rural artisan, small trader or self-employed person assistance' of Rs 25,000/- for construction of working shed or shop. h) In case of Kiosks, only Rs. 5000 will be paid as one-time grant.

S. No.	Applic ation	Definition of Entitled Unit	Entitlement	Details
E. Loss of Livelihood				
6	Families living within the project area	Title Holders/ Non-Title holders/ sharecroppers, agricultural labourers and employees	Resettlement & Rehabilitation Assistance	a) Subsistence allowance of Rs. 36,000 as one-time grant. (PAPs covered under 1(f), 2 (f) and 5 (e) above would not be eligible for this assistance). b) Training Assistance of Rs 10,000/- for income generation per family. c) Temporary employment in the project construction work to project affected persons with particular attention to vulnerable groups by the project contractor during construction, to the extent possible and preference in the employment of semi-skilled and unskilled jobs in the project with adequate training for the job.
F. Additional Support to Vulnerable Families				
7	Families within project area	As per definition of vulnerable	Resettlement & Rehabilitation Assistance	One-time additional financial assistance of Rs. 50,000. Squatters and encroachers already covered under clause 5 are not eligible for this assistance.
G. Loss of Community Infrastructure/Common Property Resources				
8	Structures & other resources (e.g. land, water, access to structures etc.) within the project area	Affected communities and groups	Reconstruction of community structure and common property resources	Reconstruction of community structure and Common property resources in consultation with the community.
H. Temporary Impact During Construction				
9	Land & assets temporarily impacted during construction	Owners of land & Assets	Compensation for temporary impact during construction e.g. damage to adjacent parcel of land / assets due to movement of vehicles for transportation of equipment's, machinery and construction activities for infrastructure development.	Compensation to be paid by the contractor for loss of assets, crops and any other damage as per prior agreement between the 'Contractor' and the 'Affected Party'.
I. Resettlement Site				
10	Loss of residential	Displaced titleholders and	Provision of resettlement site/ vendor market	Resettlement sites will be developed as part of the project, if a minimum of 25 project displaced families opt for assisted resettlement. Vulnerable PAPs will be

S. No.	Applic ation	Definition of Entitled Unit	Entitlement	Details
	structur es	non- titleholders		given preference in allotment of plots/flats at the resettlement site. Plot size will be equivalent to size lost subject to a maximum of provision given in RFCTLARR Act 2013. Basic facilities shall be provided by the project at resettlement site as per the provisions given in the Third Schedule of RFCTLARR Act 2013. Similarly, if at least 25 displaced commercial establishments (small business enterprises) opt for shopping units, the Project Authority will develop the vendor market at suitable location in the nearby area in consultation with displaced persons. Basic facilities such as approach road, electricity connection, water and sanitation facility, will be provided in the vendor market by the project. Vulnerable PAPs will be given preference in allotment, of shops in vendor market. One displaced family will be eligible for only one land plot at resettlement site or shop in the vendor market.
J. Land on lease				
11	Titlehol ders	Land Titleholders	Owners/ Annual Lease rental for use of land	<ul style="list-style-type: none"> a) Annual Lease Rent as per pre-agreed rate with the land owners giving consent for sparing their land for the project b) Provisions regarding the increase in lease rent on predetermined rates and timeframe c) Provisions related to loss of structure/ trees/ crops as per the provisions of Clause 2 and 4 respectively
12	Agricul tural Labour	Non-Title holders/ sharecroppers, agricultural labourers and employees		As per Clause 6 above

CHAPTER 7. INDEGENOUS PEOPLES PLANNING FRAMEWORK

7.1 Introduction

The Indigenous People (IPs) who are known as the tribal people in India, are often vulnerable in the process of implementing development projects because of their cultural autonomy this group endure specific disadvantages in terms of social indicators of quality of life, economic status and usually as subject of social exclusion. The term “Indigenous Peoples” is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

- i. Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- ii. Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories
- iii. Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- iv. An indigenous language, often different from the official language of the country or region.

Under the Disclosure Policy, this Indigenous Peoples Planning Framework will be discussed with and disclosed to the key stakeholders. This framework encompasses suggestions and recommendations received from different sections during its preparation. Further, this framework shall be disclosed to the public on the project web-site; and printed copies of the framework will be placed in government offices and other public locations for easy access by the tribal population.

OP 4.10 requires that special planning measures be established to address particular issues concerning tribal people. More specifically, the policy requires the undertaking of a social assessment and free, prior and informed consultation process leading to the broad community support by tribal for the project, and the development of an instrument for indigenous peoples in the form of a Tribal Peoples Plan (TPP).

7.2 Process

Step 1: Information disclosure

Prior to the ESIA, the project will disseminate project information to all stakeholders through various means, such as mass media, project brochures/posters and a dedicated project site on the internet.

Step 2: Screening

A screening will be conducted in order to determine if tribal families or communities are present or have collective attachment in the area of influence of the proposed projects. Where tribal communities are found to be present or have collective attachment in the area of influence of the project, it is to note that the OP 4.10 will be triggered and the following steps will be taken even if no negative impact is likely to occur.

The identification of tribal families/communities will be as per Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act”, 2006 and as directed under OP 4.10. The determination as to whether a group is to be defined as indigenous peoples is made by reference to the presence (in varying degrees) of four identifying characteristics:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- An indigenous language, often different from the official language of the country or region.

Step 3: Social Assessment (SA) and Free, Prior and Informed Consultations

If screening finds a tribal community to be present in or have collective attachment to any of area of the proposed intervention of the project, a participatory Social Impact Assessment (SIA) that will be conducted as part of feasibility study will address all elements of Social Assessment (SA) defined under OP 4.10, including, at minimum, the following:

- Identify key stakeholders of affected tribal minorities and establish an appropriate framework for their participation in the selection, design, implementation, and monitoring and evaluation of the relevant project activities;
- Assess the demographic, socioeconomic, cultural and other relevant characteristics of affected ethnic on and near the project sites, establish social baseline and identify potential barriers to their full participation in benefiting from project activities;
- Review relevant legal and institutional framework applicable to tribal minorities;
- Assess, based on free, prior, and informed consultation with the affected tribal minorities, the potential impact of project activities and, where adverse impacts are identified, determine how they can be avoided, minimized, or substantially mitigated;
- Propose specific measures to ensure that affected tribal people will, meaningfully and in a culturally appropriate manner, participate in project activities, benefit from the project, and mitigate and mitigate negative impacts; and
- Develop institutional arrangements and implementation procedures to assist tribal farmers to voice grievances and have them addressed in ways that are socially sound, in line with the procedures described in this ESMF.
- In case of any project which incorporates modernization/expansion or augmentation of any existing infrastructure which involved any displacement when constructed, the nature, scale and scope of displacement are to be assessed as part of the due diligence. The current state of the livelihood of the formerly displaced tribal minority population are also to be assessed.

The PEA, under the guidance of Safeguard Coordinator at SPMU, will provide necessary support to the FS team so that all requirements under OP 4.10 would be addressed in the respective ESIA. Free, prior and informed consultations with affected tribal minorities will

also be conducted as part of the ESIA. Notice of consultation meetings will be disseminated at least one week prior to the meetings and in a language or modes that are understandable to affected people. Care will be exercised so that not only the concerned community, but a broad range of local people will also be invited. Also, the ESIA will be conducted even if no negative impact is anticipated under the respective project interventions.

7.3 Entitlement

Based on the Operational Policy 4.10 of the World Bank and as one of its significant R&R requirements; special provisions for the Scheduled Tribes (ST) has been made in the project R&R Policy (apart from the general compensation and assistance to be received as Project Affected Persons (PAPs) of proposed project activities for loss of assets. Apart from compensation at replacement value and R&R assistance for any adverse impact, each Tribal family will be entitled for additional benefits as one-time grant.

7.4 Tribal Peoples Plans (TPP)

On the basis of the ESIA and free, prior and informed consultation conducted as part of the process, a Tribal Peoples Plan (TPP) will be prepared for each intervention site wherever applicable. The PEA and the contractor, under the guidance of the SPMU, will provide necessary support so that all requirements under OP 4.10 would be addressed in TPP(s). One TPP(s) may bundle more than one project activity, depending on the proximities of sites, similarities in socioeconomic impact, timing of investment preparation and financing, and other relevant conditions. A TPP should include the following elements, as needed:

- The description of the project objective and activities, in particular on project activities that will be conducted for the site;
- A summary of the ESIA including the results of the free, prior, and informed consultation with affected tribal communities and verification of their broad community support for the project;
- Description of potential negative impacts and measures to address them;
- A framework to ensure that affected tribal communities can meaningfully participate in the project activities, and in the process to minimize and mitigate negative impacts. Where tribal communities are related to the resource or issue that the project is focusing on, an integrated framework will be developed that will ensure both tribal and other communities would collaborate in minimizing and mitigating negative impacts for common benefits.
- Mechanisms through which affected tribal communities are able to voice concerns and grievances and have them addressed;
- Mechanisms and benchmarks for monitoring, evaluating, and reporting on the implementation of TPP; and
- The financing plan for TPP implementation.

7.5 Suggested Format for TPP

The suggested format for the TPP is as follows:

- i. Description of sub projects and implications for the indigenous community

- ii. Gender disaggregated data on number of tribal households by impact category
- iii. Social, cultural and economic profile of affected households
- iv. Land tenure information
- v. Documentation of consultations with the community to ascertain their views about the project design and mitigation measures
- vi. Findings of need assessment of the community
- vii. Community development plan based on the results of need assessment
- viii. Modalities to ensure regular and meaningful consultation with the community
- ix. Institutional arrangement and linkage with other national or state level programmes
- x. Institutional mechanism for monitoring and evaluation of TPDP implementation and grievance redress
- xi. Implementation Schedule and cost estimate for implementation

7.6 Key Elements of TPP and Participatory Approach

The key elements in an TPP include:

- i. All development plans for indigenous people should be based on full consideration of the options and approaches that best meet the interests of the communities.
- ii. Scope and impact be assessed and appropriate mitigation measures are identified
- iii. Project should consider the social and cultural context of affected peoples, and their skills and knowledge relating to local resource management
- iv. During project preparation, formation and strengthening of indigenous people's organization; communication to facilitate their participation in project identification, planning, execution and evaluation should be promoted.
- v. In case project doesn't have the capacity of preparing and implementing TPP, experienced community organizations / NGOs can be involved as intermediaries.

7.7 Approval and Disclosure

Once the draft TPP(s) and the associated ESIA Report(s) are drafted, they will be submitted to PMU for review and approval. PMU will translate them into relevant local languages, make them available in its website as well as in locations accessible to affected tribal communities, and consult them with affected tribal communities for comments. PMU will also disclose them on SPMU's webpage, finalize them considering the comment received, and submit them to the Bank for review and clearance. The Bank will disclose the TPP(s) through the Info shop as well as at the country office website.

7.8 Implementation Arrangements

The overall responsibility of the implementation of this IPPFIPPF rests with the PMU under the assistance of the Safeguard Coordinator/social expert in the SPMU. A competent person with a long experience in Bank safeguard policies will be hired as the Safeguard Coordinator wherever required who will ensure a full compliance of all actions taken at the central as well as village level. Safeguard Coordinator will prepare the safeguard capacity development plan at the beginning of the project in which existing capacity gaps to implement this IPPF are

identified and measures to fill the gaps will be presented. The safeguard capacity development plan will be shared with the Bank for review and comments. Safeguard Coordinator will implement the safeguard capacity development plan to train PEA staff, relevant line department officers who will work on the project, and all implementing contractor. Refresher training will be organized at the mid-term.

At village level, the PEA will assume the overall responsibility for the implementation of this IPPF. PEA will include a Safeguard Focal Point who will be responsible for safeguard related issues at the block level, in close coordination with the SPMU and under the supervision of the Safeguard Coordinator.

7.9 Monitoring and Evaluation

Throughout the implementation of the project, the Safeguard Coordinator will monitor the project compliance with Bank safeguard policies. The Safeguard Coordinator will visit at least on a monthly basis since the planning till 2 months after the completion of civil works the project sites and meet the affected tribal communities. Upon the completion of a TPP, the Safeguard Coordinator, will carry out an TPP completion assessment to confirm that all measures under this TPP have been fully implemented and that the negative impacts on tribal communities have been adequately addressed.

Monitoring group will be created in each tribal inhabited project areas which will ensure that all actions would be undertaken in line with this IPPF and, in case of irregularities, contact the PEA or SPMU. The participatory Monitoring and Evaluation (M&E) will be conducted, under the facilitation of the Safeguard Coordinator, whereby affected people are encouraged and facilitated to report outstanding issues and air grievances. The meeting is attended by other SPMU members and village authorities. The minutes of the meeting will be prepared, and measures will be taken to address the recorded issues in the subsequent annual cycle. This record will be submitted to SPMU and NPMU.

All concerned PEAs will have a IPPF focal point who will regularly supervise and monitor TPP implementation. These focal points will report to SPMU Director on IPPF related matters, and request support of the Safeguard Coordinator if needed. S/he will travel to the sites and spot check if the actions are taken and information provided in conformity with the IPPF.

The project Management Information System (MIS) system will collect key data on IPPF such as the presence and absence of tribal community, the number of tribal population and their name of ethnicity, dates of consultation meetings conducted. The IPPF focal point will go to all project schemes at least on a monthly basis during and planning and implementation of civil works, prepare a back to office report upon return from the field, and develop the quarterly progress report. The Back to office reports during the report period will be attached to the quarterly progress report, which will be shared with the Bank. The project webpage will have a dedicated section where such reports will be disclosed.

8.1 Gender Equity

Mainstreaming gender equity and empowerment is already a focus area in the project. In the sub projects, activities related to livelihood restoration will address women's needs. A Gender Development Framework is being designed under the project as part of ESMF which will help in analysing gender issues during the preparation stage of sub project and design interventions. At the sub project level, gender analysis will be part of the social assessment and the analysis will be based on findings from gender specific queries during primary data collection process and available secondary data. The quantitative and qualitative analysis will bring out sex disaggregated data and issues related to gender disparity, needs, constraints, and priorities; as well as understanding whether there is a potential for gender based inequitable risks, benefits and opportunities. Based on the analysis, the specific interventions will be designed and if required gender action plan will be prepared. The overall monitoring framework of the project will include sex disaggregated indicator and gender relevant indicator.

The participation of beneficiaries and focus on poverty reduction are two other key determinants of the effectiveness and sustainability of any project. Any project must address the constraints on women's participation in project design, construction, and monitoring and evaluation (M & E). The project must also focus on the linkage between gender and poverty, by identifying, for example, households headed by females and those households' special needs. An adaptive, learning, and process-oriented approach works better than a blue print approach; continuous dialogue between the project and the beneficiaries / PAPs is therefore important. Project beneficiaries are likely to have a stronger sense of ownership when the project gives them enough time, design flexibility, and authority to take corrective action. In this way, they find it easier to incorporate their earlier learning and negotiate with project staff and service providers. Therefore, a mechanism must be built into the project to allow such two-way interactions between the beneficiaries and the service providers.

ENCORE emphasizes inclusive community development through a number of integrated interventions, especially taking into consideration the vulnerable coastal communities – sustaining by traditional means of utilizing coastal and marine resources. In order to make the project more inclusive and participatory, it is required that women associate themselves in different activities which they find feasible. This approach of inclusion and equity, specifically involvement and engagement of women will be helpful to attain social justice and reduce marginalization of women and empower them to avail maximum benefit from the project.

Thus, incorporating gender and other social issues in the development projects helps to improve project performance and facilitate achievement of the Bank's goal of poverty reduction. A gender approach in the overall project framework takes care of key gender issues and brings in parity in association and participation of women and minimises gap between male and female at the project level. A gender approach is also a way to comprehend the impacts on the women beneficiaries and ensures equality in project induced wellbeing.

During the social assessment, consultations will be organised with different stakeholders to understand the gender issues and possible measures that can help women in ensuring their participation in the overall process. The assessment helped to identify certain key issues pertaining to women and their involvement in different livelihood activities as well as other activities which will directly or indirectly impact their lives.

8.2 Policy Provision

Directions in Constitution

The constitution of India provides provisions to secure equality in general and gender equality in particular. Various articles in the Constitution safeguard women's rights by putting them at par with men socially, politically and economically. The Preamble, the Fundamental Rights, Directive Principles of State Policies (DPSPs) and other constitutional provisions provide several general and special safeguards to secure women's human rights. The Preamble to the Constitution of India assures justice, social, economic and political; equality of status and opportunity and dignity to the individual. Thus, it treats both men and women equal.

The policy of women empowerment is well entrenched in the Fundamental Rights enshrined in our Constitution. For instance:

1. Article 14 ensures to women the right to equality;
2. Article 15(1) specifically prohibits discrimination on the basis of sex;
3. Article 15(3) empowers the State to take affirmative actions in favour of women;
4. Article 16 provides for equality of opportunity for all citizens in matters relating to employment or appointment to any office. These rights being fundamental rights are justifiable in court and the Government is obliged to follow the same.

Directive principles of State Policy also contains important provisions regarding women empowerment, and it is the duty of the government to apply these principles while making laws or formulating any policy. Though these are not justifiable in the Court but these are essential for governance nonetheless. Some of them are:

1. Article 39 (a) provides that the State to direct its policy towards securing for men and women equally the right to an adequate means of livelihood.
2. Article 39 (d) mandates equal pay for equal work for both men and women.
3. Article 42 provides that the State to make provision for securing just and humane conditions of work and for maternity relief.

Fundamental Duties

Fundamental duties are enshrined in Part IV-A of the Constitution and are positive duties for the people of India to follow. It also contains a duty related to women's rights. Article 51 (A) (e) expects from the citizen of the country to promote harmony and the spirit of common brotherhood amongst all the people of India and to renounce practices derogatory to the dignity of women.

Other Constitutional Provisions

Through 73rd and 74th Constitutional Amendment of 1993, a very important political right has been given to women which is a landmark in the direction of women empowerment in India. With this amendment women were given 33.33 percent reservation in seats at different levels of elections in local governance i.e. at Panchayat, Block and Municipality elections. Thus, it can be seen that these Constitutional provisions are very empowering for women and the State is duty bound to apply these principles in taking policy decisions as well as in enacting laws.

Specific Laws for Women

Some specific laws, which were enacted by the Parliament in order to fulfil Constitutional obligation of women empowerment are;

1. The Equal Remuneration Act, 1976.
2. The Dowry Prohibition Act, 1961.
3. The Immoral Traffic (Prevention) Act, 1956.
4. The Maternity Benefit Act, 1961.
5. The Medical termination of Pregnancy Act, 1971.

6. The Commission of Sati (Prevention) Act, 1987.
7. The Protection of Women from Domestic Violence Act, 2005
8. The Prohibition of Child Marriage Act, 2006.
9. The Pre-Conception & Pre-Natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act, 1994.
10. The Sexual Harassment of Women at Work Place (Prevention, Protection and) Act, 2013.

Above mentioned and several other laws are there which not only provide specific legal rights to women but also gives them a sense of security and empowerment.

International Commitments

India is a part to various International conventions and treaties which are committed to secure equal rights of women. One of the most important among them is the Convention on Elimination of All Forms of Discrimination against Women (CEDAW), ratified by India in 1993. Other important International instruments for women empowerment are: The Mexico Plan of Action (1975), the Nairobi Forward Looking Strategies (1985), the Beijing Declaration as well as the Platform for Action (1995) and the Outcome Document adopted by the UNGA Session on Gender Equality and Development & Peace for the 21st century, titled “Further actions and initiatives to implement the Beijing Declaration and the Platform for Action”. All these have been whole-heartedly endorsed by India for appropriate follow up.

National Policy for Woman

In the year 2001, the Government of India launched a National Policy for Empowerment of Women which was revised in the year 2016. The National Policy for Women, 2016 (draft) having the vision of “A society in which, women attain their full potential and are able to participate as equal partners in all spheres of life and influence the process of social change”. The objectives of the policy are

1. Creating a conducive socio-cultural, economic and political environment to enable women enjoy de jure and de facto fundamental rights and realize their full potential;
2. Mainstreaming gender in all-round development processes/programmes/projects/ actions;
3. A holistic and life-cycle approach to women’s health for appropriate, affordable and quality health care;
4. Improving and incentivizing access of women/ girls to universal and quality education;
5. Increasing and incentivizing work force participation of women in the economy;
6. Equal participation in the social, political and economic spheres including the institutions of governance and decision making;
7. Transforming discriminatory societal attitudes, mindsets with community involvement and engagement of men and boys;
8. Developing a gender sensitive legal-judicial system;
9. Elimination of all forms of violence against women through strengthening of policies, legislations, programmes, institutions and community engagement;
10. Development and empowerment of women belonging to the vulnerable and marginalized groups;
11. Building and strengthening stakeholder participation and partnerships for women empowerment;
12. Strengthen monitoring, evaluation, audit and data systems to bridge gender gaps.

World Bank’s Approach

The World Bank’s approach to promoting gender equality makes all staff responsible for ensuring that the Bank’s work is responsive to the differing needs, constraints and interests of males and females in client countries. Gender equality is now a core element of the Bank’s strategy to reduce poverty. There is a clear understanding that until women and men has equal capacities, opportunities and voice, the ambitious poverty-reduction agenda set out in the Sustainable Development Goals will be difficult to achieve.

8.3 Issues of Significance

Mainstreaming gender equity and empowerment is already a focus area in the project. In the sub projects, activities related to diversification of livelihood, improvement of basic services and protection of coastal and marine resources will address women's needs. A Gender Development Framework will be designed under the project as part of ESMF which will help analyse gender issues during the DPR preparation stage of sub project and design interventions. At the sub project level, gender analysis will be part of the social assessment and the analysis will be based on findings from gender specific queries during primary data collection process and available secondary data. The quantitative and qualitative analysis will bring out sex disaggregated data and issues related to gender disparity, needs, constraints, and priorities; as well as understanding whether there is a potential for gender based inequitable risks, benefits and opportunities. Based on the analysis, the specific interventions will be designed and if required gender action plan will be prepared. The overall monitoring framework of the project will include sex disaggregated indicator and gender relevant indicator.

The participation of beneficiaries and focus on poverty reduction are two other key determinants of the effectiveness and sustainability of any project. Any project must address the constraints on women's participation in project design, construction, and monitoring and evaluation (M & E). The project must also focus on the linkage between gender and poverty, by identifying, for example relation between the household income and occupation of the women of the fisherman community. An adaptive, learning, and process-oriented approach works better than a blue print approach; continuous dialogue between the PEAs through engaging the Gram Sabha in case of rural areas and local urban bodies in case of urban areas, and the beneficiaries / PAPs is therefore important. Project beneficiaries are likely to have a stronger sense of ownership when the project gives them enough time, design flexibility, and authority to take corrective action. In this way, they find it easier to incorporate their earlier learning and negotiate with project staff and service providers. Therefore, a mechanism must be built into the project to allow such reciprocal interactions between the beneficiaries and the service providers.

Three major tools are used to identify and deal with gender issues in the project cycle: gender analysis, project design, and policy dialogue.

1. Gender analysis should be an integral part of the initial social assessment at the screening stage itself. The issues identified can be scaled up during the feasibility and detailed analysis can be carried out during the project preparation stage.
2. The project designs should be gender responsive based on the gender analysis, and should be included in the ESIA document. The findings and recommendations from the gender analysis during project planning and feedback from beneficiaries during implementation must be discussed thoroughly to determine the need for further action.
3. Consultations will be organised with different stakeholders to understand the gender issues and possible measures that can help women in ensuring their participation in the overall process. The consultations helped to identify certain key issues pertaining to women and their involvement in the proposed interventions.

Significant Gender Issues

Since the interventions have not been finalized yet, all issues are yet to be identified. However, following are the major common gender issues applicable to most of the interventions.

1. Lack of options of occupation for the women of the fisherman community. Absence of diversity of work other than helping with the catch at the landing sites affects the income of household especially for small traditional fishing community during lean period.
2. Exclusion of women in fisheries related activities such as community mariculture
3. Low land holding of traditional dual farming and hence low production and insecure livelihood
4. Women earn less wage for the same duration of work, especially in informal / private sector;
5. Occupational health issues due to prolonged duration of engagement during small community based fisheries related activities or farming.
6. Drudgery of women in agricultural activities due to less usable agricultural equipment;
7. Limited access to technical equipment, capital and trainings for developing alternative livelihood options
8. Few women holding of productive resources such as land, animals, and machinery.
9. Negligible role of women in decision-making process of the community for conservation of resources (such as mangroves or turtles) or disaster management.
10. Lack of proper solid waste or sewage management leading to serious health hazards
11. Active participation in community institutions is limited to a few women and large section either do not participate or remain passive;
12. Lack of awareness in coastal communities and poverty lead to higher rate of school drop-outs and child marriage

Gender Action Plan through the Project Cycle

Three major tools are used to identify and deal with gender issues in the project cycle: gender analysis, project design, and policy dialogue.

Gender analysis should be an integral part of the initial social assessment at the screening stage itself. The issues identified can be scaled up during the feasibility and detailed analysis can be carried out during the project preparation stage.

The project designs should be gender responsive based on the gender analysis, and should be included in the ESIA document. The findings and recommendations from the gender analysis during project planning and feedback from beneficiaries during implementation must be discussed thoroughly to determine the need for further action. Listed below are the key action points:

a) General Check list

1. Identify key gender and women's participation issues.
2. Identify the role of gender in the project objectives.
3. Prepare terms of reference (TOR) for the gender specialist or social development specialist of the client
4. Conduct gender analysis as part of overall Social Assessment.
5. Draw up a socioeconomic profile of key stakeholder groups in the target population and disaggregate data by gender.

6. Examine gender differences in knowledge, attitudes, practices, roles, status, wellbeing, constraints, needs, and priorities, and the factors that affect those differences.
7. Assess men's and women's capacity to participate and the factors affecting that capacity.
8. Assess the potential gender-differentiated impact of the project and options to maximize benefits and minimize adverse effects.
9. Identify government agencies and nongovernmental organizations (NGOs), community-based organizations (CBOs), and women's groups that can be used during project implementation. Assess their capacity.
10. Review the gender related policies and laws, as necessary.
11. Identify information gaps related to the above issues.
12. Involve men and women in project design.
13. Incorporate gender findings in the project design.
14. Ensure that gender concerns are addressed in the relevant sections (including project objectives, scope, poverty and social measures, cost estimates, institutional arrangements, social appendix, and consultant's TOR for implementation and M & E support).
15. List out major gender actions.
16. Develop gender-disaggregated indicators and monitoring plan.

b) Core Requirement for Mainstreaming Gender

1. All data should be disaggregated by gender, caste, ethnicity, location and age
2. Issues of division of labour, access to resources and decision-making power (who is doing what, who has access to what, who makes the ultimate decision) have to be assessed for their gender differential impact on women and men of different social identity group.
3. Assessment of policies, programs, institutional arrangements, human resources issues and M&E system has to be done from a gender perspective of project, project authorities and community groups.

c) Steps of Gender Mainstreaming

Three major tools will be used to identify and deal with gender issues in the project cycle: initial gender assessment, gender action plan, and policy note. The initial gender assessment should be an integral part of the initial social assessment at the screening stage. The issues identified can be scaled up during the feasibility study and detailed analysis can be carried out during the detailed project report stage. The project design should be gender responsive based on the gender analysis, and should be included in the detailed project report in the form of a gender action plan. The findings and recommendations from the gender analysis during project planning and feedback from beneficiaries during implementation must be discussed thoroughly to determine the need for further action.

Focus of Intervention	Inputs and Process Indicators	Data Source
Policy checklist	<ul style="list-style-type: none"> i. What are the requirements of the national gender equality policy, if any, and the executive support provided to it? ii. Which ministry focal point or unit is responsible for advocacy and gender inclusion at the policy and project level? iii. Does the Energy sector strategy address gender issues (labor issues, e.g. promotion of gender in labor-based work, participation of women in prioritization and design of works, measures to eliminate discriminatory labor or contracting practices, HIV/AIDS prevention and treatment) in its works and contracts? iv. Do policies for renewable energy projects and planning procedures explicitly take gender into account: identification of gender gaps and gender-specific needs, capacities, constraints, and opportunities inclusion of socioeconomic empowerment as an integral element? v. Are women and men civil society stakeholders consulted on policies and programs; included in teams analyzing policy and strategy; included in decision making? vi. Is there a system for monitoring the implementation of gender and other components of sector policies and strategies? vii. Sex disaggregation of beneficiary data and key gender indicators outreach and capacity building on gender and other social dimensions grants for addressing gender issues? viii. Are there training sessions on gender including gender-sensitive planning? ix. Is stakeholder consultation facilitated? x. Is there participation of implementing agencies or community organizations? xi. Are gender sensitization workshops held for men and women of power ministry / department staff and implementing agencies, and do they consider knowledge gaps in gender elements in the sector? xii. How many women are represented on gender boards and in works prioritization and decision-making forums related to the planning, implementation, monitoring, and evaluation of projects? 	Contract documents; ministry of new and renewable energy; ministry of women and child development; SPPD
Project cycle: Project identification, preparation, and design	<ul style="list-style-type: none"> i. Conduct a rapid assessment to identify and quantify potential gender-related issues and impacts affecting access, risks, benefits, and participation ii. Identify disadvantaged or vulnerable groups, including who they are, where they live, and their socioeconomic characteristics (scheduled castes, women-headed households, widows, disabled) iii. Examine the impacts of project on these groups iv. Identify the gender-specific implications of land acquisition and resettlement v. Identify gender-specific implications of employment opportunities to be created under the project 	Stakeholder and beneficiary assessments: user satisfaction survey, project concept note, social assessments (household surveys and focus group discussions in project influence area), mid-term and end term evaluation surveys

Focus of Intervention	Inputs and Process Indicators	Data Source
	<ul style="list-style-type: none"> vi. Identify gender-specific constraints in receiving information and providing feedback and complaints on the project vii. Discuss identified gender and other social issues in the project viii. Include both females and males affected by the project in stakeholder consultations ix. Use separate focus groups to enable women to voice their views separately from men x. Analyze the data collected to highlight gender differences in uses and the underlying causes of women's and men's project related problems xi. Examine relevant inter-sectoral linkages, such as access to health services, HIV/AIDS prevention, and access to markets and schools xii. Ensure that analysis of gender differences in needs, use, constraints, and access are included in the terms of reference for the social assessment xiii. Identify the gender-related issues that need to be addressed to ensure the effectiveness and sustainability of the project xiv. Develop approaches for addressing the gender-related issues identified and creating opportunities for equal access to project benefits for men and women, including training, organizational capacity building, grants programs, targets for women's participation xv. Develop indicators for measuring progress on gender-related issues within the relevant project components (e.g. construction works, institutional arrangements, land acquisition and resettlement benefits, privatization, livelihood restoration, awareness building, consultations, complaint handling) 	
Project cycle: Methodology	<ul style="list-style-type: none"> i. Desk review (secondary literature) ii. Review available information (e.g. statistics, gender analysis, documents of previous solar projects, if available or other projects involving acquisition for non-linear projects) in the project area and the socioeconomic profile of the target population iii. Review the relevant legal framework (e.g. inheritance law), policy framework (e.g. resettlement and rehabilitation), and institutional framework (e.g. current administrative system for land acquisition, compensation disbursement, grievance handling, awareness creation) and their gender implications iv. Review government programs for encouraging equal opportunities and participation of women in the project influence area v. Household surveys (primary survey) vi. Draw up gender-disaggregated socioeconomic and cultural profiles and identify the problems faced by and needs of the target population vii. Conduct group discussions, random interviews, and transect walks to study the activity pattern viii. Collect quantitative information 	Other projects in the country/state and gender policy documents, household surveys, national sample survey, latest census data, participatory rapid appraisal of target area, focus group discussions, consultations with beneficiaries

Focus of Intervention	Inputs and Process Indicators	Data Source
	<ul style="list-style-type: none"> ix. Participatory methodologies (e.g. participatory rapid appraisal) x. Collect qualitative information that cannot be collected through surveys (socio cultural norms, behavioral questions) xi. Define ways in which men and women beneficiaries and other stakeholders, especially poor women, can equally participate in the project xii. Map out the target areas and assess which are the most disadvantaged areas and sections of society (widows, female-headed households, disabled men and women) in terms of access to services and poverty level xiii. Identify major stakeholder groups and their positions xiv. Staffing xv. Ensure adequate gender balance in field teams xvi. Select field team members with gender awareness, local knowledge, cultural understanding, and willingness to listen 	
Project cycle: Data collection	<ul style="list-style-type: none"> i. Socioeconomic profile: Gender-disaggregated data ii. Demographic: Gender, sex ratio, caste, marriageable age, female-headed households, migration trend, household size iii. Economic: Income level and source, expenditure pattern and decision making, access to land and resources iv. Health: Population growth rate, infant and adult mortality rate, availability of medical facility, reproduction-related decision making, HIV/AIDS awareness v. Education: Literacy, school enrolment and dropout ratio, child labor vi. Status of women: Political representation and awareness, socio cultural perceptions and practices of men and women, domestic violence, trafficking, gender-discriminatory policies and laws, gender roles, responsibilities and gender division of labor in productive areas (e.g. agriculture, income-generating activities) and reproductive areas (e.g. household chores, child care), and time allocation for each responsibility vii. Fuel, fodder, water and sanitation viii. Availability, quantity, and quality of fuel and fodder, who collects fuel, fodder, and water for the family, sources of drinking and agricultural water, how men and women store and use water collected, dry season management, how far away these resources are located, time spent on collection of the resources, mode of transport used to collect the resources, availability of sanitation service (chargeable or not, who runs it) ix. Access, control, constraints x. How men and women differ in their access to and control of land, agricultural inputs, extension, markets, employment opportunities, and credit xi. Whether external assistance is provided to improve access and control, and by whom 	District, block, and village census data, national sample survey data, health survey data, household surveys, focus group discussions, behavioral surveys, observation

Focus of Intervention	Inputs and Process Indicators	Data Source
	<ul style="list-style-type: none"> xii. Participation xiii. Factors affecting the level of participation of men vs. women, incentives and constraints, means of information dissemination about the project preferred by men vs. women, labor demand for men vs. women, which modes of participation men and women favour (e.g. decision making in planning, cash contribution, labor contribution for construction, training, financial management, organizational management) xiv. Perception of benefits and impacts xv. Men's and women's perceptions of positive and negative impacts of the project, how negative effects can be mitigated 	
Project implementation: Gender action plan	<ul style="list-style-type: none"> i. Prepare gender action plan. Under this: ii. Undertake quality social and gender analyses. Identify constraints to participating and benefiting men and women; develop strategies for each component to ensure that men and women participate and benefit equally iii. Revisit gender design strategies at inception to develop a detailed gender action plan. The plan needs to be tested and reviewed early in implementation; identify detailed activities, targets, resources, and responsibilities for implementation iv. Citizen Engagement Framework: Gender action plan must be fully owned and understood by the executing agency. Use a participatory and flexible approach to developing the plan; a strong rationale that is directly linked to overall project objectives is needed for targeting and working with women v. Identify realistic targets linked to loan objectives. Targets and strategies should enable step-by-step progress, bringing incremental changes and challenging culture without threatening it; linking targets to loan objectives helps all stakeholders to understand the rationale for focusing on women and helps monitoring of participation and benefits. vi. Include gender capacity building in the gender action plan. Both formal training and ongoing support and mentoring are needed for developing skills, ownership, and commitment. vii. Provide adequate skills and resources for implementation of gender action plan. Long-term gender specialists in the executing agency or project team and adequate resources for implementation of actions; nongovernmental organizations and other agencies contracted to implement project activities should have a demonstrated gender capacity. viii. Monitor and follow up gender-related targets and activities. Systematic follow-up to ensure that policy reforms and gender actions are implemented; routine monitoring and reporting; gender-sensitive indicators and gender-related risks must be included in project logical frameworks. 	Gender expertise, Discussion and participation with beneficiaries, separate focus group discussions with men and women, government departments, labor and employment laws, provisions in project and budget, learning approaches from good practice cases

Focus of Intervention	Inputs and Process Indicators	Data Source
Project implementation: Participation strategy	<ul style="list-style-type: none"> i. Develop a participation strategy for men and women during project implementation and monitoring and evaluation: ii. Avoid overly high expectation of women's participation and develop a practical schedule for participation iii. Planning. Conduct women-specific consultation to take their views and suggestions on the design. Any mechanism established during the project design, such as grievance mechanisms, should have adequate representation of women iv. Construction. Ensure work conditions that are conducive to women's participation (e.g. gender-equal wage rates, construction season, toilet and child care facilities) v. Training options. Identify ways to link up with income generation, literacy, and other activities to support an integrated approach to poverty reduction and women's empowerment vi. Staffing, scheduling, procurement, and budgeting. Hire female project staff vii. Consider seasonal labor demand in scheduling civil works viii. If appropriate, set a minimum percentage of female labourers and prohibit the use of child labourers in the civil works contract ix. Ensure adequate and flexible budgeting to allow a learning approach (e.g. training budget, consulting service budget for women's organizations) 	Gender expertise, Discussion and participation with beneficiaries, separate focus group discussions with men and women, government departments, labor and employment laws, provisions in project and budget, learning approaches from good practice cases
Project cycle: Impact	<ul style="list-style-type: none"> i. Establish whether men and women perceive positive and negative impacts of the project differently, and assess how the negative effects can be mitigated ii. Consider whether the benefits are likely to be distributed equitably iii. For disadvantaged or vulnerable groups, find out who they are, where they live, what are their socioeconomic characteristics (scheduled castes, women-headed households, widows, disabled), and how the project will affect them iv. Assess the gender-specific implications of the following: <ul style="list-style-type: none"> • land acquisition and resettlement: extent of land being acquired • utility relocation: what and where • tree cutting: how many and local dependence • diversion of forest land: how much and local dependence 	Project monitoring reports, audits, group discussions, household survey, land tenure details
Monitoring and Evaluation: Feedback mechanism	<ul style="list-style-type: none"> i. Develop a feedback mechanism in which both males and females have a voice ii. Disaggregate all relevant indicators by gender, such as number of women gaining access to credit, increase in women's income, and career prospects for project-trained women 	Focus group discussions, project monitoring reports

Focus of Intervention	Inputs and Process Indicators	Data Source
	iii. Integrate sex-disaggregated beneficiary data and relevant measures of gender equality into the baselines and other routine monitoring and evaluation processes iv. Measure the impacts of the project components on women and men v. Assess the value added by women's participation in the project	
Monitoring and Evaluation: Gender-informed indicators	i. Develop gender-informed results indicators for monitoring. These include: ii. Increased income, employment, and entrepreneurship. Number of women and men employed in sector, number of women and men employed in solar power project; increased women's and men's income from produce marketed using project services. iii. Time saving and increased productivity. Reduced women's and men's time for domestic work (collection of water, fuel wood, food crop collection, fodder, etc.); increased productive time used for economic activities. iv. Improved affordability. Percentage increase of income among women and men; increased participation in decision making; number of women and men participating in community decision meetings; reduced incidence of harassment, crime, and human trafficking; increased awareness of HIV/AIDS transmission and prevention; number of women and men leading committees; number of women and men managers in agencies; women control their income and establish bank accounts in their names; increased recognition of women's contributions to the household and community	Review of gender-informed results indicators

8.4 Key Activities in Project Cycle

Involvement of women groups in the identification of impacts and opportunities through project activities shall form the basis for preparation of gender sensitive project activities. The procedure to be followed and process and outcome are presented in the following matrix.

Table 8.1: Opportunities for Involvement of Women during Project stages

Project Stages	Key Activities	Responsibility
Planning Stage	<ul style="list-style-type: none"> Identify gender concerns / issues related to the project with due consultation with women group Organize women stakeholders' meeting to inform about the project activities, its benefits and key expectations from the project. Sensitize and discuss on the project and its components. Sensitize other stakeholders on gender concerns/issues; Identify key areas of constraints that may be improved through the project; Prepare project component wise activity plan where women can be engaged in different project activity. 	Social Development Specialist, PEAs, Gram Panchayats/ Urban Local Bodies, SPMU, NPMU

Project Stages	Key Activities	Responsibility
Implementation Stage	<ul style="list-style-type: none"> • Implementation of provisions of project activity specific plan addressing gender concerns as per the GAP; • Monitoring engagement of women in different project activities, skilled and unskilled works; • Monitor safety and security measures of women in work and camp sites; • Monitor women specific provisions and facility created in the project site and camps. • Supervising adherence to wage payment norms 	Social Development Specialist, PEAs, SPMU, External M&E Agency
Post-Implementation Stage	<ul style="list-style-type: none"> • Continuation of activities initiated under the project; • Monitoring sustenance of project inputs and its benefits accessed by women 	Social Development Specialist, SPMU

8.5 Monitoring Gender Action Plan

The indicators, frequency and agency recommended for monitoring are presented in *Table 8.2*.

Table 8.2: Monitoring Indicators for Gender Action Plan

Aspects	Monitoring Indicators (Process and Outcome)	Frequency	Monitoring Responsibility
Economic	<ul style="list-style-type: none"> • No. of women engaged in different activities and their proportion to total workforce; • Days of engagement of women in different wage / non-wage activities and proportional days of engagement in comparison to their male counterpart; • Growth in income of women due to such engagements; • Reduction in no. of days of migration (if migrating earlier); • No. of women having additional / new market oriented employable skills for self-engagement; • No. of women accessed different govt. schemes / provisions including beneficial enrolment in agricultural interventions; • Improvement in asset holding of women (productive and household assets). 	<ul style="list-style-type: none"> • Planning Stage: for the base line data • Half yearly Monitoring • Mid Term Review (MTR) • Final Impact Assessment 	DPMU Third party Monitor along with PMU
Social	<ul style="list-style-type: none"> • Improvement of association of women in local institutional and decision-making process (membership, management position etc.); 	<ul style="list-style-type: none"> • Planning Stage: for the base line data • Half yearly Monitoring • Mid Term Review (MTR) • Final Impact Assessment 	DPMU Third party Monitor along with PMU

8.6 Implementation Arrangements

The preparation, implementation and monitoring of Gender Action Plan (GAP) is the responsibility of the project implementing entities. The Social Development specialist, at the

PMU level will facilitate and supervise this process of preparation and implementation of Action Plan. All efforts will be made to coordinate and work with associated line departments and other department, more specifically the Women and Child Development department, State Livelihood Mission, Panchayati Raj and Rural Development department to help dovetailing with their development programs for the socio-economic development of women.

8.7 Framework for citizen engagement

Unlike traditional types of engagement – Communication and Consultation, Citizen Engagement is an interactive two-way process that encourages participation, exchange of ideas and flow of conversation. It reflects willingness to share information and make citizens a partner in decision making.

Active engagement gives the right to hold others accountable, and accountability is the process of engaging in participation. It seeks greater accountability from the service providers through increased dialogue, consultation and by monitoring and assessing performance externally and mutually.

Ways of Citizen Engagement: A variety of mechanism may be adopted to incorporate and promote citizen engagement in Projects.

a) Information sharing: In order to generate awareness and to prepare the citizens, elected representatives and other stakeholders, wide range of information should disseminate. It includes display of Citizen's Charter with listing services and service levels, roles and responsibilities of officials and escalation mechanism etc. In addition, regular meetings and interfaces may also be used to share information. For many departments and services, mobile based voice or text services and web-based presence also serves as an additional channel for information sharing.

b) Consultation: Consultative meetings with the stakeholders are to be undertaken at different stages of project cycle at regular intervals. Each intervention should be discussed with the citizens, elected representatives, local civil society groups and other stakeholders to get their perspectives included in the designing of the interventions, and thereby increasing the chances of ownership among various stakeholders. Such consultations may be undertaken both online as well as face to face.

c) Joint assessment: Participatory assessment and monitoring with the stakeholders, particularly the identified service seekers, are used as tools for enhancing citizen engagement. These include use of a variety of techniques such as joint citizen monitoring, meetings with the elected representatives etc.

9.1 Labour influx

ENCORE Program comprises of a number of interventions which involve construction works such as construction of coastal protection structures, augmentation of infrastructure, construction activities related community-based livelihood activities including ecotourism among the many. Moreover, other interventions such as plantation of mangrove and bio-shield and beach cleaning may also require additional workforce. This project will also help in escalating the development activities around the project site which will demand constant supply of labour for many sectors. The influx of workforce will put additional pressure on existing resources. The workforce normally consists of solitary migrant males and that can be potential risk for host population. However, in many cases the migrant male member of the family might relocate his family with him. Specifically, influx of labour force can lead to:

- Risk of conflict and social unrest due to cultural differences between the labour force and local community
- Risk of spread of communicable diseases due to interaction of the labour and the local community
- Risk of gender-based violence
- Risk of violation of child-safety measures
- Health hazard for host community due to lack of sanitation facilities and waste management
- Additional pressure on the local resources and social infrastructures

9.2 Construction Labour Management Plan

It is envisaged that during construction phase of the project of the different interventions in the States and UTs, labourers will be hired. Since the construction activities are mostly labour intensive by nature, therefore, it is also envisaged that many of the labourers will be employed from outside the particular State or UT and will therefore, be migrant labourers and hence, accommodation will be provided. These migrant labourers will be accommodated in a temporary campsite within the project area.

9.2.1 Objectives

The influx of migrant labour will have both negative and positive impacts on the nearby community and local environment. The labour will be accommodated in temporary campsite within the project area which can have significant interface with the nearby community. However, the influx of migrant workers would lead to a transient increase of population in the immediate vicinity of the project area for a limited time. This would put pressure on the local resources such as roads, fuel for cooking, water etc.

Hence, a plan has been designed to demonstrate the:

- Potential impacts associated with influx on the host population and receiving environment are minimized;

- Provision of safe and healthy working conditions, and a comfortable environment for migrant labour; and
- To ensure compliance with the national labour laws.

9.2.2 IFC Performance Standards

International Finance Cooperation (IFC) Performance Standard 2- Labour and Working Conditions is specific to labour and working conditions. This Standard focuses on the protection of the basic rights of workers, fostering constructive worker-management relationships, as well as promoting fair treatment and the provision of a safe and healthy workplace. The basic provisions for migrant workers under PS 2 are enumerated below:

- As per the provisions of PS 2, the client shall identify migrant workers engaged through third party and ensure that they are engaged on substantially equivalent terms and conditions to non-migrant workers carrying out similar work (if any);
- The Contractor shall ensure provision of adequate accommodation, transportation, and basic services including water, sanitation, and medical care for the workers working on that project;
- The compensation paid to the migrant workers should be non-discriminatory and the principle of equal opportunity and fair treatment to be followed; and
- Wastewater, sewage, food and any other waste materials are to be properly handled, in compliance with local standards– whichever is more stringent – and without causing any significant impacts to the biophysical environment or surrounding communities.
- IFC PS 4 – Community Health, Safety and Security carries health and safety through to the community environment. The objectives of the Performance Standard are:
 - To minimize and manage health and safety risks to local communities; and
 - To ensure that the project does not harm community health and safety.

9.2.3 General Requirements

All migrant workers are envisaged to be accommodated in proper temporary campsite within the project area or as guided by the Engineer / ESIA. If migrant workers are accompanied by their families, provisions should be made accordingly. As per the National Acts, inclusion of requirements for labour camp to be established by contractors during construction phase of the project. Contractor(s) shall ensure implementation of the following measures to minimise the potential negative impacts of worker accommodation and workers on local communities:

- Cleanliness: Pest extermination, vector control and disinfection are to be carried out throughout the living facilities in compliance with local requirements and/or good practice.
- Complaints and incident reporting: A formal Complaints Procedure will be implemented to ensure timely and transparent response to complaints as received from labour.
- Labour education: The workforce will be sensitized to local social and cultural practices through provision of an induction course for all employees that stipulates expected behaviour;
- Labour behaviour in campsite provided: A Code of Behaviour governing appropriate behaviour in the accommodation facilities to be kept in place and to be strictly enforced.

The contractor shall ensure implementation of the “rules of engagement” between labourers living in campsite and community and shall be implemented by construction contractors for all engaged labourers.

- Labour Compensation and Accommodation: Client shall ensure that labourers are provided with benefits such as annual leave, weekly rest day, etc. Accommodation to be provided for the construction labour which cover facilities (including catering facilities, dining areas, washing and laundry facilities etc.) and supporting utilities.

9.2.4 Hiring and Recruitment Procedure

The manpower contractor shall, wherever possible, locally recruit the available workforce and shall provide appropriate and requisite on job and EHS training as necessary. The following general measures shall be considered for the workforce during their employment tenure:

- The concerned PEA in consultation with the SPMU should include a code of conduct relating to the accommodation to be signed with the contract Document of contractors.
- The contractor shall not employ any person below the age of 18 years nor will have any forced labour;
- The construction labourers will be provided with documented information regarding their rights under national labour and employment law such as but not limited to Factories Act, Minimum Wages Act, Trade Unions Act and Workmen’s Compensation Act;
- First priority for employment of labour should be given those impacted by the project such as landowners who have lost land;
- No discrimination shall be done by the construction contractor with respect to recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, termination of employment or retirement, and disciplinary practices;
- The contractor to ensure that work hours are set at eight hours a day, 48 hours a week, with a weekly rest day for all engaged labour;
- Every labour is entitled for maximum of only two hours a day as Overtime (OT) work. OT pay is twice the hourly remuneration;
- The borrower country though the NPMU and SPMU shall ensure equal wages for male and female workers for work of equal nature or value is maintained;
- A grievance redress mechanism for workers shall be put in place by the contractor to raise workplace concerns. The workers will be informed about the grievance mechanism at the time of recruitment; and
- The Contractor shall ensure that their contractors develop and implement a procedure to review the performance of their sub-contractors.
- The procedure developed should include regular inspection of the camp sites, maintaining information pertaining to labour sourced by sub-contractors;

9.2.5 Worker’s Accommodation

The Contractor will supervise and monitor the activities performed by their contractor and accommodation facilities provided in campsite. The following measures shall be provided:

- The labour will be provided with accommodation on twin sharing basis made of insulated material and locally available building material, etc.;
- The migrant workers with families shall be provided with individual accommodation comprising bedroom, sanitary and cooking facilities;
- The units will be supported by common latrines and bathing facilities duly segregated for male and female labour;
- Adequate number of toilets shall be provided in the accommodation facilities. A minimum of 1 unit to 15 males and 1 unit for 10 females shall be provided;
- The contractor shall provide a canteen facility for the construction workers and the food will be of appropriate nutritional value and will consider religious/cultural backgrounds;
- All doors and windows shall be lockable and mobile partitions/curtains shall be provided for privacy;
- Facilities for the storage of personal belongings for workers shall be provided within the campsite only;
- Dustbins shall be provided for collection of garbage and will be removed on a daily basis;
- It is also required to provide first aid box in adequate numbers; and
- Ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

9.2.6 Security

The contractors shall put in place the following security measures to ensure the safety of the workers. The following measures shall be incorporated:

- Access to the campsite shall be limited to the residing workforce;
- The contractor shall be responsible for deploying adequate number of guards;
- Adequate, day-time night-time lighting shall be provided;
- The security personnel shall be provided with training to respect the community traditions and in dealing with, use of force etc.; and
- The rental accommodation shall be provided with firefighting equipment and portable fire extinguishers.

9.2.7 Provisions for Drinking Water

Access to an adequate and convenient supply of free potable water is necessity for workers. The domestic water supply shall be made available by the contractor.

- Safe drinking water conforming to the IS 10500:2012 for drinking water shall be provided;
- Private tanks can be utilized for provision of drinking water for the migrant labours;
- The direct usage of water from bore well should not be allowed and water shall be adequately treated;
- The Contractor(s) should regularly monitor the quality of drinking water available. In case of non-compliance with the Drinking Water Specifications, additional treatment shall be provided, or alternative sources of water supply shall be arranged; and

- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

9.2.8 Cooking Arrangements

The construction phase will involve engagement of large number of migrant people in the project area for a limited time. Hence, there shall be requirement of provision of cooking facilities (kitchen) as listed below:

- Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation;
- Adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water; and
- All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials;
- Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials.

To ensure that the fuel need of labourers in the project area does not interfere with the local requirements, necessary arrangements for supply of fuel to the labourers shall be done by the contractor.

9.2.9 Wastewater Generation

There will be generation of wastewater from the campsite. About 80% of water used shall be generated as sewage/wastewater. Contractors shall ensure that the campsite are equipped with septic tank and soak pit for disposal of sewage. It is also recommended that the storm water and sewage system should be separate. The surface water drainage shall include all necessary gutters, down pipes, gullies, traps, catch pits, manholes etc. Sanitary and toilet facilities are constructed of materials that are easily cleanable. Sanitary and toilet facilities are required to be cleaned frequently and kept in working condition.

9.2.10 Solid Waste Management

The municipal solid waste generated from campsite will mostly comprise of compostable wastes like vegetable matters (kitchen waste) and combustible waste like paper, cans, plastic and some non-degradable waste like glass/glass bottles. Improper disposal of solid waste will lead to environmental degradation and health hazards to labour as well as nearby community.

The following measures shall be adopted by contractors for ensuring effective management of solid waste:

- The solid wastes of domestic nature generated shall be collected and stored separately in appropriate containers with proper sealing on them;
- Separate bins with proper markings in terms of recyclable or non-recyclable waste shall be provided in the houses and kitchen premises in sufficient numbers for collection of garbage;
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation; and

- The contractor shall identify the nearest municipal solid waste storage facility and tie up with the concerned urban local body for disposal of waste at frequent intervals.

9.2.11 Medical Facilities

Effective health management is necessary for preventing spread of communicable diseases among labour and within the adjoining community. The following medical facilities shall be provided by contractors for the construction workers:

- A first aid centre shall be provided for the labour within the construction site equipped with medicines and other basic facilities;
- Adequate first aid kits shall be provided in the campsite in accessible place. The kit shall contain all type of medicines and dressing material;
- Contractor shall identify and train an adequate number of workers to provide first aid during medical emergencies;
- Regular health check-ups shall be carried out for the construction labourers every six month and health records shall be maintained;
- Labours should have easy access to medical facilities and first aider; where possible, nurses should be available for female workers;
- First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.
- An adequate number of staff/workers is trained to provide first aid; and
- Information and awareness of communicable diseases, AIDS etc. shall be provided to workers.

9.2.12 Recreation Facilities

- Basic collective social/rest spaces are provided to workers.
- Facilities like a common television can be provided in labour camps

9.2.13 Inspection of Accommodation Facilities

Campsite shall be inspected at frequent intervals to ensure that the facilities are well organized and maintained to acceptable and appropriate standards by the Contractor. The key areas are:

- Daily sweeping of rooms and houses shall be undertaken;
- Regular cleaning of sanitary facilities shall be undertaken;
- The kitchen and canteen premises shall be established under good hygiene conditions;
- Daily meal times shall be fixed for the labour;
- Smoking and alcohol consumption shall be prohibited in the workplace;
- Water logging shall be prevented at areas near the accommodation facilities and adequate drainage is to be provided; and
- Checklists pertaining to the daily housekeeping schedule shall be maintained and displayed at houses, toilets and kitchen.

To limit the impact due to cumulative labour onsite during construction phase, contractors shall provide adequate labour camp which should be appropriate for its location and be clean, safe and, at a minimum, meet the basic needs of workers.

- Contractors should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel;
- It should be ensured that the labour camp(onsite)should have basic amenities such as electricity, drinking water, health& sanitation facility, kitchen and rest room;
- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated and all the migrant workers will be instructed accordingly;
- Employers should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of workers;
- The labour camp will be equipped with septic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes;
- Contractors should ensure that the disruption of local communities is minimum, in particular local communities' transport infrastructures and if required limit the workers movements in nearby areas;
- Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers;
- Contractors should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;
- Where possible, an adequate transport system to surrounding communities will be provided. It is good practice to provide workers with free transportation to and from local communities

Specifically:

- The contractor and labourers will sign code of conduct by contractors and workers to maintain good manners with the community and avoid gender based violence;
- Project will undertake awareness raising program for the workers and community on the risk of labour influx; and
- To the extent possible, local workforce will be engaged to minimize the influx of workers

9.3 Contractor's responsibility

Within 30 days from the appointed date, the Contractor shall prepare and submit 4 hard copies and 1 soft copy of Labour Influx and Worker's Camp Management Plan to the concerned PEA that addresses specific activities that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, training programs on HIV/AIDS, etc. A Workers' Camp Management Plan addresses specific aspects of the establishment and operation of workers' camps.

This Labour Influx and Worker's Camp Management Plan will include:

- (i) mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women;
- (ii) informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted;

- (iii) introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination), manual scavenging, engagement with local residents, child labour, non-discrimination, harassment of co-workers including women and those belonging to SC and STs and other minority social groups,
- (iv) contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence.
- (v) training programs on HIV/AIDS and other communicable diseases,
- (vi) workers' Camp Management Plan addressing specific aspects of the establishment and operation of workers' camps provided the Local Body/ Executing Agency is unable to cater to the demand for affordable housing for this additional workforce in terms of rentals, hostels, apartments etc.; and
- (vii) complaint handling Mechanism at the project level

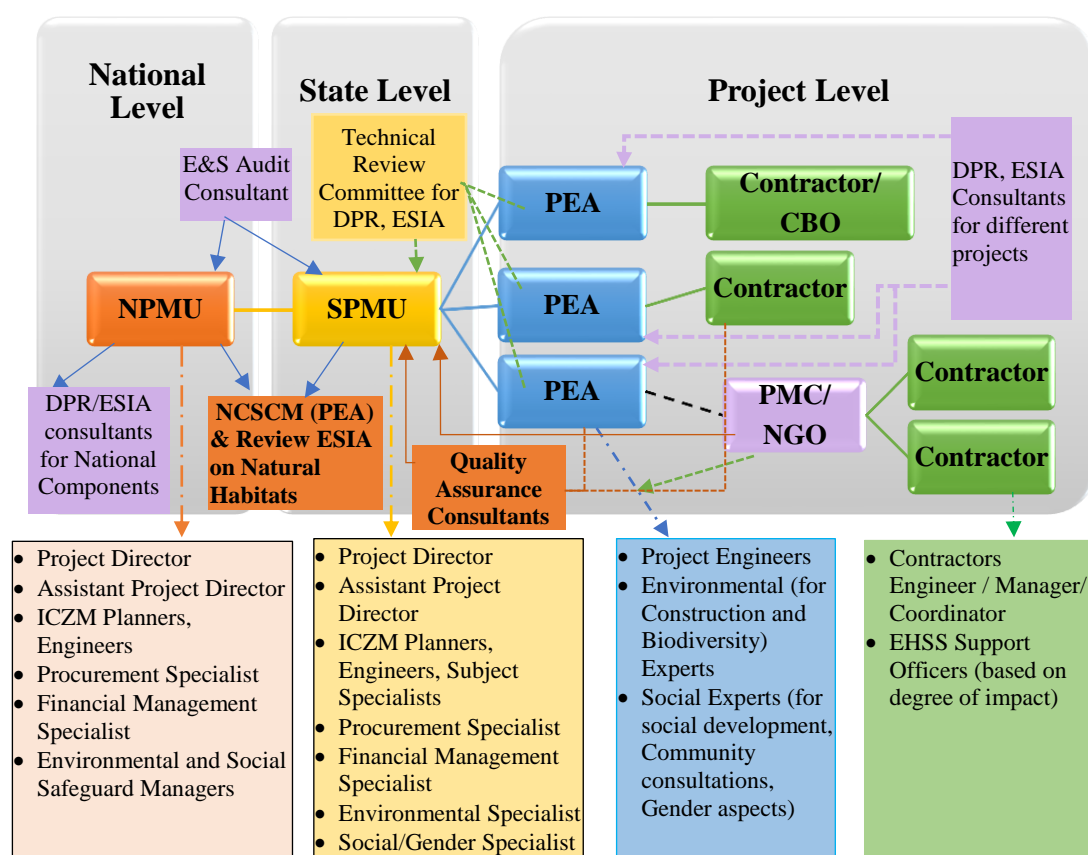
Additional measures that aim to reduce incentives to engage with the local community by providing workers with the opportunity to spend their time off away from the host community, where feasible with a small transport allowance, ideally allowing workers to regularly return for brief visits to their families, spouses and friends, or to visit nearby urban centres that provide a variety of legal social opportunities. For workers who need to travel further it may be attractive to forego weekends off in exchange for longer breaks that would allow for such home leave travel.

While clear and decisive measures by the contractor are critically important, the effectiveness of these measures often depends on complementary actions by the Borrower. Those are typically focused on public administration and law enforcement, such as: (i) reinforcing local police in a remote setting, where services may not be sufficiently staffed or equipped to maintain public order after the influx, (ii) ensuring that complaints about gender-based violence are taken seriously by local law enforcement, which may be supported by (iii) deploying female officers to the project area, and (iv) participating in preventive training with workers to demonstrate the presence of government authority in the project area.

Ever since ICZM Project (2010), NPMU has an established organization support structure to ensure that the policy obligations and associated procedures in the ESMF are implemented. The implementation experience of ESMF in coastal management projects necessitates extension of the responsibility to respective SPMUs and PEAs to enhance safeguard arrangements at the implementation level, besides Capacity Building for continued incorporation of environmentally acceptable measures for all future coastal development activities.

10.1 Proposed Institutional Framework at National, State, Project Levels

Proposed institutional framework at National, State and Project levels and suggested responsibilities for environmental and social safeguards is presented in the following *Figure 8.1*.



Legend:

NPMU: National Project Management Unit
SPMU: State Project Management Unit
PEA: Project Executing Agency
PMC: Project Management Consultant
E&S: Environmental and Social
EHSS: Environment, Health, Safety and Social

NCSCM: National Centre for Sustainable Coastal Management
NGO: Non-Governmental Organizations
CBO: Community Based Organizations
DPR: detailed Project Report
ESIA: environmental and Social Impact Assessment

Figure 10:1 Proposed Institutional Framework for Safeguards Management for ENCORE

10.1.1 NPMU

SICOM, under the MoEFCC is the NPMU for the Program. ENCORE Program activities are overseen by Project Director of NPMU with the support of Assistant Project Director. In addition to the professionals including ICZM Planners, Environmental / Civil Engineers, Biodiversity Specialist, Procurement, Financial Management specialists; Environmental and Social Managers will also be also deployed to ensure implementation of ESMF during both project preparation and implementation. Currently, NPMU has two Environmental and Social Managers (one Environment and one Social) who would be adequate for the same. The outline ToR for the environmental and social Managers is presented in Volume II of this ESMF document. Biodiversity officer at NPMU will also provide inputs to review and clear projects involving natural habitats.

NPMU will be responsible to oversee and provide guidance and approval to the environmental and social actions on projects by various SPMUs. NPMU will also review the findings of the Annual Environmental and Social Audit and guide corrective actions if required. Environmental and Social Managers of NPMU will also prepare suitable formats and ensure record keeping on environmental and social actions under this project for any further reporting. SICOM will be supported by NCSCM on technical and scientific aspects. Any clarifications on applicability of CRZ rules or technical / scientific aspects related to coastal/marine / natural habitats and need for special review of projects involving natural habitats will be sent to NCSCM for clarifications and suggestive good practices. Detailed Management Information System linking project details, scheduling and documentation to EIA process and ESMF implementation will support the NPMU in effective preparation of safeguard instruments, supervision and monitoring.

Thus, the role and responsibilities of the Environment and Social Specialists at the NPMU shall include:

- Updating of the ESMF document,
- Training and orientation of the PEAs on the requirements and application of the Environment and Social Management Framework,
- Reviewing the monitoring reports submitted by the States on compliance with the ESMF, including the ESMPs,
- Undertake Annual site visits, specifically covering sub-projects near environmentally sensitive sites, across the implementing states, to review compliance with the ESMF and sub-project specific plans,
- Provide guidance and inputs to the SPMUs on environment and social management aspects, including documentation,
- Maintaining and reviewing the safeguards aspects using a full-fledged MIS
- Act as a single point of contact for resolving queries related to environment and social issues (along with NCSCM),
- Prepare regular reports/updates for the World Bank.

10.1.2 SPMUs

SPMUs will be formed to oversee the project activities in respective States. SPMUs will also have ICZM specialists in various fields, procurement, financial management specialists and environmental and social specialists under the leadership of Assistant Project Director and Project Director. Design team in SPMU will oversee the preparation of DPRs and incorporating Environmental and social aspects highlighted in ESIA. SPMU oversees ESMF implementation by PEAs during all project stages and maintains records on project – wise / implementing agency -wise report on environmental and social actions at respective State Levels. SPMU environmental and social Specialists guide the PEAs to undertake environmental and social Screening of each subproject. Their main role is to ensure that environmental and social requirements set forth for the program are applied appropriately to subprojects, and the implementation of sub-projects is carried out in line with ESMF, applicable Government of India regulations and World Bank safeguard policies. SPMU specialists are mandated to review and approve the categorization of the project based on screening information provided by the PEAs and provide guidance to ensure that the environment and social safeguards documents (ESIAs/ ESMPs) are prepared satisfactorily leading to approval of sub-projects. SPMU will also guide and co-ordinate with PEAs to get requisite approvals from National / State levels as required by various rules / acts and maintain record on approval/clearance status and reasons for delays if any. As part of appraisal, the environmental and social conditions identified for sub-project approval and the final documents will be approved by NPMU/World Bank and disclosed. SPMU will supervise and monitor implementation of social and environment safeguards in sub-projects as per this ESMF. The environmental and social specialists of SPMU shall undertake quarterly visit to subprojects to ensure compliance with ESMPs/ ESMF; and guide and support PEAs/contractors to oversee safeguards management, prepare quarterly progress reports on this for submission to NPMU, review monthly progress reports by PEAs to resolve any issues, join the field visits undertaken by NPMU as part of annual monitoring of the subprojects. unscrupulous

All safeguards instruments for E1/S1 projects will be subject to World Bank prior review and clearance by the World Bank safeguards specialist assigned to the ENCORE Program.

- Environmental Screening Reports
- TORs for Environmental Assessments
- ESIAs, and ESMPs

Upon clearance, safeguards instruments can be included in bidding documents and other procurement documents. Work shall not commence on project sites without due clearance of the respective safeguards instrument.

Upon project commencement the safeguards specialist of SPMU shall prepare a datasheet in tabular format and maintain an MIS to track all requisite safeguards

instruments for sub-projects. This Project Info-Table or MIS shall be continuously updated as and when each subproject starts or as required. The decision to start preparations for each subproject shall be conveyed to the SPMU safeguards specialists and / or procurement plan for each quarter shall be shared well in advance to initiate screening, categorisation and preparation of ESIAs. This sheet shall be submitted to NPMU as part of quarterly progress report sent by SPMU. NPMU shall in turn share this along with the World Bank safeguards specialist every quarter or when requested.

Thus, the design team, procurement team and environmental and social specialists shall oversee the incorporation of actions in relevant reports, estimates, bids and implementation of ESMF as well as other environmental and social provisions specified in the applicable regulatory frameworks. Duties and responsibilities of the environmental and social specialists are compiled in Volume II.

10.1.3 Project Executing Agencies (PEAs)

The PEAs shall have dedicated environmental and social experts with appropriate qualification and experience for coordinating with Local Bodies, line departments and SPMU. They shall undertake screening of the projects following the exclusion list and IESE formats in ESMF Volume II. For this; they shall co-ordinate and get guidance from the specialists in SPMU (for State Projects) / NPMU (for National Projects). They shall evaluate the appropriacy of the consultants (with guidance from SPMUs) who would prepare ESIAs, guide ESIA preparation (with guidance from SPMUs) and review the ESIA documents and send to SPMU / NPMU for clearance. They shall be mandated to support and co-ordinate for Government approvals and statutory clearances to ensure adoption of Environmental and Social safeguards, submit the relevant documents/ reports for the adopting and compliance of the ESMF, as required. PEA will assist in securing of "Enter Upon Permissions and Land alienation" for other Government lands and processing the private land acquisition proposals with District Administration. PEA will verify and certify the sites are free of encumbrances and all required permissions are received before handing over site to the contactors for construction.

Environmental and Social experts of the PEA will submit the compliance reports to SPMU on clearances, permits, and environmental and social safeguards along with physical progress reports, as required. The frequency of compliance report submission is monthly or as needed. Special compliance reports on any environmental and social action points suggested by SPMU / NPMU may also be submitted as and when required considering the need to follow up and ensure environmental and social actions to mitigate implementation / other risks.

The PEAs (line departments) shall be responsible for the execution of the contracted work either through the contractors or internally by the department staff. They will ensure during the day-to-day functioning that the ESMF, ESMPs and the RAPs, are implemented by contractors / others concerned properly in their respective sub-projects.

The PEAs shall carry out the following key tasks:

- Prepare project designs (pre-feasibility/feasibility/DPRs) inhouse / through consultants,
- Leading social and environment screening exercise for every sub-project site, through their environmental and social experts,
- Integrate findings of the screening and assessments (where applicable) in the sub-project selection and/or design process,
- Preparation of the EA/SA and ESMP/RAP documents along with the DPRs where applicable either through internal resources or external consultants, its initial review and forwarding to SPMUs. They shall also through consultants incorporate the comments of stakeholders, SPMU/NPMU and the World Bank so as to finalise the reports,
- On-site review for compliance with the ESMF, ESMP and the RAP requirements,
- Providing safeguard inputs/onsite compliance of safeguards into the MIS,
- Take required actions, including application of contractual remedies, on contractors when needed,
- Provide required update/data/information/ monthly reports to the SPMU on ESMF implementation.

10.1.4 Project Management Consultants (PMCs)

PEAs may require the support of PMCs for certain projects. SPMUs / PEAs will appoint PMCs with adequate technical and managerial manpower (including environmental and social safeguard specialists) and expertise on specific project types. The TOR for PMC services shall include supervision of environment and social impacts in the implementation of the projects mainly in case of E1 and S1 projects. PMC shall be well equipped to guide the contractors and PEAs on safeguards adoption and best practices. The PMC will submit **monthly** compliance reports on environmental and social safeguards along with physical progress reports, as required to the PEAs/ SPMU / NPMU as applicable. In case of special requirements / emergency follow up on environmental and social actions, the PMC shall submit such follow up reports as and when required.

10.2 Capacity Building

NPMU envisages capacity building for all other agencies involved including SPMUs, PEAs (including Line Departments, Local Bodies, Statutory Boards, Public Undertakings) and Potential Private Operators, PMCs, and Contractors in order to ensure that the ESMF is effectively operationalised. This will be accomplished by organising sensitization programs, workshops, and training programs, which will be co-ordinated and anchored through training institutions in respective States and other local and National Institutions (such as NCSCM) and individuals experienced in various

aspects of coastal management and infrastructure provision. The expertise of the World Bank also will be availed for capacity building exercise. Orientation programs on the various aspects like environmental and social aspects, Project Management and Engineering and Public Health will be conducted. ESMF training will be specially structured and delivered to PEAs. Discussants can include line departments, and Pollution Control Boards. ESMF training include ESIA methods, new land acquisition and R&R act, preparation and implementation of ESMP and RAPs, consultations and public hearing, regulatory requirements, ESMF adoption and compliance, sustainable urban/regional/coastal development, energy efficiency, climate change resilience, mitigation and adaptation, etc.

Indicative details of training program are presented in **Table 10:1**. This will be elaborated, and a proper training plan and schedule / module will be devised by NPMU/SPMUs through support of national training institutions.

NPMU will make a conscious effort to mainstream the environmental and social aspects in other main training programs under this project. The Environment and Social Specialists at the national level will provide technical assistance in planning and design of the safeguard / environmental and social aspects of activities, including reviews and trainings. The training programs will aim at orienting the personnel towards value addition and enhancement benefits of proper management of environmental and social issues. NPMU will also enhance the capacity of its own staff and Environmental and Social managers in environmental and social safeguards, technical aspects of the proposed projects, through orientation programs, trainings, exposure visits to similar projects implemented, courses and participation in both national and international training courses and seminars/workshops. It is also suggested to organise workshops during year 2, 4 and 6 of the project for cross learning between the project experiences of SPMUs/PEAs.

The World Bank specialists shall provide adequate training to SPMU / NPMU safeguard specialists thrice during the project duration: well-spaced to update the new techniques, practices and to effect cross-learning. Through this, the SPMU/NPMU safeguard specialists can attain necessary guidance to train the sub-project staff.

In addition, Safeguards specialists at NPMU and SPMU shall provide training to safeguards staff of PEAs, PMCs and the contractors at the start of each sub project and mid-term during its implementation. This includes training on ESMP implementation and safeguards management during various sub-project stages; including during work close out / work exit. One such training shall be for PEAs or SPMUs to learning from each other's experiences and good practices.

The proposed training/capacity building activities for ESMF implementation will be supported through the TA Sub-component of ENCORE at an **estimated cost of INR 170 Crores, for 3 Years of Phase I, MPA.**

Table 10:1 Outline of the Proposed Capacity Building Program on ENCORE (2020 – 2025)

Sl No	Training Programs and Modules	Contents	Presenter/s	Frequency and Duration	Targeted Participants
A	National Level Training Programs organised by NPMU				
I	Orientation Program			Two days (First	NPMU, SPMU
	Module 1: About ENCORE Program	<ul style="list-style-type: none"> - About ICZMP and Concept of ENCORE and involvement of Government of India, States and The World Bank (including Financing Instrument) - Technical and Financial Aspects - Project Implementation Set up 	NPMU Project Director / Assistant Project Director	Three modules – together in a day; fourth module on second day)	NPMU, SPMU and PEA / PEA/Local Body staff, technical review committee members
	Module 2: ESMF and the Project Cycle and Regulatory Aspects	<ul style="list-style-type: none"> - World Banks Safeguards Policies and Concept of ESMF - Applicable regulations: National, State, Local / others - Project Cycle of ENCORE - ESMF incorporation in Project Cycle during Identification (Screening, Categorization), Preparation, Appraisal, Implementation (Monitoring, Audit) 	Environmental / Social Specialists of NPMU, The World Bank	First Year (before initiating implementation), Third and Fifth Year of Implementation	Module 4 (Day 2): Environmental Specialists attends Sub-module on Environment & Social Specialists attends sub-module on Social specifically
	Module 3: Overview of Locations and Project Activities; Impacts	<ul style="list-style-type: none"> - Overall Project Locations - Expected impacts: activity wise - Need for mitigation / management 	Environmental / Social Specialists of NPMU, Forests, Pollution Control Board		
	Module 4: Sub-project level Environmental and Social Assessments, Generic Mitigation / Management measures, Institutional Aspects, budget (Case studies)	<ul style="list-style-type: none"> - ESIA: EA process, Identification of Environmental Impacts, Impact Identification Methods, Identification of Mitigation Measures, Formulation of Environmental Management Plan, Climate Change adaptation and mitigation Plans, Implementation and Monitoring, Institutional Mechanism - SIA: R&R policies and procedures, National & World Bank Requirements, LA process, Identification of PAPs, Social Entitlement Frameworks, Social Impact Assessment, RAP Techniques Beneficiary Assessments, IPPF 	Environmental / Social Specialists of NPMU, The World Bank		

Sl No	Training Programs and Modules	Contents	Presenter/s	Frequency and Duration	Targeted Participants
II	Implementation Experience Sharing Program			One day; Second, Fourth and Final Year of Implementation	NPMU, SPMU and PEA Local Body staff, technical review committee members
	Module 1: Experience Sharing on ESMP Implementation	- Experiences on implementation of ESMF in implemented projects - Best Practices-Site visits to project towns/sites	Environmental / Social Specialists of NPMU; SPMUs		
	Module 2: Review of Audit Results	- Discussion on the results of the annual audit on ESMF	Environmental / Social Specialists of NPMU		
	Module 3: Stakeholder Participation and Community Engagement	- Stakeholder Analysis - Participation models in various projects by CBOs, Communities, Individuals, Private parties, PEAs	Environmental / Social Specialists of NPMU		
	Module 4: Best Practices Show-case	- Site visit to select projects to display best practices in any field/aspect	Environmental / Social Specialists of NPMU; SPMUs		
B	State Level Training Programs (in each Project State) organised by SPMU				
I	Orientation Program			Two days; First (before initiating implementation), Third and Fifth Year of Implementation	SPMU and PEA staff/ Local Body, line departments, technical review committee members, PMCs, NGOs, Communities, CBOs
	Module 1: About ENCORE Program	- About ICZMP and Concept of ENCORE and involvement of Government of India, States and The World Bank (including Financing Instrument) - Technical and Financial Aspects - Project Implementation Set up	Environmental / Social Specialists of SPMU, NPMU		
	Module 2: ESMF and the Project Cycle	- World Banks Safeguards Policies and Concept of ESMF - Applicable regulations: National, State, Local / others - Project Cycle of ENCORE, ESMF incorporation in Project Cycle during Identification (Screening, Categorization), Preparation, Appraisal, Implementation (Monitoring, Audit)	Environmental / Social Specialists of SPMU, NPMU		
	Module 3: Regulations, Sub-project level Environmental and Social Assessments, Generic	- Overall Project Locations - Expected impacts: activity wise - Need for mitigation / management	Environmental / Social Specialists of SPMU,		

Sl No	Training Programs and Modules	Contents	Presenter/s	Frequency and Duration	Targeted Participants
	Mitigation / Management measures, Institutional Aspects, budget		NPMU, Pollution Control Board, Forests		
	Module 4: Stakeholder Participation and Community Engagement	<ul style="list-style-type: none"> - Stakeholder Analysis - Participation models in various projects by CBOs, Communities, Individuals, Private parties, PEAs 	Social Specialists of SPMU		
II	ESMP Implementation				
	Module 1: Environmental Enhancement and Occupational Health and Safety	<ul style="list-style-type: none"> - Clearance / permits / regulatory aspects - Occupational Health & Safety Training - Staff & Labour Code of Conduct - HIV/AIDS prevention Training, Best hygiene practices - Emergency Response System - Behavioural Training - Implementation of ESMP provisions 	Environmental / Social Specialists of SPMU	One day; Every Year, starting from Second	PEA staff, Contractors, Line departments, PMCs
	Module 2: Review of Audit Results	<ul style="list-style-type: none"> - Discussion on the results of the annual audit on ESMF – specifically focusing on ESMP implementation, contractors / PMCs performance and corrective actions 	Environmental / Social Specialists of SPMU with Auditors, NPMU		

Modules for training may be developed keeping in the needs of the various target groups/stakeholders. A more comprehensive plan on training and capacity building will be included in the Operations Manual for the project, which is currently being drafted/developed in consultation with the states.

10.2.1 Subproject Monitoring: Environmental and Social Management

The environment management instruments provide guidance on monitoring and evaluation parameters and describe the institutional arrangements to facilitate the 'process' and 'progress' monitoring.

Designated Environment and Social Specialists at various levels shall be responsible for overseeing compliance of the sub-projects to Bank safeguards, GoI regulations and applicable ESMF guidelines. They shall also review regularly the timely implementation of environment and social provisions as per the ESMF, ESMP and RAP, where applicable. The monitoring and reporting will be done by line departments/implementing agency to SPMU, which in turn will be reporting to NPMU.

The following aspects shall be monitored and reported as per the frequency provided in **Table 8.2** below. Corrective actions shall be initiated in a planned manner as appropriate to ensure compliance to the ESMF/ESMP measures.

Table 10:2 Monitoring Schedule

Sl.No.	Particulars	Frequency	Reporting Responsibility	Monitoring responsibility
1	ESMF Compliance/Status Report, including screening results, status of conduct of ESIA/SIA and actions taken for compliance	Monthly/ Quarterly	PEA, Environmental and Social Experts	SPMU - Project Director and Environmental and Social Specialists
2	Environment and social site visit report	Quarterly	PEA/PMC, Environmental and Social Experts	SPMU - Project Director and Environmental and Social Specialists
3	Regulatory clearances - Environment	Quarterly	PEA/PMC, Environmental and Social Experts	SPMU - Project Director and Environmental Specialists
S4	Verification of land to be acquired and status of land acquisition	Monthly	PEA, Social Expert	SPMU - Project Director and Social Expert
5	Distribution of entitlements and assistances	Monthly	PEA, Social Expert	SPMU - Social Expert
6	Community consultations	Quarterly	PEA Environmental and Social Experts	SPMU - Project Director and Environmental and Social Specialists
7	Grievance redressal	Monthly/ Quarterly	PEA Social Expert	SPMU - Project Director and Environmental and Social Specialists

10.2.2 Reporting Formats

Reporting formats shall be developed by NPMU to get progress and results data of the project from the field. This will also help in synchronising and streamlining reporting requirements from the various SPMUs to the NPMU.

10.3 Budget for ESMF Implementation

To effectively implement the environmental and social management measures suggested as part of the ESMF, necessary budgetary provisions will be made in the DPRs for the individual subprojects. Tentative budget for each of the project should include the environmental management costs along with the good engineering practices and cost of environmental and resettlement monitoring.

As presented in *sub-section 5.5.1*, the budget for complying with the ESMP needs to be worked out for each sub-project by working out the cost of implementing each ESMP mitigation measure. Where this is not possible, provision of a minimum of 2 percent of the sub-project cost needs to be earmarked for implementing ESMP measures. In addition, provision for ESHS performance security in the new bid documents shall be made to ensure ESMP implementation.

All administrative costs for implementing the ESMF shall be budgeted for as part of budget for human resource and other facilities while preparing the budget for PEA and PMU establishment and operations.

Drawing from the project experience and current indicative costs of **Category A** projects the following **Table 11:3** provides a rough estimation of costs for safeguard management and ESMF implementation. All safeguards instruments have been inbuilt in to the project modality and will be financed through the project and detailed project cost tables will include the necessary costs accordingly. Updated cost tables will be prepared when the ESMF is updated during each Phase of this MPA project.

The associated cost to implement ESMPs as well as training for project staff, contractors etc. have been integrated into the project budget. The project will ensure that all works contracts will include the ESMP, and the cost of implementing the ESMP will be identified as an item in the Bill of Quantities.

Budget for ESMF implementation has been calculated based on assumed rates for safeguards management for a National program. This should be made part of overall program costs for ENCORE to ensure smooth implementation of environmental and social aspects including safeguards management through the use of this framework. The budget is worked out for 3 years – Phase I of MPA. This shall be revised and worked out as appropriate during subsequent stages of MPA.

Table 10:3 Proposed Budget for ESMF Implementation

Sl NO	Proposed Safeguards Management Activity	Quantity	Unit Rate (INR) or Rate / Year	No: of years	Total Cost (INR)	Assumptions
1	Environmental & Social Specialists, Biodiversity and Gender Specialists at NPMU	4	1800000	3	21600000	4 specialists @ Rs 150000 per specialist per month for 3 years
2	Environmental & Social Specialists at SPMUs	26	1200000	3	93600000	2 Specialists each for all States and UTs; Rs 100000 per specialist per month for 3 years
3	National Level Training	1	1000000	3	3000000	One training annually
4	State Level Trainings (3 per State; assuming 11 States)	39	750000	-	29250000	3 Trainings per State, for all 11 States and 2 UTs
5	Project screening by PEAs	195	200000	-	39000000	around 15 projects per State/UT for 13 States/UTs
6	Co-ordination and Travel for Safeguards Management by PMU (including site verifications, discussions, compliance monitoring, review committee meetings)	13	1500000	3	58500000	lumpsum per year
7	Preparation of Safeguards Instruments	156	5000000	-	780000000	12 high / moderate risk projects requiring clearances, for all States/ UTs (may be included in total cost if EPC contract depending on choice of implementation mechanism)
8	QA/QC and Project Management Consultants for States	13	3000000	3	117000000	All States, UTs each year
9	Project Management Consultants (for coordinating Safeguards Management) / project Management by PEAs	78	1000000		78000000	50 percent of high/moderate risk projects-cost only for safeguards/project E&S support

Sl NO	Proposed Safeguards Management Activity	Quantity	Unit Rate (INR) or Rate / Year	No: of years	Total Cost (INR)	Assumptions
10	Annual environmental and social Audit	13	5000000	3	195000000	All States, UTs each year
11	ESIA review and CRZ Clarifications by NCSCM	78	500000		39000000	Assumed that special cell will be constituted. Review required for 50 percent of high/moderate risk projects
	Sub Total				1453950000	
12	Contingencies & Miscellaneous; including overall coordination and planning, emergencies	15 percent			218092500	
	Grand Total				1672042500	
					say 170 crores INR	

10.4 The Roles and Responsibilities of World Bank

The World Bank project task team, specifically the environmental and social specialists, will provide close supervision and necessary implementation support by reviewing and providing guidance on conducting screening, and the preparation of relevant safeguard instruments as well as providing training for SPMU/NPMU specialists; as presented here:

- Undertake prior review and provide feedback on suggested safeguards instruments, review of monitoring updates and other relevant safeguards documents,
- Participate in regular missions to review overall safeguards performance and provide further implementation support,
- Share knowledge on technologies and best practices,
- Provide guidance on handling complaints and grievances from a technical standpoint,
- Provide training support on Bank's safeguard policies and safeguards requirements of the project.

11.1 Grievance Redress Mechanism

Effective grievance redressal mechanism gives an opportunity to the organization to implement a set of specific measures to ensure good governance accountability and transparency in managing and mitigation of environmental and social issue of a particular project. This consists of defining the process for recording/receiving complaints and their redressal in respect of environmental and social matters. The Grievance Redressal Mechanism for the ENCORE Program incorporates an integrated system with Grievance Redressal Cell (GRCs), with necessary officers, officials and systems, at the SPMU in all the states and UTs. There should be a person in charge/nodal officer at the PEA, SPMU and NPMU level to receive the complaints. Grievances may be submitted through various mediums, including in person, in written form to a noted address, e-mail, social media (if comes to the notice of the concerned authority), or through direct calls to concerned official/s. The Social and Environmental Expert/person in charge in the concerned agency shall be responsible for coordination of grievance/complaints received. The grievance redress mechanism should be in place at the time of initiating the implementation of RAP and project implementation activities in the area. A platform for grievance redressal should be organized and its regular meetings may be conducted so as to allow people to put forth their grievances. It will help the appropriate authority to find solutions and amicably address the issues.

11.2 Web Based Grievance Mechanism

In case of grievances received through toll free number or web-based system, a person will be made in-charge of screening and resolution of the same/communicating with the concerned divisions for resolution of the same. The person in-charge based on nature of complaint, will forward the same to the concerned official. A ticket or a unique number will be generated for all such complaints. The complainant will follow up based on that unique number. All calls and messages will be responded within two weeks. If response is not received within 15 days, the complaint will be escalated to project head. The websites of SPMU and PEA will include a link where affected person(s) can register their complaints online. A telephone number will also be on the website of SPMU and PEAS and displayed on the project sites, so that the general public can register their complaint with the SPMU office.

Facilities available:

Locations	Information (the complainant has the right to keep his/her identity undisclosed)
Project sites	Phone number (of all the concerned authorities including SPMU and NPMU, SCZMA/NCZMA, and the national toll-free number), email, complaint box, link to website

Locations	Information (the complainant has the right to keep his/her identity undisclosed)
PEA (displayed at office and website)	Phone number (of all the concerned authorities including SPMU and NPMU, SCZMA/NCZMA, and the national toll-free number), email, complaint box, link to website for registering complaint
SPMU (displayed at office and website)	Phone number (of all the concerned PEAs, NPMU, SCZMA/NCZMA,) and the national toll-free number), email, complaint box, link to website for registering complaint
NPMU (website)	Phone number (of all the concerned PEAs, SPMUs, list of social and environmental expert in-charge in all the SPMUs, SCZMA/NCZMA,) and the national toll-free number), email, link to website for registering complaint, link to social media

11.3 Three-tier Grievance Management System

11.3.1 First-tier Grievance Redress

The community organizers at the village / project site, for each activity implemented at village level, will be the first level contact for any aggrieved person. On a fixed date of every month, individuals / community can approach the community organizer to register their grievance. That apart, the project sites will have information board with the (i) name of the PEA; (ii) name of the nodal grievance redress/social development officer of SPMU; and (iii) a toll-free number to register grievances. The community organizer will prepare a monthly report on these cases and submit to the respective PEA. Wherever the nature of the project activity does not include a community organizer, the Nodal Officer of the PEA will assume the same responsibility.

Tiers of Grievance Redress Mechanism	Nodal Person for Contact	Contacts, Communication and Other Facilitation by Project	Timeframe to address grievance
Project Site or Village	Community Organizer or Nodal Officer of PEA	<ul style="list-style-type: none"> Each Project Site or Village will have Information Board listing the names and contact telephones. One public meeting day with regular pre-decided schedule organized every month. 	15 days

11.3.2 Second-tier Grievance Redress

Any grievance of the community / individual addressed to the community organizer, if remains unresolved will be passed on to the higher level by the community organizer. At the SPMU level, the grievance redress mechanism will comprise of the (i) grievance registration system as described above, (ii) a dedicated staff of the Communication and Capacity Building Cell of SPMU to prepare monthly reports on grievances and escalate specific grievances within a day of receiving a complaint or grievance to the SPMU Grievance Committee, and (iii) a Grievance Committee of the SPMU which will include the Additional project Director, the Social Development Specialist of SPMU and the Communications Specialist of the SPMU. This committee will prepare a quarterly report on grievances received and resolved and provide specific detailed description of the cases where the issues were escalated, and submit to the State Project Director, within 10 days of completion of each calendar quarter. The mechanism at NPMU will be exactly the same.

Tiers of Grievance Redress Mechanism	Nodal Person for Contact	Contacts, Communication and Other Facilitation by Project	Timeframe to address grievance
SPMU / NPMU	Social Development Specialists and Communication Specialists	<ul style="list-style-type: none">▪ A toll-free dedicated telephone number to register grievances, advertised in each Information Board at Project Site or Village.▪ Website advertisement, public notices in print media.▪ Additional means include the social audit and surveys undertaken by the third-party monitoring consultants; or annual stakeholder meetings.▪ In-house monitoring of the project activities by the NPMU/SPMU technical, communication and capacity building cells are also expected to assist in the process of grievance registration and management.▪ The Social Development Specialist will be responsible to ensure that there is no cost imposed on the aggrieved person due to the grievance redress mechanism at the first and second tier	30 days

11.3.3 Third-tier Grievance Redress

In case grievance is not addressed at this tier as well, the aggrieved person can approach the State Coastal Zone Management Authority or the National Coastal Zone Management Authority, as the case may be. The National and State Coastal Zone Management Authorities have, apart from representation from the Government agencies, members who are either experts independent of the Government or representatives of NGOs working on coastal zone management issues. The State/National Project Director, through the Department of Environment of the State or the MoEFCC will place the case in the agenda of the SCZMA/NCZMA meeting. The SPMU/NPMU Social Development Specialist will be responsible to prepare all background documentation for the SCZMA/NCZMA to consider the case with all required information. The Communication Specialist in SPMU/NPMU will be responsible to inform the aggrieved person the process of contacting the SCZMA/NCZMA, and the date and time of meeting of the SCZMA/NCZMA at least 3 days in advance of the meeting.

Tiers of Grievance Redress Mechanism	Nodal Person for Contact	Contacts, Communication and Other Facilitation by Project	Timeframe to address grievance
SCZMA or NCZMA	State or National Project Director, with assistance from SPMU/NPMU Social Development Specialists	<ul style="list-style-type: none">▪ Only after exhausting the first and second tiers▪ Website advertisement, public notices in print media.▪ State Project Director will place the specific grievance and the background documentation in the agenda of the SCZMA/NCZMA meetings.▪ The aggrieved person can attend the hearing by SCZMA/NCZMA in person.▪ The Social Development Specialist will be responsible to ensure that there is no cost imposed (such as for travel, etc) on the aggrieved person if the person belongs to the vulnerable groups. If required, the Social Development Specialist of the concerned Community Organizer shall represent the aggrieved vulnerable persons.▪ Further, the project will assist the vulnerable aggrieved person if such a person is requested to attend the hearing in person by any of the following - SCZMA/NCZMA, Secretary, State Department of Environment, or Secretary, MoEFCC.	60 days

11.4 Assistance for aggrieved persons belonging to vulnerable groups for accessing legal recourse

If an aggrieved person is not satisfied with the results of grievance redress by the SCZMA/NCZMA, such a person can approach the Courts, under the laws of the Country, and the verdicts of the Courts will be final, as per the judicial processes established in India. In general, the legal system is accessible to all such aggrieved persons. However, there might be cases where vulnerable sections of the citizens of India face hurdles in accessing the legal recourse system. These hurdles usually include the cost of litigation, knowledge about the legal

system, or the lack of awareness about formal legal procedures. To help citizens to access the legal recourse system, each State has an operational mechanism called the Legal Aid Centre, which provides free services including services of lawyers without any cost to the litigants. SPMUs in this project will establish a partnership with respective State legal Aid Centre to provide such services to the aggrieved persons claiming impact from the project. As part of the partnership, the project will reimburse all additional costs that accrue to the State Legal Aid Centres. This facilitation will be available to the aggrieved person(s) if they fulfil the following two conditions: (1) that such aggrieved person(s) belong to any of the following vulnerable sections of the society - below poverty line families, scheduled castes, scheduled tribes; or is disabled, handicapped, orphaned or destitute person; and (2) such a person or persons have at least accesses both the second and third tier grievance redress mechanism offered by the project.

11.5 Stakeholder Consultation Framework

This section describes the stakeholder consultation process that needs to be undertaken during the detailed assessments of the project activities.

11.5.1 Need for Consultations

Stakeholder consultation is an integral part of the environmental and social assessment and provides inputs for the preparation of Social and Environment Management Framework (ESMF). The overall objective of such consultations was to document the concerns of the stakeholders with specific reference to the project planned interventions. The consultation meetings were organized basically for two important purposes, i.e., (1) to share project objectives and proposed project interventions with the identified stakeholder groups and (2) to consult with the stakeholders and document their concern, with particular reference to social and environmental impacts of the proposed project interventions.

To understand the expected project benefits / risks and people's perception on the project, field visits will be conducted to different places within the planned project jurisdiction. In the process of assessment, mapping of stakeholders will be done in the visited areas to understand how the project is going to impact upon these stakeholders.

The SPMU under the guidance of the NPMU through the PEAs will consult all key stakeholders on the project safeguard documents (for category E1, S1, E2, S2 projects) during the process of assessment. The Stakeholder Consultation will provide a summary of the proposed project's objectives. Stakeholder analyses and consultations will be used to identify the requirements, priorities, concern and conflicts, development risks and opportunities. Consultation, participation, and disclosure will ensure that information is provided and feedback on proposed design is sought early, right from the preparation phase, so that the views/preferences of stakeholders including potential beneficiaries and affected person can be adequately considered, and continue at each stage of the activity preparation, processing, and implementation. Meaningful stakeholder consultation and participation is part of the activity preparation and implementation strategy.

The key stakeholders to be consulted during project activity preparation and implementation include:

1. Project beneficiaries, and project affected persons
2. Elected representatives, community leaders, and representatives of community-based organizations; business and industrial associations, etc.,
3. Relevant local NGOs;
4. Local government and relevant government agencies, including the authorities responsible for land acquisition, protection and conservation of forests and environment, archaeological sites, religious sites, and other relevant government departments (regulatory, administration and infrastructure services related)
5. Residents, shopkeepers, business people, farmers (owners and workers) who live and work alongside the canal embankment and near sites where facilities will be built; custodians, and users of socially and culturally important buildings;
6. Vulnerable groups, women groups etc.

At the minimum, the proponent must meet with the principal stakeholders to inform them about the proposed project activity and to solicit their views about it. More extensive consultations are required for specific project activities that have significant impacts. The methods and results of the consultations shall be documented in the ESIA Report.

All consultations need to be a two-way dialogue with the aim of informing the stakeholders about the potential impacts (positive/negative) and obtain their feedback and views about the project activities and the proposed mitigation measures. All consultations need to be inclusive of all groups and gender, transparent and documented.

The implementing agencies will conduct meaningful consultations with all relevant stakeholders who are directly or indirectly affected. For this purpose, SPMU will prepare a consultation plan with all stakeholders. The proceedings and outcomes of these consultations will be recorded. For the ESIA, the SPMU will, with the support of participants, summarize how the consultations were conducted, key topics discussed, and the decisions arrived at. These decisions will be incorporated into the ESIA and ESMP. Photographic records and signatures of participants will be recorded in the ESIA report.

SPMU will draft ESIA and ESMP after discussions with all stakeholders. The implementing agencies will inform stakeholders and communities about the project activities, obtain their views, and hear their comments and complaints. Through periodic consultations with the local community, SPMU will engage them in project planning, implementation, and monitoring. Consultations will be conducted in an atmosphere that is conducive to the project development and beneficial to the community and local population. The SPMU will ensure that the consultations are free of coercion and intimidation, are gender-inclusive, and tailored to the needs of disadvantaged and vulnerable groups. All relevant stakeholders will be informed in advance about the timing and format of the consultations. This will be done through advertisements in local newspapers and / or written letters to the district magistrates, representatives of relevant departments, heads of the local village councils, representatives of urban local bodies, and NGOs in the vicinity of the project sites. During the consultations,

information about the project, its rationale, scope, benefits, and costs, including potential environmental and social impacts and mitigation measures, will be presented by the SPMU.

Comments and suggestions of all stakeholders will be noted, and their queries will be clarified. The signatures of all participants will be collected. Photographs of the consultations will be taken for the record. The comments and suggestions will be recorded and how these have been addressed will be detailed in the ESIA report. During project implementation, safeguards experts will have informal discussions with the locals residing in the vicinity of the proposed project activity sites. They will note the grievances, if any, due to construction. The purpose of consultations is to give factual information about the project to the stakeholders and to clarify misconceptions if any. This process helps in enhancing local ownership and ensures smooth project implementation in the long run.

A variety of approaches can be adopted, and stakeholders should be consulted throughout the project implementation. At minimum, the following consultation activities should be conducted. This is indicative and SPMU can also adopt more effective methods and approaches, which are locally appropriate.

Table 12.1 : Details on Stakeholder Consultations required during various Project Stages

Project Stage	Consultation Activities	Remarks
Project activity preparation	Household level consultations through sample questionnaire surveys on service levels, needs, priorities for project preparation	At the start of the project - during the detail designing stage
	Consultation with all line departments) and other Government Establishment as well as private agency	At the start of the project - during the detail designing stage
	Focus group discussions with people residing/working near the project sites	During the visits to project sites
	Consultations with affected persons: affected persons shall be consulted to ensure: <ul style="list-style-type: none"> • incorporate their views/concerns on compensation/resettlement assistance • incorporate their views/concerns on mitigation measures for identified impacts • inclusion of vulnerable groups in project benefits • identify assistance required by affected persons during rehabilitation, if any • Avoid potential conflicts for smooth project implementation. It will also provide adequate opportunities for consultation and participation to all stakeholders and inclusion of the poor, vulnerable, marginalized, and affected persons in the project process 	At various stages since the beginning, especially during, the preparation and implementation of resettlement plan
Activity Implementation	Focus group discussions with the people residing/working near the project sites	During the ESMP monitoring at work sites

Project Stage	Consultation Activities	Remarks
	Informal discussions with the construction workers and construction supervision staff (contractor, consultants and PIU)	During the ESMP monitoring at work sites
	Informal discussions with commuters and general public along the roads where works are implemented	During the ESMP monitoring at work sites

11.6 Information Disclosure

11.6.1 Procedure Information Disclosure Procedures

Project related information shall be disclosed through public consultation and making relevant documents available in public locations. The SPMU and associated line departments shall provide relevant safeguards information in a timely manner, in an accessible place and in a form and languages understandable to affected person and other stakeholders. For illiterate people, other suitable communication methods will be used.

The draft ESMF report will be discussed with the SPMUs at the NPMU before making it available at the offices of SPMUs. A concise summary of project and draft ESMF report (in local languages and UTs), providing all necessary details of proposals, implementation arrangements, project locations, likely issues and mitigation and monitoring measures and grievance redress mechanism, shall be made available to the stakeholders. This should also provide contact information of project agency. This summary shall also be displayed at the notice boards of SPMU, district level offices of the PEA and related line departments -DM's Office, State and District Libraries, Local municipal and gram panchayat office and other public places. During project implementation, relevant information about any major changes to project scope will be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders.

The following documents shall be made available at the offices of SPMU, DM's Office, State and District Libraries, Local municipal and gram panchayat office and other public places for public reference and shall also be uploaded on respective websites.

1. Summary of project and draft ESMF (in local languages and English)
2. Draft ESMF Report (in English)

Once the draft is finalized after consultation with the stakeholders including the implementing agencies. The following documents will be made available at offices of SPMU, offices of the PEAs, DM's Office, State and District Libraries, Local municipal and gram panchayat office and other public places for public reference shall also be uploaded on respective websites.

3. Final ESMF Report (in English)
4. Updated/amended ESMF (in English)
5. Corrective action plan prepared during project implementation (English)
6. Semi-annual Environmental Monitoring Reports (English)

The following documents will be submitted to the World Bank for disclosure on Bank's website. SPMU will send written endorsement to The World Bank for disclosing these documents:

1. Draft ESMF;
2. Final ESMF;
3. A new or updated ESMF and corrective action plan prepared during project implementation, if any; and
4. Environmental monitoring reports

11.6.2 Information to be disclosed

Table below specifies the type of additional information and frequency of dissemination:

Table 11.1: Information Disclosure Matrix

Topic	Documents to be Disclosed	Frequency	Where
Environmental and Social Impact Assessment; Resettlement, Rehabilitation and Land Acquisition	ESIA, ESMP and Resettlement Action Plan (RAP).	Once in the entire project cycle. But to remain on the website and other disclosure locations throughout the project period.	World Bank's website. On the website of SPMU, The borrower would make the ESIA, ESMP and RAP available at a place accessible to displaced persons and local NGOs, in a form, manner, and language that are understandable to the PAPs in the following offices: Local PEA office DM's Office State and District Libraries Local municipal and <i>gram panchayat</i> office Office of the contractor
	Resettlement & Rehabilitation Policy translated in Bengali	Once in the entire project cycle.	Distributed among Project Affected Persons (PAP)
	Information regarding impacts and their entitlements in Bengali	Once at the start of the project and as and when demanded by the PAP.	Through one-to-one contact with PAPs. Community consultation List of PAPs with impacts and entitlements to be displayed in PEA's office and on the website of SPMU
	R&R and LA monthly progress report.	10th day of every month	Website of SPMU. Hard copy in the office of contractor in local language
	RAP Impact Assessment Report	At midterm and end of the RAP implementation	Website of SPMU and concerned PEA's website in local language.
	Land Acquisition notifications	As required under the direct purchase	Website of SPMU and concerned PEA's website in local language

Topic	Documents to be Disclosed	Frequency	Where
		GO of state government	Hard copy in the office of contractor in local language
	Grievance redressal process.	Continuous process throughout the project cycle.	World Bank's website. On the web sites of PEA, SPMU and NPMU Hard copies in local language in the following offices: DM's Office gram panchayat/municipality/municipal corporation office Office of the contractor PAPs to be informed on one to one contact
Public Consultation	Minutes of Formal Public Consultation Meetings	Within two weeks of meeting	On the web sites of PEA, SPMU and NPMU Hard copies in local language in the following offices: DM's Office gram panchayat/municipality/municipal corporation office Office of the contractor

In addition to the information specified in **Table 12.2**, the following information shall also be displayed / disseminated, wherever applicable.

1. Project specific information need to be made available at each contract site through public information kiosk
2. Project information brochures shall be made available at all the project sites as well as the office of SPMU / PEA.
3. Reports and publications, as deemed fit, shall be expressly prepared for public dissemination e.g., English versions of the ESIA, ESMP and RAP and Executive Summary of ESIA, ESMP and RAP in local language.
4. Wherever civil work will be carried out a board will be put up for public information which will disclose all desired information to the public, for greater social accountability.
5. All information will be translated into local language and will be disclosed to the public through the Panchayat, District Magistrate's office, concerned project offices, websites of SPMU.

11.7 Status of Consultations and Disclosure of this ESMF

The need for ESMF and its contents were presented to all participating States during various interactions during February – March 2019. SICOM also carried out one-to-one discussions with the NCSCM, SPMUs / State representatives during the process of finalisation of

respective Project Reports for ENCORE. List of stakeholders who attended these meetings / presentations are provided in *Annexure V* of this Volume.

After preparation, Draft ESMF was disclosed in the offices and website of SICOM, and Department of Environment / Co-ordinating Departments of participating States inviting comments / suggestions of stakeholders. Draft ESMF will also be presented to the stakeholders during various State and National Level workshops / meetings and one-to-one discussions held during May - June 2019. All comments and suggestions (mainly clarifications) will be suitably incorporated in the document. Further, after incorporating the comments of stakeholders the ESMF will be finalised and redisclosed in NPMU / SPMU offices and websites and in World Bank's IDU following approval/procedural requirements.

11.8 Conclusion

This ESMF document for ENCORE, presented in two Volumes (Volume I and II) will at as the guidance document for management of environmental and social aspects and safeguards management for all components of the project. This is a living document and shall be updated, if required; following the consultations, approval and disclosure requirements of the World Bank.

ANNEXURES

Annexure I: Detailed Baseline Environmental Setting of Project States

Detailed baseline environmental and social setting of the Project states is presented here.

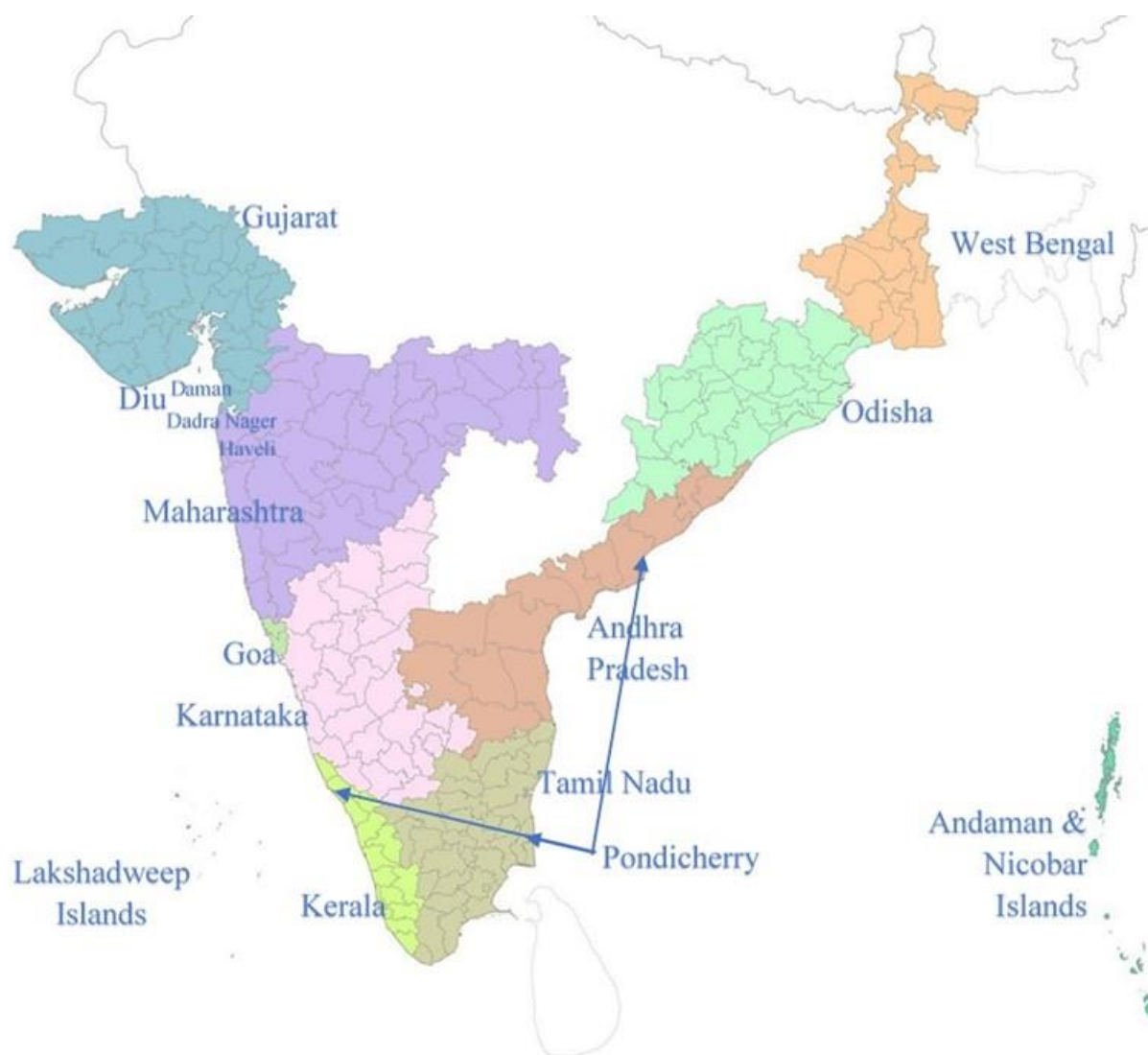


Figure A:1 Coastal States of India

The following **Figure A:2** presents the coastal districts of India; distributed in its coastal States.

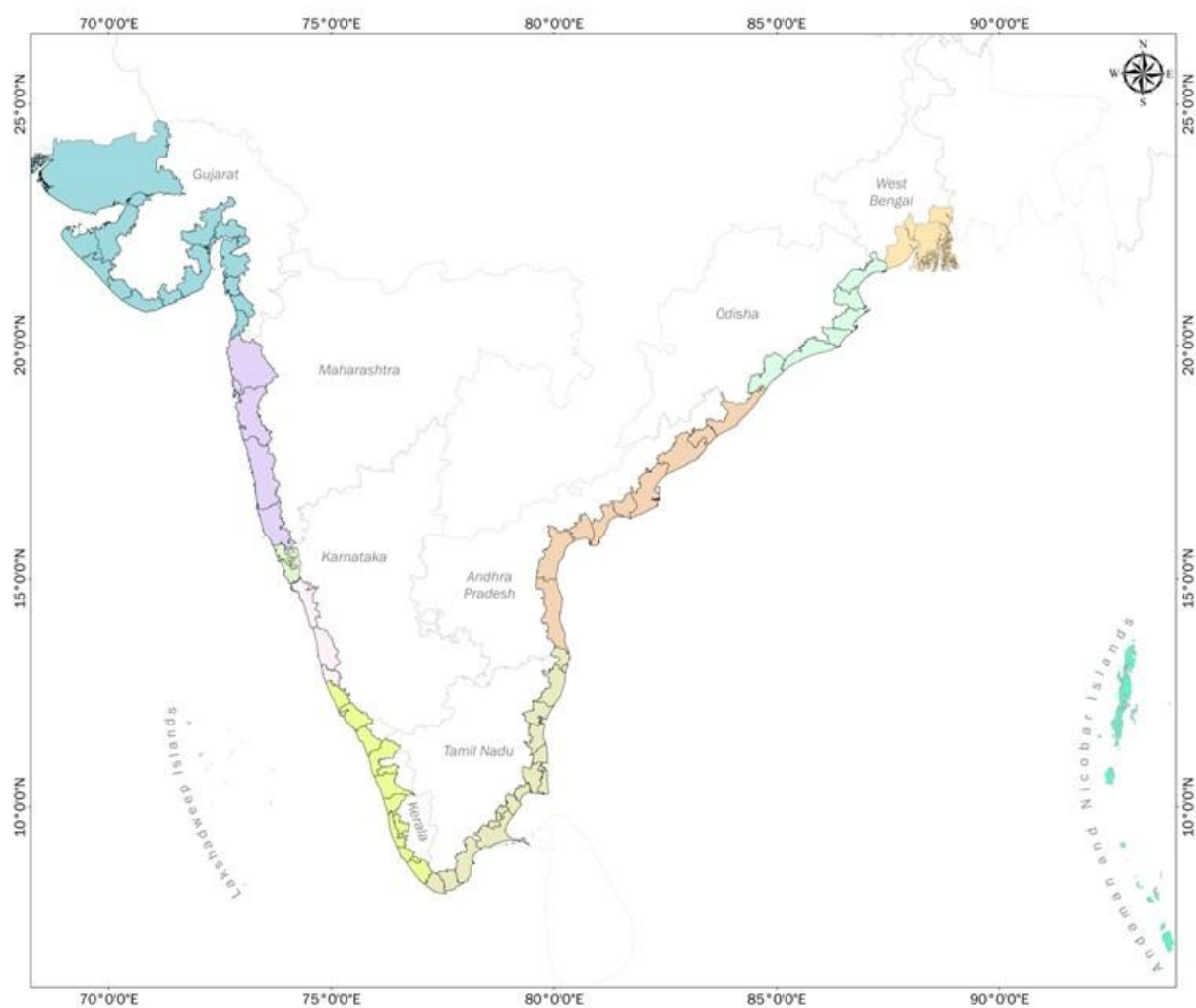


Figure A:2 Coastal Districts of India

Table A:1 Key Statistics of India

Attributes	Details
Length of coastline	7516.6 km Mainland: 5422.6 km Island Territories: 2094 km
Total Land Area	3,287,26 km ²
Area of continental shelf	372,42 km ²
Territorial sea (up to 12 nautical miles)	193,83 km ²
Exclusive Economic Zone	2.02 x10 ⁶ million km ²
Maritime States and UT	
Number of coastal States and Union Territories	Nine states 1. Gujarat 2. Maharashtra 3. Goa 4. Karnataka 5. Kerala 6. Tamil Nadu

Attributes	Details
	7. Andhra Pradesh 8. Odisha 9. West Bengal Two Union Territories 1. Daman & Diu 2. Puducherry
Island Territories	1. Andaman & Nicobar Islands (Bay of Bengal) 2. Lakshadweep Islands (Arabian Sea)
Total number of coastal districts	69 coastal districts in mainland India; 3 in Andaman & Nicobar and 1 in Lakshadweep
Total number of coastal villages	24306
Coastal Geomorphology (Mainland)	
Sandy Beach	43 %
Rocky Coast	11%
Muddy Flats	36%
Marshy Coast	10%
Coastline affected by erosion	1624.435 km in mainland 132km in islands)
Population	
Total Population of India	1.27 billion (Census, 2011)
Population of Coastal States and UTs	560 million
Total Population of coastal districts	171 million
Percentage of population in coastal districts of India	14.2
Population of Island Territories	0.44 million
Coastal Ecosystems	
Coastal wetlands	43230 km ²
Major estuaries	97
Major Lagoons	34
Mangrove Areas	31
Area under mangroves	5591 km ² (57% East coast, 23% west coast, 20% Andaman & Nicobar Islands)
Coral Reef Areas	5
Marine Protected Areas	31
Area Covered by MPA	16488.5 km ²
Coastal Biodiversity	
Marine Algae	217 genera 844 species
Seagrasses	6 genera 14 species
Mangroves	25 families, 43 genera, 39 species Associated flora: 420 Associated fauna: 1862
Crustaceans	2934 species
Molluscs	3370 species
Echinoderms	765 species
Hard Corals	218 species
Fishes	2546 species

Attributes	Details
Reptiles	5 sea turtle species 26 sea snake species
Marine Mammals	25 reported from Indian waters 3 species of cetaceans: Irrawaddy dolphin, Ganges River Dolphin and Sperm whale; Dugong listed in Schedule I of Wildlife Act 1972
Marine Fisheries	
No. of Marine Fishing Villages	3288
Fishermen Population	About 4 million comprising in 864,550 families
Number of Fishing Harbours	Major fishing harbours: 6 Minor fishing harbours: 40
Number of Fish Landing Centres	1511
Estimated marine Fish Landing	38,20,207 tonnes (2011)
Fishing crafts	194,490 crafts mechanized: 37% motorized: 37% non-motorized: 26%
Ports and Harbours	
Major Ports	13
State wise number of ports (major/ intermediate/ minor)	Gujarat: 40 Maharashtra: 53 Goa: 5 Daman & Diu: 2 Karnataka: 10 Kerala: 13 Lakshadweep Islands: 10 Tamil Nadu: 15 Puducherry: 1 Andhra Pradesh: 12 Odisha: 2 West Bengal: 1 Andaman & Nicobar Islands: 23

Profile of the Participating States

ENCORE is a multi-state and multi-sectoral project. It is spread over a wide geographical area and has a large number of direct beneficiaries. Description for each of the coastal states is provided this section.

Baseline Scenario of Gujarat State

The state of Gujarat has a large number of key ports and coastal settlements along its 1,600 km coastline. It serves as gateway for importing petroleum, gas and other bulk goods to North India. Gujarat has the largest share (at 23%) of the total Indian coastline. The width of its coastal tract varies from 7 to 15 km.

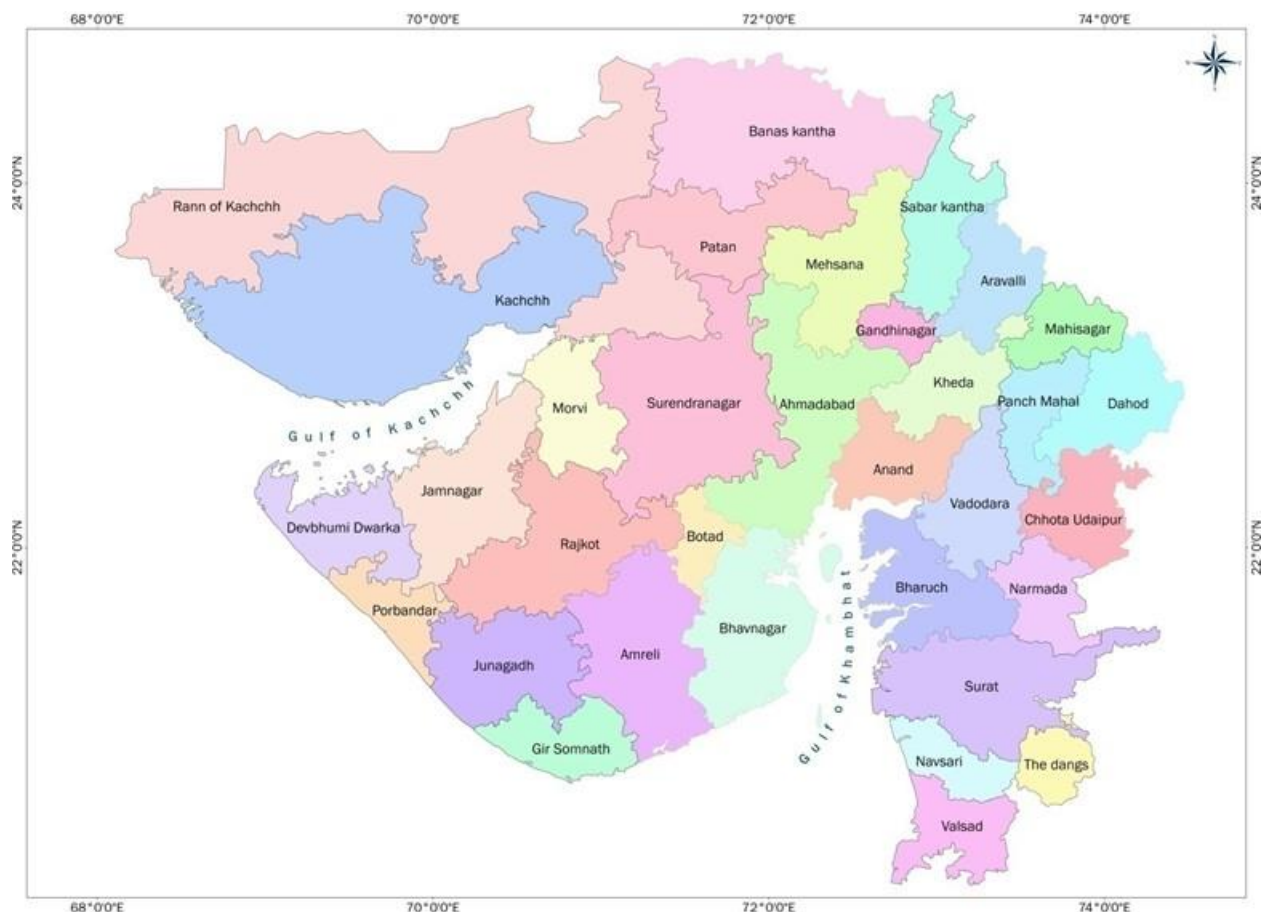


Figure A:3 Districts of Gujarat

The Gujarat coast has a high diversity of terrain, shelf depths and hydrology. Some parts of the coast are extremely flat and low lying. The highest tidal ranges in the Indian coast are witnessed in the Gulf of Khambhat (up to 8 m). These characteristics can amplify storm surges and impact wide stretches unlike many other coastal regions of India. Two cyclone seasons are experienced in Gujarat: March to July (advancing southwestern monsoon) and September to November (retreating monsoon). Maximum wind speed class of >200km/h (100-year return period) have been observed along the Saurashtra coast, specifically in Porbandar, Jamnagar and Junagadh districts which are exposed to the highest intensity of cyclonic and storm impact. The 182-200 km/h sub-class extends further inland to cover much of Jamnagar, part of Rajkot, Junagadh and Kachchh districts. About 90,000 houses mostly in Biomass spread over 1300 settlements are vulnerable to severe damages due to 100-year return period cyclones. A simulation of storm surge along the Gujarat coast substantiated by field work and observations indicate an estimated 291 settlements are prone to storm surges of various intensities along the Gujarat coast.

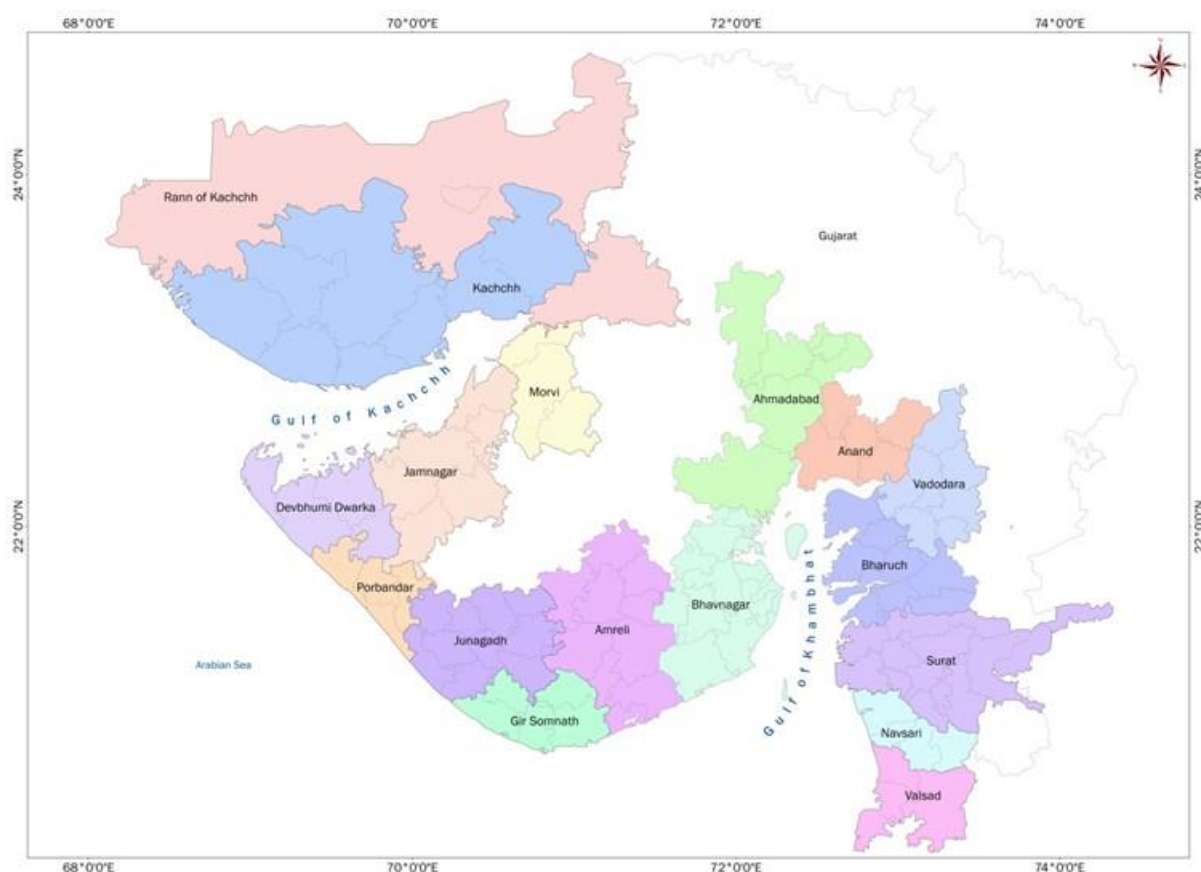


Figure A:4 Coastal Districts and Taluks of Gujarat

Table A:2 Key Statistics of Gujarat State

GUJARAT	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 20°10' N to 24°56'00" N Longitude: 68°42'03" E to 74°38'13" E
Geographic area	1,96,024 km ²
Forest area	21899.49 km ²
Reserve Forest	14594.92 km ²
Protected Forest	2884.11 km ²
Coastline	1214.7 km
Average Annual Rainfall	33 to 152 cm
Demographic Indicators	
Total Population	6.04 million (Census 2011)
Rural Population	3.46 million
Urban Population	2.58 million
Population Density	308 persons/km ²
Literacy rate	78.03% (Census 2011)
Administrative information	
No. of districts	33
No. of subdivisions	225

GUJARAT	
Attributes	Details
No. of towns	348
No. of Taluks	250
No. of cities	30
No. of villages	18225
No. of fishing villages	247
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	7
Mineral Resources	Natural gas, Limestone, Bauxite, Calcite, Gypsum, Quartz, Silica Sand, Dolomite, steatite
Ramsar Sites	1
National parks	4
Wildlife Sanctuaries	23
Bird Sanctuaries	6
Biosphere Reserve	3
Archaeological sites	43
World Heritage sites (UNESCO)	3
Islands(Inhabited/uninhabited)	183
Tourism	
No of tourist spots	35
Average annual tourist	44.8 million (as of 2017)
No of Beaches	77
Types of Coast	
Sandy (%)	5%
Soft Rock(%)	42%
Muddy(%)	53%
Natural Disasters (1975 till date)	
Cyclones	3
Floods	3
Earthquakes	1
Fishery Resources	
Continental Shelf area	184000 km ²
Total inland water bodies (lakh Ha)	4.26 Lakh ha
Marine/Inland Fish Landings	695.58 MT / 97.84 MT (as of 2013 – 14)
Fish Landing centres	121
Coastal area	
Geographical Area	133495.77 km ²
No. of districts	17
No. of Taluks	107
No of Villages	4987
ESA (Coastal/Marine)	7094.19 km ² (95%, 5%)
Mangroves	1421.33 km ²
Corals	369.92 km ²

GUJARAT	
<i>Attributes</i>	<i>Details</i>
Seagrass	17.02 km ²
Salt Marsh	283.74 km ²
Turtle Nesting Ground	4.00 km ²
Bird Nesting Site	9.82 km ²
Sand Dune	66.5 km ²
Mudflat	2980.63 km ²
Protected Area	1 km ²
Archaeological & Heritage	1.98 km ²

Baseline Scenario of Maharashtra

Maharashtra, located in the north centre of India along the west coast, is the second largest state in terms of population and the third largest in terms of area and is spread over 307,713 square km. Maharashtra has the country's second largest urban population, and is about 43% urbanized. Mumbai, Maharashtra's capital city is the principal financial centre and a major commercial hub of the country. The Sahyadri mountain range (Western Ghats) rises to an average elevation of 1000m. It falls in steep cliffs, to the Konkan on the west. Owing to this mountain range and its topography, the coastal part of the state, west of the Sahyadri is prone to heavy rainfall while the eastern part is dry. Maharashtra is prone to a host of hazards. It is at moderate risk to Cyclones and storms. During the period from 1890 to 1995, 210 cyclonic depressions were recorded in the Arabian Sea. Out of these 19 (including 6 major ones) affected the Maharashtra-Goa coast. The Konkan region lies in the cyclone moderate to low damage risk zone since wind speeds rarely exceed 155km/h. Heavy urbanization has also increased vulnerability to hazards like urban flooding.

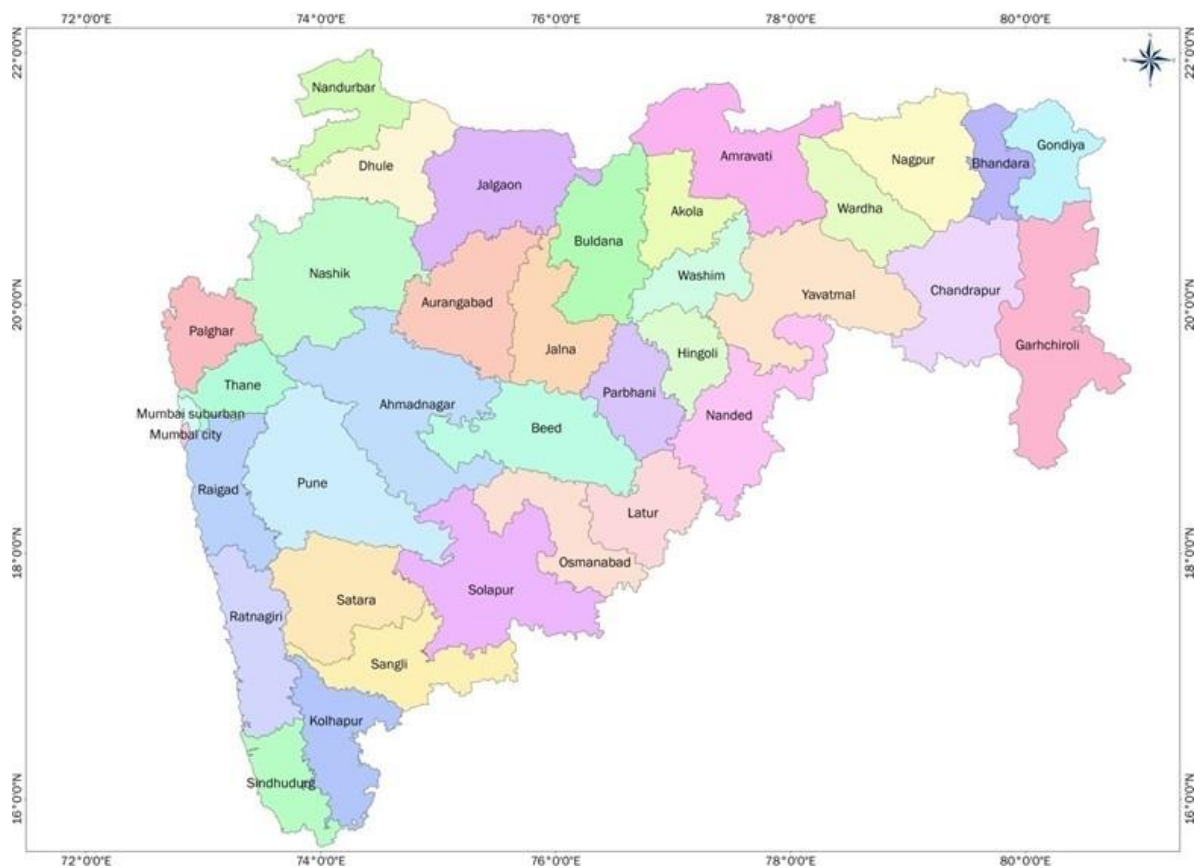


Figure A:5 Districts of Maharashtra

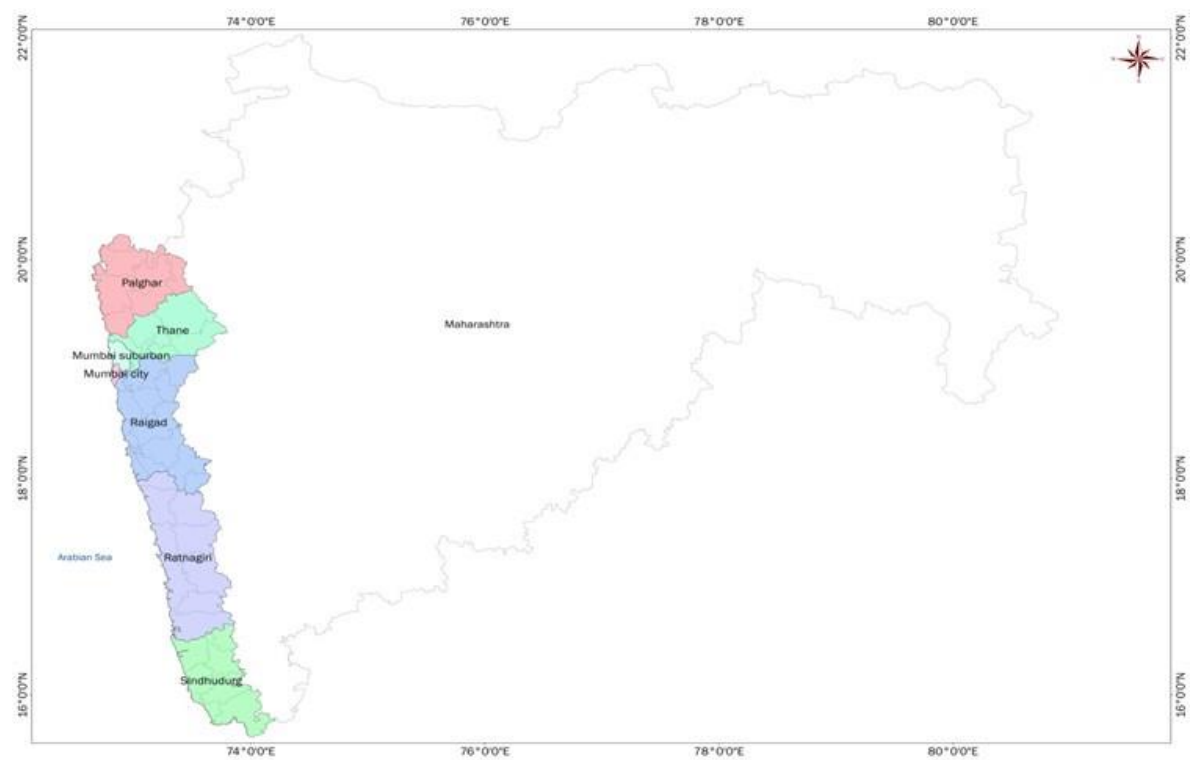


Figure A:6 Coastal Districts and Taluks of Maharashtra

Table A:3 Key Statistics of Maharashtra State

MAHARASHTRA	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 15°35'06" N to 22°03'10" N Longitude: 72°36'03" E to 80°54'11" E
Geographic area	307713 km ²
Forest area	61939 km ²
Reserve Forest	49222.92 km ²
Protected Forest	8194.53 km ²
Coastline	652.6 km
Average Annual Rainfall	1600 to 2000 mm
Demographic Indicators	
Total Population	112.40 million (Census 2011)
Rural Population	61.60 million
Urban Population	50.80 million
Population Density	365 persons/km ²
Literacy rate	82.30% (Census 2011)
Administrative information	
No. of districts	36
No. of subdivisions	259
No. of towns	371
No. of Taluks	358
No. of cities	27
No. of villages	55393
Ports and Harbours	
Major Ports	2
Minor/ Intermediate Ports	14
Mineral Resources	Iron ore, Coal, Manganese, Limestone, Dolomite, Kyanite, Silica sand and Sillimanite
National parks	6
Wildlife Sanctuaries	42
Bird Sanctuaries	3
Archaeological sites	22
World Heritage sites (UNESCO)	5
Islands(Inhabited/uninhabited)	173
Tourism	
No of tourist spots	42
Average annual tourist	11.4 million (as of 2011)
No of Beaches	108
Types of Coast	

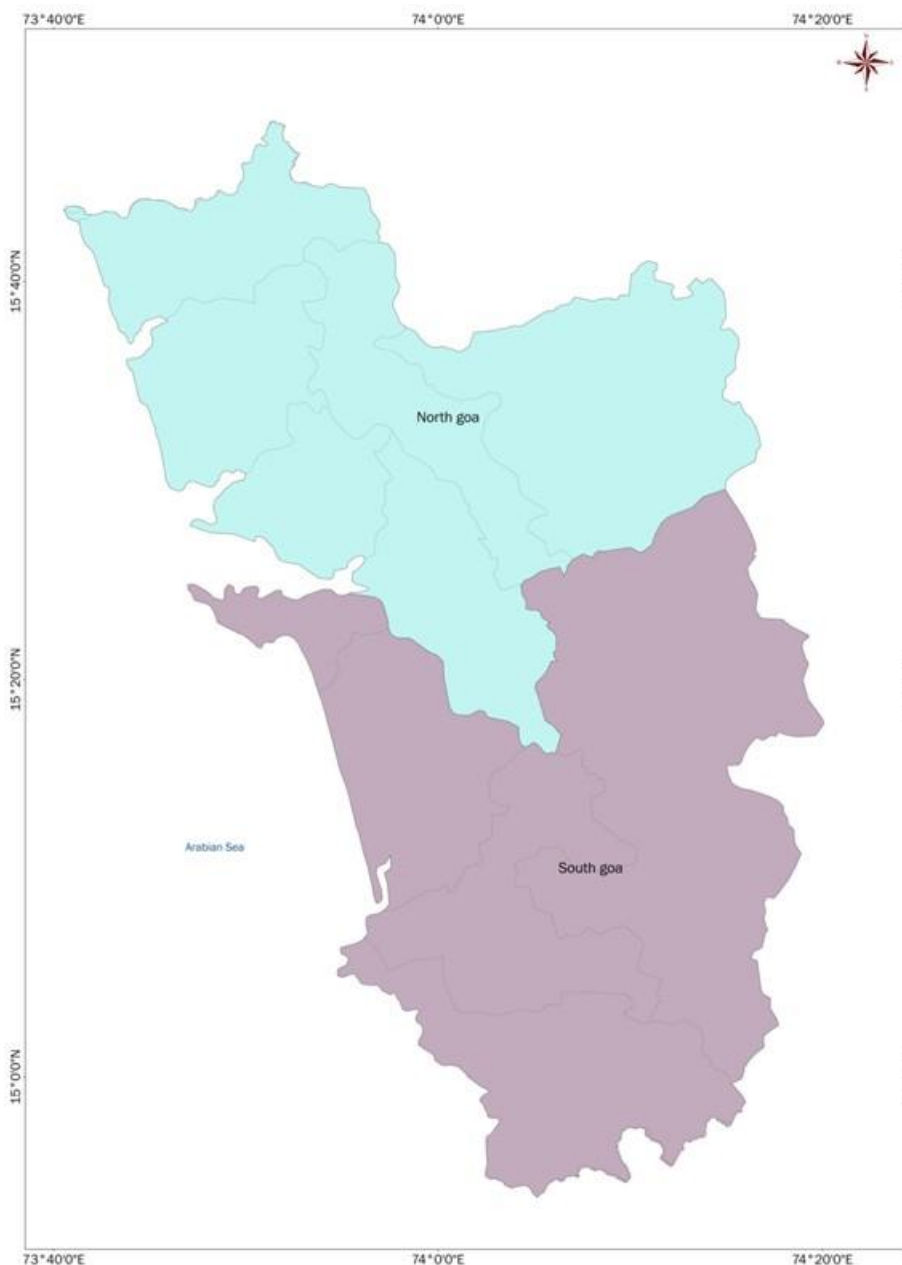
MAHARASHTRA	
<i>Attributes</i>	<i>Details</i>
Sandy (%)	17%
Hard Rock(%)	37%
Muddy(%)	46%
Natural Disasters (1975 till date)	
Floods	1
Earthquakes	1
Fishery Resources	
Continental Shelf area	112000 km ²
Total inland water bodies (lakh Ha)	3.48 Lakh ha
Marine/Inland Fish Landings	423.79 MT / 124.95 MT (as of 2014 – 15)
Fish Landing centres	162
Coastal area	
Geographical Area	34109.12 km ²
No. of districts	7
No. of Taluks	50
No of Villages	2573
ESA (Coastal/Marine)	811.46 km ² (99.97%, 0.03%)
Mangroves	317.24 km ²
Corals	0.18 km ²
Seagrass	Nil
Salt Marsh	4.55 km ²
Turtle Nesting Ground	2.02 km ²
Bird Nesting Site	0.22 km ²
Sand Dune	4.11 km ²
Mudflat	46.97 km ²
Protected Area	435.15 km ²
Archaeological & Heritage	1.02 km ²

Baseline Scenario of Goa

Goa is the smallest state of India by area located on the west coast. It is a well-known national and international tourist destination due to its scenic beauty, abundant greenery, attractive beaches, temples, churches, architectural splendour, wild life sanctuaries, colourful and lively feasts and festivals. To facilitate revenue administration, North Goa is divided into four Sub-Divisions namely Panaji, Bicholim, Mapusa and Ponda and South Goa is divided into five Sub-Divisions namely Margao, Quepem and Sanguem, Mormugao, Canacona and Dharbandora. The population density of the state is about 394 persons / km² which is higher than national average 382 persons/sq km. There are seven major rivers in the state namely Zuari, Mandovi, Terekhol, Chapora, Galgibag, Kumbarjua canal, Talpona and the Sal. The Zuari and the Mandovi are the most important rivers, interspaced by the Kumbarjua canal, forming a major estuarine complex. The total navigable length of Goa rivers is

253 km (157 mi). There are about 300 ancient water-tanks built during the rule of the Kadamba dynasty and over 100 medicinal springs.

Most of Goa's soil cover is made up of laterites rich in ferric-aluminium oxides and reddish in colour. Further inland and along the riverbanks, the soil is mostly alluvial and loamy. The soil is rich in minerals and humus, thus conducive to agriculture. Some of the oldest rocks in the Indian subcontinent are found



in Goa between Molem and Anmod on Goa's border with Karnataka. The rocks are classified as Trondjemeitic Gneiss estimated to be 3,600 million years old, dated by rubidium isotope dating. The Western Ghats, which form most of eastern Goa, have been internationally recognized as one of the biodiversity hotspots of the world. In the February 1999 issue of *National Geographic Magazine*, Goa was compared with the Amazon and the Congo basins for its rich tropical biodiversity. Goa's wildlife sanctuaries boast of more than 1512 documented species of plants, over 275 species of birds, over 48 kinds of animals and over 60 genera of reptiles.

Figure A:7 Districts and Taluks of Goa

Agriculture is the major occupation of about 70% of the population. Goa is also known for its coconut cultivation. Fishing is the second largest occupation in the state. There are many major and minor fish landing centres such as Betim (Malim) Chapora, Khariwado, Cutbona and Betul. The state hosts Fish Festival “Aqua Goa” for three days is being conducted in the State to create awareness about fisheries and sea food. The event provides a platform to entrepreneurs/Fishermen/farmers from all over the State to exhibit their products.

Table A:4 Key Statistics of Goa

GOA	
Attributes	Details
Geographic location	Latitude: 14°53'54" N to 15°40'00" N Longitude: 73°40'33" E to 74°20'13" E
Geographic area	3072 Sq.km
Forest area	1424 Sq.km
Coastline	131 km
Average Annual Rainfall	2813 mm
Demographic Indicators	
Total Population	14.59 Lakhs (as of 2014)
Rural Population	9.07 Lakhs
Urban Population	5.52 Lakhs
Population Density	394 persons/sq km
Literacy rate	88.7%
Administrative information	
No. of Districts	2
No. of Subdivisions	9
No. of Towns	70
No. of Taluks	12
No of Gram Panchayats	189
No. of Cities	14
Number of villages (including Uninhabited villages)	334
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	5
Mineral Resources	Iron Ore, Manganese, Bauxite, Basalt, Laterite, rubbles
National parks	1
Wildlife Sanctuaries	6
Bird Sanctuaries	1
Archaeological sites	51
World Heritage sites (UNESCO)	1
Islands(Inhabited/uninhabited)	19
Tourism	
No of tourist spots	19
Average annual tourist	5.04 million (as of 2014)
No of Beaches	39
Types of Coast	
Sandy	33%

GOA	
<i>Attributes</i>	<i>Details</i>
Rocky	67%
Natural Disasters (1975 till date)	
Floods	2
Landslides	6
Fishery Resources	
Continental Shelf area	10000 sq. km
Total inland water bodies (lakh Ha)	3.48
Marine/Inland Fish Landings	144.28/5.33 thousand tonnes <i>as of 2017</i>
Fish Landing centres	29
Coastal area	
Geographical Area	133495.77 km ²
No. of districts	2
No. of Taluks	14
No of Villages	239
ESA	41.89 km ² (99.1%, 0.9%)
Mangroves	32.88 km ²
Corals	0.34 km ²
Seagrass	Nil
Salt Marsh	1.06 km ²
Turtle Nesting Ground	0.26 km ²
Bird Nesting Site	Nil
Sand Dune	2.94 km ²
Mudflat	1.05 km ²
Protected Area	2.83 km ²
Archaeological & Heritage	0.53 km ²

Baseline Scenario of Karnataka

Karnataka is one of the coastal states in the south western side of peninsular India. Karnataka is bordered by the Arabian Sea to the west, Goa to the northwest, Maharashtra to the north, Telangana to the northeast, Andhra Pradesh to the east, Tamil Nadu to the southeast, and Kerala to the south. The state covers an area of 191,791 square kilometres, or 5.83 percent of the total geographical area of India.

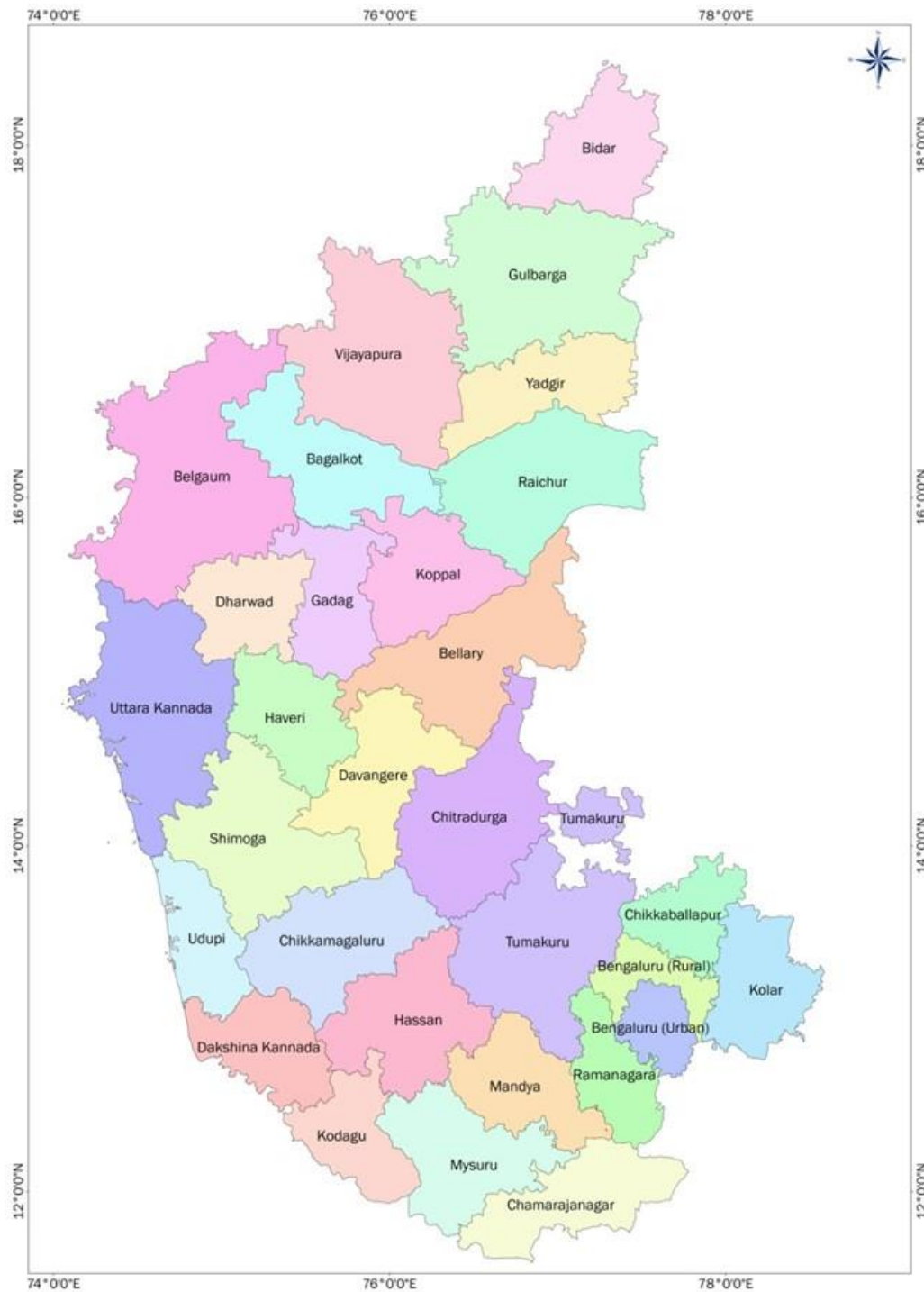


Figure A:8 Districts of Karnataka

It is the sixth largest Indian state by area. With 61,130,704 inhabitants at the 2011 census, Karnataka is the eighth largest state by population, comprising 30 districts. The river systems of the state are the Krishna and its tributaries, the Bhima, Ghataprabha, Vedavathi, Malaprabha and Tungabhadra in North Karnataka Sharavathi in Shivamogga and the Kaveri and its tributaries, the Hemavati, Shimsha, Arkavati, Lakshmana Thirtha and Kabini, in the south.

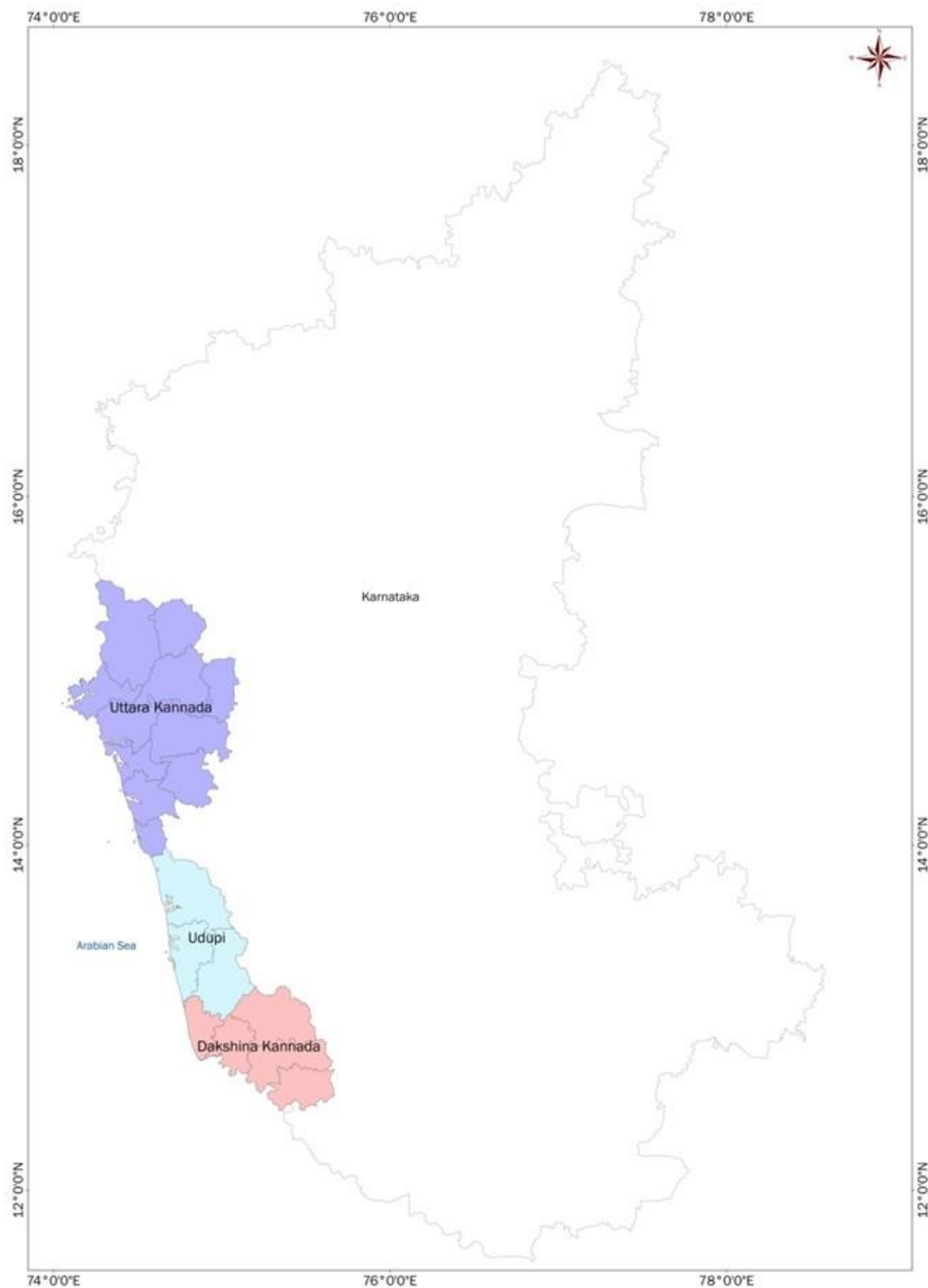


Figure A:9 Coastal Districts and Taluks of Karnataka

Most of these rivers flow out of Karnataka eastward, reaching the sea at the Bay of Bengal. The state has four distinct physiographic landforms such as the Northern Karnataka Plateau, the Central Karnataka Plateau, the Southern Karnataka Plateau and the Coastal Karnataka Region. The area is mainly composed of the Deccan Trap. It represents an extensive deforested plateau landscape. The Northern Karnataka Plateau has an elevation of 300 metres to 600 metres from the sea level. The plateau slopes towards the east. The landscape is mainly covered with rich black cotton soils. The elevation of the Central Karnataka Plateau varies between 450 metres and 700 metres. The general slope of this plateau is towards the east. This plateau region is covered by a high degree of slope. It is encircled by the Western Ghats on the west and the south. The Southern Karnataka Plateau has a general elevation of 600 metres to 900 metres. The Karnataka Coastal Region includes the districts of Uttara Kannada and Dakshina Kannada. The terrain of this region consists of rivers, creeks, waterfalls, ranges of hills and peaks. The Karnataka Coastal Region can be divided into two main geographical divisions, known as the Western Ghats and the plains. The coastal belt has an average width of 50 km to 80 km. It covers a distance of around 267 km from north to south. Karnataka has 26 east flowing rivers and 10 west flowing rivers.

The west flowing rivers of Karnataka flow to the Arabian Sea. These west-flowing rivers are responsible for providing 60% of the state's inland water resources. The State has 60% (114 lakh ha) cultivable land and 72% of the cultivable area is rainfed and 28% is under irrigation. The State has 10 Agro climatic Zones. The Red soil constitutes major soil type, followed by Black soil. The net sown area of the State constituted 51.7% of the total land. Discontinues coastal stretches from Karwar to Honnebali of north Karnataka experiences erosion while the other stretches indicate stable and low accretion.

Table A:5 Key Statistics of Karnataka State

KARNATAKA	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 11°30' to 18°25' N Longitude: 74°10' to 78°35' E
Geographic area	1,91,791 Sq. Km
Forest area	43,382.76 Sq. km
Coastline	280 km
Average Annual Rainfall	2000-3200 mm in Western Ghats 400-500 mm in other parts
Demographic Indicators	
Total Population	6.11 million (as of 2011)
Rural Population	3.75 million
Urban Population	2.36 million
Population Density	320 persons/km ²
Literacy rate	75.36% (Census 2011)
Administrative information	
No. of districts	30
No. of subdivisions	4
No. of towns	347

KARNATAKA	
Attributes	Details
No. of Taluks	176
No. of cities	274
Number of villages (including Uninhabited villages)	29,340
No of village Panchayats	6019
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	10
Mineral Resources	Asbestos, Bauxite, Dolomite, Gold, Iron Ore, Kaolin, Limestone, Magnesite, Manganese, Ochre, Quartz And Granite, Kyanite, Silver, Feldspar, Mica, Silica Sand, Felsite , Chromite
National parks	5
Wildlife Sanctuaries	30
Bird Sanctuaries	11
Archaeological sites	25
World Heritage sites (UNESCO)	2
Islands(Inhabited/uninhabited)	124
Tourism	
No of tourist spots	42
Average annual tourist	85 million (<i>as of 2015 – 16</i>)
No of Beaches	46
Types of Coast	
Sandy (%)	68%
Hard Rock(%)	32%
Natural Disasters (1975 till date)	
Floods	2
Earthquakes	Few minor (2.5 - 3 Richter scale)
Fishery Resources	
Continental Shelf area	27000 Sq. km
Total inland water bodies (lakh Ha)	5.65 lakh Ha
Marine/Inland Fish Landings	411762 MT/168828 MT (<i>as of 2014 – 15</i>)
Fish Landing centres	26
Coastal area	
Geographical Area	19938.94 km ²
No. of districts	3
No. of Taluks	28

KARNATAKA	
<i>Attributes</i>	<i>Details</i>
No of Villages	752
ESA	142.18 km ²
Mangroves	16.47 km ²
Corals	0.16 km ²
Seagrass	Nil
Salt Marsh	0.56 km ²
Turtle Nesting Ground	Nil
Bird Nesting Site	0.35 km ²
Sand Dune	0.47 km ²
Mudflat	0.81 km ²
Protected Area	123.07 km ²
Archaeological & Heritage	0.29 km ²

Baseline Scenario of Kerala

Kerala has a geographical area of 38,863 sq km. It lies between the Arabian Sea on the west and the Western Ghats on the east. Kerala's coast runs 560 km in length, while the state itself varies between 35 –120 km in width. Kerala receives an average annual rainfall of 3,107 mm mostly through seasonal monsoons and averages 120–140 rainy days per year. The excessive rainfall that the state receives every season, including from tropical cyclones, makes Kerala prone to severe landslides, flooding and coastal erosion.

The density of coastal urban population is 4,228 persons per square km, nearly twice the average urban density in the state. This puts a huge number of coastal communities at risk, exposing them to multiple natural hazards. Continuous occurrence of high intensity rainfall within a few days is the primary factor contributing to extreme floods in the State. Between 1891 to 2007, 31 Cyclonic Storms / Severe Cyclonic Storms have affected the Kerala coast. During the past 35 years, Kerala has seen 2 severe Cyclonic Storms that originated over Bay of Bengal, crossed the eastern coast of India and reemerged into the Arabian Sea as a depression. Cyclones are usually accompanied by tidal waves which, on occasion, enter land up to a distance of 10 km, along with heavy rains and winds with speeds exceeding 50 km/h. People residing in habitations within a distance of 5 km from the sea coast are generally the worst affected with the inundation (varying between approximately 2.5 to 5 m) lasting for over 5-6 days. The Kerala coast was significantly affected by the 2004 Indian Ocean tsunami with maximum damages reported in the low coastal land of Kollam, Alleppey and Ernakulam districts.

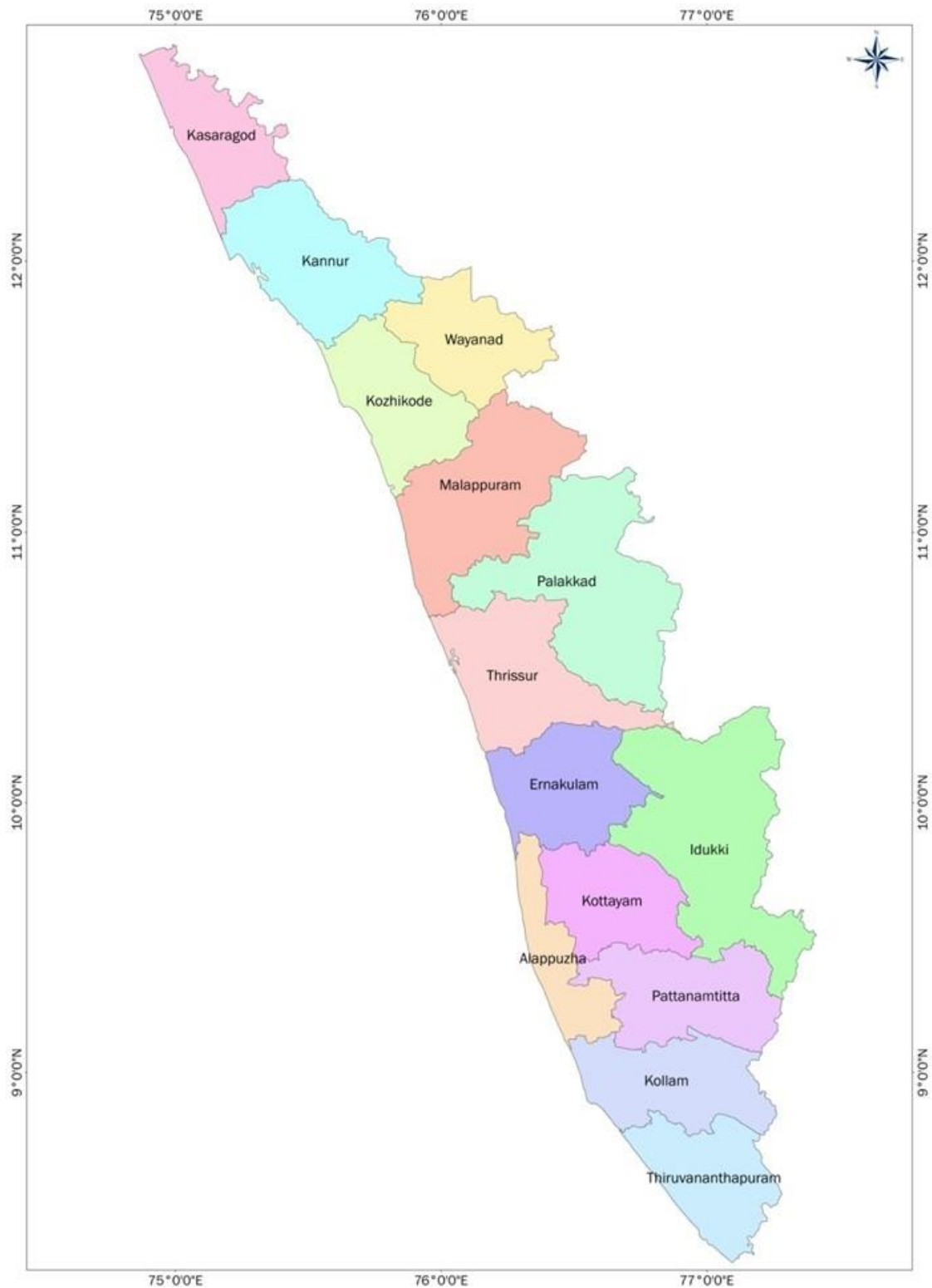


Figure A:10 Districts of Kerala

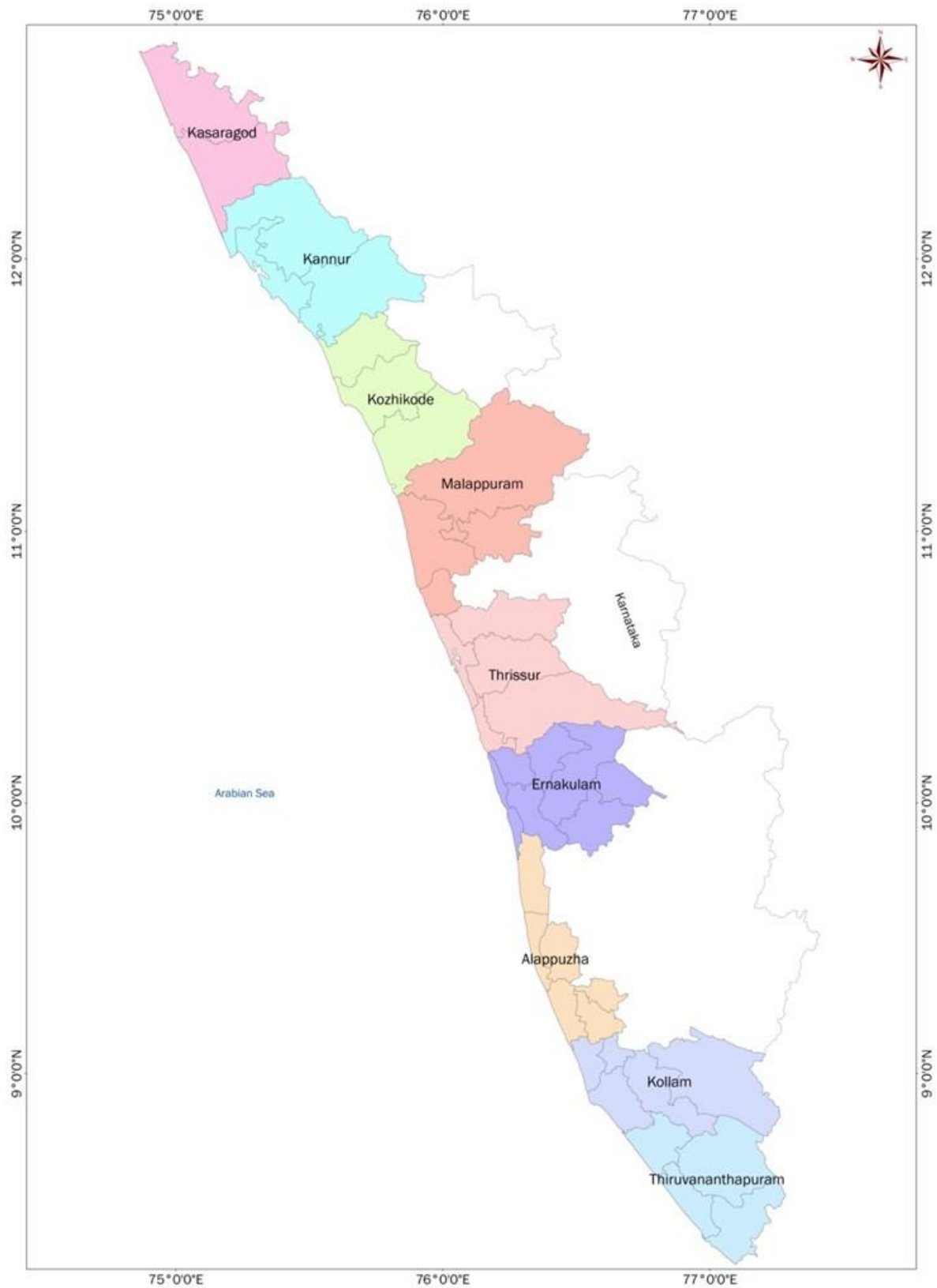


Figure A:11 Coastal Districts and Taluks of Kerala

Table A:6 Key Statistics of Kerala State

KERALA	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 8°52'11" N to 12°46'21" N Longitude: 74°52'23" E to 77°47'14" E
Geographic area	38863 km ²
Forest area	11309.50 km ²
Coastline	569.7 km
Average Annual Rainfall	3107 mm
Demographic Indicators	
Total Population	3.34 million (Census 2011)
Rural Population	1.75 million
Urban Population	1.59 million
Population Density	860 persons/km ²
Literacy rate	94.01% (Census 2011)
Administrative information	
No. of districts	14
No. of subdivisions	27
No. of towns	422
No. of Taluks	62
No. of cities	14
No. of villages	1453
No. of Gram Panchayats	1007
No of fishing villages	222
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	18
Mineral Resources	Ilmenite, Rutile, Zircon, Monazite, Sillimanite) ,Gold, Iron ore, Bauxite, Graphite, China Clay, Fire Clay, Tile and Brick Clay, Silica Sand, Lignite, Limestone, Granite, Gemstones
National parks	6
Wildlife Sanctuaries	14
Bird Sanctuaries	8
Biosphere Reserve	2
Archaeological sites	31
Islands(Inhabited/uninhabited)	113
Ramsar Site	3
Tourism	
No of tourist spots	42
Average annual tourist	1.58 million (as of 2017)

KERALA	
<i>Attributes</i>	<i>Details</i>
No of Beaches	67
Types of Coast	
Sandy	45%
Hard Rock	5%
Muddy	15%
Seawalls	35%
Natural Disasters (1975 till date)	
Floods	2
Earthquakes	1
Fishery Resources	
Continental Shelf area	41000 km ²
Total inland water bodies (lakh Ha)	6.93 Lakh ha
Marine/Inland Fish Landings	3.49 MT / 6.58 MT (as of 2014 – 15)
Fish Landing centres	189
Coastal area	
Geographical Area	23276.94 km ²
No. of districts	9
No. of Taluks	45
No of Villages	894
ESA	22.84 km ²
Mangroves	21.12 km ²
Corals	Nil
Seagrass	Nil
Salt Marsh	Nil
Turtle Nesting Ground	1.17 km ²
Bird Nesting Site	Nil
Sand Dune	Nil
Mudflat	Nil
Protected Area	0.37 km ²
Archaeological & Heritage	0.18 km ²

Baseline Scenario of Tamil Nadu

This is the southern most state of India and is bordered by Kerala to the west, Karnataka to the northwest, Andhra Pradesh to the north, the Bay of Bengal to the east and the Indian Ocean to the south. Tamil Nadu is the eleventh largest state in India and covers an area of 130,058 square kilometers. Tamil Nadu is the only state in India which has both the Western Ghats and the Eastern Ghats mountain ranges which meet at the Nilgiri hills. The Western Ghats dominate the entire western border with Kerala, effectively blocking much of the rain bearing clouds of the South West Monsoon from entering the state.

The eastern parts are fertile coastal plains. The northern parts are a mix of hills and plains. The central and the south-central regions are arid plains. The state's economy is largely agriculture-based and 70% of the population is involved in this industry. Tamil Nadu constitutes 4 percent of India's land area and is inhabited by 6 percent of India's population, but has only 2.5 percent of India's water resources. More than 95 percent of the surface water and 80 percent of the ground water have already been put into use.

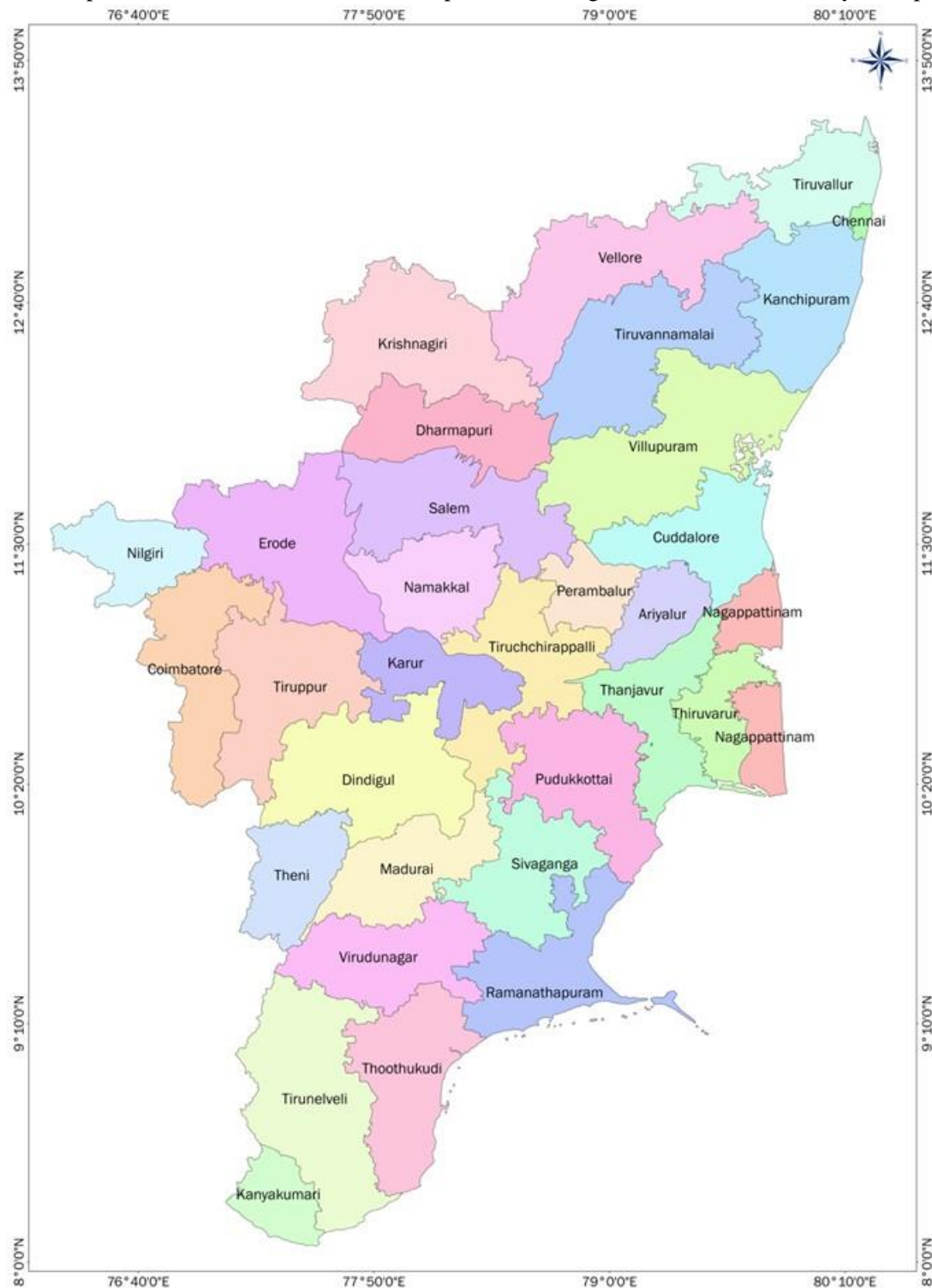


Figure A:12 Districts of Tamil Nadu

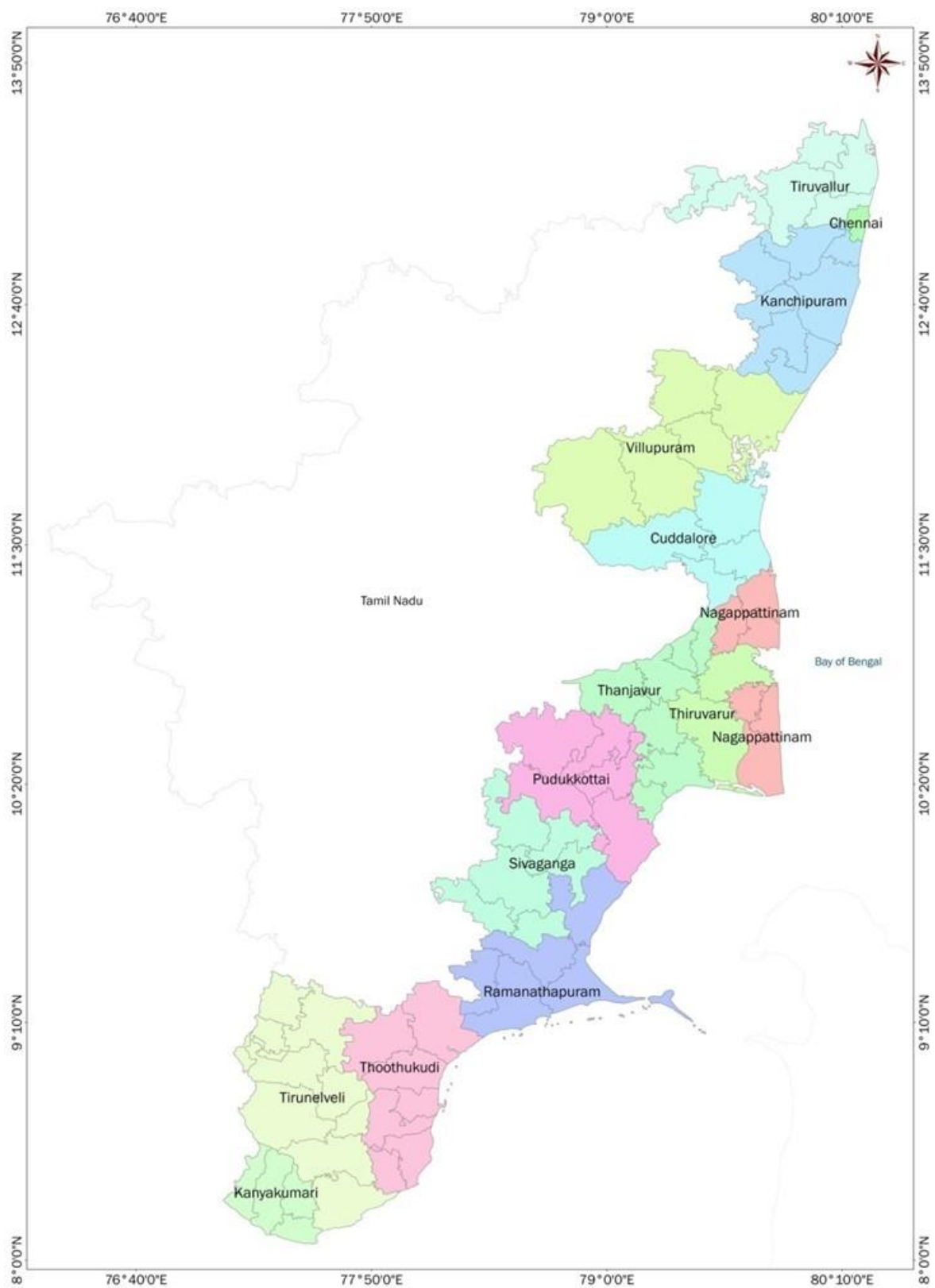


Figure A:13 Coastal Districts and Taluks of Tamil Nadu

Major uses of water include human/animal consumption, irrigation and industrial use. There are 17 river basins in Tamil Nadu. Cauvery is the only major basin. Of the others, 13 basins are medium and 3 are minor river basins. Forest Cover of the State is 26,345 sq.km which is 20.26% of the State's geographical area. The State has been a victim of natural calamities such as cyclones, tsunamis and floods in some years and severe drought in certain years. According to the National Institute of Disaster Management, 13 districts of Tamil Nadu are vulnerable to high or very high cyclonic impact and flooding.

Table A:7 Key Statistics of Tamil Nadu State

TAMIL NADU	
Attributes	Details
Geographic location	Latitude: 8°00'00" N to 13°50'00" N Longitude: 76°40'00" E to 80°10'00" E
Geographic area	130058 sq.km
Forest area	26,345 sq.km
Coastline	906.9 km
Average Annual Rainfall	930 mm
Demographic Indicators	
Total Population	72.14 million (2011 Census)
Rural Population	37.19 million
Urban Population	34.95 million
Population Density	277
Literacy rate	80.33%
Administrative information	
No. of Districts	32
No. of Subdivisions	82
No. of Towns	561
No. of Taluks	285
No. of Cities	5
No. of Villages	17680
Gram Panchayats	12618
Tribal districts	5
Municipality (M)	125
Ports and Harbours	
Major Ports	3
Minor/ Intermediate Ports	17
Mineral Resources	Lignite, vermiculite, dunite, garnet, molybdenum, titanium
National parks	5
Wildlife Sanctuaries	15
Bird Sanctuaries	15
Tiger Reserve	4
Archaeological sites	47
World Heritage sites (UNESCO)	4

TAMIL NADU	
Attributes	Details
Ramsar Site	1
Islands(Inhabited/uninhabited)	74
Tourism	
No of tourist spots	42
Average annual tourist	16.3 million (<i>as of 2014 – 15</i>)
No of Beaches	62
Types of Coast	
Sandy	57%
Hard Rock	5%
Muddy	38%
Natural Disasters (1975 till date)	
Cyclones	5
Floods	2
Earthquakes	1
Tsunami	1
Oil Spill	1
Fishery Resources	
Continental Shelf area	41000 sq km
Total inland water bodies (lakh Ha)	3.73
Marine/Inland Fish Landings	7 Lakh MT / 4.5 Lakh MT
Fish Landing centres	363
Coastal area	
Geographical Area	55344.66 km ²
No. of districts	13
No. of Taluks	82
No of Villages	4139
ESA	2215.99 km ²
Mangroves	119.10 km ²
Corals	23.30 km ²
Seagrass	398.80 km ²
Salt Marsh	59.40 km ²
Turtle Nesting Ground	2.63 km ²
Bird Nesting Site	595.45 km ²
Sand Dune	30.83 km ²

TAMIL NADU	
Attributes	Details
Mudflat	189.43 km ²
Protected Area	796.16 km ²
Archaeological & Heritage	0.79 km ²

Baseline Scenario of Andhra Pradesh

The geographical area of the state is about 2,75,069 sq km which constitutes 8.4% of India's total land area. The state has 3 distinct physiographic regions such as hilly regions and eastern ghats ranging from 500m to 3000m, the plateau having an altitude range of 100m to 1000m and the deltas of rivers between the eastern ghats and seacoast. As per the records of the forest department 23.20% of the geographical area is covered with forest, of which 3.08% is under protected area network. Nagarjunasagar Srisailem, the largest tiger reserve of the country is located in the state covering about 0.36 million hectares. Andhra Pradesh economy is mainly based on agriculture and livestock. Four important rivers of India, the Godavari, Krishna, Pennar and Thungabhadra flow through the state and provide irrigation. 60 percent of the population is engaged in agriculture and related activities. Fisheries contribute 10% of total fish and over 70% of the shrimp production of India. The geographical location of the state allows marine fishing as well as inland fish production. Andhra Pradesh is exposed to cyclones, storm surges, floods and drought.

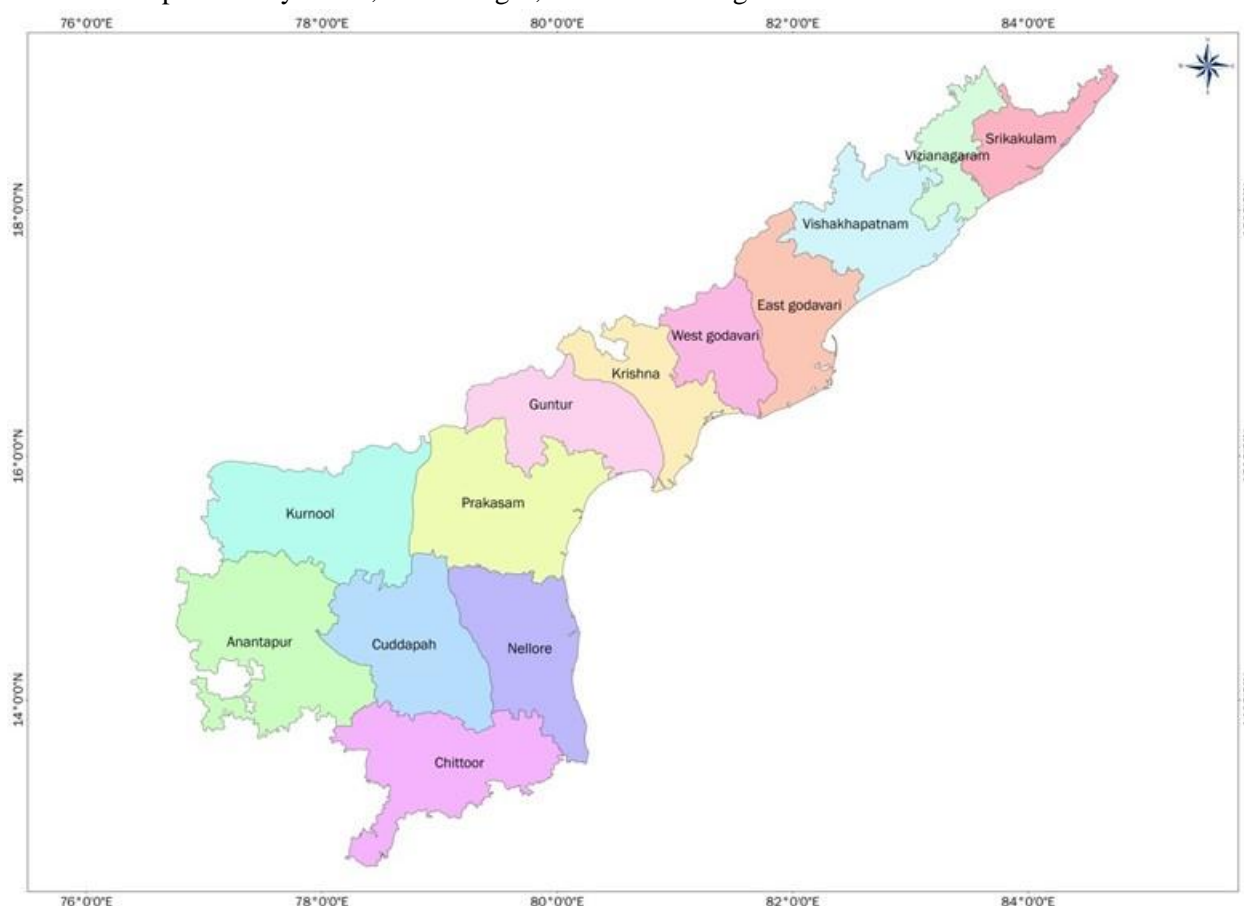


Figure A:14 Districts of Andhra Pradesh

A moderate to severe intensity cyclone can be expected to make landfall every two to three years. About 44 percent of the state is vulnerable to tropical storms and related hazards. More than 60 cyclones have affected the state this century as per the records of IMD. The incidence of cyclones seems to have increased in the past decades, to the extent that severe cyclones have become a common event occurring every two to three years, repeatedly and severely affecting the state's economy while challenging its financial and institutional resources. Almost 9 million people are vulnerable to cyclones and their effects in Coastal AP, 3.3 million of who belong to communities located within 5 km of the seashore. The Godavari and the Krishna rivers have well-defined stable courses, and their natural and man-made banks have usually been capable of carrying flood discharges, with the exception of their delta areas. Traditionally, the flood problem in AP had been confined to the spilling of smaller rivers and the submersion of marginal areas surrounding Kolleru Lake. However, the drainage problem in the delta zones of the coastal districts has worsened, thereby multiplying the destructive potential of cyclones and increasing flood hazards. As per the recent study of country's erosion study using high resolution aerial data by NCSCM, 17% of the state's coastline undergo erosion.

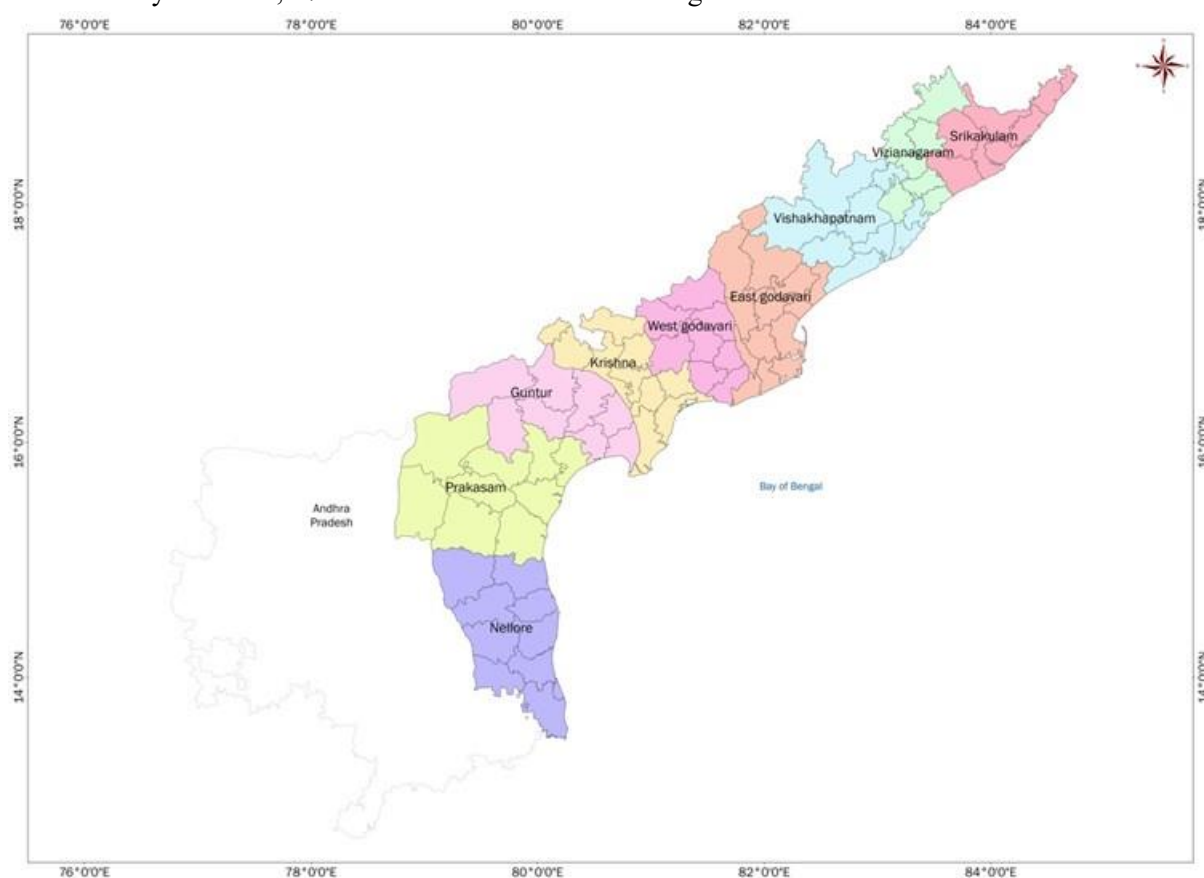


Figure A:15 Coastal Districts and Taluks of Andhra Pradesh

The coastal stretches of the two major deltas, the Krishna and the Godavari were the most affected coastal areas for this human induced disaster. The deadliest cyclone in the past 40 years was the one that struck Andhra's coast in November 1977, killing about 10,000 people. About 250,000 cattleheads perished, one million houses were damaged and crops on 1.35 million hectares (ha) were destroyed that year. According to the State Disaster Management Department, about 44 per cent of the state is vulnerable to tropical storms and related disasters. Vulnerability to storm surges is not uniform along the coast of Andhra. The stretch between Nizampatnam in Guntur district and Machilipatnam in Krishna district is the most prone to storm surges. East and West Godavari districts, with vast stretches of paddy

fields and irrigation, drainage canals always bear the brunt of cyclones accompanied by strong winds and pounding rains. In the aftermath of cyclones, these areas get flooded, leading to huge crop losses besides other damage.

Table A:8 Key Statistics of Andhra Pradesh State

ANDHRA PRADESH	
Attributes	Details
Geographic location	Latitude: 12°41'00" N to 19°07'00" N Longitude: 77°50'00" E to 84°40'00 E
Geographic area	275069 sq.km
Forest area	63,814 sq.km
Coastline	973.7 km
Average Annual Rainfall	930 mm
Demographic Indicators	
Total Population	53.06 million (as of 2011)
Rural Population	35.36 million
Urban Population	17.70 million
Population Density	308 persons/km ²
Literacy rate	67.41% (Census 2011)
Administrative information	
No. of Districts	13
No. of Subdivisions	50
No. of Towns	104
No. of Taluks	671
No. of Cities	31
No. of Villages	28293
Gram panchayats	21843
No. of Fishing Villages	555
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	14
Mineral Resources	Mica, Limestone, Asbestos, Iron ore, Manganese, Silica sand, Oil and natural gas
National parks	5
Wildlife Sanctuaries	13
Bird Sanctuaries	3
Biosphere Reserve	3
Archaeological sites	40
Ramsar Site	1
Islands(Inhabited/uninhabited)	72
Tourism	
No of tourist spots	83

ANDHRA PRADESH	
Attributes	Details
Average annual tourist	121.8 million (2015-16)
No of Beaches	75
Types of Coast	
Sandy	38%
Hard Rock	3%
Muddy	52%
Marshy	7%
Natural Disasters (1975 till date)	
Floods	2
Cyclones	60 (in last 4 decades)
Tsunami	1
Typhoon	1
Heat Waves	1
Fishery Resources	
Continental Shelf area	33227 sq km
Total inland water bodies (lakh Ha)	11.25 Lakh Ha
Marine/Inland Fish Landings	4.8 Lakh MT / 14.89 Lakh MT (2015-16)
Fish Landing centres	353
Coastal area	
Geographical Area	101610.39 km ²
No. of districts	9
No. of Taluks	84
No of Villages	2694
ESA	3245.55 km ²
Mangroves	507.29 km ²
Corals	Nil
Seagrass	Nil
Salt Marsh	26.08 km ²
Turtle Nesting Ground	13.75 km ²
Bird Nesting Site	264.93 km ²
Sand Dune	115.94 km ²
Mudflat	7.13 km ²
Protected Area	2310.30 km ²
Archaeological & Heritage	0.13 km ²

Baseline Scenario of Odisha

The State of Odisha (Orissa) is located on the eastern coast of India at 17°51'00" N to 22°53'00" N Latitude & 81°37'00" E to 87°53'00" E Longitude carved out of Bihar in 1936. The state is bordered by Madhya Pradesh in the west, Andhra Pradesh in the south, West Bengal in north-east, Bay of Bengal in the east and Bihar in the north, the state extends to an area of 1,55,707 Sq. Km and Population (*Census, 2011*) of 45,987,358. The climate of state is tropical with 1451mm average rainfall. This is one of the densely populated states in India and is divided into 30 districts, of which Mayurbhanj is the biggest (1042km²) and Jagatsinghpur the smallest (197km²) by area.

The districts are subdivided into 317 CD Blocks or taluks and 58 subdivisions. There are 58 subdivisions and 171 tahasils. According to 2001 census there are 49694 villages and 6234 Gram Panchayats. Apart from other Population statistics, Literacy rate in Odisha has witnessed a major growth and has increased to 73.45 percent according to 2011 against 63.08% in 2001 census. The State has a total forest area of 61204 km², which is about 37% of its geographical area. The Department of Forest and Environment manages 26,350 km² of Reserve forests area (RFs) under various working plans and schemes while 34,854 km² are Demarcated Protected Forests (DPFs) and Undemarcated Protected Forests (UDPFs) and other forests.

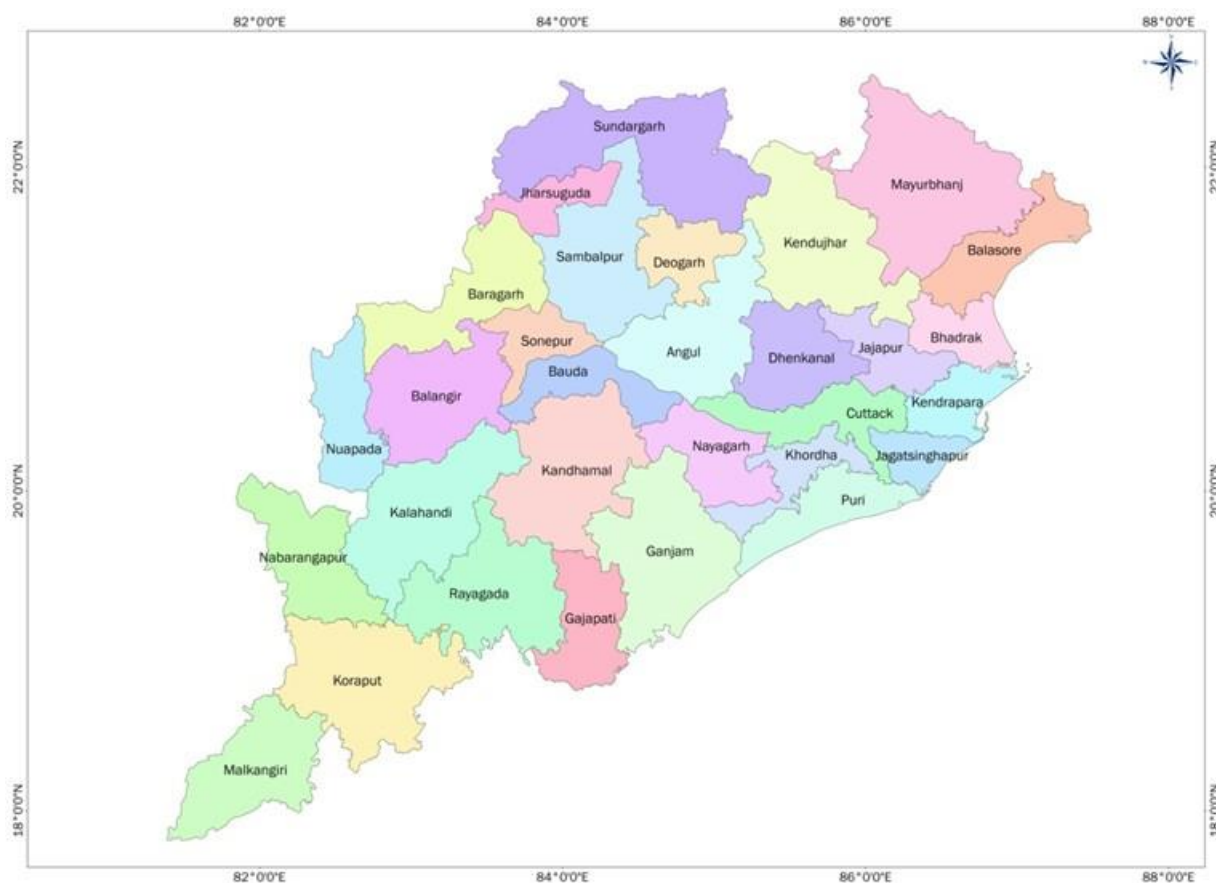


Figure A:16 Districts of Odisha

Odisha is drained by 11 major rivers and their tributaries separated by high ridges. The Odisha Coastal Plains are the depositional landforms of recent origin and geologically belong to the Post-Tertiary Period. The 75 metre contour line delimits their western boundary and differentiates them from the Middle Mountainous Region. This region stretches from the West Bengal border, i.e. from the River Subarnarekha in the north to the River Rushikulya in the south. Port of Paradip is one of the major

ports in the east coast shore and situated at the confluence of river Mahanadi and the Bay of Bengal. Tourism in Odisha are noted for sculptural and artistic heritage and has long been famous to scholars and connoisseurs for the magnificent Sun Temple at Konark (The legendary 'Black Pagoda' of European mariners), for the majestic temple of Lord Jagannath at Puri (renowned for the spectacular Rath Yatra chariot festival), and for the glorious temples of Bhubaneswar. Beaches at Puri and Gopalpur on sea attracts both national and international tourists.

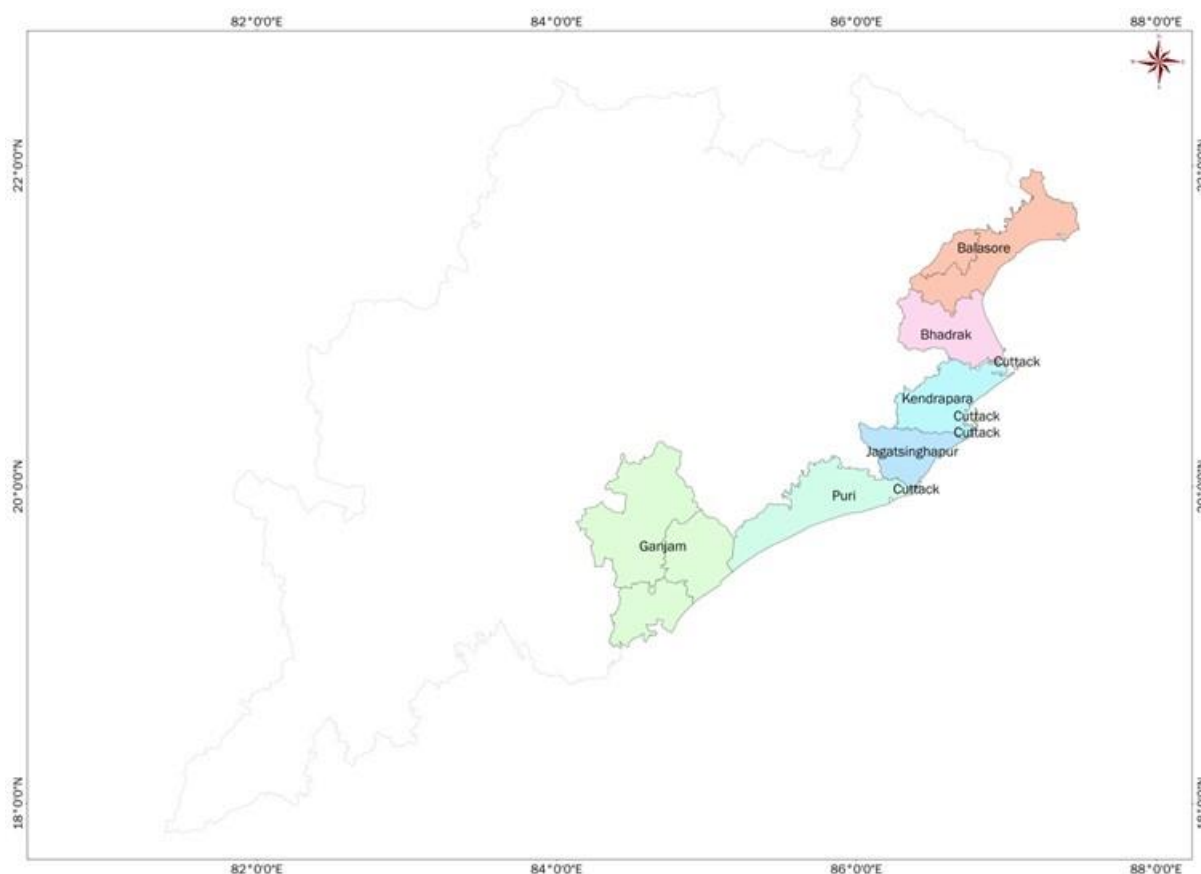


Figure A:17 Coastal Districts and Taluks of Odisha

Gahirmatha Marine Sanctuary extending from Dhamra River mouth in the north to Brahmani river mouth in the south is the world's largest nesting beach for Olive Ridley Turtles extending to an area of about 1,435 km².

The state is one of the high multi-disaster prone areas of the country. The state falls victim for most of the tropical cyclones, storm surges that occur in Bay of Bengal due to its sub tropical littoral location. Fani cyclone is the second extremely strongest cyclone since Phailin in 2013 affected about 1.6 crore people in the state in May 2019. Its densely populated coastal plains are the alluvial deposits of its river systems. The rivers in these areas with heavy load of silt have very little carrying capacity, resulting in frequent floods, only to be compounded by breached embankments. Though a large part of the state comes under Earthquake Risk Zone-II (Low Damage Risk Zone), the Brahmani Mahanadi graben and their deltaic areas come under Earthquake Risk Zone-III (Moderate Damage Risk Zone) covering 43 out of the 103 urban local bodies of the state. Besides these natural hazards, human-induced disasters such as accidents, stampede, fire, etc, vector borne disasters such as epidemics, animal diseases and pest attacks and industrial / chemical disasters add to human suffering.

Table A:9 Key Statistics of Odisha State

ODISHA	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 17°51'00" N to 22°53'00" N Longitude: 81°37'00" E to 87°53'00 E
Geographic area	155707 sq.km
Forest area	61204.17 sq.km
Coastline	476.4 km
Average Annual Rainfall	1451.2 mm
Demographic Indicators	
Total Population	45.99 million (2017)
Rural Population	38.31 million
Urban Population	7.68 million
Population Density	300
Literacy rate	73.45%
Administrative information	
No. of Districts	30
No. of Subdivisions	58
No. of Towns	42
No. of Taluks	317
No. of Cities	5
No. of Villages	49694
No of Gram Panchayats	6234
No of Fishing Villages (Marine/Inland)	3878 (813 /3065)
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	12
Mineral Resources	Chromite, Nickel, Bauxite, Iron ore, Coal
National parks	2
Wildlife Sanctuaries	19
Bird Sanctuaries	2
Biosphere Reserve	1
Archaeological sites	6
World Heritage sites (UNESCO)	1
Ramsar Site	2
Islands(Inhabited/uninhabited)	35
Tourism	
No of tourist spots	20
Average annual tourist	1.42 million (2017 -18)

ODISHA	
<i>Attributes</i>	<i>Details</i>
No of Beaches	32
Types of Coast	
Sandy	66%
Muddy	34%
Natural Disasters (1975 till date)	
Cyclones	5
Floods	4
Earthquakes (3 – 6 Richter scale)	6
Heat Waves	12
Tsunami (Dec 2004)	1
Landslides	9
Lightining	9
Fishery Resources	
Continental Shelf area	24000 sq km
Total inland water bodies (lakh Ha)	4.18
Marine/Inland Fish Landings	1.10 Lakh MT / 0.60 Lakh MT (2016 -17)
Fish Landing centres	72
Coastal area	
Geographical Area	25827.46 km ²
No. of districts	6
No. of Taluks	12
No of Villages	5001
ESA	2606.85 km ²
Mangroves	264.63 km ²
Corals	Nil
Seagrass	87.08 km ²
Salt Marsh	131.69 km ²
Horseshoe Crab Habitat	29.33 km ²
Turtle Nesting Ground	8.73 km ²
Bird Nesting Site	730.96 km ²
Sand Dune	96.82 km ²
Mudflat	70.21 km ²
Protected Area	1187.32 km ²
Archaeological & Heritage	0.08 km ²

Baseline Scenario of West Bengal

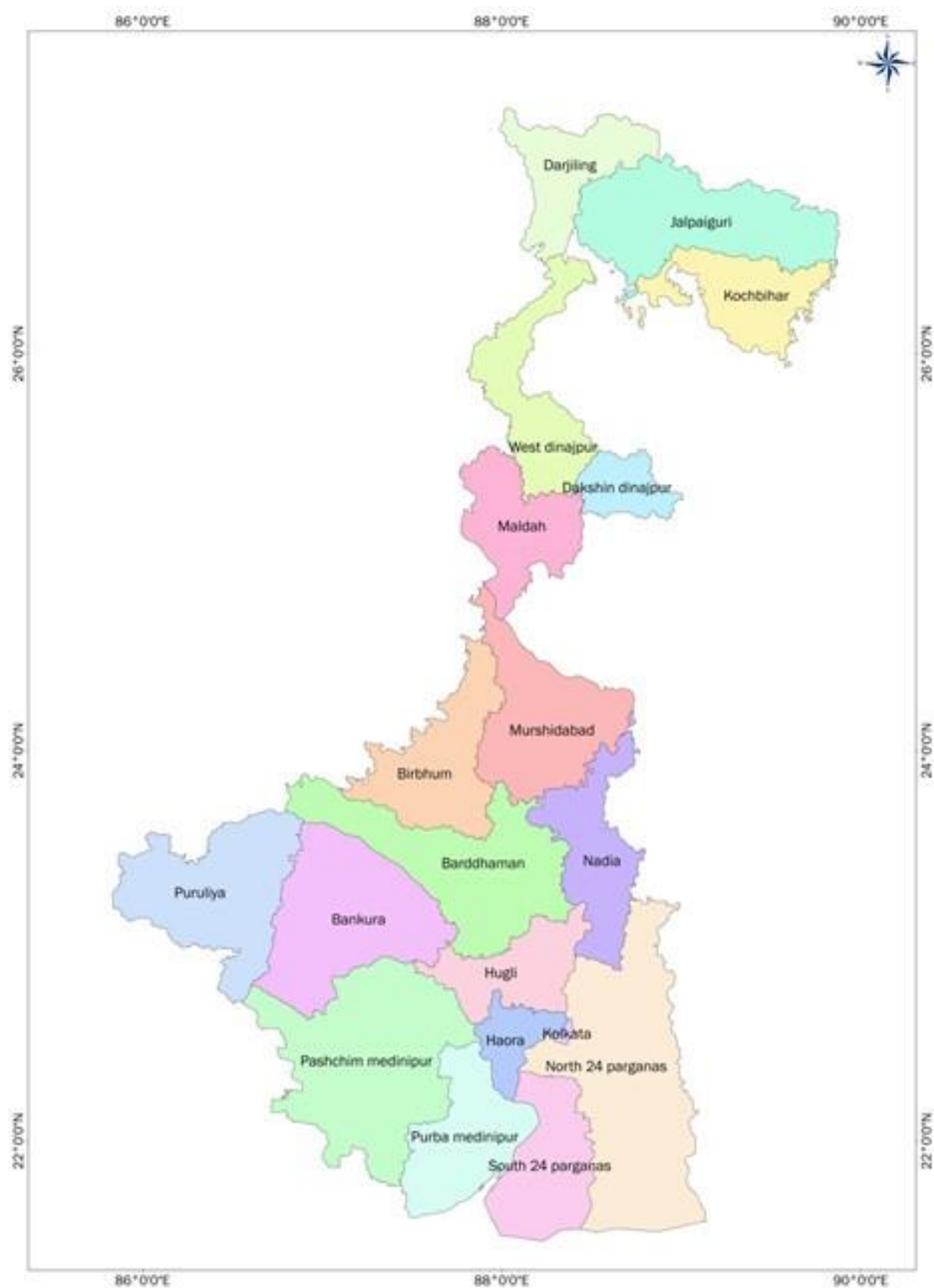
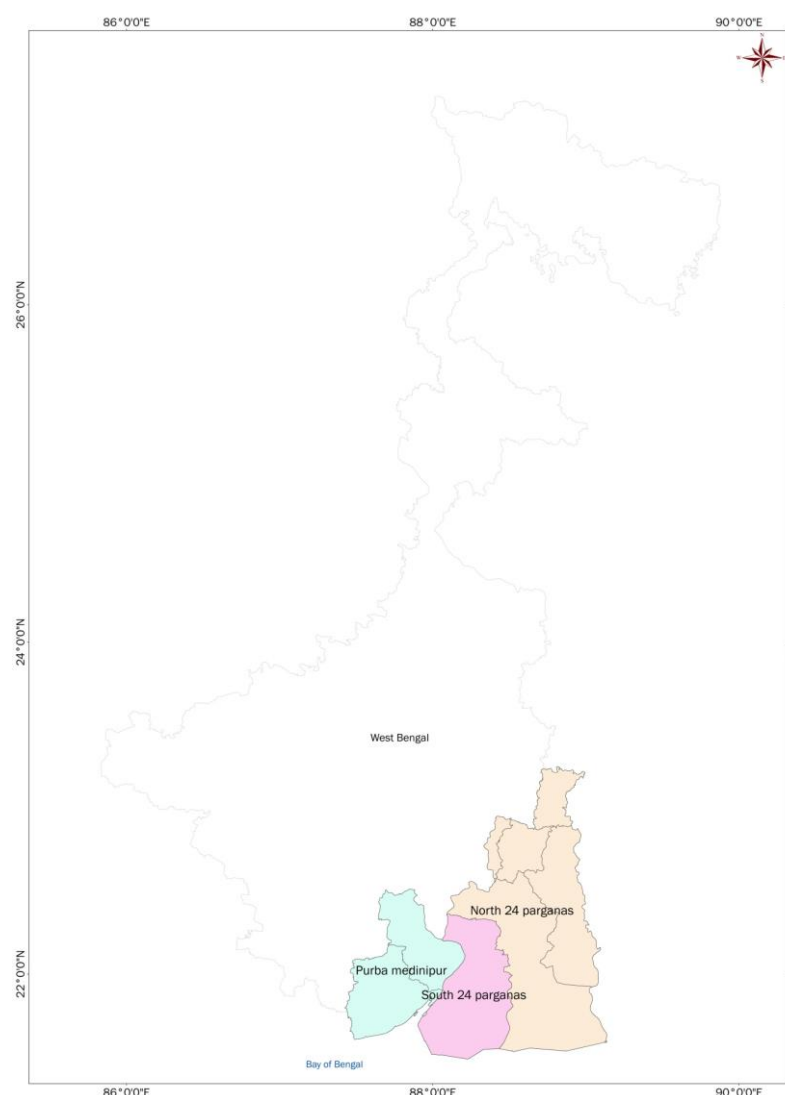


Figure A:18 Districts of West Bengal

West Bengal is bounded on the north by Sikkim and Bhutan, on the east by Assam and Bangladesh, on



the south by the Bay of Bengal and on the west by Odisha, Bihar and Nepal. West Bengal covers a geographical area of 88,752 sq. km, which constitutes about 2.7% of the total land area of the country. The State is divided into 23 administrative districts. The State can be divided into two distinct regions, i) the Himalayas and the Sub-Himalayas and their associated forest types in the northern parts and ii) the thickly populated Gangetic Plains, merging with the sea in the form of vast, tangled mangroves in the southern part. The climate is generally humid tropical monsoon. It varies from moist-tropical in the southeast to dry tropical in the southwest and from subtropical to temperate in the mountains of the north. The total human population of the state is 9.13 million (as per Census 2011), which is the rural population comprises 68.13 in % and urban 31.87 in %.

Figure A:19 Coastal Districts and Taluks of West Bengal

The population density of the state is 1028 persons per sq. km (Dept.of Labour- 2013-14). There are eight forest types in the State. They are Tropical Semi-evergreen, Tropical Moist Deciduous, Tropical Dry Deciduous, Subtropical Broadleaf Hill, Subtropical Pine, Himalayan Moist Temperate, Montane Wet Temperate, Littoral and Swamp Forests. The forests are mainly distributed in the north, southwest and southeast. As per the Forest Survey of India report of 2001, the total recorded forest area is 11,879 sq. km, which constitutes 13.4% of the geographical area of the State and 1.5% of country's forest area. By legal status, reserved forest constitutes 59.3%, protected forest 31.8% and unclassed forest 8.9% (Ministry of Environment and Forest 2001). There are five national parks and 16 wildlife sanctuaries covering an area of 0.28 million ha, constituting 3.15% of the geographical area of the State (Rodgers et al. 2000). The State has two Tiger Reserves namely, Sundarbans and Buxa, both are identified IBAs.

The Sundarbans Biosphere Reserve is one of the 12 Biosphere Reserves of the country and one of the world's largest mangrove forest spread to an area of about 140000 Ha. As per the statistics of the National Centre for Sustainable Coastal Management (NCSCM) the total mangrove cover of the wetland is about 2044.23 sq km which is about 94% of the state's total mangrove area. The Sundarbans National Park is also a World Heritage site. There are about Six national parks and all of them are

identified as (Important Bird and Biodiversity Areas (IBA's), namely Buxa National Park, Gorumara National Park, Lava-Neora National Park, Sundarbans National Park and Singhalila National Park. Out of 16 wildlife sanctuaries, three have been identified as IBAs, namely Jaldapara Wildlife Sanctuary, Kulik Bird Sanctuary and Mahananda Wildlife Sanctuary. The major soil types of the state are laterite, Red soils, Alluvial Soil, Tarai Soil, Saline Soil and Red and Gravelly Soils. About 70 % of the State population is dependent on agriculture. The major crops are paddy, jute, tea, potatoes, oilseeds, betel-vine, tobacco, wheat, barley and maize. Aquaculture is also a prominent activity and West Bengal is one of the major fish producers and consumers in India.

Table A:10 Key Statistics of West Bengal State

WEST BENGAL	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 21°20' and 27°32' N Longitude: 85°50'E and 89°52' E
Geographic area	88,752 sq. km
Forest area	11,879 sq.km
Coastline	157.5 km
Average Annual Rainfall	175 cm
Demographic Indicators	
Total Population	9.13 million (Census 2011)
Rural Population	6.22 million
Urban Population	2.91 million
Population Density	1028 persons/sq km
Literacy rate	76.26 %
Administrative information	
No. of Districts	23
No. of Subdivisions	66
No. of Towns	252
No. of Municipalities	121
No. of Taluks/Blocks	341
No of Gram Panchayats	3349
No. of Cities	3
Number of villages (including Uninhabited villages)	37, 469
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	5
Mineral Resources	Apatite, Dolomite, limestone, silica sand, wolframite
National parks	6
Wildlife Sanctuaries	15
Bird Sanctuaries	1
Biosphere Reserve	1
Archaeological sites	36

WEST BENGAL	
<i>Attributes</i>	<i>Details</i>
World Heritage sites (UNESCO)	2
Ramsar Site	2
Islands(Inhabited/uninhabited)	20
Tourism	
No of tourist spots	19
Average annual tourist	5.04 million (<i>as of 2014</i>)
No of Beaches	23
Types of Coast	
Marshy	49%
Muddy	51%
Natural Disasters (1975 till date)	
Floods	3
Cyclones	14
Fishery Resources	
Continental Shelf area	372,424 km ²
Total inland water bodies (lakh Ha)	801477.42 Ha
Marine/Inland Fish Landings	178.85 MT / 1438.47 MT (as of 2014 – 15)
Fish Landing centres	59
Coastal area	
Geographical Area	21956.02 km ²
No. of districts	3
No. of Taluks	10
No of Villages	3027
ESA	8361.09 km ²
Mangroves	2182.09 km ²
Corals	Nil
Seagrass	Nil
Salt Marsh	32.58 km ²
Horseshoe Crab Habitat	40.54 km ²
Turtle Nesting Ground	2.65 km ²
Bird Nesting Site	2632.31 km ²
Sand Dune	2.64 km ²
Mudflat	131.34 km ²
Protected Area	3336.89 km ²
Archaeological & Heritage	0.05 km ²

Union Territories

Baseline Scenario of Daman and Diu

Daman and Diu is a union territory in western India. With an area of 152 km², it is the smallest federal division of India on the mainland. The territory comprises two distinct regions Daman and Diu that are geographically separated by the Gulf of Khambhat. The state of Gujarat and the Arabian Sea border the territory. According to the 2011 census, the lowest female-to-male ratio in India (618 females per thousand males) was recorded in Daman and Diu. The entire area of Daman and Diu is distinguished as two different districts called Daman and Diu. Both these districts are located on the seashore. Both of them have borderlines with the state of Gujarat. The district of Daman is situated close to the place called Surat in the southern part of Gujarat. The district of Diu is located close to the place called Junagadh in the peninsula called Saurashtra Peninsula in Gujarat.

The region of Daman is a small region in the Gulf of Khambhat. The region of Diu is connected to the state mainland by a creek. The Daman Ganga River divides Daman into two parts. Three rivers pass through the land. They are the Bhagwan River, the Kalem River and the Daman Ganga River lying in between. The district is bounded on the North by Bhagwan River, east by Valsad district of Gujarat state, south by Kalem River and on the west by the Arabian Sea. Its altitude is 12 meter above sea level. The districts Daman has an area of 112 km², the main settlement is the city of Daman and Diu district has an area of 40 km², the main settlement is the town of Diu.

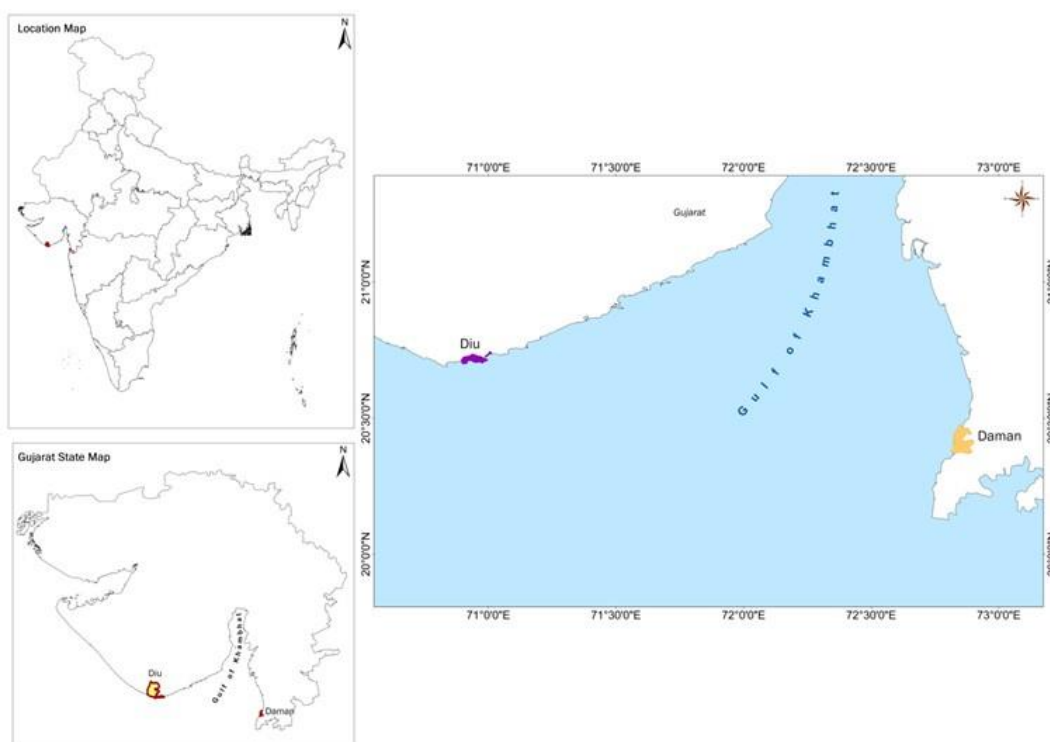


Figure A:20 Location Map of Daman and Diu

Total irrigated area is 393.93 h.a. and un-irrigated area is 3304.73 hectares as per the Agricultural Census 2000-01. In 2000-01 the net area under cultivation was 3375.65 h.a. Important field and garden crops are paddy, ragi, bajra, jowar, groundnut, pulses and beans, wheat, banana, sapota, mango, chickoo, coconut and sugarcane. There are no major forests in the territory. There are 2930 small-scale and medium-scale industries in Daman and Diu. Two industrial areas have been developed by Omnibus

Industrial Development Corporation at Daman. The other industrial areas are Dabhel, Bhimpore, Kachigam and Kadaiya.

Table A:11 Key Statistics of Daman Diu

DAMAN AND DIU	
<i>Attributes</i>	<i>Details</i>
Geographic location	Daman Latitude: 20°22'06" N to 20°27'57" N Longitude: 72°49'20" E to 72°54'25 E Diu Latitude: 20°42'00" N to 20°44'34" N Longitude: 70°52'26" E to 71°00'24 E
Geographic area	Daman - 112 Sq.km Diu – 40 Sq.km
Forest area	20.49 sq km
Coastline	29.5 km
Average Annual Rainfall	2000 mm
Demographic Indicators	
Total Population	2.43 Lakhs (as of 2011)
Rural Population	1.82 Lakhs
Urban Population	60,398
Population Density	2164 persons/km ²
Literacy rate	87.10% (Census 2011)
Administrative information	
No. of Districts	2
No. of Subdivisions	1
No. of Towns	6
No. of Taluks	2
No. of Cities	2
Number of villages (including Uninhabited villages)	19
No of Fishing Villages	11
Ports and Harbours	
Major Ports	0
Minor/ Intermediate Ports	2
Mineral Resources	Limestone
Wildlife Sanctuaries	1
Bird Sanctuaries	1
Archaeological sites	12
Islands(Inhabited/uninhabited)	
Tourism	
No of tourist spots	17
Average annual tourist	0.2 million (<i>as of 2014</i>)

DAMAN AND DIU	
<i>Attributes</i>	<i>Details</i>
No of Beaches	2
Types of Coast	
Soft Rock	Entire
Natural Disasters (1975 till date)	
Cyclones	8
Fishery Resources	
Total inland water bodies	11.25 sq km
Marine/Inland Fish Landings	64070 tonnes as of 2017
Fish Landing centres	7
Coastal area	
ESA	47.75 km ²
Mangroves	5.22 km ²
Corals	Nil
Seagrass	Nil
Salt Marsh	0.40 km ²
Turtle Nesting Ground	Nil
Bird Nesting Site	Nil
Sand Dune	3.82 km ²
Mudflat	1.88 km ²
Protected Area	35.88 km ²
Archaeological & Heritage	0.55 km ²

Baseline Scenario of Lakshadweep Islands

Lakshadweep is a tropical archipelago consisting of 12 attols, 3 reefs and 6 newly formed/ submerged sand banks in the Laccadive Sea, off the coast of Kerala, India. Lakshadweep islands are scattered in the Arabian Sea 200 to 400 km away from Malabar coast and 10 to 400 km from each other. *Lakshadweep* means "one hundred thousand islands" in Sanskrit and Malayalam. The islands form the smallest Union Territory of India. The Inhabited islands are Kavaratti, Agatti, Bangara, Amini, Kadmat, Kiltan, Chetlat, Bitra, Andrott, Kalpeni and Minicoy. Though, the land area of this Coral paradise is only 32 Sq.kms. the lagoon area is about 4200 Sq.Kms. of its lagoon area, 20,000 Sq.km. of territorial waters and 20000 km² of EEZ of the country.

Each island of Lakshadweep is fringed by coral sands. A common feature of these islands is that a shallow lagoon exists invariably in their western side separating the outer reef rim from low-lying coral islands composed essentially of calcareous sand and soil. The islands are generally aligned from north to south with one exception namely, Andrott, which lies east to west. It is said that the islands and reefs were formed as a result of the coral growths over the continuation of the Aravalli system of rock of Rajasthan and Gujarat. There exist no kind of forest except thick coconut groves. Coconut is the only major crop in Lakshadweep. Fishing is another major occupation of Lakshadweep. The sea around the

island is highly productive. The islands stand first in the country in per capita availability of fish. Coconut fibre extraction and fibre production is the major industry of this territory. There are few small industrial units like boat building, tuna canning, bakeries, hosiery factory, vinegar and jaggery making, flour and oil mills and furniture making etc.

There are seven coir fibre production cum demonstration unit and four coir curling units under government sector. Apart from these factories small coir units are also functioning under private ownership in different islands. Lakshadweep is a group of coral islands entirely covered by coconut trees and with lake and lagoons. The scenic beauty of the whole islands is charming. Tourism industry is one of the major industries of these islands.

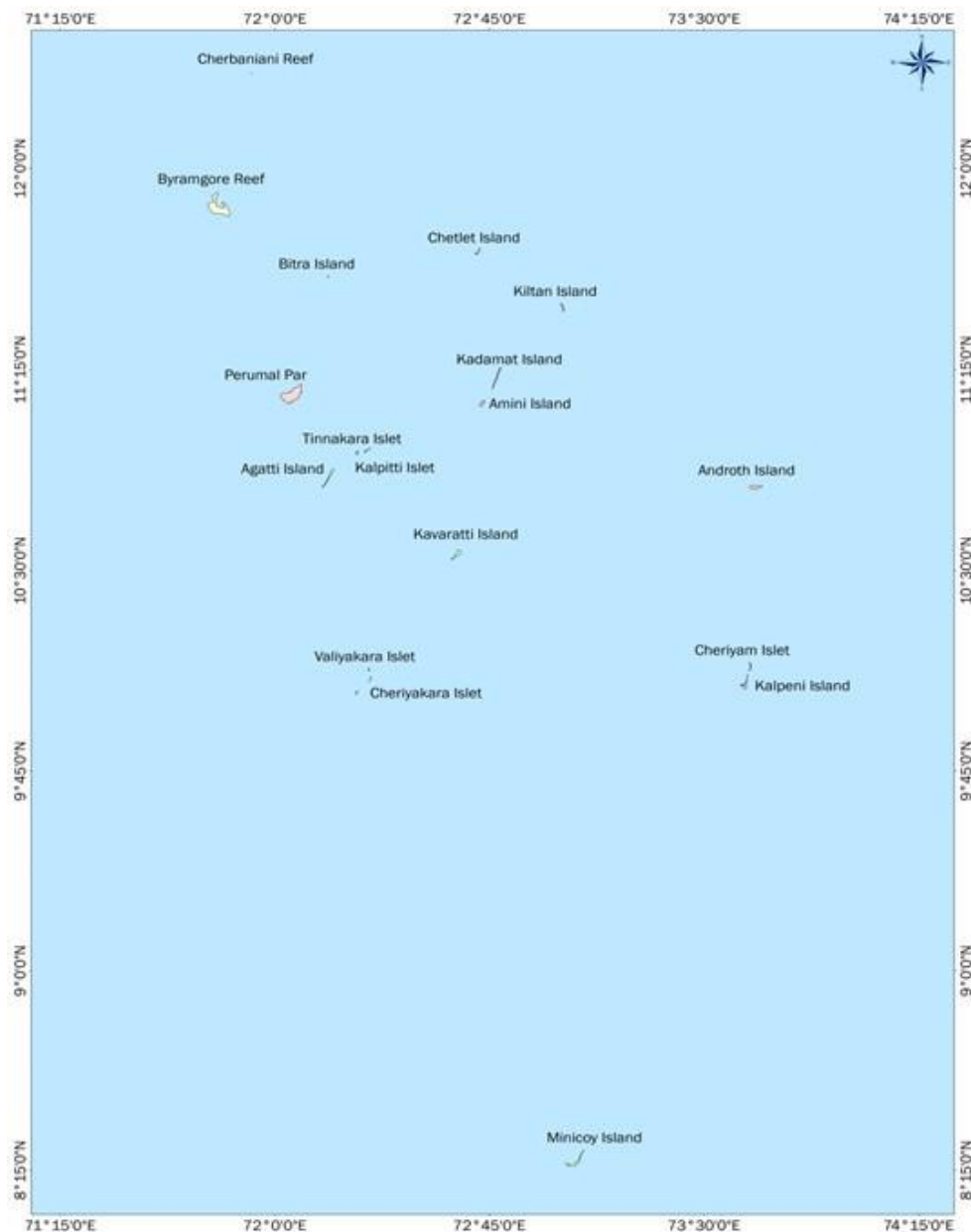


Figure A:21 Lakshadweep Islands

To develop the tourism industry Indian government takes several initiatives like water sports complex, arrangement of fishing in the deep sea, viewing the underwater coral world in a glass bottom boat etc. Some of the important tourist centres are Minicoy island, Bangaram island etc.

Table A:12 Key Statistics of Lakshadweep Islands

LAKSHADWEEP ISLANDS	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 08°16'-13°58'N, Longitude: 71°44°-74°24'E
Geographic area	32.69 km ²
Forest area	27.10 sqkm
Coastline	132 km
Average Annual Rainfall	1600mm
Demographic Indicators	
Total Population	64,473 persons (as of 2011)
Rural Population	14139 persons
Urban Population	50334 persons
Population Density	2015 persons/km ²
Literacy rate	91.85% (Census 2011)
Administrative information	
No. of Districts	1
No. of Subdivisions	10
No. of Towns	6
No. of Taluks	10
No. of Cities	1
Number of villages (including Uninhabited villages)	21
Ports and Harbours	
Major Ports	0
Minor/ Intermediate Ports	10
Mineral Resources	Nil
Bird Sanctuaries	1
Archaeological sites	1
Islands(Inhabited/uninhabited)	27 (10 / 17)
Tourism	
No of tourist spots	15
Average annual tourist	8000
Natural Disasters (1975 till date)	
Cyclones	6
Fishery Resources	
Continental Shelf area	4,336 km ²

LAKSHADWEEP ISLANDS	
<i>Attributes</i>	<i>Details</i>
Total inland water bodies (lakh Ha)	
Marine/Inland Fish Landings	13.19 MT/ 0 (<i>as of 2014 – 15</i>)
Fish Landing centres	15
Coastal area	
ESA	600.08 km ²
Mangroves	Nil
Corals	552.22 km ²
Seagrass	0.72 km ²
Salt Marsh	Nil
Turtle Nesting Ground	9.92 km ²
Bird Nesting Site	37.22 km ²
Sand Dune	Nil
Mudflat	Nil
Protected Area	Nil
Archaeological & Heritage	Nil

Baseline Scenario of Andaman and Nicobar Islands

Andaman and Nicobar Islands is the largest archipelago system in the Bay of Bengal. It is made of two island groups: the Andaman Islands and the Nicobar Islands. **Andaman and Nicobar** is one of the seven union territories of India comprising 572 islands covered with lush forest. The Andaman group has 325 islands and Nicobar group has 247 islands. For administrative purpose it is divided into three districts North & Middle Andaman, South Andaman and Nicobar. Only 38 islands are inhabited, 11 islands in South Andaman district, 14 in North & Middle Andaman district and 13 in Nicobar district. The total geographical area of the islands is 8,250 km². Andaman and Nicobar have a tropical climate with humidity about 80% and temperatures varying from 23°C to 31°C.

The capital of Andaman and Nicobar Islands is Port Blair. As per census of India 2011, the population density of the island is 46 persons / Sq.km. The Andaman and Nicobar Islands have a tropical rainforest canopy about 86.2% of the total land area. The island is endowed with about one fifth of the country's extensive and diverse mangroves which is accounted to be about 699 sq km as per NCSCM ESA statistics, 2011. The total coastline of the islands is 1962 km which is about 25% of the country's coastline and encompasses 28% of the total Indian Exclusive Economic Zone. India's only active volcano-the Barren Island is located in the Andaman Islands. The chain of islands was seriously affected by Indian Ocean Tsunami 2004. Agriculture and fishing are the major economic activity here. A total of 48,675 hectares of land is used for agriculture purposes. Paddy, the main food crop, is mostly cultivated in Andaman group of islands, whereas coconut and areca nut are the cash crops of Nicobar group of islands. Andaman and Nicobar islands are developing into a major tourism hub with exotic-looking beaches and pristine islands as this scenic nature attracts the international as well as domestic tourists. The seas surrounding these islands are absolutely perfect for scuba diving and snorkeling. The Cellular Jail in Andaman and Nicobar Islands is National Memorial as it depicts the agonies of the Indian freedom fighters.

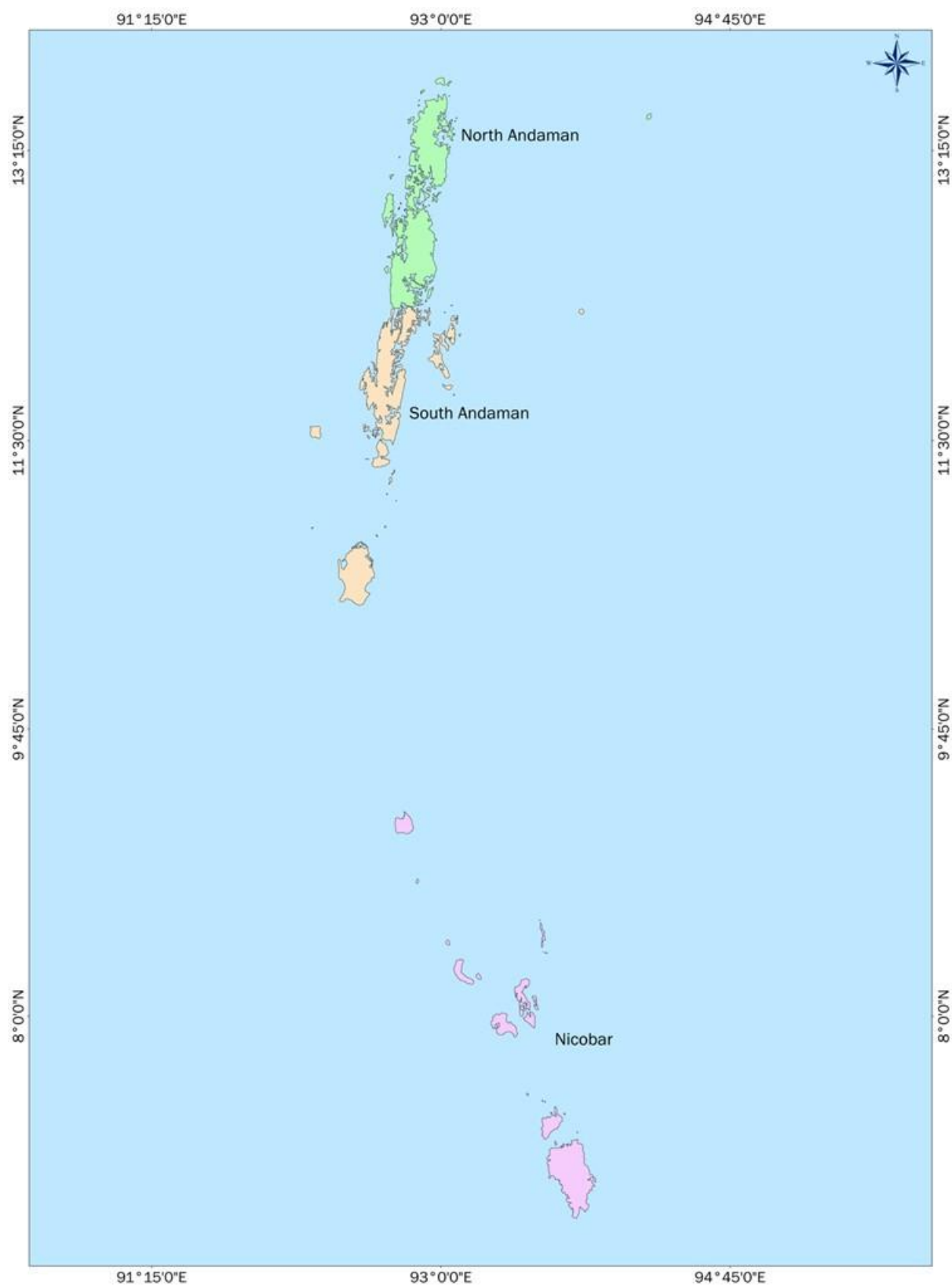


Figure A:22 Andaman and Nicobar Islands

Table A:13 Key Statistics of Andaman and Nicobar Islands

ANDAMAN AND NICOBAR ISLANDS	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 6°45' to 14°41' N Longitude: 92°12' to 94°57' E
Geographic area	8,250 km ²
Forest area	7606 Sq.km
Coastline	1962 km
Average Annual Rainfall	3000 mm
Demographic Indicators	
Total Population	3.81 Lakhs (as of 2011)
Rural Population	2.37 Lakhs
Urban Population	1.44 Lakhs
Population Density	46 persons/km ²
Literacy rate	86.63% (Census 2011)
Administrative information	
No. of districts	3
No. of subdivisions	7
No. of towns	5
No. of Taluks	14
No. of cities	9
Number of villages (including Uninhabited villages)	555
Ports and Harbours	
Major Ports	1
Minor/ Intermediate Ports	23
Mineral Resources	Copper, Chromite
National parks	9
Wildlife Sanctuaries	96
Bird Sanctuaries	1
Archaeological sites	Nil
World Heritage sites (UNESCO)	1
Islands(Inhabited/uninhabited)	
Tourism	
No of tourist spots	42
Average annual tourist	4.38 Lakhs (<i>as of 2016 – 17</i>)
No of Beaches	20
Natural Disasters (1975 till date)	
Cyclones	8

ANDAMAN AND NICOBAR ISLANDS	
<i>Attributes</i>	<i>Details</i>
Earthquakes	4
Tsunami	1
Fishery Resources	
Continental Shelf area	34965 Sq.km
Total inland water bodies	552.19 Ha
Marine/Inland Fish Landings	39284/220 MT (<i>as per 2017-2018</i>)
Fish Landing centres	25
Coastal area	
ESA	8961.40 km ²
Mangroves	699.26 km ²
Corals	493.42 km ²
Seagrass	14.60 km ²
Salt Marsh	60.24 km ²
Turtle Nesting Ground	133.44 km ²
Bird Nesting Site	1115.20 km ²
Sand Dune	Nil
Mudflat	123.91 km ²
Protected Area	6321.33 km ²
Archaeological & Heritage	Nil

Baseline Scenario of Puducherry Union Territory

Puducherry

Puducherry is a union territory of India. It has four districts- Puducherry, Mahé, Yanam and Karaikal. Puducherry district is the largest among the four districts of the Union Territory bounded by Bay of Bengal on the east, Cuddalore and Villupuram districts of Tamil Nadu on the other three sides. Puducherry district is an irregular stretch of land spread over 294 sq.km. The district has semi-arid type of climate, with a mean annual temperature of around 30° C and 70-85 % relative humidity. The region is flat with average elevation of about 15 m above sea level, intersected by the deltaic channels of River Gingee and Pennaiyar and other streams forming the two main drainage basins. The district bears relics to the rich cultural ancestry and traditional legacy of the bygone French era. Unaltered and unaffected by rapid industrialization, the district of Puducherry has preserved the rich historical past of the glorious period of the French colonies. The economy of people is based on agriculture, animal husbandry and fishing. Blessed with a natural scenic beauty, the district of Puducherry has many interesting places of tourist destination. Some of the notable tourist spots of Puducherry district are Botanical Garden, Puducherry Museum, Auroville and Shri Aurobindo Ashram etc. The area is prone to coastal erosion at certain stretches which are currently under the focus of protection by different engineering soft measures.

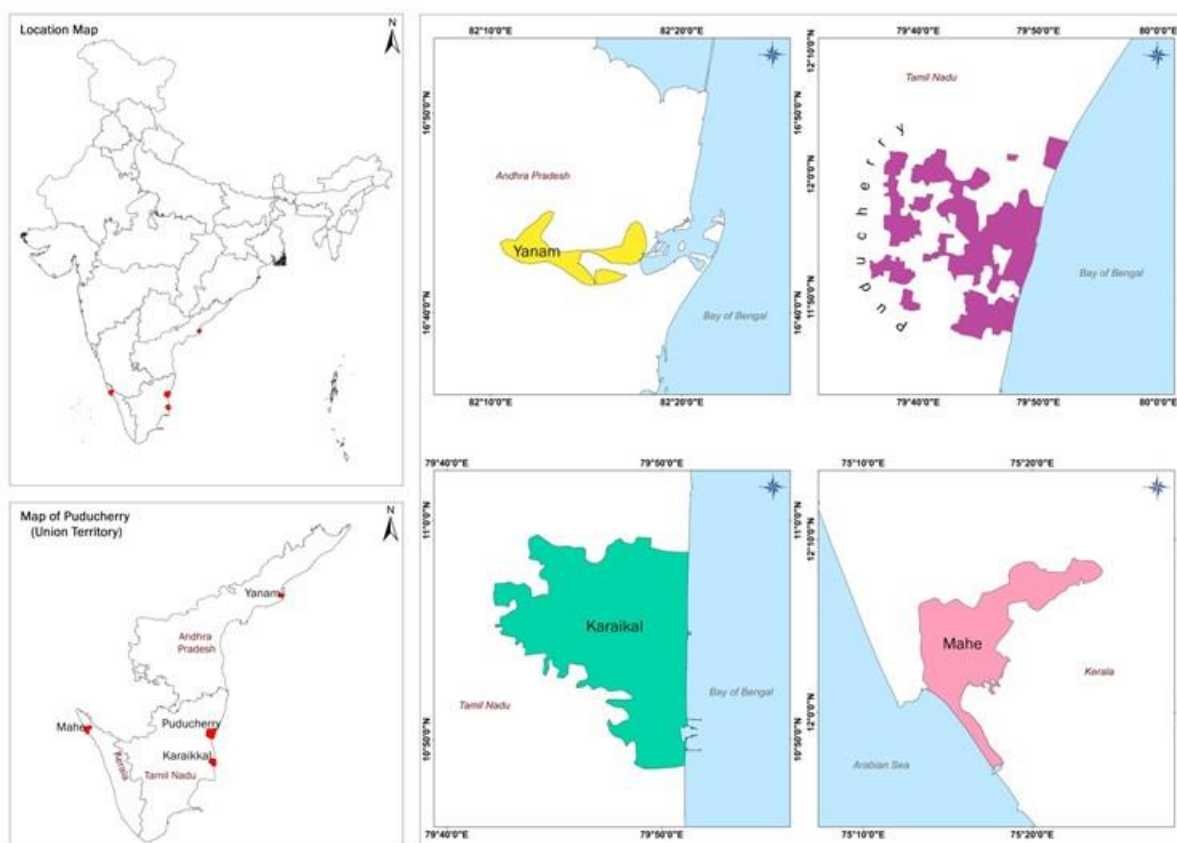


Figure A:23 Distribution of Union Territory of Puducherry

Table A:14 Key Statistics of Union Territory of Puducherry

PUDUCHERRY	
Attributes	Details
Geographic location	Latitude: 11°55'48"N Longitude: 79°49'48"E
Geographic area	294 Sq.km
Forest area	26.1Sq.km (2017)
Coastline	19.78 km
Normal Rainfall	1272.7 mm
Demographic Indicators	
Total Population	9.51 Lakhs (as of 2011)
Rural Population	6.56 Lakhs
Urban Population	2.95 Lakhs
Population Density	3232 persons/km ²
Literacy rate	85.44% (Census 2011)
Administrative information	
No. of districts	1
No. of subdivisions	0
No. of towns	6
No. of Taluks	4

PUDUCHERRY	
<i>Attributes</i>	<i>Details</i>
No. of cities	2
No of Gram Panchayats	150
Number of villages (including Uninhabited villages)	81
No of Fishing Villages	17
Ports and Harbours	
Major Ports	0
Minor/ Intermediate Ports	1
Mineral Resources	limestone, clay, lignite, phosphate rocks
Wildlife Sanctuaries	1
Bird Sanctuaries	1
Islands(Inhabited/uninhabited)	
Tourism	
No of tourist spots	20
Average annual tourist	78000 (<i>as per 2014</i>)
No of Beaches	2
Types of Coast	
Sandy	41%
Rocky	4%
Seawall	55%
Natural Disasters (1975 till date)	
Cyclone	1
Tsunami	1
Fishery Resources	
Continental Shelf area	1000 Sq.km
Total inland water bodies (Ha)	1.35 Ha
Marine/Inland Fish Landings	19064 T / 1423 T (<i>as of 2004-05</i>)
Fish Landing centres	16
Coastal area	
ESA	9.63 km ²
Mangroves	4.36 km ²
Corals	Nil
Seagrass	Nil
Salt Marsh	0.06 km ²
Turtle Nesting Ground	0.16 km ²
Bird Nesting Site	Nil
Sand Dune	0.28 km ²
Mudflat	4.59 km ²

PUDUCHERRY	
<i>Attributes</i>	<i>Details</i>
Protected Area	Nil
Archaeological & Heritage	0.18 km ²

Karaikal

Karaikal district is one of the four regions of the Union Territory of Puducherry. Karaikal came into existence with effect from June 1, 2005. It is about 130 Km south of Puducherry and enclave within Nagapattinam and Thiruvarur districts of Tamil Nadu. This region is made up of the Municipality of Karaikal, and Communes of Neravy, Tirumalairajanpattinam, Thirunallar, Nedungadu and Kottucherry. Covered completely by a thick mantle of alluvium of variable thickness, the region is flat having gentle slope towards Bay of Bengal in the east. Karaikal is situated in the fag end of Cauvery delta. Cauvery and its tributaries fertilize the lands of Karaikal region. This is the rice bowl of UT of Puducherry. The prominent source of income to the district is from agriculture. Due to scarcity of Cauvery water and poor rainfall the area under cultivation has diminished and the majority in the region could raise only a single crop. In addition to paddy, pulses, groundnut, gingely, banana and vegetables are grown here. The fishing villages of Karaikal are Mandabathur, Kalikuppam, Akkampettai, Kottucherry, Kasakudymedu, in Karaikal municipal area, Kilinjalmedu, Karaikalmedu, in Tirumalairayam Pathinam commune, Karakalchery in Neravy commune, Keezhaiyur Pattinacacherry and North vanjore. Karaikal is known for its rich religious heritage, and is a destination for those seeking leisure and serenity. Karaikal Port is a hub for oil exploration activities and multi-cargo handling.

Table A:15 Key Statistics of Karaikal in Puducherry

KARAIKAL	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 10°49'N to 11°01'N Longitude: 79°43'E 79°52'E
Geographic area	157Sq.km
Forest area	15.1 Sq.km (2017)
Coastline	12.04 km
Average Annual Rainfall	126 mm
Demographic Indicators	
Total Population	2.00 Lakhs (as of 2011)
Rural Population	1.02 Lakhs
Urban Population	0.88 Lakhs
Population Density	1275 persons/km ²
Literacy rate	87.05% (Census 2011)
Administrative information	
No. of districts	0
No. of subdivisions	2
No. of towns	1
No. of Taluks	2
No. of cities	1

KARAIKAL	
<i>Attributes</i>	<i>Details</i>
No. of villages (Including inhabited / uninhabited)	28
No of fishing villages	10
Ports and Harbours	
Major Ports	0
Minor/ Intermediate Ports	1
Mineral Resources	Limonite, Garnet sand
Islands(Inhabited/uninhabited)	
Tourism	
No of tourist spots	12
Average annual tourist	25000 (<i>as of 2014</i>)
No of Beaches	2
Types of Coast	
Sandy	Entire
Natural Disasters (1975 till date)	
Cyclone	1
Fishery Resources	
Marine/Inland Fish Landings	15226.90 T / 2407.84 T (<i>as of 2004 – 05</i>)
Fish Landing centres	9

Mahe

Mahe (Mayyazhi) is a land titled as the Eye brow of Arabian Sea, which is very small and situated on the estuary of the Mayyazhi River and Arabian Sea. The district satiates an intelligent tourist, Indian, as well as foreign. Mahe is a place with fantastic blend of Myth and Mystery. Its every nook and corner has its own wonderful stories, which keeps your eyes wild with awe and excitement. Mahe is a tiny point in the Geographical map of Kerala, the million earners for the distant Pondicherry Government, 630 kms away from Puducherry. In this former small French Town which covers an area of 9 Sq. kms, over 36,000 inhabitants live in peace. This petit French Town is situated on the West Coast of the Indian Peninsula between 11 Degrees 42' and 11 Degrees 43' Northern Latitude, and between 75 Degrees 31' and 75 Degrees 33' Eastern Longitude, just between Badagara and Thalassery, 58 kilometers from Kozhikode, 24 kilometers from Kannur in Kerala State and is a busy trade centre. The coast line here lies between the richest fishing belt between Ponnani and Mangalore on the west coast. Mahe is at the centre of a prawn group which stretches from Quilon to Mangalore. The major marketing centres in and around Mahe are Mahe, Cannanore or Kannur (24kms), Kozhikode (58 kms) and Tellicherry. Industrial units have concentration only in Pondicherry and Karaikal. The only large scale industry functioning in this district is the Cannanore spinning and weaving mills.

Table A:16 Key Statistics of Mahe in Puducherry

MAHE	
<i>Attributes</i>	<i>Details</i>
Geographic location	Latitude: 11° 42' To 11° 43' N Longitude: 75° 31' To 75° 33' E
Geographic area	9 km ²
Coastline	7.91 km
Average Annual Rainfall	3122.9 mm
Demographic Indicators	
Total Population	41816 (as of 2011)
Urban Population	41816
Population Density	4646 persons/km ²
Literacy rate	97.87% (Census 2011)
Administrative information	
No. of districts	0
No. of subdivisions	1
Tourism	
No of tourist spots	4
Average annual tourist	7320 (<i>as of 2011</i>)
No of Beaches	1
Types of Coast	
Sandy	Entire
Fishery Resources	
Continental Shelf area	15 sq km
Marine/Inland Fish Landings	3170.90 T / 0 (<i>as of 2004 – 05</i>)
Fish Landing centres	1

Yanam

Yanam town and eight villages covering 30 sq.km, lies 840 km north-east of Pondicherry, at 16 degrees 42' northern latitude, and between 82 degree 11' Eastern longitude, within the East Godavari district in Andhra Pradesh. The district lies on the spot where the Coringa River and Godavari River separate. The district lies in the delta of the Godavari River; the town is situated where the river meets its tributary, the Koringa River (Koringa River), nine kilometers from the Bay of Bengal on the Coromandel coast. It is more or less a flat land. The soil is alluvial type suitable for the cultivation of paddy, tobacco, chilly, etc. The crops of this district are coconut, paddy, jowar, ragi, pulses, coriander, fenugreek etc. The main fishing units are Gulrimpeta, Agraharam, Kothapeta, Mettakur, Kanakalapeta, Kursampeta, Padvarevupeta and Sangadirerupeta. The shoe dhony (canoe) is the commonest fishing crafts here. Padona is another kind of boat in use. The catches consist mainly of mullets, hilsa, prawns, cat fish etc. River cruise through the Yanam River is an exhilarating experience for the tourists. Gauthami Godavari River which bounds Yanam on the east and south discharges itself into the Bay of Bengal after flowing almost 14 Kms towards east.

Agriculture and Industries play an important role in strengthening the economy of the district of the Yanam. The district is blessed numerous important educational institutions of great repute. The agriculturalists of Yanam grow several agricultural products of paddy, coconut, ground nut and pulses in addition to the other miscellaneous crops. The majority of the indigenous populations are engaged in the allied economic activities of fishery and animal husbandry that contributes to building up a strong base for economic development of the district. Yanam district houses numerous small scale and medium scale cottage industries of coir making and handicraft items that enables the local craftsman of the district to earn handsome revenues. With several important educational institutions, Yanam may truly be said to be the Educational hub of Puducherry UT.

Table A:17 Key Statistics of Yanam in Puducherry

YANAM	
Attributes	Details
Geographic location	Latitude: 16°44'00"N Longitude: 82°15'00"E
Geographic area	30 sq.km
Coastline	5.27 km
Average Annual Rainfall	1042.7 mm(2011)
Demographic Indicators	
Total Population	55,626 persons (as of 2011)
Urban Population	55,626 persons
Population Density	1854 persons/km ²
Literacy rate	80% (Census 2011)
Administrative information	
No. of districts	0
No. of subdivisions	1
No. of towns	1
Islands(Inhabited/uninhabited)	
Tourism	
No of tourist spots	3
Average annual tourist	15350 (as of 2011)
Fishery Resources	
Marine/Inland Fish Landings	36100 MT / 5850 MT (2011)
Fish Landing centres	1

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Annexure II: Baseline Environmental Scenario of Indian Subcontinent

Climate and Meteorology

This section discusses the aspects of rainfall and temperature across the country. The climate of India is divided into five (5) zones as per SP-7 :2005⁷³ on the basis of following criteria:

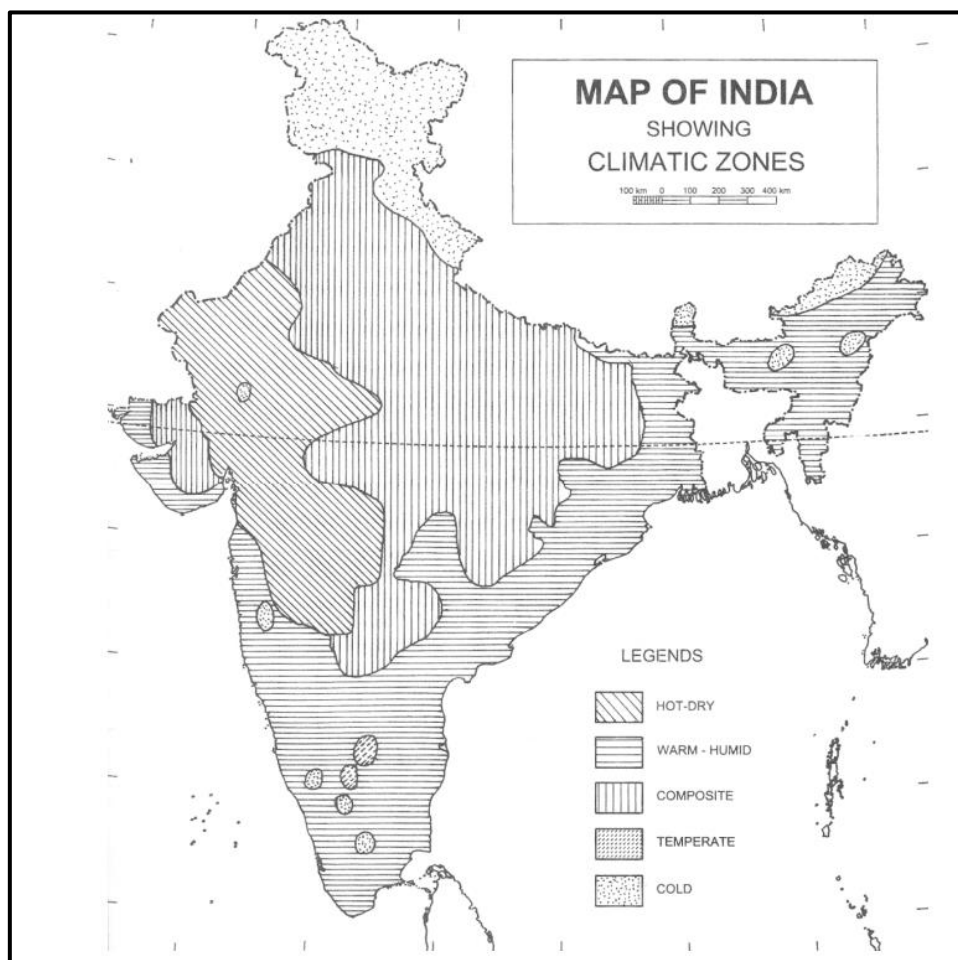


Figure A:24 Climatic Zones of India

⁷³ Ministry of Non-renewable Energy

Table A.18 Attributes of Various Climatic Zones

Sl. No	Climatic Zone	Maximum Ambient Temperature Range (°C)		Humidity (%)	Annual Precipitation (mm)	Remarks
		Summer	Winter			
1	Hot and Dry	Day: 40-45 Night: 20-30	Day: 5 -25 Night: 0 -10	25-40	< 500	Covers Western and Central Part of India
2	Warm and Humid	Day: 30-35 Night: 25-30	Day: 25-30 Night: 20-25	70-90	1200	Covers coastal parts of the country
3	Moderate /Temperate	Day: 30-34 Night: 17-24	Day: 27-33 Night: 16-18	Winter and Summer: 20—55 Monsoon : 55-90	>1000	Covers hilly or high-plateau regions with fairly abundant vegetation
4	Composite	Day : 32-43 Night : 27-32	Day : 10-25 Night : 4-10	Dry period : 20-25 Wet periods : 55-95	500-1300	Covers Central Part of India
5	Cold and Cloudy	Day :20-30 Night : 17-27	Winter : 4-8 Night : -3 to 4	70-80	1000	Northern part of India experiences this type of climate. Most cold and cloudy regions are situated at high altitudes
6	Cold and Sunny	Day : 17-24 Night : 4-11	Day : -7 to 8 Night : -14 to 0	10-50	200	Leh (Ladakh)

Ecology and Biodiversity

The ecology and biodiversity aspects encompass the hotspots of various eco-sensitive zones notified by MoEFCC. India has 881 sensitive locations which include National Parks, Wildlife Sanctuaries, Core Biosphere Reserves, Ramsar sites pertaining to Wetlands, major estuaries in the coastal areas, Marine protected areas, potential important bird areas and tiger reserves, notified elephant reserves and critically polluted areas. The inventory of the aforesaid eco-sensitive zones in each state is given in Annexure I⁷⁴.

Andaman Nicobar, Maharashtra, Gujarat, Tamilnadu, Madhya Pradesh, Rajasthan, Himachal Pradesh, Uttar Pradesh, Karnataka, Kerala, Andhra Pradesh, Assam, Odisha are states with more than 30 sensitive zones as per the list given in Annexure I.

The entire coastal belt of India, up to 500 m from High Tide Line, and all locations where mangroves are present are also environmentally sensitive locations.

Land Use

The land is used for agriculture, for growing forests, for grazing animals, for mining, for installing industries and for construction of houses, roads, railways, etc. For sustainable

⁷⁴ Lists as compiled in Nov 2017.

development and prosperity of any country, the proper and wise use of the land is required. The land use depends on the kind of land, its depth, fertility, water retention capacity, available mineral contents, and means of transportation, etc. The use of land for agriculture depends on soil type, irrigation facilities, and climate.

In India, about 51.09% of the land is under cultivation, 21.81% under forest and 3.92% under pasture. Built up areas and uncultivated land occupy about 12.34% (Kundra, 1999). About 5.17% of the total land is uncultivated waste, which can be converted into agricultural land. The other types of land comprises up to 4.67%.

Demographic profile of India

The demographic profile of India is presented in **Table A:19** below.

Table A:19 Demographic Profile of India⁷⁵

Sl. No	Demographic Attribute	Total	Males (Percentage)	Female (Percentage)
1	Population	1210854977	623270258 (51.5)	587584719 (48.5)
2	Literates (7+ years)	763638812 (63)	434763622 (36)	328875190 (27)
3	Population Density (per sq.km)		382	
4	Population size (0-6 years)	164515253 (13.5)	85752254 (7)	78762999 (6.5)
5	Sex Ratio		943	
6	Sex Ratio (0-6 years)		918	

The demographic profile of India as per Census of India 2011 reflects that India has a population of 1,210,854,977 about out of which 51.5% are males while 48.5% are females. The Literate population (7+ years) is about 763,638,812 no's which is about 63% as compared to the total population of India in which 36% are males and the rest i.e., 27% are females. The population density is 382 per sq.km. The population size within the age bracket of 0-6 years is 164,515,253 no's which is about 13.5% out of which 7% are males while 6.5% are females as compared to the total population of India. The sex ratio is 943 while the sex ratio in the age bracket of 0-6 years is 918.

Cultural Heritage

India is rich in its history and culture. It has many listed / notified and unlisted archaeological properties along its length and breadth. India has more than 3400 Archaeological properties identified by Archaeological Survey of India. It reflects that the maximum number of archaeological monuments are in the State of Karnataka (506) followed by State (413), Uttar Pradesh (376), Maharashtra (285) and Delhi (174). Apart from these there are many properties and occasions which are considered as Heritage by local administration and communities.

⁷⁵ http://www.dataforall.org/dashboard/censusinfoindia_pca/

Several national level pilgrimages/ mass gatherings (for example Ajmer Sharif, Bodhgaya, Puri, Rameshwaram, Belur Math, Guruvayoor Temple, Somnath Temple, Rajgir, Shirdi, Vaishno Devi etc. and many others) and various local pilgrim destinations and circuits are also considered as part of local culture by various communities.

The sensitivities regarding cultural heritage in the form of number of notified archaeological monuments as per Archaeological Survey of India were collated and are presented in **Table A:20** below.

Table A:20 List of Archaeological Monuments

State	Archaeological monuments	State	Archaeological monuments
Andhra Pradesh	8	Madhya Pradesh	292
Arunachal Pradesh	5	Maharashtra	217
Assam	55	Manipur	1
Bihar	70	Meghalaya	8
Chhattisgarh	47	Mizoram	1
Dadar and Nagar Haveli	0	Nagaland	4
Daman and Diu	12	Odisha	78
Delhi	174	Pondicherry	7
Goa	21	Punjab	33
Gujarat	202	Rajasthan	163
Haryana	91	Sikkim	3
Himachal Pradesh	40	State	413
Jammu and Kashmir	69	Tripura	8
Jharkhand	12	Uttar Pradesh	742
Karnataka	506	Uttarakhand	44
Kerala	26	West Bengal	134

Natural Disasters

The data collected from National Disaster Management Authority website reveals that the states of Sikkim, Maharashtra and Gujarat are prone to Earthquakes, while the states of Odisha, Andhra Pradesh and State are vulnerable to the cyclonic events, while Jammu and Kashmir are prone to cloudburst and floods also. The State of Uttarakhand is susceptible to floods and Bihar is susceptible to flood events. The data of the notable natural disasters are presented in **Table A:21** below.

Table A:21 Major Natural Disasters which occurred in India ⁷⁶

Sl. No.	Name of Event	Year	State & Area	Fatalities
1	Cyclone Fani	2019	Odisha	
2	Floods and heavy rains	2018	Kerala	
3	Flood and Heavy Rains	July -15	Rajasthan	38 people died
4	Flood and heavy rains	June ,July - 15	Gujarat	71 people died in July 80 people died in June
5	Lightning	Oct -15	Maharashtra	32 people died
6	Flood and Heavy Rains	Nov15 to Dec-15	State	350 people died
7	Flood and Heavy Rains	June-15 to July -15	Sikkim	41 people died
8	Thunderstorm Earthquake	April -15	Bihar	65 people died 50 people died
9	Flood and heavy rains	Aug -15 to Sept -15	Assam	41 people died
10	Flood and heavy rains	July-15 to Aug-15	West Bengal	70 people died
11	Lightning	Apr-15 to Aug-15 May-15	Odisha	240 people died 36 people died
	Heat Wave			
12	Heat Wave	May-15 to June -15	Telangana	580 people died
13	Heat Wave	May-15 to June-15 Nov -15 to Dec-15	Andhra Pradesh	1400 people died 50 people died
14	Floods	Oct-14	Jammu & Kashmir	
15	Cyclone Hud Hud	Sep-14	Andhra Pradesh & Odisha	
16	Odisha Floods	Oct-13	Odisha	21
17	Andhra Floods	Oct-13	Andhra Pradesh	53
18	Cyclone Phailin	Oct-13	Odisha and Andhra Pradesh	23
17	Floods/Landslides	Jun-13	Uttarakhand and Himachal Pradesh	4,094

⁷⁶ <http://www.ndma.gov.in/en/disaster-data-statistics.html> and <http://www.imdpune.gov.in/Links/annual%20summary%202015.pdf>

Sl. No.	Name of Event	Year	State & Area	Fatalities
18	Cyclone Mahasen	May-13	State	8
	Cyclone Nilam	Oct-12	State	65
19	Uttarakhand Floods	Aug – Sep 2012	Uttarkashi, Rudraprayag and Bageshwar	52
20	Assam Floods	July – Aug 2012	Assam	---
21	Cyclone Thane	Dec-11	State, Puducherry	47
22	Sikkim Earthquake	Sep-11	Sikkim, West Bengal, Bihar	60
23	Odisha Floods	Sep-11	19 Districts of Odisha	45
24	Sikkim Earthquake	2011	North Eastern India with epicentre near Nepal Border and Sikkim	97 people died (75 in Sikkim)
25	Cloudburst	2010	Leh, Ladakh in J&K	257 people died
26	Drought	2009	252 Districts in 10 States	-----
27	Krishna floods	2009	Andhra Pradesh, Karnataka	300 people died
28	Kosi Floods	2008	North Bihar	527 deaths, 19,323 livestock perished, 2,23,000 houses damaged, 3.3 million persons affected
29	Cyclone Nisha	2008	State	204 deaths
30	Maharashtra Floods	Jul-05	Maharashtra State	1094 deaths 167 injured 54 missing
31	Kashmir	2005	Mostly Pakistan, Partially Kashmir	1400 deaths in Kashmir (86,000 deaths in total)
32	Tsunami	2004	Coastline of State, Kerala, Andhra Pradesh, Pondicherry and Andaman and Nicobar Islands of India	10,749 deaths 5,640 persons missing 2.79 million people affected 11,827 hectares of crops damaged 300,000 fisher folk lost their livelihood
33	Gujarat Earthquake	2001	Rapar, Bhuj, Bhachau, Anjar,	13,805 deaths

Sl. No.	Name of Event	Year	State & Area	Fatalities
			Ahmedabad and Surat in Gujarat State	6.3 million people affected
34	Orissa Super Cyclone	1999	Orissa	Over 10,000 deaths
35	Cyclone	1996	Andhra Pradesh	1,000 people died, 5,80,000 housed destroyed, Rs. 20.26 billion estimated damage
36 37	Latur Earthquake	1993	Latur, Marathwada region of Maharashtra	7,928 people died 30,000 injured
38	Cyclone	1990	Andhra Pradesh	967 people died, 435,000 acres of land affected
39	Drought	1987	15 States	300 million people affected
40	Cyclone	1977	Andhra Pradesh	10,000 deaths hundreds of thousands homeless 40,000 cattle deaths
41	Drought	1972	Large part of the country	200 million people affected

Annexure III: Details of Applicable Regulations

Table A:22 Key Regulations Applicable to ENCORE

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
Coastal Regulation Zone	Coastal Regulation Zone (CRZ) Notification, 2019	<p>This notification under Environment (Protection) Act, 1986 supplements the law on site clearance by declaring certain zones as CRZ and regulates activities in these zones. The CRZ Notification, 2011 clearly lists out the areas that fall within the categories of I, II, III and IV of CRZ and the permissible and non-permissible activities in each zone. The main objectives of the Coastal Regulation Zone Notification, 2016 are to ensure livelihood security to the fishing communities and other local communities living in the coastal areas; to conserve and protect coastal stretches and; to promote development in a sustainable manner based on scientific principles, taking into account the dangers of natural hazards in the coastal areas and sea level rise due to global warming.</p> <p>Projects attracting this notification shall obtain CRZ clearance for implementation from the authority as required.</p>	<p>Care to be taken while selecting the project interventions according to the norms of CRZ. Many of sub-projects are situated in CRZ areas and will require obtaining permission before start of construction. Some of the typical projects are but not limited to solid waste management, components of livelihood development, STP, fecal sludge management, hatchery and interpretation centers, conservation activities etc.</p> <p>The purpose of CRZ-2011 is to ensure livelihood of fisher communities and other communities living in the coastal areas and conservation and protection of coastal stretches and its unique environment and marine environment.</p> <p>Development activities or projects, regulated or permissible, falling in CRZ-I and CRZ-IV areas need clearance from the MoEFCC for clearance based on the recommendations from the concerned CZMZ.</p> <p>All the activities falling in CRZ-II and CRZ-III will seek clearance from the CZMA and however for the projects traversing through CRZ-I and CRZ-IV areas or both need clearance from the MoEFCC.</p> <p>Project or activities which require ESIA clearance along with CRZ clearance will be dealt as a composite environmental and CRZ clearance under ESIA notification, 2006.</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
Water Pollution	<p>No.36 of 1977, [7/12/1977] - The Water (Prevention and Control of Pollution) Cess Act, 1977, amended 1992</p> <p>No. 19 of 2003, [17/3/2003] - The Water (Prevention and Control of Pollution) Cess (Amendment) Act, 2003</p> <p>No.6 of 1974, [23/3/1974] - The Water (Prevention and Control of Pollution) Act, 1974, amended 1988</p>	<p>To provide for the prevention and control of water pollution, and for the maintaining or restoring of wholesomeness of water in the country. The Act was amended in 1988. The Water (Prevention and Control of Pollution) Cess Act was enacted in 1977, to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities.</p> <p>Under this law, it is mandatory to obtain consent for discharge of effluents and pay consent fees to State Pollution Control Boards for any municipal projects causing water pollution.</p>	<p>All construction activities involved to attain the project objective may create localized deterioration in water quality, if executed without proper diligence.</p> <p>This Act prohibits the discharge of pollutants into water bodies beyond a given standard and lays down penalties for noncompliance.</p> <p>Water act includes the maintenance or restoring the wholesomeness of the water</p> <p>Consent to Establish and Consent to Operate are required to be taken for such projects</p>
Air Pollution	<p>No.14 of 1981, [29/3/1981] - The Air (Prevention and Control of Pollution) Act 1981, amended 1987 and rules thereof</p>	<p>To provide for the prevention, control and abatement of air pollution in India.</p> <p>These laws address the prevention and control of air pollution. Under section 21 of this Act, it is mandatory to obtain consent from Pollution Control Board to establish or operate any industrial operation. Activities involving emission of pollutants like establishing batch mixing plants require consent from Pollution Control Boards.</p>	<p>Air act restricts the operation of any industrial plant in an air pollution control area without a valid consent. The Air Act is applicable to all civil works activities, activities which involves use of DG Sets and other machines contributing to air pollutions.</p> <p>The construction activities involved to attain the project objective may create localised deterioration in air and water quality, if executed without proper diligence.</p> <p>All construction contractors need to obtain the consent-to-establish and consent-to-operate for plants i.e. concrete batching, stone crushing and other plants that they may be required for the purpose of construction. The NOC certificates need to be obtained from the nearest regional offices of the SPCB. Wherein the existing plants are used, the contractor shall ensure that all applicable consents are obtained for operating the plant.</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			Ambient air quality standards should be followed as per the National Ambient Air Quality Standards, Central Pollution Control Board Notification – November 18, 2009.
Environmental Protection	No.29 of 1986, [23/5/1986] - The Environment (Protection) Act, 1986, amended 1991 and rules	<p>To provide for the protection and improvement of the environment. It empowers the Central Government to establish authorities [under section 3(3)] charged with the mandate of preventing environmental pollution in all its forms and to tackle specific environmental problems that are peculiar to different parts of the country, and improve the quality of the environment by setting standards for emissions and discharges; regulating the location of industries; management of hazardous wastes, and protection of public health and welfare. This encompasses all legislations providing for the protection of environment in the country. It includes the power to direct the closure, prohibition or regulation of any industry, operation or process by the government. The Act was last amended in 1991.</p> <p>Popularly known as EP Act, it is an umbrella legislation that supplements existing environmental regulations. This law essentially links pollution and natural resource issues. Salient features of the Act are the following: Section 6 empowers the Government of India to make rules to regulate environmental pollution by stipulating standards and maximum allowable limits to prevent air, water, noise, soil and other environmental pollutants Section 7 prohibits operations that emit pollutants in excess of standards</p>	<p>Some of the typical projects are but not limited to construction activities, sewage and trade effluents, solid waste management, effluent treatment plant and livelihood projects etc.</p> <p>The proposed project intervention involves construction activities that will have indirect or direct impact on the overall quality of the environment.</p> <p>Empowered by the EP Act, the Ministry of Environment, Forests and Climate Change (MoEFCC) Government of India has issued various notifications such as Hazardous Wastes (Management & Handling) Rules, 1989; Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989; Noise Pollution (Regulation and Control) Rules, 2000; Environmental Impact Assessment Notification, 2006 etc.</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
		Section 9 regulates handling of hazardous substances and identifies persons responsible for discharges and pollution prevention	
Environmental Impact Assessment	ESIA Notification, dt 2006 (S.O.1533(E), dt.14/09/2006)	The notification specifies that prior environmental clearance is required for the projects listed in the schedule of the notification before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity. The Schedule of the notification lists eight broad categories of projects that require prior environmental clearance. These projects are categorized in to Category 'A' and category 'B' based on the magnitude and environmental impacts of the project. Clearance is to be obtained from the Ministry of Environment, Forests and Climate Change for Category 'A' projects, and from the State Environment Impact Assessment Authority (SESIAA) for Category 'B' projects. Category 'B' projects will be further classified in to category 'B1' and category 'B2' based on their magnitude and environmental impacts. Category 'B2' projects do not require an ESIA study. The scope and ToR of the ESIA study for category 'A' and category 'B' projects will be decided by the MoEFCC and the SESIAA respectively. ICZMP projects falling under any of these categories will have to obtain environmental clearance from the authority as applicable.	<p>Prior permission for typical projects but no limited to Common hazardous waste treatment, storage and disposal facilities (TSDFs), Common Municipal Solid Waste Management Facility (CMSWMF)</p> <p>Environment (Protection) Rules, 1986 imposes restrictions and prohibitions on new projects or activities, or on the expansion or modernization of existing projects or activities based on their potential environmental impacts as indicated in the Schedule to the notification</p> <p>This project incorporates sub-projects in States and UTs which will require environmental clearance. Such projects which will need environmental clearance will fall under Category A or Category B depending on the nature and location of the project.</p> <p>Projects with activities related to 7(h) Common Effluent Treatment Plants (CETPs), 7(i) Common Municipal Solid Waste Management Facility (CMSWMF) and 8(a) Construction projects will be considered applicable for Environmental clearance category B.</p> <p>For Category B the State or Union territory Level Environment Impact Assessment Authority (SESIAA), to be constituted by the Central Government in consultation with the State Government or the Union territory Administration concerned under sub-section (3) of section 3 of the Environment (Protection) Act, 1986.</p> <p>However, as per the ESIA notification 2006, any project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of: (i) Protected Areas notified under the Wild Life (Protection) Act, 1972, (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time, (iii) Notified Eco-sensitive areas, (iv) inter-State boundaries and international boundaries.</p>
Public Liability Insurance	No.6 of 1991, [22/1/1991] - The Public Liability Insurance Act, 1991, amended 1992	To provide for damages to victims of an accident which occurs due to handling of any hazardous substance. The Act applies to all owners associated with the production or handling of any hazardous chemicals.	<p>All projects involving storage or handling of chemicals, including sewage treatment plants, research institutions.</p> <p>According to this notification, all the Major Accident Hazard (MAH) units handling chemicals in excess of the threshold quantities referred to in the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, are mandated to take an insurance</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			policy and deposit an equal amount in the Environment Relief Fund (ERF) to ensure immediate payment to the chemical accident victims.
Forest Conservation	Forest (Conservation) Act, 1980, amended 1988. The Indian Forest Act, 1927 State/Union Territory Minor Forest Produce (Ownership of Forest Dependent Community) Act, 2005 - Draft	The Forest Conservation Act 1980 was enacted to help conserve the country's forests. It strictly restricts and regulates the de-reservation of forests or use of forest land for non-forest purposes without the prior approval of Central Government. To this end the Act lays down the pre-requisites for the diversion of forest land for non-forest purposes. The Indian Forest Act, 1927 consolidates the law relating to forests, the transit of forest-produce and the duty leviable on timber and other forest-produce. Forest (Conservation) Act, 1980 was enacted to halt rapid deforestation and governments cannot de-reserve forest land or direct that it be used for non-forest purposes. Projects with activities falling in reserved forest areas need a clearance from MoEFCC.	To be ascertained for each sub-project during screening/ preparation process. By and large project interventions will not be located in notified or protected forest area/s and therefore will not require diversion of forest land. Such areas will be avoided as far as possible during the selection of sites and through screening exercise. This Act restricts the powers of the state in respect of de-reservation of forests and use of forestland for non-forest purposes. All diversions of forestlands to any non- forest purpose, even if the area is privately owned, require approval of the central government Leases of forest land to any organization or individual require approval of the central government. Proposals for diversion of forest land for construction of dwelling houses are not to be entertained
Biological Diversity	No. 18 of 2003, [5/2/2003] - The Biological Diversity Act, 2002 and related	To realize the objectives enshrined in the United Nations Convention on Biological Diversity (CBD) 1992 which recognizes the sovereign rights of states to use their own Biological Resources. The Act aims at the conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner and through a just process for purposes of implementing the objects of the Act it establishes the National Biodiversity Authority in Chennai.	To be ascertained for each sub-project during screening/ preparation process. Some sites/activities may be located close to ecologically sensitive areas that are beyond the protected domain. The Biological Diversity Act, which came into force in February 2003, aims to promote conservation, sustainable use and equitable sharing of benefits of India's biodiversity resources. It provides for establishment of a National Biodiversity Authority at national level, State Biodiversity Boards at state level and Biodiversity Management Committees at the level of Panchayats and Municipalities
Wetland Protection	Wetland (Conservation and Management) Rules 2010	Protection and management of wetlands. The rules lists list of wetlands that needs to be protected like those covered under Ramsar Convention, those in UNESCO heritage site,	The typical project activities related to this are; mangrove restoration, marine and coastal fauna such as marine turtle conservation and rejuvenation o(de-siltation) of creeks and others. The rules will be applicable to the project activities located in:

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
		<p>those which are ecologically sensitive etc., and prohibits the following activities within such wetlands:</p> <p>Reclamation of wetlands</p> <p>Setting up of new industries and expansion of existing industries</p> <p>Manufacture, storage, handling or disposal of hazardous substances</p> <p>Solid waste dumping</p> <p>Discharge of untreated effluents</p> <p>Any permanent construction except boat jetties</p> <p>Any other activity affecting ecosystem of the wetland</p>	<p>(i)any of the wetlands with international importance identified as Ramsar site under Ramsar Convention on Wetlands (3.1)</p> <p>(ii)wetlands notified by the concerned State Governments which are located in their jurisdiction (3.2)</p> <p>(iii)wetlands notified by the Central Government based on recommendation of the Union territory Administrations for wetlands located in their jurisdiction (3.3)</p> <p>Projects in the wetlands in coastal areas shall be regulated as per the provisions of the Coastal Regulation Zone Notification, 2011 (2019) and the respective management plans.</p> <p>These projects shall comply with the (i) the principle of ‘wise use’ for maintaining the ecological integrity, (ii) and as per the comprehensive list of activities developed by the Wetland Authority of a State/Union Territory and the integrated management plan prepared for each of the notified wetlands. (4. h & i).</p>
Heritage Preservation	Ancient Monuments and Archaeological Sites and Remains Act 1958 updated as per Ancient Monuments and Archeological Sites and Remains (Amendments and Validation) Act, 2010	Excavation of and protection of ancient monuments. Permit for activity near ancient/protected monuments, chance findings	<p>While project activities are not envisaged in such areas, considering the possibility of chance finding of objects of historical importance (given the state’s and project areas cultural setting) during implementation of sub-projects, this is being triggered.</p> <p>The Ancient Monuments and Archaeological sites should be protected from any developmental activity.</p> <p>The area within the radius of 100 m and 300m from the Protected Property are designated as Protected area and Controlled Area respectively.</p> <p>No development activity (including building, mining, excavating, blasting etc.,) is permitted in the Protected Area and developmental activities likely to damage the protected property are not permitted in the Controlled Area without prior permission of the Archaeological Survey of India. Relevant.</p> <p>Activities in the protected area shall not be undertaken. If activities are to be done in the controlled area of protected properties, then the implementing agency/line department need to take the necessary clearance from ASI.</p>
Disaster Related	Disaster Management Act, 2005	Codes for construction under in disaster prone areas Disaster prone areas codes of construction, disaster relief codes, relief and rehabilitation	Some of the typical activities concerning disaster management act are soft measures taken up for coastal protection, mangrove restoration, bio-shield plantation and multi-purpose cyclone shelter.

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			<p>Measures that must be taken for the prevention of disasters, or the mitigation of their effects</p> <p>Depending on the nature and location, it is required that project activities will comply to the National/State or departmental disaster management plan⁷⁷. Particularly, the State authority can review any standard laid for construction and take up necessary actions if it is considered to be inadequate.</p>
Wildlife Protection	<p>The Wildlife (Protection) Act, 1972, as amended in 1993.</p> <p>The Wild Life (Protection) Amendment Act, 2006 (No. 39 of 2006)</p> <p>The Wild Life (Protection) Amendment Act, 2002 (No. 16 of 2003, [17/01/2003])</p>	<p>With the objective of effectively protecting the wild life of this country and to control poaching, smuggling and illegal trade in wildlife and its derivatives. This Act seeks to protect wildlife, by creating protected areas and controlling trade in wildlife products. The Act was amended in January 2003 and punishment and penalty for offences under the Act have been made more stringent. The Ministry has proposed further amendments in the law by introducing more rigid measures to strengthen the Act. The objective is to provide protection to the listed endangered flora and fauna and ecologically important protected areas. Project activities that cross over into protected area regimes then requisite permission must be obtained.</p>	<p>Project interventions will not be located in designated or notified protected areas, such as Wildlife Sanctuaries and National Parks. Such areas shall be avoided during the selection of sites and through screening exercise.</p> <p>This Act provides for protection to listed species of Flora and Fauna in the declared network of ecologically important protected areas such as wild life sanctuaries and national parks. The wildlife protection act has allowed the government to establish a number of national Parks and Sanctuaries, over the past 25 years, to protect and conserve the flora and fauna of the state</p> <p>Utmost care has been taken while selecting the project location that none of the project is located in Wildlife protected area or National Parks.</p>
Green Tribunal	National Green Tribunal Act, 2010 (No. 19 of 2010)	<p>For effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources</p> <p>This act provides for establishment of National Green Tribunal for effective and expeditious disposal of cases relating to environmental</p>	<p>This Act applies to all the project activities which may have a substantial question related to environment.</p> <p>Effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources.</p> <p>This Act applies to all the project activities which may have a substantial question related to environment. According to this Act, applications can be made by:</p>

⁷⁷ Karnataka: <http://www.dm.karnataka.gov.in/page.php?id=148>

Kerala: <http://sdma.kerala.gov.in/wp-content/uploads/2018/11/Kerala%20State%20Disaster%20Management%20Plan%202016.pdf>

Tamil Nadu: <https://tnsdma.tn.gov.in/app/webroot/img/document/tnsdma-2016.pdf>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
		<p>protection and conservation of forests and other natural resources including enforcement of any legal right to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental. The National Green Tribunal established under this act is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues. The Tribunal shall not be bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by principles of natural justice.</p>	<p>i. the person who has sustained injury ii. the owner or the property to which the damage has been caused iii. where death has resulted from the environmental damage by all or any of the legal representatives of the deceased. iv. any agency duly authorized by such person or owner of such property or all or any of the legal representatives v. any person aggrieved, including any presentative body or organization vi. the Central or State Government or a Union Territory Administration or the Central Pollution control Board or a State Pollution Control Board or Committee or a local authority, or any environmental authority constituted or established under the Environment Protection Act 1986 or any other law.(18.2)</p> <p>The Tribunal, by an order will provide: i. relief and compensation to the victims of pollution and other environmental damage (15.a) ii. for restitution of property damage (15.b) iii. for restitution of environment for such areas The relief and compensation shall be in addition to the relief paid under the Public Liability Insurance Act 1991(15.c) Heads under which compensation or damage can be claimed are: Death Permanent, temporary, total or partial disability or other injury or sickness Loss of wages due to total or partial disability or permanent or temporary disability Medical expenses incurred for treatment of injuries or sickness Damages to private properties Expenses incurred by the Government or any local authority in providing relief, aid and rehabilitation to the affected persons Expenses incurred by the Government for any administrative or legal action or to cope with any harm or damage including compensation for environmental degradation and restoration of the quality of environment Loss to the Government or local authority arising out of, or connected with, the activity causing any damage Claims on account of any harm, degradation or destruction to fauna including milch and draught animals and aquatic fauna Claims on account of any harm, degradation or destruction to flora including aquatic flora, crops, vegetables, trees, and orchards</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			<p>Claims including cost of restoration on account of any harm or damage to environment including pollution of soil, air, water, land and eco-systems Loss and destruction of any property other than private property; Loss of business or employment or both Any other claim arising out of, or connected with, any activity of handling of hazardous substance. (Schedule II)</p> <p>The Tribunal can distribute the compensation under separate heads as specified to so as to compensate the claimant and restitute the damaged property or environment.</p>
Noise Pollution	The Noise Pollution (Regulation and Control) Rules, 2000	<p>To regulate and control of noise producing and generating sources (industrial activity, construction activity, generator sets, loud speakers and Public-address system, horns, mechanical devices) with the objective of maintaining ambient air quality standards in respect of noise.</p> <p>Noise pollution have effects on human health and the psychological well being of the people; it is considered necessary to regulate and control noise producing and venerating sources with the objective of maintaining the ambient air quality standards in respect of noise.</p> <p>The ambient air quality standards in respect of noise for different areas/zones namely industrial, commercial, residential or silence areas/zones are specified in the Schedule of these rules. An area comprising not less than 100 metres around hospitals, educational institutions and courts may be declared as silence area/zone as per these rules. The noise levels in any area/zone shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule.</p>	<p>The typical project activities where the Noise Pollution Rules may have implications are mainly sources such as construction activities, generator set, vehicular horn and other mechanical devices related to physical infrastructure (STP, SWM or soft engineering intervention for coastal protection and other) or development of infrastructure for social/livelihood activities (construction of work shelters, fish auction halls and others).</p> <p>All construction projects, events and associated activities which will generate high noise levels. Use of generator set, vibrating equipment's, activities like drilling, etc will generate high noise levels. Project contractors shall adopt appropriate noise muffling devices, Personnel Protection equipment's for workers working under high noise levels, create buffers with hard materials. Some projects create noise pollution during operation stage as well. Green belts and buffers shall be planned. Activities shall be phased out to exclude high noise generating activities during night time.</p> <p>All development authorities, local bodies and other concerned authorities while planning developmental activity or carrying out functions relating to town and country plan will take into consideration the aspects of noise pollution.(3.4)</p> <p>While selecting project locations, it may be taken into consideration that an area comprising not less than 100 meters around hospitals, educational institutions and courts may be declared as silence area/zone.</p> <p>The ambient air quality standards in respect to noise will be as per the category of areas/zone which will be categorized by the State Government.</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>			
			Area Code	Category of area/zone	Limit in dB(A)	
					Day time	Night time
			A	Industrial area	75	70
			B	Commercial area	65	55
			C	Residential Area	55	45
			D	Silence Zone	50	40
			<p>* Silent zone is an area comprising not less than 100 mts around educational institutions, courts, religious places or any other area which is declared by the competent authority</p> <p>All construction projects, events and associated activities which will generate high noise levels. Use of generator set, vibrating equipment's, activities like drilling, etc will generate high noise levels.</p> <p>Project contractors shall adopt appropriate noise muffling devices, Personnel Protection equipment's for workers working under high noise levels, create buffers with hard materials.</p> <p>Some projects create noise pollution during operation stage as well. Green belts and buffers shall be planned. Activities shall be phased out to exclude high noise generating activities during night time.</p>			
Siting Industries	The Environment (Siting for Industrial Projects) Rules, 1999	Detailed provisions relating to areas to be avoided for siting of industries, precautionary measures to be taken for site selecting as also the aspects of environmental protection which should have been incorporated during the implementation of the industrial development projects	This may be applicable in case of any subproject wherein an industry is proposed to be established; as in the case of a Solid Waste Management Facility, Construction and Demolition Waste Facility or a Plastic Waste Management Facility			
Handling of Batteries	The Batteries (Management & Handling) Rules, 2001	Shall apply to every manufacturer, importer, re-conditioner, assembler, dealer, auctioneer, consumer, and bulk consumer involved in the manufacture, processing, sale, purchase, and use of batteries or components so as to regulate and ensure the environmentally safe disposal of used batteries.	<p>These rules applies to every project involved in manufacture, import, re-condition, assemble, dealing, recycling auction, consumer and bulk consumer involved in manufacture, processing, sale, purchase and use of batteries or components.</p> <p>There are large number of illegal units run in deplorable conditions and creating threat to public health and environment.</p> <p>Dealer in collaboration with the local authority should ensure the mechanism for collection and transportation of used batteries</p>			

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			<p>Any dealer needs to obtain registration from Ministry of Environment and Forests to legally reprocess batteries</p> <p>CPCB will review the compliance of the rules periodically to improve the collection and recycling of used Lead batteries</p> <p>Local authority or Project Executing Agency is responsible to regulate and ensure the safe disposal of used batteries and implementation of other provisions of the Rules and take necessary clearance.</p>
Hazardous Wastes	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	<p>To control the generation, collection, treatment, import, storage, and handling of hazardous waste. The Rules distinguish between hazardous and other wastes. The import of solid plastic waste, including PET bottles, is banned along with waste electrical and electronic assemblies scrap, and other chemical wastes, especially those in solvent form.</p> <p>This law addresses handling of hazardous substances that fall under specified schedules and necessitates authorization for such facilities from State Pollution Control Board. Projects attracting this rule will have to follow the guidelines for handling and disposal of hazardous wastes.</p>	<p>Typical project activities related to any projects dealing with hazardous materials (chemical, biological, reactive, toxic, flammable, explosive or corrosive specified in Schedules), import and export of hazardous waste.</p> <p>These rules may be applicable to any intervention dealing with hazardous materials having characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment.</p> <ul style="list-style-type: none"> • Management of hazardous and other wastes involve prevention, minimization, reuse, recycling, recovery and its utilization including co-processing and safe disposal. • waste generated should be sent or sold to an authorized user for disposal • Transportation to authorized disposal facility in accordance to these rules • Steps to contain contaminants and prevent accidents and safety gears to all handling waste • For import and export of waste prescribed in Schedule III (Part A and Part B) need prior permission from Ministry of Environment, Forest and Climate Change.
	Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (MSIHC Rules, 1989)	<p>These rules aim at providing control for the generation, storage and Import of hazardous chemicals. According to these rules, the user of hazardous chemicals has to follow procedures as stipulated in the rules to prevent and control hazards from such chemicals and to ensure safety and permission has to be obtained from the authority concerned for such activity.</p>	<p>Typical project interventions related to any projects / industrial activity dealing with hazardous chemical materials as mentioned in the rules, its isolated storage, upgradation of industrial unit, site or in the pipeline, import and export of hazardous chemical.</p> <p>These rules may be applicable to all activities dealing with hazardous chemical materials or prevent such major accidents and to limit their consequences by creating</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
		The list of chemicals and threshold limits of handling falling under the purview of these rules is provided in the schedule to the rules. Chlorine used for disinfection of water is categorised as hazardous chemical as according these rules and usage of these chemicals above 10 tons per year attracts the provisions of these rules.	<p>awareness with information technology and equipment's including antidotes to persons and the environment.</p> <p>a) Notification of major accident within 48 hr and steps taken to avoid any such occurrences in the future.</p> <p>b) Increase or decrease in the maximum threshold quantity of a hazardous chemical is liable for upgradation at the site or in the pipeline</p> <p>c) Both new and existing industrial activities shall prepare a safety report and carryout independent safety audit of respective industrial activities</p> <p>d) Prepare and keep up-to-date on-site emergency plan and off-site emergency plan</p> <p>e) Every container of hazardous chemical is clearly marked and labelled</p> <p>f) Hazardous chemical is imported by providing all the necessary information prescribed in Schedule V</p>
Solid Wastes	Solid Waste Management Rules, 2016	Apply to every local bodies/ authority responsible for the collection, segregation, storage, transportation, processing, and disposal of municipal solid wastes. These rules lay emphasis on source segregation and use of 4R's to minimize waste going to landfill site. It lays stress on composting of the organic, bio-degradable waste. Further, these rules lay guidelines to be followed by the urban local bodies / gram panchayat or the operator for disposal of residual waste in scientific manner. These rules authorize urban local bodies / gram panchayat to levy user charges to the waste generators. It also authorizes to levy Spot fine for littering and non-segregation of the waste.	<p>Typical projects activities related to waste generated in 3 categories bio-degradable, non-biodegradable and domestic hazardous waste, composting, waste to energy, waste to wealth, sanitary landfill or reclamation of dumping ground.</p> <p>Solid waste generation is increasing day by day and in absence of proper mechanism of disposal it is being dumped everywhere causing nuisance and threat to health and environment</p> <p>Waste Generators shall segregate waste & store separately and hand over to authorized waste collector</p> <p>Local Authority/Panchayats/PEA shall prepare SWM plan with timeline & its implementation, segregate, adopt 4-Rs, material recovery, processing/ disposal of waste, levy user fee & spot fine.</p> <p>District Collector/Magistrate shall facilitate identification and allocation of landfill site, quarterly review the performance of local bodies</p>
Plastic Waste	Plastic Waste Management Rules 2016	Regulatory frame work for management of plastic waste generated in the country; and to implement these rules more effectively and to give thrust on plastic waste minimization, source segregation, recycling, involving waste pickers, recyclers and waste processors in collection of plastic waste fraction either from households or	These rules are applicable to every plastic waste generator or units or industries involved in manufacture, import and production of plastic and these rules are exempted for the export-oriented units or units in special economic zones notified by the Central Government.

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
		<p>any other source of its generation or intermediate material recovery facility and adopt polluter's pay principle for the sustainability of the waste management system</p> <p>These rules provide guidelines for manufacturer of plastic bags with respect to thickness (40microns), labelling of plastic bags and prohibits availability to consumers free of cost. Further, these rules lay the responsibility of disposal of these wastes in scientific manner with the municipalities/ urban local body.</p>	<p>Most of plastic is recyclable, the recycling sector is largely unorganised and incapable of handling the volume. Toxic chemicals leach out of plastic and seep into ground water, lakes and rivers without proper management.</p> <p>All the producers, retailers, recyclers and manufacturers shall obtain registration from State Pollution Control Board</p> <p>Local authority / Gram Panchayats either on its own or by engaging an agency shall set up, operationalize and co-ordinate for waste management for ensuring segregation, collection, storage, transportation of plastic waste and channelization of recyclable plastic waste to recyclers having valid registration form SPCB.</p>
E-Waste	E-waste (Management) Rules, 2016	<p>The rules prescribe procedures for manufacture, collection, dismantling, recycling, disposal of electronic wastes and requires authorisation of the State Pollution Control Board for the same.</p> <p>Shall apply to every manufacturer producer, consumer, bulk consumer, collection centers, dealers, e-retailer, refurbisher, dismantler and recycler involved in manufacture, sale, transfer, purchase, collection, storage and processing of e-waste or electrical and electronic equipment listed in Schedule I, including their components, consumables, parts and spares which make the product operational but shall not apply to -</p> <p>(a) used lead acid batteries as covered under the Batteries (Management and Handling) Rules, 2001 made under the Act; (b) micro enterprises as defined in the Micro, Small and Medium Enterprises Development Act, 2006 (27 of 2006); and (c) radio-active wastes as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and rules made there under.</p>	<p>Any activity involved in production, manufacture, sale and purchase of electrical equipment as listed in Schedule I of Rules and in the process of collection, storage dismantling and recycling and disposal of e-waste.</p> <p>In the process of breakdown of hazardous material of e-waste by the informal sector their working condition and risk to health and environment polluting ground water and soil.</p> <p>SPCB will provide authorization to manufacturer for the collection, recycling and disposal. Dismantler should obtain authorization from the concerned SPCB for dismantling of e-waste (segregation and recovery) and non-recyclable or non-recoverable components will be sent to authorized treatment storage and disposal facilities</p> <p>These rules are applicable to every manufacturer, producer, consumer, bulk consumer, collection centers, dealers, e-retailer, dismantler and recycler involved in manufacture, sale, transfer, purchase, collection, storage and processing of e-waste or electrical and electronic equipment. And may store the e-waste for a period of 6months and shall maintain record of collection, sale, transfer and storage of wastes. The processes involved shall not have any adverse effect on health and environment</p>

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Construction and Demolition waste	Construction and Demolition Waste Management Rules, 2016	Emphasizes the roles and accountability of waste generators and various stakeholders, give thrust to segregation (four categories– concrete, soil, steel and wood, plastics, bricks and mortar), recovery, reuse, recycle at source, address in detail the management of construction and demolition waste.	<p>These rules are applicable in all the project interventions where there is need for the construction, demolition or remodeling of the building structure. However, some of typical projects where these rules need to consider are various kinds of STP, fecal sludge management, components of solid waste management, marine aquarium cum interpretation centre, riverbank protection, some projects under livelihood where construction is required etc.</p> <p>This will ensure that the waste generated during the process will be segregated, recycled and reused and remaining waste is disposed scientifically. And these rule encourage to recycle and reuse of the material in new construction activities.</p> <p>Waste generators are responsible for the storage and transportation and disposal of C&D waste to the authorized processing facilities and payment of relevant charges notified by concerned authority. Large generators have to prepare environmental management plan and waste management plan and get approved from local authority before initiating any project. State Government land concerned department will provide suitable sites for setting up of the storage, processing and recycling facilities and Town and Country planning Department will incorporate the site in the approved land use Plan for sustainable development of processing facility and Procurement of materials made from C&D waste to be made mandatory to a certain percentage in municipal and Government contracts subject to strict quality control</p>
Thermoset Plastic waste	Guidelines for Disposal of Thermoset Plastic including Sheet molding compound (SMC)/Fiber Reinforced Plastic (FRP)	Applies to disposal of thermoset plastics as in Electrical & electronics: housing, fuses, switchgear, etc. and Power utilities like MCB boxes. Thermoset plastic can't be remoulded or recycled due to its composite chemical structure. Further these rules provide guidelines for the disposal of SMC/FRP in the cement kilns through proper monitoring of the air quality.	<p>It is applicable to industrial development of automobiles, electronic and electrical, mass transport, power utilities, domestic and sanitary appliances. As this project doesn't have any such development but will be applicable to waste generated from these activities at household or community level along with components of solid waste management like reclamation of dumping ground etc.</p> <p>Thermoset plastic can't be remoulded or recycled due to its composite chemical structure and discarded waste gets accumulated and landfilled.</p> <p>Local authority / Gram Panchayat / PEA will set up, operationalize waste management system.</p> <p>Major producers of thermoset plastic like automotive industry, electricity authority etc devise a mechanism for the collection and transportation of waste to cement kilns as alternate fuel. They should also develop regular air quality monitoring of these kilns.</p>

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Electric Safety	Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Amendment Regulations, 2016	Safety requirements for Operations, Construction and maintenance of electric plants and electricity lines	<p>Central electricity authority (technical standards for construction of electrical plants and electrical lines) is applicable to all the thermal generating stations and electrical lines for transmission.</p> <p>Project interventions will not be planned in the proximity of the thermal generating stations and electrical lines. Such areas shall be avoided during the selection of sites and through screening exercise.</p> <p>Compliance with all applicable environmental quality standards (air quality, gaseous emissions, liquid effluent discharge, solid waste disposal etc.) as per the CPCB / SPCB</p> <p>Not applicable as such project's interventions are not planned for thermal stations and electrical transmission lines or in vicinity of the same.</p>
Electric Safety	Electricity Act 2003, relevant para-electricity Laws, section 67, 68 & 69.	Para 67 & 68 give provision for granting license to licensee to break-up any utility area like roads, railway line, sewage lines, drain or tunnel to lay the transmission lines in his area of supply. This is required to install poles and lattice structures and laying of transmission lines. The Act says that '...the consent in writing of the appropriate government, local authority, owner or occupier as the case shall be required for carrying out the work.' This applies to agricultural land as well.	<p>This act has provision for an authorized licensee to shift public utilities such as railway lines, sewage lines, drains etc. after obtaining written approval for laying transmission lines</p> <p>Applicable if electric lines are to be laid for any project such as energy generation and supply (alternate energy), laying of lines is necessary for supply to a subproject facility</p> <p>The licensee shall obtain written consent required to carry out work. The appropriate government / PEA may specify nature and period of notice given by licensee to carry out work; procedure for consideration of suggestion and objections received; payment of compensation to the affected; right of owner/occupier to carry out certain works; procedure for alteration of position of pipelines, electric lines etc.; avoidance of public nuisance, environmental damage and unnecessary damage to the public and private property by such works and manner of restoration and maintenance thereof; procedure for deposition of compensation payable etc.</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
Worker Health and Safety at work place	Building and Other Construction Workers Act	All the establishments involved in the construction activities involving 10 or more workers on any day of the preceding twelve months. This act lays basis for the welfare of the construction worker on the site with basic provision like fixed working hours, availability of potable drinking water, latrine, creche etc. as well as by providing temporary habitable accommodation	<p>It applies to an authority, contractor or the employer employing more than ten workers at a time undertaking building or other construction work – construction, alteration, repair, streets, roads, flood protection work.</p> <p>This Act ensures workers welfare for safety and other basic provisions such as fixed working hours and a rest day, temporary habitable accommodation, creche, first aid, latrines and drinking water provisions in any establishment. State Welfare Board will ensure pension and immediate assistance in case of accident.</p> <p>Every establishment has to register within 60days from the commencement of work to the registration office. Every building worker registered (worker completed eighteen years of age, but has not completed sixty years of age, and is engaged in any building or other construction work for not less than ninety days during the preceding twelve months) as a beneficiary under this Act is entitled to the benefits provided by the Board from its Fund under this Act.</p> <p>Contractor will notify authority of accident (death, body injury preventing from work) within forty-eight hours.</p> <p>Registered building worker will contribute to the fund at rates specified by the state government until he attains the age of sixty years.</p> <p>Contractor will make provision at convenient location for safe drinking water; latrine and urinals; free of charge temporary habitable accommodation with lavatory facilities, habitable room for children below the age of six where more than fifty female workers are employed; first aid facilities; canteen where more than two hundred and fifty workers are employed.</p> <p>Safety Committee will be establishment where more than five hundred workers are employed.</p>
	February 2009, the National Policy on Safety, Health and Environment at Work Place	Declared by the Ministry of Labor and Employment, Government of India in February 2009 after consultations with partners. The Action Program to implement the Policy is part of the document. Sets out a set of goals with the view to building and maintaining a national preventative safety and health culture and improving the safety, health and environment at	<p>This Policy is applicable to every employer or employee in any establishments engaged in any industry including construction to regulate all economic activities for management of safety and health risks at workplaces</p> <p>This Policy will ensure the welfare and to provide measures so as to ensure safe and healthy working conditions for every working man and woman by reducing incidences of injuries, fatalities and diseases</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
		workplace. The Policy also expresses a set of the national objectives.	Government will provide statutory framework on Occupational Safety and Health to employer for designing suitable control system for compliance, enforcement and incentives for better compliance
Building Materials	Fly Ash Notification, 1999	This notification necessitates use of flyash for various construction activities like brick manufacturing, road projects etc within 100km radius of thermal power stations.	<p>This Notification is applicable to the fly ash producing thermal power plants. However, the projects don't have proposed any activities involved in generation of fly ash. But it is applicable to the construction activities such as bricks, paver blocks road construction etc. within 100km radius of thermal power plant.</p> <p>Fly ash is used for paving roads, in embankment and mine fills, making fly ash bricks etc. It can also be used as a replacement material of cement and fine aggregate in green paver blocks and tiles as a means of sustainable construction.</p> <p>Local authority need to specify in their tender documents, building byelaws and regulations for the use of fly-ash and fly-ash based products.</p> <p>Central Electricity Authority and other approving agencies will provide land for fly ash storage up to 50 hectares for 500 MW unit (based on 45% ash content)</p> <p>Thermal power plants (lignite and coal) is free to sell fly-ash to users/agencies i) pond ash should be available free of charge to fly-ash product manufacturing units, farmers, Public works department, road construction agencies etc. ii) at least 20% of dry ESP fly-ash shall be made available free of charge to fly-ash brick, block tiles manufacturers.</p> <p>Construction agencies engaged in construction within 100 km radius of thermal power plant will fly ash based products for construction and for reclamation of low lying soil borrow areas only fly ash will be used for compaction.</p>
Manual Scavengers	Prohibition of Employment as Manual Scavengers 'and their Rehabilitation Bill 2012	This act prohibits construction of insanitary latrines and employment or engaging of manual scavenger for the purpose of manual scavenging. No person, local authority or any agency shall, from such date as notified by the State Government (which shall not be later than one year from the date of commencement of this Act), engage or employ, either directly or indirectly, any person for hazardous cleaning of a sewer or a septic tank.	<p>Care to be taken to ensure that no individual will be employed for manual scavenging activities.</p> <p>Prevention of manual scavenger working in inhumane and hazardous conditions without personal protective equipment's. It also has the provision for every individual involved in manual scavenging for rehabilitation and providing alternate source of livelihood to sustainable and healthy living.</p> <p>Local authority shall carry out survey of insanitary latrines and give notice to the occupier for upgradation into sanitary latrine. If occupier fails to demolish or convert</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			<p>into sanitary latrine local authority shall convert or demolish such latrines and recover the cost incurred from the occupier.</p> <p>District magistrate of the concerned district shall be responsible for rehabilitation of each manual scavenger</p> <p>Any person in the final list of survey shall be rehabilitated by providing photo identity card, one time cash assistance; scholarship for the children; residential plot and financial assistance for construction or ready built house; livelihood skill training depending on eligibility and willingness with stipend for the training period; or subsidy or concessional loan for taking alternative livelihood on sustainable basis to at least one adult.</p> <p>Any contract or agreement for engaging or employing a person for the purpose of manual scavenging should be terminated and compensation will be payable. Any person engaged as full-time basis as manual scavenger shall be retained subject to his willingness shall be assigned work other than manual scavenging.</p> <p>Local authority, railway authority and cantonment board shall be responsible for construction and maintenance of sanitary community latrines.</p>
Climate Change	National Action Plan on Climate Change	India is faced with the challenge of sustaining its rapid economic growth while dealing with the global threat of climate change. India, in 2008, has set up National Action plan on climate change (NAPCC) which outlined policies aimed at sustainable growth and dealing with climate change concerns effectively. NAPCC outlines eight national missions to address various adaptation and mitigation measures pertaining to Solar Energy, Enhanced Energy Efficiency, Sustainable Habitat, Water, Sustaining Himalayan Ecosystem, Green India, Sustaining Agriculture, Strategic Knowledge on Climate Change.	<p>The National Action Plan on Climate Change is organized through intersectoral groups including various related ministries, Planning Commission, experts from industry, academia and civil society to overcome, adapt and mitigate the effects of climate change for sustainable development. The typical interventions where it is applicable is indicative but not limited to solar lighting, agriculture, rainwater harvesting, restoration of bio shields and mangroves, disaster preparedness etc.</p> <p>The plan document elaborates an approach to reduce the stress of climate change and uses the poverty-growth linkage. Emphasizing the overriding priority of maintaining high economic growth rates to raise living standards, the plan identifies measures that promote development objectives while also yielding co-benefits for addressing climate change effectively.</p> <p>The Prime Minister's Council on Climate Change is in charge of the overall implementation of the plan.</p> <p>Inclusive and sustainable development strategy to protect the poor</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			<p>Qualitative change in the method through which the national growth objectives will be achieved i.e. by enhancing ecological sustainability leading to further mitigation</p> <p>Cost effective strategies for end use demand side management</p> <p>Deployment of appropriate technologies for extensive and accelerated adaptation, and mitigation of greenhouse gases</p> <p>Innovative market, regulatory and voluntary mechanisms to promote Sustainable Development</p> <p>Implementation through linkages with civil society, local governments and public-private partnerships</p> <p>International cooperation, transfer of technology and funding</p>
Energy conservation	Energy Conservation Act, 2001	Aims to reduce specific energy consumption in different sectors and sets up a specialized Bureau of Energy Efficiency to institutionalize energy efficiency measures, monitoring, and measurement at plant and macro-levels.	<p>This Act is applicable to energy consumption in various sectors to minimize the energy consumption and increase the energy efficiency through design and utilization of applicable / energy efficient appliances.</p> <p>Provide a policy framework and direction to provide for efficient use of energy and its conservation</p> <p>Central Government may specify the norms for processes and energy consumption standards for any equipment, appliances; prohibit manufacture or sale or purchase or import of equipment or appliance; direct any designated consumer to furnish information of energy consumed and actions taken to the recommendations of accredited energy auditor to the designated agency.</p> <p>Bureau will implement pilot projects and demonstration projects for promotion, promote innovative financing and provide financial assistance to the institutions for promoting efficient use of energy and its conservation.</p> <p>State government may amend the energy conservation building codes to suit the regional and local climate and notify the energy conservation building code; direct every owner or occupier of a building or building complex to comply with the energy conservation codes; designated agency shall appoint inspecting officers to ensure compliance with energy consumption after the expiry of five years from the date of commencement of this Act.</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
	Energy Conservation Building Code (ECBC)	The Energy Conservation Act 2001 that was passed by the Indian Parliament, empowered the Central Government to prescribe an Energy Conservation Building Code (ECBC). ECBC was launched in 2007 on a voluntary basis by the Bureau of Energy Efficiency (BEE). ECBC sets minimum energy efficiency standards for design and construction encouraging energy efficient design or retrofit of buildings without constraining the building function, comfort, health, or the productivity of the occupants and appropriate regard for economic considerations. Mandatory Scope Covers commercial buildings with a connected Load in excess of 500kW or when Contract Demand in excess of 600 kVA. ECBC is recommended for all buildings with conditioned area >1000m ² and applies to new constructions.	<p>The Code is applicable to buildings or building complexes that have a connected load of more than 100 kW or contract demand of 120 kVA or greater and are used for commercial purposes. Not applicable to buildings under the private residential purpose.</p> <p>The purpose of the Energy Conservation Building Code (Code) is to provide minimum requirements for the energy-efficient design and construction of buildings. The Code also provides two additional sets of incremental requirements for buildings to achieve enhanced levels of energy efficiency.</p> <p>To comply with the Code, buildings shall demonstrate compliance with ECBC requirements</p> <p>(a) have an Energy Performance Index Ratio (EPI Ratio) less than or equal to 1,</p> <p>(b) meet all mandatory requirements for (i) Building envelope, (ii) Thermal comfort systems and controls, including heating, ventilating, and air conditioning, service hot water heating, (iii) Lighting systems and controls, and (iv) Electrical systems, (v) renewable energy systems as specified in the ECBC Code.</p>
Social Policies			
Land Acquisition (rehabilitation and resettlement)	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013	<p>The Right to Fair Compensation and Transparency in Land Acquisition, Resettlement and Rehabilitation (RFCTLAR&R) Act, 2013, enacted by the Government of India is the latest legislation. The act specifies that the process of obtaining the consent shall be carried out along with the Social Impact Assessment (SIA) study. The act also has the provision that no land shall be transferred by way of acquisition, in the Scheduled Areas in contravention of any law (including any order or judgment of a court which has become final) relating to land transfer, prevailing in Scheduled Areas.</p> <p>The act defines (1) "affected area" as such area as may be notified by the Government for the</p>	<p>i) Projects for which this rule is applicable</p> <p>Though it has been especially taken care at the preliminary design stage that no private land will be acquired, there may be some project activities where minimum amount of private land might be required. For infrastructure projects;</p> <ol style="list-style-type: none"> 1. All activities or items listed in the notification of the Government of India in the Department of Economic Affairs (Infrastructure Section) number 13/6/2009-INF, dated the 27th March, 2012 2. Projects involving supply of inputs to agriculture, warehousing, cold storage facilities, marketing infrastructure for agriculture and allied activities such as dairy, set up or owned by the appropriate Government 3. Project for water harvesting and water conservation structures, sanitation 4. Project for tourism <p>ii) reasons for applicability</p> <p>In case of private land acquisition for construction or any other project activity. In this regard, obtaining consent during SIA is compulsory for compensation, rehabilitation and resettlement.</p>

Sector	Acts	Purpose	Describe applicability to Project Components
		purposes of land acquisition; (2) “affected family" includes a family whose land or other immovable property has been acquired; a family which does not own any land but a member or members of such family may be agricultural labourers, tenants including any form of tenancy or holding of usufruct right, share-croppers or artisans or who may be working in the affected area for three years prior to the acquisition of the land, whose primary source of livelihood stand affected by the acquisition of land; (3) the Scheduled Tribes and other traditional forest dwellers who have lost any of their forest rights recognised under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 due to acquisition of land (4) family whose primary source of livelihood for three years prior to the acquisition of the land is dependent on forests or water bodies and includes gatherers of forest produce, hunters, fisher folk and boatmen and such livelihood is affected due to acquisition of land.	

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
A. Loss of Private Agricultural, Home-Stead & Commercial Land				
1	Land for the Project	Titleholder family. and families with traditional land Right	Compensation at Market value, Resettlement and Rehabilitation	a) Land for land, if available. Or, Cash compensation for the land at replacement value, which will be determined as provided under section 26 of RFCTLARR Act 2013. b) The land if allotted will be in the name of both husband and wife. c) If post-acquisition, residual land is economically unviable, the land owner will have the choice of either retaining or sell off rest of the land. d) Refund of stamp duty and registration charges incurred for replacement land to be paid by the project; replacement land must be bought within a year from the date of payment of compensation to project affected persons. e) Subsistence allowance of Rs. 36000 as one-time grant f) One-time grant of Rs. 500,000 or annuity g) Compensation at market value for loss of crops if any

Sector	Acts		Purpose		Describe applicability to Project Components
	Residual land	Titleholder and families with traditional land Right	family Compensation at replacement value, Resettlement and Rehabilitation	In case residual land is found to be economically unviable, PAPs have the choice of: c) selling off the residual land at the market value to the project d) take 25% of the compensation value and retain the land parcel.	
B. Loss of Private Structures (Residential/Commercial)					
2	Loss of Structure	Title Holder/ Owner	Compensation at Market value, Resettlement & Rehabilitation Assistance	a) Cash compensation for the structure at Market value which would be determined as per as per section 29 of the RFCTLARR Act 2013. House under Indira AwasYojana in rural area or Rs 50000 in lieu off and house under RAY in urban area or Rs 100,000 in lieu off. The house if allotted will be in the name of both husband and wife. b) Right to salvage material from the demolished structures. c) Three months' notice to vacate structures. d) Refund of stamp duty and registration charges for purchase of new alternative houses/shops at prevailing rates on the market value as determined in (a) above. Alternative houses/shops must be bought within a year from the date of payment of compensation. e) In case of partially affected structures and the remaining structure remains viable, additional10% to restore the structure. In case of partially affected structures and the remaining structure becomes unviable additional 25% of compensation amount as severance allowance. f) Subsistence allowance equivalent to Rs. 36000 as one-time grant. g) Each affected family getting displaced shall get a one-time financial assistance of Rs 50,000 as shifting allowance. h) Each affected family that is displaced and has cattle, shall get financial assistance of Rs 25,000/- for construction of cattle shed. i) One-time grant of Rs. 50,000 as resettlement assistance j) Each affected person who is a rural artisan, small trader or self-employed person and who has been displaced (in this project owner of any residential-cum commercial structure) shall get a one-time financial assistance of Rs 25,000/-for construction of working shed or shop. k) One-time grant of Rs. 500,000	
3	Structure	Tenants/ Lease Holders	Resettlement & Rehabilitation Assistance	a) Registered lessees will be entitled to an apportionment of the compensation payable to structure owner in case the lessee has erected any art of1 the structure as per applicable local laws. b) In case of tenants, three months written notice will be provided along with Rs 50,000 towards shifting allowance.	
C. Loss of Trees and Crops					
4	Standing Trees, Crops	Owners and beneficiaries	Compensation at market value	a) Three months advance notice to project affected persons to harvest fruits, standing crops and removal of trees.	

Sector		Acts	Purpose	Describe applicability to Project Components
		(Registered/ Un-registered tenants, contract cultivators, leaseholders & sharecroppers		b) Compensation to be paid at the rate estimated by: <ul style="list-style-type: none"> i) The Forest Department for timber trees ii) The State Agriculture Extension Department for crops iii) The Horticulture Department for fruit/flower bearing trees. c) Registered tenants, contract cultivators & leaseholders & sharecroppers will be eligible for compensation for trees and crops as per the agreement document between the owner and the beneficiaries. d) Un-registered tenants, contract cultivators, leaseholders & sharecroppers will be eligible for compensation for trees and crops as per mutual understanding between the owner and the beneficiaries.
D. Loss of Residential/ Commercial Structures to Non-Titled Holders				
5	Structures on Government land	Owners of Structures or Occupants of structures identified as per Project Census Survey	Resettlement & Rehabilitation Assistance	a) Non-vulnerable encroachers shall be given three months' notice to vacate occupied land b) Vulnerable encroachers will be provided cash assistance at replacement cost for loss of structures as described in section 29 of the RFCTLARR Act 2013. c) Any encroacher identified as non-vulnerable but losing more than 25% of structure used will be paid cash assistance at replacement cost for loss of structures. The amount will be determined as per section 29 of the RFCTLARR Act 2013. d) All squatters to be paid cash assistance for their structures at replacement costs which will be determined as mentioned in section 29 of the RFCTLARR Act 2013. e) All squatters (other than kiosks) will be eligible for one-time grant of Rs 36000 as subsistence allowance. f) All squatters other than Kiosks will be given shifting allowance of Rs 50,000 per family as one-time grant for a permanent structure and Rs. 30,000 for a semi-permanent structure and Rs. 10,000 for a temporary structure. g) Each affected person who is a rural artisan, small trader or self-employed person assistance' of Rs 25,000/- for construction of working shed or shop. h) In case of Kiosks, only Rs. 5000 will be paid as one-time grant.
E. Loss of Livelihood				
6	Families living within the project area	Title Holders/ Non-Title holders/ sharecroppers, agricultural labourers and employees	Resettlement & Rehabilitation Assistance	a) Subsistence allowance of Rs. 36,000 as one-time grant. (PAPs covered under 1(f), 2 (f) and 5 (e) above would not be eligible for this assistance). b) Training Assistance of Rs 10,000/- for income generation per family. c) Temporary employment in the project construction work to project affected persons with particular attention to vulnerable groups by the project contractor during construction, to the extent possible and preference in the employment of semi-skilled and unskilled jobs in the project with adequate training for the job.
F. Additional Support to Vulnerable Families				

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
7	Families within project area	As per definition of vulnerable	Resettlement & Rehabilitation Assistance One-time additional financial assistance of Rs. 50,000. Squatters and encroachers already covered under clause 5 are not eligible for this assistance.
G. Loss of Community Infrastructure/Common Property Resources			
8	Structures & other resources (e.g. land, water, access to structures etc.) within the project area	Affected communities and groups	Reconstruction of community structure and common property resources Reconstruction of community structure and Common property resources in consultation with the community.
H. Temporary Impact During Construction			
9	Land & assets temporarily impacted during construction	Owners of land & Assets	Compensation for temporary impact during construction e.g. damage to adjacent parcel of land / assets due to movement of vehicles for transportation of equipment's, machinery and construction activities for infrastructure development. Compensation to be paid by the contractor for loss of assets, crops and any other damage as per prior agreement between the 'Contractor' and the 'Affected Party'.
I. Resettlement Site			
10	Loss of residential structures	Displaced titleholders and non-titleholders	Provision of resettlement site/ vendor market Resettlement sites will be developed as part of the project, if a minimum of 25 project displaced families opt for assisted resettlement. Vulnerable PAPs will be given preference in allotment of plots/flats at the resettlement site. Plot size will be equivalent to size lost subject to a maximum of provision given in RFCTLARR Act 2013. Basic facilities shall be provided by the project at resettlement site as per the provisions given in the Third Schedule of RFCTLARR Act 2013. Similarly, if at least 25 displaced commercial establishments (small business enterprises) opt for shopping units, the Project Authority will develop the vendor market at suitable location in the nearby area in consultation with displaced persons. Basic facilities such as approach road, electricity connection, water and sanitation facility, will be provided in the vendor market by the project. Vulnerable PAPs will be given preference in allotment, of shops in vendor market. One displaced family will be eligible for only one land plot at resettlement site or shop in the vendor market.

Sector		Acts		Purpose	Describe applicability to Project Components
J.		Land on lease			
11	Titleholders	Land Owners/ Titleholders	Annual Lease rental for use of land	a) Annual Lease Rent as per pre-agreed rate with the land owners giving consent for sparing their land for the project b) Provisions regarding the increase in lease rent on predetermined rates and timeframe c) Provisions related to loss of structure/ trees/ crops as per the provisions of Clause 2 and 4 respectively	
12	Agricultural Labour	Non-Title holders/ sharecroppers, agricultural labourers and employees		As per Clause 6 above	
Community participation and local governance		73rd constitutional amendment act, 1992	The act strengthens the decentralized governance system and promotes bottom-up planning. As per the act, there will three-tier system of panchayats (at the village, district and state level). the Gram Panchayat level plans are to be prepared in Gram Sabha which is having an important bearing on the planning process of the proposed project. The act is having both mandatory and discretionary provisions and of the mandatory provisions of the Panchayati Raj Act, the most critical are those that strengthen the structure of representative democracy and political representation at the local level.		<p>i) Projects for which this rule is applicable This act is applicable to interventions which are located in the rural areas. The following are the related areas which under the jurisdiction of Panchayats. Under this Act the Gram Panchayat takes care of the functions such as agriculture including agricultural expansion, land improvement, implementation of land reforms, land consolidation and soil conservation, Industry, minor irrigation, water management and watershed development, non-conventional sources of energy among others.</p> <p>ii) reasons for applicability The Gram Sabha and Gram Panchayat will be extensively involved in consultation with the community as well as be the immediate nodal agency for information related to the project, or to direct the community to the right authority in case of grievance.</p> <p>iii) procedures to be followed Consultations in different phases of the project will be done in cooperation with the Gram Sabha and Gram Panchayat.</p> <p>Provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (PESA) applicable to Andhra Pradesh The salient feature of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (PESA) and the modalities worked out to grant rights to tribals in the country are:</p> <ol style="list-style-type: none"> 1. Legislation on Panchayats shall be in conformity with the customary law, social and religious practices and traditional management practices of community resources; 2. Habitation or a group of habitations or a hamlet or a group of hamlets comprising a community and managing its affairs in accordance with traditions and customs; and shall have a separate Gram Sabha.

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			<p>3. Every Gram Sabha to safeguard and preserve the traditions and customs of people, their cultural identity, community resources and the customary mode of dispute resolution.</p> <p>4. The Gram Sabhas have roles and responsibilities in approving all development works in the village, identify beneficiaries, issue certificates of utilization of funds; powers to control institutions and functionaries in all social sectors and local plans.</p> <p>5. Gram Sabhas or Panchayats at appropriate level shall also have powers to manage minor water bodies; power of mandatory consultation in matters of land acquisition; resettlement and rehabilitation and prospecting licenses/mining leases for minor minerals; power to prevent alienation of land and restore alienated land; regulate and restrict sale/consumption of liquor; manage village markets, control money lending to STs; and ownership of minor forest produce.</p>
	74th constitutional amendment act, 1992	This Act empowers the urban local bodies by giving them constitutional status. Article 243Q provides for establishment of 3 kinds of Municipalities such as Nagar Panchayat, Municipal council and Municipal Corporation.	<p>i) Projects for which this rule is applicable Apart from the administrative functions, after the introduction of 12th Schedule functions such as urban planning and regulation of land-use and construction of buildings, urban forestry, protection of the environment and promotion of ecological aspects, provision of urban amenities and facilities such as parks, gardens, playgrounds and others have been added.</p> <p>ii) reasons for applicability The Nagar Panchayat, Municipal council and Municipal Corporation will be extensively involved in consultation with the community as well as be the immediate nodal agency for information related to the project, or to direct the community to the right authority in case of grievance.</p> <p>iii) procedures to be followed Consultations at different phases of the project will be done in cooperation with the Nagar Panchayat, Municipal council and Municipal Corporation.</p>
	Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act”, 2006	Grants legal recognition to the rights of traditional forest dwelling communities, partially correcting the injustice caused by the forest laws. Makes a beginning towards giving communities and the public a voice in forest and wildlife conservation	<p>i) Projects for which this rule is applicable Utmost care has been taken while structuring the project activities that during any stage of this project, no displacement or loss of livelihood will happen to any forest dwelling scheduled tribe or other traditional forest dweller. However, at this stage, the project activities have not been elaborated, and some projects may be located in the areas of forest dwelling scheduled tribes or traditional forest dwellers.</p> <p>ii) reasons for applicability This act will be applied if any project may have an impact on land of any description falling within any forest area and includes unclassified forests, un-</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
			<p>demarcated forests, existing or deemed forests, protected forests, reserved forests, Sanctuaries and National Parks (2. d) with members or communities of scheduled tribe living in and depending on forest for livelihood needs, or forest villages (2. c and f).</p> <p>iii) procedures to be followed The State Level Monitoring Committee should monitor compliance of the provisions of Section 3(1)(m) of the Act, which recognizes the right to in situ rehabilitation including alternative land in cases where the forest dwelling Scheduled Tribes and other traditional forest dwellers have been illegally evicted or displaced from forest land without receiving their legal entitlement to rehabilitation, and also of the provisions of Section 4(8) of the Act, which recognizes their right to land when they are displaced from their dwelling and cultivation without land compensation due to State development interventions. https://tribal.nic.in/FRA/data/FRARulesBook.pdf</p>
Labour rights	Contract Labour (Regulation and Abolition) Act, 1970;	<p>The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. It is applicable to:</p> <p>a) To every establishment in which twenty or more workmen are employed or were employed on any day of the preceding twelve months as contract labour;</p> <p>(b) to every contractor who employees or who employed on any day of the preceding twelve months twenty or more workmen: (4. a and b)</p> <p>It is applicable to establishments which are not intermittent in nature which means the work should continue for more than 120 days in preceding twelve months, and if season then it should be performed for more than 60 days in a year.</p>	<p>i) Projects for which this rule is applicable This act will be applied to (i) any office or department of the Government or a local authority, or(ii) any place where any industry, trade, business, manufacture or occupation is carried on (5. b i and ii). As all the project activities are not finalized yet, here, the particular interventions where this act will be applicable is only indicative. Some of the projects which may come under this act are establishment of SPMU, or establishment or augmentation any other institution under the capacity building. Livelihood development, and pollution abatement component. Similarly, this act can be applicable projects such as establishment of turtle conservation centre, creation of mangrove gene pool under the conservation of coastal resource component.</p> <p>ii) reasons for applicability The license under this act will ensure the welfare of the contract labour regarding conditions such as hours of work, fixation of wages and other essential amenities. The principal employer is required to take Certificate of Registration and the Contractor is required to take a licence from the licensing Officer. This license is valid for a period of time and has to be renewed. Under certain conditions, there can be revocation, suspension and amendment of licenses. For more details please see; http://labour.bih.nic.in/acts/contract_labour_regulation_and_abolition_act_1970.pdf</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996.	All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay Cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. It applied to every establishment which employs 10 or more workers on any day of the preceding 12 months.	<p>i) Projects for which this rule is applicable In relation to this project, the building and other construction workers (regulation of employment and conditions of service) act, 1996 is applicable to building or other construction work” means the construction, alteration, repairs, maintenance or demolition, of or, in relation to, buildings, streets, roads, irrigation, drainage, embankment and navigation works, flood control works (including storm water drainage works), generation, transmission and distribution of power, water works (including channels for distribution of water), canals, reservoirs, watercourses, and such other work as may be specified in this behalf by the appropriate Government, by notification but does not include any building or other construction work to which the provisions of the Factories Act, 1948.</p> <p>ii) reasons for applicability These two Acts ensures workers’ welfare in any establishment, regarding safety and other basic provisions such as working hour, accommodation, creche, first aid and latrines. The State Welfare Board will conduct functions such as providing pension and immediate assistance to beneficiary in case of accident and sanction loans under special circumstances.</p> <p>iii) procedures to be followed Every establishment has to register to the registration officer within 60 days from commencement. Every building worker with age between 18 to 60 years, and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months shall be eligible for registration as a beneficiary under this Act (12.a). Under this Act, the following for workers are defined such as fixing hours for normal working day, wage rate and overtime rate, maintenance of registers and records, prohibition of employment of certain persons in certain building or other construction works, accommodation, creche, first aid and canteen, and provision of latrines and urinals. (for details please see, chapter IV)</p> <p>For further information please see: https://indiacode.nic.in/bitstream/123456789/1989/1/199627.pdf http://legislative.gov.in/sites/default/files/A1996-28_0.pdf </p>
	The Inter-State Migrant Workmen (Regulation of Employment and	The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the	<p>i) Projects under for which this rule is applicable This is applicable for any office or department of the Government or a local authority; or any place where any industry, trade, business, manufacture or occupation is carried out (2.d). Under this project this Act may be applied but to not restricted to</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
	Conditions of Service) Act, 1979	establishment situated in another state). The inter- state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc.	<p>construction activities regarding coastal protection, infrastructure development or conservation of coastal or marine resources; activities for diversification of livelihood or capacity building of institute or organization which requires employment of 5 or more migrant workmen.</p> <p>ii) reasons for applicability In any such establishment which employs 5 or more migrant workmen, it is applicable to safeguard regular and fixed wage rate, and to ensure facilities such as displacement allowance, journey allowance and others.</p> <p>iii) procedures to be followed Contractor shall register with Labour Department if Inter- state migrant workmen are engaged. Adequate and appropriate amenities and facilities to be provided to workers - housing, medical aid, traveling expenses. For more information, please see: https://indiacode.nic.in/bitstream/123456789/7735/1/the_inter-state_migrant_workmen_%28regulation_of_employment.pdf</p>
	The Child Labour (Prohibition and Regulation) Act, 1986	The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labor is prohibited in Building and Construction Industry.	<p>i) Projects under for which this rule is applicable Utmost care has been taken while structuring the project activities that during any stage of this project no child will be involved in any occupation or process. However, at this stage, since the project activities have not been elaborated, this Act further elaborated the terms to avoid any remote possibility of employing a child in any of these activities. For categories please see: https://labour.gov.in/sites/default/files/act_3.pdf</p> <p>ii) reasons for applicability While designing the projects, it has been taken into consideration that child labour will be engaged in any activity. However, under circumstances, if any of the project include the above mentioned, or any other activity from the Act should not involve employing child labour.</p> <p>iii) procedures to be followed Every occupier in an establishment who employs or permit a child to work shall inform the inspector a written notice.</p>
	The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014	GOI recently enacted the act that specifically aims to protect the rights of urban street vendors and to regulate street vending activities. It provides for Survey of street vendors and protection from eviction or relocation; issuance of certificate for vending; provides for rights and obligations of street vendors; development of street vending plans; organizing of capacity	<p>i) Projects under for which this rule is applicable During the design phase it has been taken care of that loss of livelihood will be prevented. However, if there are temporary displacement issues or inconvenience occurred due to construction activities this Act will ensure the rights of the street vendors</p> <p>ii) reasons for applicability Any development activity related to this project might cause relocation</p>

<i>Sector</i>	<i>Acts</i>	<i>Purpose</i>	<i>Describe applicability to Project Components</i>
		building programmes to enable the street vendors to exercise the rights contemplated under this Act; undertake research, education and training programmes to advance knowledge and understanding of the role of the informal sector in the economy, in general and the street vendors, in particular and to raise awareness.	

Note: In the Government of India amends the provisions in the various acts or notifications under the Coastal Zone Notification, Environment Protection Act, Environment Rules or any other applicable Act / Rule during the course of implementation of the project, then compliance to the amended rules and regulations, as applicable under the revised notification, will become mandatory.

Annexure IV: List of Stakeholders Consulted for ESMF Preparation

S.No.	Name	Designation	National/State
Date: 05 April, 2019 Location: Ground Floor Pt Deendayal Antyodaya Bhavan, CGO Complex Lodhi Road			
1.	Ritesh Kumar Singh	Joint Secretary, MoEFCC	Project Director (PD), NPMU
2.	Satyendra Kumar	Additional Project Director	Assistant Project Director (APD), NPMU
3.	Shayamal Binoy Tikadar	Project Director, SPMU	Gujarat SPMU
4.	Nischal Joshi	Sr. Manager, SPMU	Gujarat SPMU
5.	K Ravi Chandran	CCF & Secretary	Daman Diu SPMU
6.	Sanjiv Joglekar	OSD GCZMA	Goa SPMU
7.	Vinay Kumar Katt	CCF, Director	Karnataka SPMU
8.	Dinesh Kumar	DCFG	Karnataka SPMU
9.	Veena N Madhavan	Director, Env & Climate Change	Kerala SPMU
10.	P Kalariarasan	Environmental Engineer	Kerala SPMU
11.	P Pookaya	Project Director, Directorate, Science & Technology, Administration of UT	Lakshadweep SPMU
12.	Jayanthi M	Member Secretary, TNSCZMA & Director	Tamil Nadu SPMU
13.	Kalamegam	Environmental Engineer	Puducherry SPMU
14.	Svermala	Additional Project Director	Andhra Pradesh SPMU
15.	Tripti Shah	Additional Project Director, ICZM	West Bengal SPMU
16.	B K Samal	Additional Project Director	Odisha SPMU
17.	Debasish Roy	Additional Project Director	Odisha SPMU
18.	Madhu K Garg	Commissioner, OSD	Andaman & Nicobar SPMU
19.	R Ramesh	Director	NCSCM, Chennai
20.	Purvaja R	Scientist G	NCSCM, Chennai
21.	Dripta Nag	ICZM Planner	SICOM, NPMU
22.	Priyanka	ICZM Planner	SICOM, NPMU
23.	Garima Sharma	Environment Engineer	SICOM, NPMU
24.			
25.	Milen F. Dyoulgerov	Sr Environment Specialist and Task Team Leader (TTL), ENCORE	The World Bank
26.	A S Ramakrishna	Sr Environment Specialist and Co-TTL, ENCORE	The World Bank
27.	Deepa Balakrishnan	Environmental Specialist and Safeguard Specialist, ENCORE	The World Bank
28.	Om Prakash	Consultant - Procurement	The World Bank
29.	Sanjeev Kumar	Procurement Specialist	The World Bank
30.	Sidharth P Merchant	Research Analyst	The World Bank
31.	S Krishnamurthy	Sr Financial Management Specialist	The World Bank
32.	Simon Chirwa	Lead Procurement Specialist	The World Bank

S.No.	Name	Designation	National/State
33.	Richard F, Delaney	Sr Coastal & Marine Policy Specialist (Consultant)	Consultant
34.	Indumathi Hewawasam	Sr. Coastal & Marine Policy Specialist (Consultant)	Consultant
35.	Nigel Bradly	Consultant	Consultant, Envirostat, New Zealand
Date :- 24th January, 2018 Location: Room No. 111 Paryavaran Bhavan, CGO , Lodhi Road Complex			
36.	A K Mehta	Additional Secretary	National PMU
37.	Ritesh Kumar Singh	Joint Secretary	National PMU
38.	Arvind Kumar Nautiyal	Additional Secretary Director	National PMU
39.	B.S.S. Prasad	Member Secretary, Andhra Pradesh pollution Control Board & Member Secretary Andhra Pradesh Coastal Zone Management Authority	Andhra Pradesh SPMU
40.	Sanjeev S Joglekar	Officer of Speical Duty (OSD), Dept of Environment	Goa SPMU
41.	A. K. Saxena	P.D. Gujarat SPMU	Gujarat SPMU
42.	Nischal Joshi	S.M.P. Gujarat SPMU	Gujarat SPMU
43.	P. Harinarayan	Senior Scientist, Kerala	Kerala SPMU
44.	Kalaiaarasan	Environmental Engineer, Karnataka	Karnataka SPMU
45.	K.H. Vinaya Kumar	Chief Conservator of Forest (CCF) & Director, Environmental Management & Policy Research Institute (ESMPRI)	Karnataka SPMU
46.	Balram Meena	Director, Science & Technology (S&T) UTLA	Lakshadweep SPMU
47.	S.B. Sadashiv	Under Secretary-Scientist, Environment Department Maharashtra	Maharashtra SPMU
48.	Susanta Nanda	P.D. Odisha SPMU	Odisha SPMU
49.	M. Dwarkanath	Director & member secretary, Coastal Zone Management Authority, Puducherry	Puducherry SPMU
50.	A.V. Venkatachalam	Director & Member Secretary Coastal Zone Management Authority	Tamil Nadu SPMU
51.	Rajender Jakher	APD, West Bengal SPMU	West Bengal SPMU
52.	Ramesh Ramachandran	Director	NCSCM Chennai
53.	Purvaja Ramchandran	Scientist G	NCSCM, Chennai
54.	Akash Sharma	Controller- F&A, SICOM	SICOM
55.	Mohit Gupta	Finance Consultant	SICOM
56.	Sanjay Jhalla	PMC, SICOM	SICOM
57.	S K Mamgain	Sociologist, SICOM	SICOM
58.	Chetna Jain	Documentation Consultant	SICOM
59.	A. Sitaramakrishna	Sr. Environmental Specialist, The World Bank	The World Bank
60.	Deepa Balakrishnan	Environmental Specialist, The World Bank	The World Bank
61.	S. Krishnamurthy	Sr. Financial Management Specialist, The World Bank	The World Bank

S.No.	Name	Designation	National/State
Date: 23rd April, 2018 Location : Teesta, Conference Hall, MoEFCC, Jor Bagh, New Delhi			
62.	A K Mehta	Additional Secretary, MoEFCC	National PMU
63.	Ashok Saxena	PCCF, Project Director, GSPMU	Gujarat SPMU
64.	B K Samal	Additional Project Director, Odisha SPMU	Odisha SPMU
65.	PadmaMahanti	Director, Environment & Climate Change	Kerala SPMU
66.	A Subba Rao	Sr Environment Engineer, Andhra Pradesh Pollution Control Board	Andhra Pradesh SPMU
67.	A. V. Venkatachalam	Director Environment Director	Chennai, Tamil Nadu SPMU
68.	N. Srinivasa Rao	Scientific Officer	Puducherry SPMU
69.	Ramachandra	Principal Secretary	Karnataka SPMU
70.	Rajendra Jakher	Additional Project Director, ICZMP	West Bengal SPMU
71.	R Ramesh	Director, NCSCM	Chennai SPMU
72.	Sanjiv Joglekar	OSD GCZMA	Goa SPMU
73.	A. Sitaramakrishna	Sr. Environmental Specialist	The Word Bank
74.	Deepa Balakrishnan	Environmental Specialist	The Word Bank
75.	Moushumi Chatterji	Consultant	The Word Bank
76.	Akash Sharma	Controller- F&A, SICOM	SICOM
77.	Shailesh K Dodia	Scientific Officer	SICOM
78.	Mohit Gupta	Senior Accountant	SICOM
79.	Dripta Nag	ICZM Planner/ Social Specialist	SICOM
80.	Priyanka	ICZM Planner	SICOM
81.	Saurabh Sharma	Project Engineer	SICOM
82.	Garima Sharma	Environment Engineer	SICOM
83.	Shailendra Mamgain	Sociologist (Consultant)	SICOM

Appendix V: Regulated Activities in CRZ Zones and Institutional Responsibility

CRZ Zone	Brief Boundary Outline	Regulated Activities	Responsible Entities
CRZ-I A	Ecologically sensitive areas such as Mangroves, Salt marsh, Coral reef, Seagrass, Turtle nesting ground, Bird nesting ground, Horse crab habitat, Mudflats, Sand dunes, Archaeological & heritage sites and Marine Protected Areas	Exploration and extraction of natural gas and oil	NCZMA
		Construction and expansion of air strips, helipads	
CRZ-I B	Area between Low Tide Line and High Tide (Intertidal zone)	Port development	NCZMA/SCZMA
		Defence activities	NCZMA
		Oil and gas exploration	
CRZ-II	The developed land areas up to the shoreline, within the existing municipal limits or in other existing legally designated urban areas. (Area built-up with a ratio 50% private plots = 50% public purpose)	Oil and gas exploration, Fencing of premises	NCZMA
		Domestic and commercial use of ground water resource	SCZMA
		Tourism related and construction activities	NCZMA
		Fishing/Aquaculture	SCZMA/Local Panchayat
		Infrastructure and coastal development required for inhabitants	
		Defence activities	NCZMA
		Renovation of religious values	SCZMA/NCZMA/Local Panchayat
CRZ-III A	Areas where has population density is more than 2161/sq km as per 2011 census base. Area up to 50 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ)'.	Mining	NCZMA
		Deforestation activities	NCZMA/SCZMA
		Domestic and commercial use of ground water resource	SCZMA/Local Panchayat
		Manufacturing and commercial usage of plastic items	
		Tourism related and construction activities	
		Disposals/discharges of sewage and pollutants	NCZMA/SCZMA/Local Panchayat
		Air and vehicular pollution	NCZMA/SCZMA
		Infrastructure and coastal development required for inhabitants including residential houses	SCZMA/ Local Panchayat
		Fishing/Aquaculture	SCZMA/ Local Panchayat
		Defence activities	NCZMA
		Renovation of religious values	SCZMA/ Local Panchayat
		Hydroelectric projects	NCZMA

CRZ Zone	Brief Boundary Outline	Regulated Activities	Responsible Entities
CRZ-III B	Areas where has population density is less than 2161/ Sq.Km as per 2011 census base. Area up to 200 meters from the HTL on the landward side shall be earmarked as the 'No Development Zone (NDZ).	Small scale green industries	SCZMA/ Local Panchayat
		Mining	NCZMA
		Deforestation activities	NCZMA/ SCZMA
		Oil, gas exploration and extraction	NCZMA
		Protection of hill slopes and river beds	NCZMA/SCZMA
		Agriculture	SCZMA
		Domestic and commercial use of ground water resource	SCZMA/Local Panchayat
		Manufacturing and commercial usage of plastic items	SCZMA/Local Panchayat
		Introduction of exotic species	NCZMA/SCZMA
		Disposals/discharges of sewage and pollutants	SCZMA/Local Panchayat
		Air and vehicular pollution	SCZMA/Local Panchayat
		Fishing/Aquaculture	SCZMA/Local Panchayat
		Infrastructure and coastal development required for inhabitants including residential houses	SCZMA/Local Panchayat
		Defence activities	NCZMA
		Hydroelectric projects	NCZMA
CRZ-IV A	The water area and the sea bed area between the Low Tide Line up to 12nm on the seaward side	Renovation of religious values	NCZMA/SCZMA
		Small scale green industries	NCZMA/SCZMA
		Oil, gas exploration and extraction	NCZMA
		Ballast water, ship washes and treated effluents	NCZMA
		Disposal of treated sewage in sea	NCZMA/SCZMA
		Use of renewable energy resources	NCZMA/SCZMA
CRZ-IV B	The 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, i.e., salinity (5 ppt) during the driest season of the year.	Shipping in designated area	NCZMA
		Port development	NCZMA
		Oil, gas exploration and extraction	NCZMA
		Disposal of treated sewage in sea	NCZMA
		Ballast water, ship washes, treated effluents	NCZMA/SCZMA
		Use of renewable energy resources	NCZMA/SCZMA

Source: NCSCM

Prohibited/Regulated/Permitted Activities Under Various Environment Acts in India⁷⁸

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
1.	Mining	Mining of land, rocks and other substrata	X	X	X	X	CRZ 2011/ICRZ 2011
		Mining of rare minerals	✓	✓	✓	✓	CRZ 2011/ICRZ 2011, Note: Mining of rare minerals which is not available outside the CRZ areas
		Mining of sand from nesting and breeding grounds of endemic and endangered species	X	X	X	X	CRZ 2011/ICRZ 2011
		Commercial mining	X	X	R	X	ESZ guidelines (2011) provides regulation will not prohibit for digging of earth for construction or repair of houses and for manufacture of country tiles or bricks for housing for personal consumption.
3.	Coastal forest & related activities	Deforestation/Felling of trees	X	X	R	NA	CRZ 2011/ICRZ 2011/ESZ GUIDELINES 2011. Use of forest land for nonforest purposes is permitted only in CRZ-III areas, subject to clearance as required under the Forest (Conservation) Act, 1980. The requirements of other Central and State laws as applicable to the project shall be met with
4.	Establishments	Hotels and resorts	X	X	R	X	CRZ 2011/ICRZ 2011. Construction of beach resorts/hotels with prior approval of MoEFCC in the designated areas of CRZ-III for temporary occupation of tourists/visitors
		Harvesting or drawal of ground water	X	X	✓	X	CRZ 2011/ICRZ 2011. In the 200m to 500m zone it shall be permitted only when done manually through ordinary wells for drinking, horticulture, agriculture and fisheries
		Rain water harvesting	X	X	✓	X	ESZ guidelines 2011(actively promoted)
		Fencing of premises	X	R	✓	X	CRZ 2011/ICRZ 2011/ ESZ guidelines 2011. Permitted in CRZ-III, live fencing and barbed wire fencing with vegetative cover may be allowed around private properties subject to the condition that such fencing shall in no way hamper public access to the beach.

⁷⁸ Compiled by NCSCM. May require some updates based on CRZ 2019 and other recent legislation/ amendments to existing legislation

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
		Exploration and extraction of oil and natural gas	R	R	R	R	CRZ 2011/ICRZ 2011. Required clearance from MoEFCC
		Protection of hill slopes and river banks	X	X	R	NA	ESZ guidelines 2011
		Sign boards and hoardings	X	X	R	X	ESZ guidelines 2011
5.	Agriculture	Intensive agriculture practices	X	X	✓	NA	CRZ 2011/ICRZ 2011.
		Ongoing agriculture and horticulture practices by local communities	X	X	✓	NA	CRZ 2011/ICRZ 2011/ESZ guidelines 2011.
		Organic farming	X	X	✓	NA	CRZ 2011/ICRZ 2011/ESZ guidelines 2011.
		Salt manufacture	✓	✓	✓	NA	CRZ 2011/ICRZ 2011.
		Drastic change of agriculture systems	X	X	R	NA	ESZ guidelines 2011
6.	Manufacturing commercial items usages & activities	Commercial use of firewood	X	X	X	NA	ESZ guidelines 2011. For hotels and other business related establishment. Permitted in national park and wildlife sanctuaries to collect firewoods for domestic use
		Domestic use of natural water resources including ground water harvesting	X	R	R	NA	CRZ 2011/ICRZ 2011. Ground water shall not be tapped within 200m of the HTL; within the 200 metre to 500 metre zone, it can be tapped only with the concurrence of the Central/State Ground Water Board
		Commercial use of natural water resources including ground water harvesting	X	X	R	NA	ESZ guidelines 2011. As per approved master plan, which takes care of habitats allowing no restriction on movement of wild animals.
		Manufacture and handling of any hazardous substances	X	X	X	X	CRZ 2011/ICRZ 2011/ESZ guidelines 2011.
		Transferring of any hazardous substances in the port area	✓	✓	✓	NA	Permitted transfer of hazardous substances from ships to ports, terminals and refineries and vice versa in the port areas. Notifications of the Government of India in the Ministry of Environment and Forests No. S.O. 594(E) dated 28th July 1989, S.O. 966(E) dated 27th November, 1989 and GSR 1037(E) dated 5th December, 1989;
		Use of polythene bags by shopkeepers	X	X	R	X	ESZ guidelines 2011
7.	Biological activities	Introduction of exotic species	X	X	X	X	EPA 1986
		Introduction of exotic species	X	X	R	X	ESZ guidelines 2011, for commercial purpose and not allowed to introduce in natural course of environment
		Construction of beach resorts or hotels in designated areas of CRZ-II and III with prior approval of MoEFCC	X	R	R	NA	CRZ 2011, Annex-III/ICRZ 2011/ ESZ guidelines 2011. Construction should not be undertaken within 200 m in the landward side of HTL and

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
8.	Tourism & related construction activities						within the area between LTL and HTL. Construction should be beyond the hazard line or 200 m from HTL (whichever is more).
		Fencing of hotels and resorts	X	R	R	NA	CRZ 2011/ICRZ 2011. Live fencing and barbed wire fencing with vegetative cover allowed around private properties.
		Flattening of sand dune	X	X	X	NA	CRZ 2011/ICRZ 2011
		Permanent structures for sports facilities	X	X	X	NA	CRZ 2011/ICRZ 2011
		Construction of goal post, net posts and lamp posts	X	R	R	NA	CRZ 2011/ICRZ 2011
		Construction of basement	X	R	R	NA	CRZ 2011/ICRZ 2011. No objection certification should be obtained from the State Ground Water Authority and the construction should not adversely affect the free flow of groundwater in that area.
		Establish or operate any tourist establishment or commercial establishment in the Buffer zone of A&N islands	X	X	X	NA	ANPATR 1956 (Amendment Regulation, 2012)
		Undertaking activities related to tourism like over-flying the National Park area by any aircraft, hot-air balloons.	X	X	X	X	ESZ guidelines 2011
9.	Disposals/ Discharges/ Pollutants	Discharge of untreated effluents and solid waste from industries cities or towns in natural water bodies	X	X	X	X	CRZ 2011/ICRZ 2011. Untreated effluents and solid wastes were prohibited in natural water bodies under Central/State Pollution Control Board and under the Environment (Protection) Act, 1986
		Disposal of treated sewage in lagoon	X	X	X	X	CRZ 2011/ICRZ 2011. In any case shall not be permitted based on island regulation and CRZ-IV under the Water (Prevention and Control of Pollution) Act, 1974; and except for storm water drains
		Disposal of treated sewage in sea (of sea side)	X	X	X	R	CRZ 2011/ICRZ 2011. Approval under the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974)
		Industrial and domestic Sewage discharge	X	X	R	X	CRZ 2011/ICRZ 2011. Necessary arrangements for the treatment of the effluents and solid wastes must be made. It must be ensured that the untreated effluents and solid wastes are not discharged into the water or on the beach; and no effluent/solid waste shall be discharged on the beach
		Dumping of ash or any wastes from thermal power stations	X	X	X	X	CRZ 2011/ICRZ 2011. Shall not be permitted in any case in CRZ areas

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
		Dumping of city or town waste for the purposes of land filling	X	X	X	X	CRZ 2011/ICRZ 2011, concerned authority shall implement schemes for phasing out any existing practice, if any, shall be phased out within a period of one year from date of commencement of this notification
		Discharge effluents and solid waste in natural water bodies or terrestrial area	X	X	X	X	ESZ guidelines 2011
		No untreated sewage, effluents Ballast water, ship washes, fly ash or solid waste from all activities including from aquaculture operations shall be let off or dumped	X	X	X	R	CRZ 2011/ICRZ 2011
		Air and vehicular pollution	NA	NA	R	NA	ESZ guidelines 2011
10	Green technology	Use of renewable energy sources	X	X	✓	R	CRZ 2011/ICRZ 2011/ESZ guidelines 2011.
		Dressing or altering of sand dunes hills, natural features including landscape changes for beautification, recreational and other such purpose	X	X	X	NA	CRZ 2011/ICRZ 2011. No flattening of sand dunes shall be carried out under CRZ-III
		Adoption of green technology for all activities	X	X	✓	X	ESZ guidelines 2011, In the buffer zone of ESA
11.	Fishing/Aquaculture	Setting up of hatchery and natural drying area for fishes	X	X	✓	NA	CRZ 2011/ICRZ 2011. Only in permitted areas
		Plants and animals collected for scientific study	✓	✓	✓	✓	WLPA, 1972.
		Collection of scheduled animals for breeding in captive breeding	✓	✓	✓	✓	WLPA, 1972.
		Traditional fishing and allied activities undertaken by local communities	X	X	X	✓	CRZ 2011/ICRZ 2011.
		Beaching of fishing craft or any other craft in turtle nesting areas	X	R	R	NA	CRZ 2011/ICRZ 2011. No developmental activities shall be permitted in the turtle breeding areas referred to in sub-paragraph (vii) in CRZ-2011
		Creating facilities required for local fishing communities such as fish drying yards, auction halls, net mending yards,	X	X	✓	NA	CRZ 2011/ICRZ 2011, In view of the unique coastal systems of backwater and backwater islands alongwith space limitation present in the coastal stretches of the State of Kerala and Goa

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
		traditional boat building yards, ice plant, ice crushing units, fish curing facilities					
		Construction/reconstruction of dwelling units of traditional coastal communities including fisherfolk may be permitted between 100 and 200 metres from the HTL along the seafront	X	X	✓	NA	CRZ 2011/ICRZ 2011, comprehensive plan prepared by the State Government or the Union territory in consultation with the traditional coastal communities including fisherfolk and incorporating the necessary disaster management provision, sanitation and recommended by the concerned State or the Union territory CZMA to NCZMA for approval by MoEFCC
12.	Navigation	Shipping (other than a designated shipping area)	X	NA	NA	R	CRZ 2011/ICRZ 2011.
		Install an authorized navigational aid	✓	✓	✓	✓	CRZ 2011/ICRZ 2011. Permitted in all CRZ areas.
		Coral removal for Construction /Widening of Navigation channels in coral area	X	X	X	X	CRZ 2011/ICRZ 2011. Coral removal for any purpose shall not be permitted in any CRZ areas
13.	Infrastructure & coastal development	Desalination plants	✓	✓	✓	NA	CRZ 2011/ICRZ 2011
		Port development and shipping	✓	✓	✓	R	CRZ 2011/ICRZ 2011. Permissible under the notification or for control of coastal erosion and maintenance or clearing of water ways, channels and ports or for prevention of sandbars or for tidal regulators, storm water drains or for structures for prevention of salinity ingress and sweet water recharge
		Residential buildings, office buildings, hospital complexes, workshops of strategic and defence projects in terms of ESIA notification, 2006	X	X	R	NA	CRZ 2011/ICRZ 2011. Subject to clearance from MoEFCC
		Construction of Jetties, quays, wharves, erosion control measures, boat repair, slipways, breakwaters, pipelines, lighthouses, navigational safety facilities, coastal police stations require waterfront	✓	✓	✓	NA	CRZ 2011/ICRZ 2011.
		Measures to prevent sand bars, installation of tidal regulators, laying of storm water drains or for structures for	✓	✓	✓	NA	CRZ 2011/ICRZ 2011.

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
		prevention of salinity ingress and freshwater recharge based on studies					
		Dredging and underwater blasting blasting in and around coral formations	X	X	X	X	CRZ 2011/ICRZ 2011.
		Construction of dwelling units, public utilities, schools and dispensaries, drainage, public toilets, sewerage, bridges, roads, public rain shelters, water supply, drainage, sewerage which are required for traditional inhabitants living within the biosphere reserves	✓	R	✓	NA	CRZ 2011/ICRZ 2011. Obtain approval from concerned Coastal Zone Management Authority
		Construction of units or auxiliary thereto for domestic sewage, treatment and disposal	X	X	R	NA	CRZ 2011/ICRZ 2011, Prior approval of the concerned Pollution Control Board or Committee
		Widening of roads	X	R	R	NA	ESZ guidelines 2011. This should be done with proper ESIA and mitigation measures.
		Movement of vehicular traffic at night	NA	NA	R	NA	ESZ guidelines 2011
		Storage of non-hazardous cargo such as edible oil, fertilizers, food items in the NDZ area near the port	✓	✓	✓	NA	CRZ 2011/ICRZ 2011.
		Storage of petroleum products and liquefied natural gas and regasification and other processes with raw petroleum	X	✓	✓	NA	CRZ 2011/ICRZ 2011.
		Construction/expansion of air strips and helipads	R	R	R	NA	CRZ 2011/ICRZ 2011. Expect for defence requirements are most essential under permissible activities in the CRZ.
		Construction activity between LTL and HTL	✓	NA	NA	NA	CRZ 2011/ICRZ 2011. Carrying treated effluents and waste water discharges into the sea, facilities for carrying sea water for cooling purposes, oil, gas and similar pipelines and facilities essential for activities permitted under this CRZ notification
		Land reclamation, bunding or disturbing the natural course of sea water with similar obstructions	X	X	X	NA	CRZ 2011/ICRZ 2011.

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
		Construction or modernisation or expansion of foreshore facilities like ports, harbours, jetties, wharves, quays, slipways, bridges, sealink, road on stilts, and such as meant for defence and security purpose	✓	✓	✓	NA	CRZ 2011/ICRZ 2011. Subject to clearance from MoEFCC
		Control of erosion, based on scientific study including ESIA studies	✓	✓	✓	NA	CRZ 2011/ICRZ 2011.
		Reclamation for commercial purposes such as shopping and housing complexes, hotels and entertainment activities	X	X	X	NA	CRZ 2011/ICRZ 2011
		Thermal power plants (only foreshore facilities for transport of raw materials facilities for intake of cooling water and outfall for discharge of treated waste cooling water)	✓	X	✓	NA	CRZ 2011/ICRZ 2011. Permitted those required water front
		All other activities with investment exceeding rupees five crores	X	X	R	X	CRZ 2011/ICRZ 2011. Except those activities which are to be regulated by the concerned authorities at the State/Union Territory level in accordance with the provisions of paragraph 6, subparagraph (2) of Annexure 1 of the notification
		Oils gas and similar pipelines, conveying systems including transmission lines and facilities	✓	✓	✓	NA	CRZ 2011/ICRZ 2011.
		Construction activity between the LTL and HTL carrying treated effluents and waste water discharges into the sea facilities	✓	✓	✓	NA	CRZ 2011/ICRZ 2011.
		Development of vacant plots between 200 and 500 metres of High Tide Line for temporary occupation for hotels and resorts	X	X	✓	NA	CRZ 2011/ICRZ 2011. Prior approval of Ministry of Environment and Forests (MEF)

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
		New constructions within 200 meters from the HTL, except those mentioned in NDZ	NA	X	R	NA	CRZ 2011/ICRZ 2011. No new construction of buildings shall be permitted within 200 metres of the HTL as per CRZ-II
		New construction of building only on the landward side of the existing road, or on the landward side of existing authorized structures	NA	R	X	NA	CRZ 2011/ICRZ 2011. subject to the existing local town and country planning regulations including the 'existing' norms of Floor Space Index or Floor Area Ratio
		Construction /alterations of an existing buildings on the landward side of the existing road, or on the landward side of existing authorized structures	NA	✓	NA	NA	CRZ 2011/ICRZ 2011.
		Atomic energy and related activities	✓	✓	✓	NA	CRZ 2011/ICRZ 2011. Permitted in CRZ-I
		Establishment of major hydroelectric projects	X	X	R	NA	ESZ guidelines 2011
		Erection of electrical cables	X	X	R	NA	ESZ guidelines 2011. Promote underground cabling
		Facilities generating power by using non-conventional energy	X	✓	✓	NA	CRZ 2011/ICRZ 2011
14.	Monitoring and Meteorological activities	Any type of construction including observation towers etc including for defence purposes and developmental activities	X	X	✓	NA	CRZ 2011/ICRZ 2011.
		Installation of Buoys to collect data on met and environmental parameters and marker buoys	✓	X	X	✓	CRZ 2011/ICRZ 2011.
		Installation of weather radars	X	X	✓	NA	CRZ 2011/ICRZ 2011.
15.	Industries	Setting up of industries/Power plants/windmills/sawmills	X	X	X	NA	CRZ 2011/ICRZ 2011/ESZ guidelines 2011.
		Setting up of small scale food/fish processing industries with waste treatment methods/plants	X	X	R	NA	CRZ 2011/ICRZ 2011. Except treatment plants of waste and effluents arising from hotels, beach resorts and human settlements located in CRZ areas other than CRZ-I and disposal of treated wastes and effluents
		Setting up of industries causing pollution (water, air, soil, noise, etc.)	X	X	X	NA	ESZ guidelines 2011

Sl. No	Broad Category	Activity	CRZ-I	CRZ-II	CRZ-III	CRZ-IV	Remarks
16.	Religious values	Reconstruction/renovation of existing religious monuments	X	✓	✓	NA	CRZ 2011/ICRZ 2011. Permitted subject to the existing FSI/FAR norms and without change in the existing use.
		Renovation of natural beauty/historically/heritage sites	X	R	X	NA	CRZ 2011/ICRZ 2011. Public use which means buildings such as for the purposes of worship, education, medical care and cultural activities
17.	Areas requiring special consideration	CRZ areas falling within municipal limits of the Greater Mumbai	R	R	R	NA	CRZ 2011. Developmental activities in the CRZ area of the Greater Mumbai because of the environmental issues, relating to degradation of mangroves, pollution of creeks and coastal waters, due to discharge of untreated effluents and disposal of solid waste, the need to provide decent housing to the poor section of society and lack of suitable alternatives in the inter connected islands of Greater Mumbai shall be regulated
		Development or redevelopment	X	R	R	NA	CRZ 2011. Accordance with the norms laid down in the Town and Country Planning Regulations as they existed on the date of issue of the notification dated the 19th February, 1991, unless specified otherwise in CRZ-2011 notification.
		Slum rehabilitation schemes	X	R	R	NA	CRZ 2011. State Government may implement slum redevelopment schemes as identified as on the date of issue of CRZ-2011 notification directly or through its parastatal agencies
		Redevelopment of dilapidated, cessed and unsafe buildings	X	R	R	NA	CRZ 2011. Due to their age these structures are extremely vulnerable and disaster prone and therefore there is an urgent need for the redevelopment or reconstruction of these identified buildings. These projects shall be taken up subject to the following conditions mentioned in CRZ-2011 notification and safeguards
		Critical Vulnerable Coastal Areas (CVCA)	X	R	R	NA	CRZ 2011. Ecological sensitive areas mentioned in CRZ-2011 notification under norms for regulation of activities permissible in areas requiring special consideration in para. 4, which shall be managed with the involvement of the local coastal communities including the fisher folk.

Source: NCSCM