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**National Cyclone Risk Mitigation Programme
-(NCRMP)-
World Bank Assisted**

***Guidelines for Preparing Cyclone Risk
Mitigation investments in States/UTs***



**Government of India
Ministry of Home Affairs
National Disaster Management Division**

Preface

The Ministry of Home Affairs has drawn up a National Cyclone Risk Mitigation (NCRM) Project to be implemented with the World Bank assistance in 13 coastal and island States/UTs, namely Andhra Pradesh, Gujarat, Andaman, & Nicobar Islands, Pondicherry, Lakshdweep, Orissa, Maharashtra, Tamil Nadu, West Bengal, Kerala, Karnataka, Goa and Daman & Diu.

2. One of the project elements is to support States/UTs to identify and implement high priority activities for cyclone risk mitigation (i.e. construction of cyclone shelters, shelterbelt plantation, preservation/regeneration of mangrove forests, construction of embankments and establishment of missing road links/culverst/bridges etc.) and commissioning of technical assistance/studies to sustain these initiatives, besides strengthening coastal zone management framework in the States/UTs. It is envisaged that the project States/UTs would draw up proposals to suit their local needs for effective mitigation of cyclone risks.

3. In order to assist/guide the project States/UTs in formulation of comprehensive project proposals, a detailed set of guidelines have been developed so as to guide Project States/UTs in formulating investment proposals for cyclone risk mitigation investments to be financed under the project. The main elements of these guidelines include:

- (i) The rationale of the proposed investments and how they are linked to State's vulnerability reduction strategy
- (ii) Expected outcomes including social and economic benefit
- (iii) Cost estimates & financial arrangements
- (iv) Implementation period, institutions responsible for implementation and implementation arrangements
- (v) Sustainability of investments in the post project scenario
- (vi) Assessment of potential environmental and social impacts and strategy to mitigate these impacts.

4. The States/UTs are advised to make use of the guidelines while preparing investment proposals.

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Part A: Background Information

A.1. State Profile (with particular emphasis on coastal regions/ cyclone prone areas):

- A.1.1 Geographic details (through maps for e.g. physical region, geology, climate and rainfall, river system, coastline etc.)
- A.1.2 Demographic details
- A.1.3 Socio economic profile (gender ratio, literacy, % below poverty line, density. % of rural population, social division etc)
- A.1.4. Administrative divisions (No. Districts/ Blocks/Talukas/ GPs/ Villages etc.)
- A.1.5 Economy, Land use pattern, health infrastructures, industry, transportation, communication and trade etc.
- A.1.7. Administrative arrangement
- A.1.8. Multi-Hazard map (ref. Vulnerability Atlas of India) , historical inundation maps.
- A.1.9. Hierarchy of towns and settlements
- A.1.9. Economic indicators of the State/ Human Development Index of the State. How disasters have affected /would affect economy/development of the State

[References: Economic Survey, Human Development Report, Annual Plan, Vulnerability Atlas (BMTPC) etc.]

(Write up should not exceed more than three-four pages excluding maps)

A. 2. Ecology

- A.1.1 Location: Creek/estuary/Lagoon/Island
- A.1.2 Soil Type
- A.1.3 Vegetation Composition(monoculture/mixed forest) & Status (dense/sparse/ degraded)
- A.1.4. Special features endemism/geographical limit of certain mangrove species/ their associates
- A.1.5. Breeding/nesting sites of specific fauna/avifauna

A. 3. Cyclone Hazard, Vulnerability & Risk Assessment

- A.3.1 Hazard Assessment (sources of risk)
 - Wind Speeds (And Tracks)
 - Rainfall & Flooding
 - Storm Surge heights & inundation areas
- A.3.2 Vulnerability Assessment
 - Physical Vulnerability (Lives, Housing, Infrastructure/Lifelines)
 - Socio-economic vulnerability (marginalization, social structure, %disabled, % minor, poverty, literacy, gender discrimination etc. and how these elements contribute to the vulnerability of the State/UT)
 - Environmental vulnerability (Ecosystems)
- A.3.3 Risk Assessment (elements at risk lives, livestock, area, livelihood, crops, trees, infrastructure, communication, houses, etc.)

[References: Vulnerability Atlas (BMTPC), States/UT's own database/ records, Census Database (2001), Existing studies/ Research Papers]

(Write up should not exceed more than five pages excluding maps)

A. 4. Existing Disaster Management Arrangements In The State

- A.4.1 State DM Policy/DM Act/ Institutional framework/ DM Act
- A.4.2 Financing of disaster management in State (relief administration/ plan and non plan schemes for Disaster Management)
- A.4.3 State DM Plans/ Codes/ manuals
- A.4.4 Committees at different levels
- A.4.5 Mechanism for receiving cyclone early warning.
- A.4.6 Warning dissemination protocols
- A.4.7 Existing infrastructure for warning dissemination (including communication system)
- A.4.8 Availability of Cyclone shelters and other cyclone resistant buildings
- A.4.9 Shelterbelt plantation/mangroves and their impact on mitigating cyclone risks.
- A.4.10 Any other measures for cyclone risk reduction

A. 5. Major Disaster Risk Reduction Initiatives Being Taken By The State.

- A.5.1 Change of orientation in relation to Disaster Management
 - Institutional/ Policy changes
 - Steps taken for mainstreaming of disaster management in other sectors
 - Other activities (strengthening of ATIs / Incorporation of DM elements in Education / Training of Govt. officials/ PRIs and other in DM, awareness etc.)

- A.5.2 On going DM projects
- A.5.3 Major initiative for multi hazard mitigation (Drawing up of DM Plans/Putting in place appropriate techno-legal regime/ Setting up of EOC/Search and Rescue Team/ Inventory of resources, any other)

A. 6. Sectoral Gaps/Needs And Priorities For Cyclone Risk Mitigation

- A.6.1 Construction of cyclone shelters (Type Design corresponding to the population, depth of inundation)
- A.6.2 Construction/ renovation of embankments and coastal canals (Including Sluices) for improved drainage
- A.6.3 Shelterbelt plantation/regeneration
- A.6.4 Plantation/ Regeneration of mangroves
- A.6.5 Establishment of missing rural road links / bridges/ culvers etc.
- A.6.6 Studies on coastal zone management/ storm-surge modeling/ hazard mapping/ development of construction standards etc.
- A.6.7 Training and capacity building of Disaster Managers and engineering professionals
- A.6.8 Enhancement and strengthening of on-shore warning system for fishermen, saltpan workers and other vulnerable groups
- A.6.9 Retrofitting of lifeline buildings/ key/vital installations
- A.6.10 Awareness generation

A. 7. Project Implementation and Monitoring

A.7.1 Project Implementation Unit:

Ministry of Home Affairs will be the Nodal Agency for execution of the project at the National Level. The Disaster Management Authority/Disaster Management Depts. in the project States/UTs will function as Implementing Agencies with respect to procurement of works, goods, and services for the specific components under the project.

Each of the Project States/UTs will set up a Project Implementation Unit (PIU) in the Department of Disaster Management/Disaster Management Authority, which will be responsible for the project implementation. The PIU will be responsible for coordination with various line Depts. for putting together investment proposals and coordinating the implementation of the project activities. The PIU will be headed by Secretary Disaster Management as ex-officio Project Director of the PIU with appropriate support staff and will function under the overall direction of the State Steering Committee Chaired by the Chief Secretary/ Administrator.

A.7.2 State Steering Committee:

The States/UTs are expected to draw up sectoral investment proposals for taking up cyclone mitigation activities. A State level Steering Committee will be set up in each of

the project State/UT to scrutinize the investment proposals so as to ensure that the investment proposals adhere to the prescribed norms/guidelines, before sending it to MHA for consideration and endorsement to the World Bank.

A.7.3 Prioritization of cyclone risk mitigation investment:

Prioritization of cyclone risk mitigation activities/investments is crucial for efficient allocation of available resources under the project. Keeping in view the available resources, project States/UTs may prioritize/identify activities in order to effectively address the most immediate and prominent cyclone risks and draw up investment proposals accordingly. The State Steering Committee may decide on the prioritization of the activities and inter-allocation of resources among various activities that are proposed to be taken up under the project.

A.7.4 Linkages with other sectoral area implementation units:

Every line Dept. in the State/UT will also need to set up a Team with appropriate support staff for implementing project activities concerning to that dept. The Team will be lead by an officer not below the rank of Addl. Secretary in the State Govt./ UT Administration.

A.7.5 Financial arrangement:

The cost of cyclone mitigation investments will be shared on a 75:25 basis; where in 75% resources will be provided by the Central Govt. as grant to project States/UTs and the rest (25%) matching resources will have to be provided by the States/UTs for taking up various activities under the project. The project States/UTs are required to make necessary budgetary provision in their budget so as to avail assistance under the project.

A.7.5 Third Party Quality Assurance and Monitoring:

States/UTs will follow the latest versions of codes of practice of Indian Road Congress (IRC), Ministry of Rural Development (MRD). Bureau of Indian Standards (BIS) as applicable for recording and presentation of the relevant design, construction, condition survey, retrofitting, purchase of materials and equipment concerning all the works under the project. For each work/sector a panel of quality assurance monitors will be identified by the States/UTs from amongst the State/Regional/National level institutions, which have the established expertise in that work/sector. The protocols and standards for quality control progress of work, time schedule and benchmarking of the expected norms and cash flow on these issue will be defined for each sector by the PIU as part of specifications laid down by latest version of codes of practice of IRC, MRD, BIS etc. and also be harmonized with the World Bank norms.

A.7.6 Environmental and Social Impact:

Assessment of environmental and social impact of an investment project at various stages of and implementation is an integral part of the planning process. The concerned States / UTs will have to undertake a screening process and based on the potential impact of the proposed activities on the environment will have to classify the said project in the respective category as per the guidelines. Projects with severe adverse impact on the environment will have to be subjected to Environmental Impact Assessment (EIA) and will be considered separately. The proposed activities will also attract various provisions

of Environment Impact Assessment (EIA) Notification, 1994 and Coastal Regulation Zone (CRZ) Notification, 1991 as amended from time to time besides provisions of other relevant acts as applicable. Adequate mitigation measures for the respective activities with potential environmental impacts will be identified and an Environmental Management Plan (EMP) to address these mitigation measures will be appended to the project document.

The project proponent will also undertake a screening of social impact of the proposed activities so as to avoid conflicts and ensure successful implementation and sustainability of the project. Preferable activities involving negative environmental and social impact vis-à-vis providing sustainable livelihood and employment opportunities to the local people should be encouraged. The environment/social screening format is attached at Annexure-I.

A.7.7 Beneficiary consultation process:

Beneficiary consultation process during planning/designing and execution of the proposals is crucial in order to ensure that investments are well targeted to meet the needs of the community. The sustainability of the assets created under the project would be ensured, if the choices and preferences of the community are factored-in during the planning, designing and implementation of the project activities. This may be achieved through involvement of community during site selection, involvement of existing community based organizations, such as women's SHGs, youth groups, mahila mandals etc., during the execution of the project.

Issues involving acquisition of land and resettlement of people as well as any conflicting interest pertaining to the implementation of any of the proposed activities shall be resolved prior to the commencement of the screening/ scoping process. Adequate consultation and participation of the local community should be ensured at all the stages of the project cycle right from its inception. Public hearing, as applicable in the EIA Notification, 1994, as amended from time to time is inevitable for the respective activities and has to be undertaken by the concerned authorities according to the procedure laid down in the said Notification prior to the submission of the investment proposal. Participation of women and Panchayati Raj Members in various activities should be considered on priority.

Thus in order to enhance local ownership of public assets, build up expertise and strengthen existing local institutions the States/UTs should ensure the participation of the community in the widest sense in the proposed interventions.

A.7.8 Sustainability:

Since a number of assets will be created under the project, their operation and maintenance is going to be a key issue. Therefore it is essential that the States/UTs should address sustainability of the interventions either through clear-cut budget provision or by surrendering responsibility of O&M to the community or through any other innovative manner.

A.7.8 Project Monitoring:

Two kinds of indicators would be considered for monitoring progress of the proposed project: (i) programme performance indicator, which allow to measure progress made toward the fulfillment of the stated short, medium and long-term cyclone risk mitigation as described for each of the proposed project components; and (ii) project performance indicators, which measures the flow of the project with respect to procurements, contract preparation and approval, and general disbursement issues.

A.8. Project Budgets**A.8.1: Sectoral Budget Summary:**

Head wise expenditure details for each investment may include recurring cost & non-recurring cost, implementation/operational/establishment cost, cost for monitoring, evaluation and sustainability & quality control, training & capacity building etc.

Part B: Sectoral Proposals

- 1. Construction of Cyclone Shelter**
- 2. Construction/Renovation of coastal canals and embankments for improved drainage.**
- 3. Shelterbelt Plantation**
- 4. Plantation and regeneration of mangroves**
- 5. Construction of Missing Road Links/Bridges**
- 6. Institutional Capacity Building and Hazard Reduction Studies**
- 7. Improvement of on-shore warning system**
- 8. Retrofitting of life-line/key/vital installations (roads/culverts/bridges)**
- 9. Awareness generation for cyclone risk mitigation.**

The State/UTs are required to submit detailed information on the project i.e., its location, description of the works to be undertaken, expected benefits from the project, time frame for execution of works, expected project cost, internal control mechanism, audit plan, environmental evaluation, etc.

The project proposal has to be submitted in the format prescribed below

- a. Description of the project investment
- b. Project objectives
- c. Brief description of location (Please enclose site plan)
- d. Present status of the area before project and how will the investment address the goal of reducing State's vulnerability to cyclones
- e. Expected outcome, including social and economic benefits
- f. Planning assumption
- g. Proposed activities(Brief description of the work components, description of works to be executed and phases of execution).
- h. Environmental and social impact
- i. Involvement of community in the proposed investment
- j. Risk factors
- k. Project management arrangements including brief outline of accounting policies to be adopted & accounting records proposed to be maintained for the project, audit plan, internal controls proposed to be set up for proper control over the project
- l. Quality control & Monitoring
- m. Project Costs/Budget (labour, capital, operation cost, contingency, maintenance, any other)
- n. Time Frame (preliminary study, engineering design, expected date of fulfillment of all technical conditions to be met prior to start up)
- o. Sustainability

B1 Guidelines for Construction of Cyclone

B1.1 General Note:

A large number of people in the Coastal area do not have access to safe shelters, which could withstand the fury of cyclone. States/UTs may conduct studies along the entire coastline to find out villages/settlements where people do not have access to safe shelters within a range of 1.5 km and without having to cross a natural barrier. Cyclone shelters may be constructed in such places.

However, the cyclone shelters, unless maintained properly would gradually dilapidate and become useless. Therefore, the cyclone shelters should be designed for multi-purpose use such as school building, community center, or any other public utility buildings so as to ensure that these building are used and maintained during normal times. For proper maintenance of these specially designed buildings in hostile terrains communities should have a sense of ownership of these. Therefore, Cyclone Shelter Management and Maintenance Committees may be constituted for upkeep of these shelters. A corpus fund may be placed with the committee for routine maintenance of the buildings. The committees may be encouraged to generate funds/revenue by collecting fees from people for using the buildings for social/cultural functions.

B1.2 Description :

- (i) Need and rationale for undertaking this activity
- (ii) Present status of Cyclone shelters in the States/UTs
- (iii) Assessment about the need and requirement and of the number of Cyclone shelters
- (iv) Availability of other buildings which can be used as cyclone shelters
- (v) Number of shelters to be built
- (vi) Involvement of the other departments while deciding the assessment needs
- (vii) Key issues such as location of cyclone prone areas, design criteria, multiplicity of usage and arrangement for maintenance

B1.3 Objectives:

- (i) To build adequate cyclone shelters so as to ensure physical safety of people those who have no access to safe shelters
- (ii) To save human lives and livestock and to ensure their sustenance during a disaster
- (iii) To safeguard basic assets needed by people to survive after disaster
- (iv) To carry out basic medical facility during and after disaster
- (v) To use as integrated service delivery centers (such as immunization programmes, feeding, social, cultural and education programmes)
- (vi) To use for community functions
- (vii) To use as a school

B1.4 How it will address the goal of reducing States/UTs vulnerability to cyclones

- (i) By building safe structures for the physical safety of the vulnerable community.
- (ii) By designing and building robust cyclone proof shelters which have storage and resting areas sufficiently high above the ground using corrosion resistant and durable materials
- (iii) Using construction methods with sufficient quality assurance and monitoring checks.

B1.5 Expected outcome including social and economic benefits

- (i) Minimization of loss of lives, property and livestock
- (ii) Can be used as the nodal point for receipt and dissemination of cyclone warning.
- (iii) Ensures safekeeping of essential stocks/items for post disaster usage.
- (iv) Can be used as a nodal point for carrying out post disaster response and relief activities.
- (v) Provides temporary protection from the monsoon and the summer to the shelter less people.
- (vi) Provides a place for providing basic health services like immunization programmes etc
- (vii) It can function as integrated service delivery center for the activities like feeding, training programmes, group meetings of youth, men and women during normal times
- (viii) Transfer of cyclone/flood/corrosion resisting housing technology

B.1.6 Planning Assumption

Population exposed to cyclones and population that need protection, inaccessible/remote/coastline villages having without safe shelters, population and number of villages in the coast line, number of cyclone shelters required, proximity from the coastline, multiple usage of the building, space planning (functional requirements have to be taken into consideration), ensuring availability of drinking water facility, sanitation, electricity & power back up interior building design, road- connectivity to the village where the cyclone shelters are planned, approach road to the cyclone shelters, special care to be taken so as to address the needs of children, old, disabled and women issue etc.

Performance Criteria

- To withstand storm surge and wind speed of the locality, adherence to existing codes regarding dead and live loads, soil bearing capacity, space, shape, disable friendliness etc.
- The cyclone shelters are to designed to serve the population in a radius of 1.5 km from their location. These are to be designed keeping in mind the expected storm surge height at the place where it is to be located.

- If the storm-surge level is 1 meter, then, plinth height for cyclone shelters should be 1.5 meters. In these cases stilts are not required. The building could be single story only.

Design criteria

- If the storm- surge level is more than 1.5 meters and less than 4.5 meters, then, the plinth should be taken as 1.5 meters and the ground floor should be used as stilt with a height varying from 2.5 meters to 4.5 meters.
- If the storm-surge level is more than 4.5 meters, then, the roof of the first floor/terrace could be used as cyclone shelter.
- To make use of the space provided as stilt on the ground floor the temporary partitions could be erected and concrete benches could be provided which are easy to maintain and clean after a cyclone.
- Rain water harvesting technique could be adopted so as to make drinking water available to people in the cyclone shelter at the time of cyclone/storm-surge.
- In general the shelters are in RCC frame with non-load bearing, laterally supported filler walls and deeper foundation on elevated ground so as to avoid submergence of the main structure during cyclonic events. Building specifications which are currently in use and specified in the National Building Code (NBC) will be adopted in all the proposed works.
- Following specifications are to be adopted to make the cyclone shelters structurally safe.
- At least 5 millimeters extra cover to that normally specified in IS 456 is to be provided to all steel reinforcement.
- Improved design of roof covering with shorter eaves to prevent uplift, with appropriate roof-slopes (say 22.5 deg to horizontal) with stronger anchoring, Hipped roofs are better than gabled roofs.

Loads- The shelter is to be designed for a basic wind speed taken 40% higher than that specified for the sea coast areas in IS: 875 (Part –3 1987). Floor and roof are to be designed for live load 500 kg/sqm as per IS:875-1964 so as to cater for crowding in the shelter.

Foundations- The shelters shall be supported by under – reamed pile foundation with the top of the pile cap at 2 ft below ground level to keep the piles free from scouring

action. The pile and pile caps are to be designed as per IS:2911-1973 (giving minimum 5 millimeter extra cover to the reinforcement for corrosion protection.)

Plaster- Where plastering of RCC elements has to be carried out, use of Recron 3S fibers may be considered to achieve tougher non-cracking surface providing extra safety against corrosion.

Design Criteria- The RCC members are to be designed on the basis of limit state design as recommended in IS-456 –2000. RCC frames may be analyzed by using any standard elastic method. The concrete grade to be adopted is M 30. Blended cement may be used for improved durability.

Steel- High yield strength deformed bars of corrosion resisting quality with a minimum guaranteed yield stress of 500 MPa may be adopted.

(Suggestions furnished here are for guidance in project proposal preparation and shall be checked prior to submission and execution.)

B.1.7 Proposed Activities:

- (i) Detailed Project proposal preparation
- (ii) Selection and taking possession of location
- (iii) Soil investigation
- (iv) Construction suitability tests
- (v) Shelter design and estimates
- (vi) Selection of construction, quality assurance and monitoring agencies.
- (vii) Testing of construction materials to be used.
- (viii) Construction activity and completion of work.

B.1.8 Environmental and Social Impact

Generally, does not involve large land acquisition, or displacement of people, hence no negative environmental and ecological impacts are envisaged. If it does, necessary remedial steps are to be taken.

B.1.9 Risk Factors

Facing unfavourable foundation strata, ground water may not be potable, unfavourable climate may delay construction, lack of cooperation and co-ordination among concerned agencies etc.

B.1.10 Management and Maintenance

- (i) Management
Management of the cyclone shelters may be entrusted to the village Panchayat/community members
- (ii) Maintenance
 - (a) Ensure multipurpose use of shelters

- (b) Collect suitable maintenance fund from the users by putting them for use for social functions.
- (c) Establish corpus fund

B1.11 Quality control and monitoring strategy

The State/UTs will follow the Proforma of the latest versions of Bureau of Indian Standard (BIS) codes of practice BIS 456-2000 and National Building Code (NBC) Guidelines for recording and presentation of relevant design and construction work details. For the protocol and standards for quality assurance and monitoring of the work and bench marking and expected norms, the direction of PIU will be followed.

B1.12 Project Cost:

Cost estimates for the respective activities shall be worked out by the Implementing Agency based on the standard practices and norms and indicated against the respective activity. A summary of Budget may be appended indicating the Cost sharing for the respective components through the Project Budget as well as through various Schemes / Projects of the State/Central Agencies as well as or any other sources of funding including international initiatives.

B1.13 Time Frame:

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B1.14 Sustainability:

- (i) Properly designed and constructed shelters with assured quality will make the shelters will withstand cyclone hazards and give durable and satisfactory service for a long period with least maintenance.
- (ii) The shelters during normal period can be put to use as schools, hospital, community centers, social gathering centers by collecting suitable user fee and these funds can be used for maintaining these shelters.
- (iii) Community involvement ensures ownership of programmes and maintenance of assets.

B.2 Guidelines for Construction/Renovation of Coastal Canals and Saline Embankments

B.2.1. General Note

B.2.1.1 Construction /Renovation of Coastal Canals

In the deltaic areas surface communication is a major handicap for response activities. In the flat terrains intertwining of rivers and rivulets is quite common. The widths of the tidal rivers are linked to the sea tide and may not have a stable embankment. This makes it difficult to construct bridges on these. An alternative to road communication could be a coastal canal system. A canal network in the coast would also be an effective tool of water management. In the deltaic area in some of the States such canal system existed but are now in a derelict state. Renovation of such canals may also be considered under the project.

Besides the States/UTs may also consider improvement to minor drains in the coastal areas for effective drainage of water and flood embankment works, which may include repair and reconstruction of damaged and other vulnerable flood embankments. Before taking up the work, one has to complete the reconnaissance survey and visual inspection, find the causes of damage, and establish the degree of damage and workout appropriate remedial measures. In the case of new constructions, the feasibility study involving the economic importance of the project, geographical features, measurable and non-measurable benefits, the method of economic appraisal and cost benefit analysis should be completed. Preparation of a Detailed Project Report (DPR) is a pre-requisite for proper evaluation of the project and it ensures timely completion and avoids time and cost over runs.

B2.1.2 Construction /renovation of Saline Embankments

Saline embankments protect people, livestock and agricultural fields from saline water inundation/storm surge. Hence, there is a need to protect vulnerable areas by renovating the existing embankments and creating new ones.

However, saline embankments have a potential to kill the mangroves due to chocking of saline water. The States/UTs may carry out detailed inspections to identify areas where these are required to be constructed particularly, where vegetative protection would not suffice. In those areas saline embankments will be constructed.

B.2.2 Description

B.2.2.1 Construction/Renovation of Coastal Canals

- (i) Need and rationale for undertaking this activity.

- (ii) Present status of coastal canals and drains
- (iii) No. of villages that do not have proper irrigation canals and drains
- (iv) No. of villages affected by damaged irrigation canals and drains
- (v) Assessment about the need, requirement of canal/drains length (km) to be renovated/newly constructed.
- (vi) Assessment about the need, requirement and the number of canals/drains locking gates and sluices to be renovated/newly constructed
- (vii) Involvement of the community and other departments while assessing the needs.
- (viii) Key issues such as location of cyclone prone areas, alignment selection, design criteria, range of tests to be carried and renovation/construction methodology etc.

B2.2.2 Construction/renovation of Saline Embankments

The points (i), (vii) and (viii) are same as in B2.2.1

- (ii) Present status of saline embankments/ locking gates and sluices
- (iii) No. of villages that do not have saline embankment/ locking gates and sluices
- (iv) No. of villages affected by damaged saline embankments/ locking gates and sluices
- (v) Assessment about the need, requirement of saline embankments length (Km)/ No. of locking gates/sluices to be renovated
- (vi) Assessment about the need, requirement of saline embankments length (km) / No. of locking gates/sluices to be constructed.

B2.3 Objectives

B2.3.1 Construction/renovation of Coastal Canals

- (i) Improved drainage for better flood water management.
- (ii) To have alternate mode of transport through waterways in times of need.

B2.3.2 Construction/renovation of Saline Embankments

- (i) To protect people, livestock, agricultural fields from saline water inundation.
- (ii) The Secondary objective is to ensure sustainable agricultural production of the vulnerable population.

B2.4 How it will address the goal of reducing State/UTs vulnerability to Cyclones

B2.4.1 Construction/renovation of coastal canals.

- (i) It will ensure the expected functionality of canals /drains in acting as shock absorbers for flood water and its force during cyclonic event. As a consequence of this, the prospect of inundation of agricultural fields, villages and roads is diminished completely or at least to a manageable level.
- (ii) All weather access to vulnerable villages is maintained as road inundation is reduced.

- (iii) By adopting the state-of-the-art technology for design and construction works, one can achieve robust canals and drains that are cyclone resistant, all weather serviceable and durable.

B2.4.2 Construction/renovation of Saline Embankments

- (i) As it will ensure the expected functionality of saline embankments in the event of cyclonic event, the prospect of inundation of agricultural fields and villages is diminished .
- (ii) It will help in keeping the agricultural activity sustainable even during cyclonic events.
- (iv) By adopting the state-of-the-art technology for design and construction works, one can achieve robust canals and drains that are cyclone resistant, all weather serviceable and durable.

B2.5 Expected Outcome including Social and Economic benefits

B2.5.1 Construction and renovation of costal canals/ drains

- (i) Minimization of loss of life and livestock
- (ii) Providing all weather alternate access through waterways to the cyclone prone areas
- (iii) Helps the artisans, farmers and fishermen in transporting their produce to market centers through alternate route ensuring them daily livelihood.
- (iv) Helps in movement of relief/emergency aid
- (v) Helps in evacuation of vulnerable groups/communities to safer places
- (vi) Ensure measurable benefits like reduction in operation and transport costs for goods and people etc. and non-measurable benefits like development of adjoining areas, promotion of social and cultural contacts among people of neighbouring villages and restoration of self confidence among vulnerable people.

B2.5.2 Construction/renovation of saline embankments.

- (i) Minimization of loss of life and live-stock
- (ii) Protect people, livestock and agricultural fields from saline water inundation and ensure sustainable agricultural production
- (iii) Ensures measurable benefits like reduction in vulnerability of crop production and improved productivity in the coastal saline belt and restores self-confidence among vulnerable people.

B2.6 Planning Assumptions

2.6.1 Construction and renovation of costal canals/ drains

- (i) Feasibility study, preparation of preliminary project report have been carried out by competent authority using conventional methods as indicated in (i) IS 8835-1978 and IS 12094-1978 standard specifications that deal with drainage network and waterway embankments and the CWPC guidelines For embankments IS -1786 is followed.
- (ii) Number and length of canals/drains and their locking gates and sluices to be renovated / constructed in the cyclone prone areas.

- (iii) Feasibility report and Preliminary Project Report are prepared as per relevant BIS/CWPC standards and practices and are available. Such a report has covered the following elements (a) cross section of canal/drain, (b) cross section of embankments, (c) soils stabilization aspects, (d) details of locking gates and sluices etc.
- (iv) Preliminary survey, hydraulic survey and subsoil investigations of the proposed site have been carried in accordance with relevant IS specifications and CWPC standard practices currently being followed for canals and drains.
- (v) Locking gates/sluices where applicable are designed following the corresponding BIS, Central Water Planning Commission (CWPC) standards.

2.6.2. Construction/renovation of saline embankments.

- (i) Feasibility study, preparation of preliminary project report have been carried out by competent authority as given in relevant BIS codes of practice and CWPC practice
- (ii) Number and length of saline embankments constructed and their locking gates and sluices to be renovated
- (iii) Feasibility report and preliminary project report are prepared as per relevant BIS standards and CWPC practices and are available. Such a report has covered the following elements (a) cross section of embankments (b) low-tide level and high-tide level, (c) details of locking gates and sluices etc.
- (iv) Preliminary survey, sub-soil investigation of the propose site have been carried out in accordance with relevant IS specifications and CWPC practices currently being followed for embankments

Performance Criteria (construction/renovation of coastal canals/drains and embankments)

To withstand the fury of cyclone floods, storm-surge, wind speed and seismic forces, of the locality, hydraulic forces as indicted in relevant CWPC practices and BIS codes of Practice.

Design Criteria (construction/renovation of coastal canals/drains and embankments)

The reinforcement cover of the foundations, substructure locking gates/sluices will be at the level specified in IRC:SP: 33-1989 to achieve the expected level durability. For steel structure, the IS-800 will be followed.

The materials used and the construction methodology followed will be in conformity with the relevant BIS specifications and CWPC practices. In absence of specific guidelines in these codes, the designers/manufacturers guidelines are to be followed.

B 2.7 Proposed Activities (construction/renovation of coastal canals/drains and embankments)

- (I) Inspection of the site and its surroundings for planning construction related work.
- (II) Study of design Report.
- (III) Preparation of design review report which includes details of the likely difficulties that may arise during the implementation process of renovation/construction work and suggested alterations if any.
- (IV) Selection of competent agency for the development of construction methodology and cost estimates
- (V) Selection of an experienced agency to carryout the construction work.
- (VI) Mobilization of construction machinery and manpower, constructing of site office, stores, work force residences etc.
- (VII) Tests on construction materials.
- (VIII) Construction activity and completion of work.

B2.8 Environmental and Social Impact

Generally, it does involve acquisition and displacement of people; hence negative environmental and ecological impact is envisaged. In the case of canal work, it will also involve the borrow areas. Necessary remedial steps are accordingly to be taken.

B2.9 Risk Factors (construction/renovation of coastal canals/drains and embankments)

While executing the construction work, new site problems such as encountering of unexpected soil strata and deciding about course of action which may arise, fresh land acquisition problems may also crop-up. Unfavourable climate, untimely supply of construction materials, lack of cooperation and coordination among concerned agencies etc may crop-up.

B2.10 Management and Maintenance

- (i) Management
Concerned State Depts. will be responsible for day to day management under the overall guidance of the PIU established in the State Dept. of disaster Management/DM Authority.
- (ii) Maintenance
 - (a) The State/ UTs have to make a separate provision for carrying out the maintenance work of canals, drains and embankments of cyclone prone areas in their annual budget.
 - (b) The State Public Works Department /Irrigation Department/Panchayat Raj Engineering Department which-ever deals with canals, drains and embankments in the concerned States/UTs is to be entrusted with the maintenance work.

B2.11 Quality Control and Monitoring Strategy.

The State/ UTs will follow (for recording and presentation of relevant construction works and materials.) the proformas of the corresponding BIS/CWPC practices for quality systems for canals, drains and embankments, IS 456 for RCC works and for material standards relevant latest BIS codes. For the protocol and standards for quality assurance and monitoring of the works and bench marking and expected norms, the direction of PIU will be followed.

B2.12 Project Cost (construction/renovation of coastal canals/drains and embankments): Cost estimates for different elements/cost sharing – Project /State/Central.

State/ UTs will work out estimates following CWPC/ irrigation Department practices and include the items (following standard practices and norms) in their budget and submit the proposal to MHA after the approval of the State Steering Committee.

B2.13 Time Frame (construction/renovation of coastal canals/drains and embankments)

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B2.14 Sustainability (construction/renovation of coastal canals/drains and embankments)

- (i) canals, drains and embankments that are properly inspected, proof checked design and executed by experienced agencies will give expected serviceability and durability and in most case satisfactory service for a long period with least maintenance.
- (ii) Regular allocation of funds for inspection and maintenance of roads, culverts and bridges through a provision in their annual budget.
- (iii) Collection of nominal cess from the road users helps in routine maintenance like removing of weeds and plants from the canals, drains and embankments.

B.3. Investment Proposal Guidelines for Shelterbelt Plantation

B.3.1 General Note:

Shelterbelts are barriers of trees or shrubs that are planted to reduce wind velocities and as a result, reduce transpiration and prevent wind erosion. In coastal areas shelterbelt plantation of Casuarinas is one of the most suitable and effective alternative to minimize the impact of wind velocity and saline ingress. They also provide direct benefits to agricultural crops, resulting in higher yields, and provide shelter to livestock, grazing lands and farms. Main objective of windbreaks and shelterbelts is to protect the human habitations and agricultural crops from physical damage due to high velocity of wind along the coastal areas. Other benefits include preventing or reducing wind erosions; reducing evaporation from the soil; reducing transpiration from plants; and moderating extreme temperatures. Windbreak/ Shelterbelt protects an area over a distance up to its own height on the windward side and up to 20 times its height on the leeward side, depending on the strength of the wind.

When designing shelterbelt, the direction of the wind must be considered. A barrier should be established perpendicular to the direction of the prevailing wind for maximum effect. The effectiveness of the windbreak or shelterbelt is influenced by its permeability. If it is dense, like a solid wall, the airflow will pass over the top of it and cause turbulence on the leeward side due to the lower pressure on that side; this gives a comparatively limited zone of effective shelter on the leeward side compared to the zone that a moderately permeable shelter creates. Optimum permeability is 40 to 50 percent of open space, corresponding to a density of 50 to 60 percent in vegetation. Gaps in the barriers should be avoided. Permeability of dense shelterbelt can be improved by pruning lower branches at 0.50 –0.8 m from the soil level.

The trees selected for such salt-breaks must have some degree of salt tolerance, for they will concentrate salt under the crowns. Species that has been used successfully tried in India include *Casuarina equisetifolia*. In the selection of tree or shrub species for windbreaks or shelterbelts, the following characteristics: such as rapid growth, straight stems, wind firmness, good crown formation, deep root system which does not spread into nearby field, resistant to drought, desired phonological characteristics (leaves all year long or only part of the year) are considered very important

B.3.2 Description of the Project investment:

- Need and rationale for undertaking this activity
- Present status of Shelterbelt Plantation in the State/UT
- Area to be covered under the existing plan, gap areas

- Master plan for shelterbelt plantation/ other schemes being implemented/ gaps etc.
- Intensive plantation/ issue of irrigation, wind / resource and time exhaustive scheme

B.3.3 Objectives

- To increase protection of life and property from cyclone, storm, gales and tidal waves to:
- To prevent deposition of sand and salt brought out by wind speeds
- To stabilize sand dunes from shifting of water course embankments
- To prevent floods and consolidate riverbanks and canal bunds.
- To increase the area under tree cover
- To create better environmental conditions along coastal zones.
- To ensure availability of fuel , fodder and local construction materials to the community
- To improve of the social and economic condition of the coastal residents

B.3.3 How it will reduce the State's vulnerability to Cyclones

Shelterbelts are barriers of trees or shrubs that are planted to reduce wind velocities and as a result, reduce transpiration and prevent wind erosion. In coastal areas shelterbelt plantation of *Casuarinas* as a main specie is the most suitable and effective alternative to minimize the impact of wind velocity and saline ingress. They also provide direct benefits to agricultural crops, resulting in higher yields, and provide shelter to livestock, grazing lands and farms. Main objective of windbreaks and shelterbelts is to protect the human habitations and agricultural crops from physical damage due to high velocity of wind along the coastal areas. Other benefits include preventing or reducing wind erosions; reducing evaporation from the soil; reducing transpiration from plants; and moderating extreme temperatures.

B.3.4 Expected Outcome, including social and economic benefits:

- Protection of shore line from strong wind erosion
- Protection of life and property from cyclones, storms, gales and floods
- Reduce wind velocities and reduce transpiration and minimize impact of saline ingress in the coastal areas.
- Stabilize sand dunes and protect human habitations and agricultural crops from physical damage due to high velocity of wind.
- Provide timber, fuel / fire wood and other economic benefits to the coastal community.

B.3.6 Proposed activities:

Plantation of Shelterbelt, maintenance of the existing plantations , plantation of other salt tolerant species of plants of economic importance so as to provide sustainable livelihood to the coastal community so as to reduce pressure on shelterbelt plantation leading to their cutting and destruction. Concerned States/UTs should also evolve suitable institutional mechanism including constitution of the Village level Committees so as to ensure participation of the coastal community. Adequate emphasis should be given to involvement of women in such Committees.

B.3.7 Environmental and Social Impact:

Issue of land acquisition, displacement of people, negative environmental impact

B.3.8 Risk factors:

- Passive interest of the implementing agencies/ State Governments in plantation, protection and maintenance of shelterbelts.
- In effective implementation and monitoring of existing Policy and legal provisions
- Availability of inadequate funding mechanism
- Lack of community participation
- Lack of training and capacity building, education and awareness and extension programs so as to provide livelihood options and ecological and economic benefits to the coastal community.
- Lack of adequate infrastructure for protection of shelterbelts including institutional capacity building and sustained monitoring mechanism for effective implementation of the program.

B.3.9 Implementation period:

Phasing of activities/ responsible institutions/ implementation arrangements to be identified by the State/UT

B.3.10 Project Management/ Implementation arrangements:

- Identification of suitable sites for plantation of Shelterbelt
- Identification of suitable species of plants depending on their ecological and physiological characteristics.
- Identification of Implementing Agency and evolve suitable institutional mechanism for implementation and monitoring including Constitution of State/ District/ Village level Committees

B.3.11 Quality Control & Monitoring

Concerned State/ UT should identify suitable Monitoring Mechanism with institutional arrangements so as to ensure effective implementation of the respective activities . State/UT should also ensure timely submission of Progress Reports, Statements of activity wise Expenditure and Utilisation Certificate pertaining to the Project.

B.3.12 Project Costs:

Cost estimates for the respective activities shall be worked out by the Implementing Agency based on the standard practices and norms and indicated against the respective activity. A summary of Budget may be appended indicating the Cost sharing for the respective components through the Project Budget as well as through various Schemes / Projects of the State/Central Agencies as well as any other sources of funding including international initiatives.

B.3.13 Time line:

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B.3.14 Sustainability:

- Effective implementation of Policies , Programmes and legal instruments by the concerned agencies
- Effective implementation and monitoring of the project activities and timely submission of Progress report and utilization of funds for the respective activities
- Ensure Community participation with Joint Mangrove Forest Management approach
- Training and Capacity Building at institutional and individual level and placement of the trained staff in the concerned institutions at least for a considerable period so as to utilise their training to carry out respective functions for which they have been trained.
- Identify sustained source of funding and institutional arrangements for essential carry forward activities

B.4. Investment Proposal Guidelines for plantation-regeneration of Mangroves

B.4.1 General Note:

Mangroves are most complex coastal ecosystems occurring in the protected areas of tropics and subtropics. They consist of trees and bushes growing below the high water level of spring tides. Their root systems are regularly inundated with saline water, although it may be diluted by freshwater surface runoff. Mangrove forests are characterized by a very low floristic diversity compared with most inland forests in the tropics. This is because few plants can tolerate and flourish in saline mud and withstand frequent inundation by seawater.

Mangrove forests develop best in areas of high sedimentation, such as estuaries and deltas, where their presences aids accumulation and compaction of river borne sediments. They are highly specialized plants that have developed unusual adaptations to the unique environmental conditions in which they are found. Accordingly, a very limited area along the coast is available for sustaining mangroves. Species specificity of mangroves including their geographical distribution based on various ecological factors along east and west coast of India has also been reported. Implementing agencies may take these factors into consideration while drawing up investment proposals.

B.4.2 Description of the Project investment:

Proposed Investment initiatives should address need and rationale for undertaking the activity, indicate status of mangroves in the State/UT in brief (Appendix B.4.I), covering on-going efforts of Central and State Governments, Inter-governmental agencies and International organizations related to conservation and management of Mangroves and identify gaps based on the lessons learnt from these initiatives. The proposed activities should include identification of potential areas for plantation and regeneration of Mangroves in the State/UT and earmark area to be covered for plantation, regeneration and protection under the existing plan, Emphasis should be given to Joint Mangrove Management approach so as to ensure participation of the coastal community with specific reference to participation of women, weaker sections so as to provide equitable sharing of benefits to all the stake holders covering various sections of the society .

Reference - National Mangrove Atlas & other State and National schemes

B.4.3 Objectives:

- To provide preventive mechanism and natural mitigation measure by providing bio-shield leading to protection of life and property from cyclones, storms, gales and tidal waves
- To protect coastline from soil erosion and deposition of sand and salt brought out by wind speeds,
- To reduce damage caused by floods and consolidate river banks,

- To enhance fishery resources by providing nursery and breeding grounds for plethora of bio-diversity and food chain for capture and culture fisheries.
- To increase area under tree cover thereby creating better environmental conditions along coastal zones, prevent coastal erosion

B.4.4 How it will address the goal of reducing State’s vulnerability to cyclones:

Plantation, Regeneration and protection of Mangroves will act as a bulwark against the natural hazards such as Cyclones, hurricanes and floods and provide natural shelter as well as protective shield for the lives and property against these hazards. They will also help in prevention of soil erosion and provide ecological and economic benefits to the coastal community including livelihood and employment opportunities.

B.4.5 Expected Outcome, including social and economic benefits:

Besides the ecological and economic benefits effective implementation of the proposed Management Action Plan (MAP) for Mangroves will enhance ongoing activities of Government of India in Conservation and Management and sustainable utilisation of Mangrove genetic resources through community participation in an integrated manner.. It will also assist in strengthening institutional and individual capacity building and generate awareness among the coastal community regarding importance of mangroves and their role in mitigation risk of the cyclones and other natural hazards.

B.4.6 Planning assumption:

- Identify potential areas for regeneration and plantation of Mangroves based on their ecological characteristics.
- Confirm ownership details of the identified area for plantation/ regeneration of Mangroves.
- Identify suitable species of Mangroves with specific emphasis on plantation of rare, endangered , threatened and endemic species and their ecological and economic importance.
- Plantation /regeneration to be done in the respective seasons on East and West Coasts
- Evolve suitable Institutional mechanism for implementation and monitoring including constitution of the respective Committees at State / District/ State/UT level prior to initiation of the respective activities.

(Refer to Annexure-II)

B.4.9 Proposed activities:

(As per the proforma enclosed at Annexure-III)

B.4.10 Environmental and Social Impact:

Issue of land acquisition, displacement of people, negative environmental impact

B.4.11 Risk factors:

- Passive interest of the implementing agencies/ State Governments in Conservation and management of Mangroves.
- In effective implementation and monitoring of existing Policy and legal provisions leading conversion of Mangrove wetlands for developmental activities.
- Availability of inadequate funding mechanism
- Lack of community participation
- Training and capacity building, education and awareness and extension programs so as to provide livelihood options and ecological and economic benefits to the coastal community.
- Lack of adequate infrastructure for protection of Mangroves including institutional capacity building and sustained monitoring mechanism for effective implementation of the program.

B.4.12 Implementation period:

Phasing of activities/ responsible institutions/ implementation arrangements to be identified by the State/UT

B.4.13 Quality Control and Monitoring:

Concerned State/ UT should identify suitable Monitoring Mechanism with institutional arrangements so as to ensure effective implementation of the respective activities as indicated in the Work Plan. State/UT should also timely submission of Progress Reports, Statements of activity wise Expenditure and Utilisation Certificate pertaining to the Project.

B.4.14 Project Costs:

Cost estimates for the respective activities as indicated in Appendix B.4.II shall be worked out by the Implementing Agency based on the standard practices and norms and indicated against the respective activity. A summary of Budget may be appended indicating the Cost sharing for the respective components through the Project Budget as well as through various Schemes / Projects of the State/Central Agencies as well as or any other sources of funding including international initiatives.

(Activities indicated in Work Plan are only indicative. Implementing Agency may modify, add or delete these activities as per their requirement)

B.4.15 Time line:

Implementing Agency should identify suitable activities as indicated in Appendix B.4.II and prioritise them, identify institutional mechanism and draw a feasible Work

Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

(Activities indicated in Work Plan are only indicative. Implementing Agency may modify, add or delete these activities as per their requirement)

B.4.16 Sustainability:

- Effective implementation of Policies , Programmes and legal instruments by the concerned agencies
- Effective implementation and monitoring of the Management Action Plan (MAP) on Mangroves and timely submission of Progress report and utilisation of funds for the respective activities

B.5.Guidelines for Undertaking Construction of Missing Road Links/Culverts/Bridges

B.5.1 General Note

Effective road connectivity ensures fast deployment of men, materials and machinery to affected areas and also ensure speedy evacuation of people from vulnerable places to safer areas in the face of an impending disaster threat. There is a need for development of a reliable road network in the vulnerable areas so as to ensure coordination of relief and response in the event of a cyclone. The link roads to existing cyclone shelters is also very crucial for evacuation of people.

Road projects involve huge investment. Hence, it is crucial to give adequate attention at the planning and design stage itself so as to achieve better and economical alignment. Roads are always associated with culverts and bridges as the terrain demands, to make them fit throughout the year. While selecting the bridge site factors like (i) permanency of the channel, (ii) presence of high and stable banks (iii) narrowness of the channel and large average depth compared to maximum depth, straight reach of the stream u/s and D/s of the proposed site, freedom from islands both u/s and D/s, possibility of right angled crossings, good approaches etc., are to be given adequate attention so as to keep them functional in the event of any disaster.

Preparation of a detailed project report (DPR) is a pre requisite for proper evaluation of the project and it ensures timely completion and avoids time and cost over runs.

B 5.2 Description

- (i) Need and rationale for undertaking this activity.
- (ii) Present status of road links in cyclone prone areas.
- (iii) No. of villages not linked with all weather roads in cyclone prone areas.
- (iv) Assessment about the need, requirement and road length (km) to be constructed.
- (v) Assessment about the need, requirement and the number of culverts and bridges to be constructed.
- (vi) Involvement of other departments while deciding the assessment needs.
- (vii) Key issues such as location of cyclone prone areas, site selection, design criteria, range of tests to be carried and construction methodology etc.

B5.3 Objectives

- (i) To create a reliable road network that connects vulnerable areas to select nodal centers from where transport, relief and rehabilitation operation can be coordinated in the event of a natural disaster..

B5.4 How it will address the goal of reducing State/UTs vulnerability to cyclones.

- (i) It will ensure linking of access and feeder rural roads to all weather functionality hence the villages that are cut off during cyclones will be brought to approachability.
- (ii) The construction of roads, culverts and bridges will provide all weather access to the villages.
- (iii) By adopting the state-of-the-art technology for design and construction works, one can achieve robust roads, culverts and bridges that are cyclone resistant, all weather serviceable and durable.

B5.5 Expected outcome including Social and Economic benefits.

- (i) Minimization of loss of life and live-stock
- (ii) Providing all weather access to the cyclone prone villages
- (iii) Helping the artisans, farmers and fishermen in transporting their produce to market centers ensuring them daily livelihood.
- (iv) Helping in the movement of vulnerable people to safer places.

B5.6 Planning Assumptions

- (i) Feasibility study, preparation of preliminary project report have been carried out by competent authority using conventional methods as indicated in (i) IRC:5-1998 and IRC:6-2000 standard specifications & code of practice for road, bridges, section 1- General features of design and (ii) Section II Loads and Stress respectively; (iii) IRC:SP:54-1999 Project preparation Manual for Bridges, (iv) IRC 34-1970 Recommendation for road construction in water logged areas. (v) IRC:28-1967 Tentative specification for the construction of stabilized soil roads with soft aggregates in areas of moderate and high rain fall, and (vi) IRC:64-1990 Guidelines for capacity of roads in rural areas and MORD specifications for rural roads.
- (ii) Number and length of roads, culverts and bridges to be constructed in the cyclone prone areas.
- (iii) Feasibility report and Preliminary Project Report as per format (IRC:SP:541999 for bridges and IRC:SP:26-1984 Report containing recommendations of IRC regional workshop on rural development for roads) are available. Such a report has covered the following elements. (a) Linear waterway, (b) Scour depth, (c) afflux, (d) LFL & HFL (e) Vertical clearance (f) Width of the carriage way, foot path (g) required aesthetic features like functionalism and environmental integration etc, (h) type of foundations (shallow or deep) open footing raft/pile/well etc are to be clearly indicated in the GAD (General Alignment Drawing). (i) Foundations (j) Abutments (k) Wing walls/return walls (l) Piers, columns and bearings (m) Deck including beams (n) Details of road surface,

- drainage and parapets (o) Expansion joints (p) Details of approaches and protective works.
- (iv) Preliminary survey, hydraulic survey and subsoil investigations of the proposed site have been carried in accordance with relevant IRC specifications and standard practices currently being followed for road and bridge projects.
 - (v) For the culverts and bridges where applicable the corresponding MOST standard drawings which deal with culverts, slab bridges (right as well as skew), RCC T beam bridges and PSC girders with RCC slab composite bridges are to be followed where applicable otherwise fresh designs are worked out.

Performance Criteria

To withstand the fury of cyclonic floods, storm-surge and wind speeds and the seismic forces, dead and live goods, breaking forces etc as indicated in relevant IRC and BIS Codes of practice (IRC:5-1998 and IRC:6-2000 standard specifications & code of practice for Road Bridges section I & Section II respectively and IS 875-1987 and IS 1893-1984 which deal with wind and Earthquake resistant design of structures respectively).

Design Criteria

The reinforcement cover of the foundations, substructure and superstructure will be at the level specified in IRC:SP: 33-1989 to achieve the expected level durability.

The construction of Bridges and Roads is to be done in accordance with MORTH specifications for road and bridge works –2001 and IRC:SP:20-2002 (Rural Roads Manual).

The materials used and the construction methodology followed will be in conformity with the relevant IRC/BIS specifications. In the absence of specific guidelines in these codes, the designers/manufacturers guidelines are to be followed.

B 5.7 Proposed Activities

- (I) Inspection of the site and its surroundings for planning construction related work.
- (II) Study of design Report.
- (III) Preparation of design review report which includes details of the likely difficulties that may arise during the implementation process of construction work of Roads/Culverts/Bridges and suggested alterations if any.
- (IV) Selection of competent agency for the development of construction methodology and cost estimates
- (V) Selection of an experienced agency to carryout the construction work.
- (VI) Mobilization of construction machinery and manpower, constructing of site office, stores, work force residences etc.

- (VII) Tests on construction materials.
- (VIII) Construction activity and completion of work.

B5.8 Environmental and Social Impact

Generally, it does involve acquisition and displacement of people, hence negative environmental and ecological impact is envisaged. In the case of road work, it will also involve the borrow areas. Necessary remedial steps are accordingly to be taken.

B5.9 Risk Factors

While executing the construction work, new site problems such as encountering of unexpected soil strata and deciding about course of action may arise, fresh land acquisition problems may also crop-up. Unfavourable climate, untimely supply of construction materials, lack of cooperation and coordination among concerned agencies etc may crop-up.

B8.10 Management and Maintenance

- (vi) Management
The responsible Line Dept. may be made responsible day-to-day management regarding all the construction work may be entrusted to the District Public Works Department /Roads and Building Department/ Panchayat Raj Engineering Department which-ever deals with roads/culverts/bridges in the concerned State/ UTs.
- (ii) Maintenance
 - (a) The State/ UTs have to make a separate provision for carrying out the maintenance work of Roads/Culverts/Bridges of cyclone prone areas in their annual budget.
 - (b) The District Public Works Department /Roads and Buildings Departments/Panchayat Raj Engineering Department whichever deals with roads/culverts/bridges in the concerned States/UTs is to be entrusted with maintenance work.

B5.11 Quality Control and Monitoring Strategy.

The State/ UTs will follow (for recording and presentation of relevant construction works and materials.) the proformas of the (i) IRC:SP:57-2001 Guidelines for quality systems for road construction; (II) IRC:SP:47-1998 (Guidelines on Quality Systems for Road Bridges (Plain, Reinforced, prestressed and composite concrete) (iii) IRC:21-2000 Standard Specifications and Code of Practice for Road Bridges; Section (iii) – Cement concrete (Plain and Reinforced); (iv) IRC:18-2000 Design Criteria for prestressed concrete road bridges (post-tensioned concrete) (v) IRC:87-1984, guidelines for design and erection of false work for road bridges and for material standards relevant latest BIS codes. For the protocol and standards for quality assurance and monitoring of the works and bench marking and expected norms, the direction of PIU will be followed.

B5.12 Project Cost:

Cost estimates for different elements/cost sharing – Project /State/Central.

(Using MOST standard data book for analysis of rates, 2003 and MORD standard data book for analysis of rates for rural roads) whichever is relevant)

State/ UTs will work out estimates and include the items (following standard practices and norms) in their budget and submit the proposal to MHA.

B5.13 Time Frame

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B5.14 Sustainability

- (iv) Roads/culverts/bridges that are properly inspected, proof checked and executed by experienced agencies will give expected serviceability and durability and in most cases.
- (v) Regular allocation of funds for inspection and maintenance of roads, culverts and bridges through a provision in their annual budget.
- (vi) Collection of nominal cess from the road users helps in routine maintenance like removing of weeds and plants from the road/bridge deck and cleaning of drainage spouts and the road surface of bridges.

B6. Investment Proposal for vulnerability and Risk Reduction Studies / Capacity Building.

B6.1 General

Hazard analysis, vulnerability and risk assessment of the coastal areas are essential components for the effective coastal zone management and planning.

B6.2 Description of the Project investment:

Need and rationale for undertaking studies/capacity building.

While the hazards due to tropical cyclones cannot be reduced, mitigation strategies to reduce their impacts can be devised. Mitigation measures like timely communication of warnings, land use planning, enforcement of cyclone resistant construction, retrofitting, etc. go a long way in reducing the vulnerability of structures to cyclonic impacts and the resulting losses. Assessment and mapping of risks to physical assets are fundamental before devising any successful mitigation strategies or plans. Micro scale (block/taluk level) hazard vulnerability and risk zonation maps for cyclone hazards and classification of settlements by priority and type of intervention required are, important for effective utilization of funds.

B6.3 Objectives of the studies/capacity building of concerned officials:

- (i) To prepare state/district/mandal or taluka level hazard zonation maps for cyclone, storm surge and flood risk and classify settlements according to risk perception.
- (ii) To assess the risks in terms of damages/losses to buildings and structures due to tropical cyclones for planning.
- (iii) To recommend feasible mitigation options to reduce the vulnerability to the above risks.

The result of the study should address the various issues of hazard exposure of the concerned State/UT and should provide for the basis for drawing up comprehensive hazard risk mitigation plans, technical capacity building of the Project Managers in the State/UT for better project management, quality assurance and certification, workshops/consultations.

B6.4 How it will address the goal of reducing State's vulnerability to cyclones

This will help States in devising required mitigation strategies or plans.

B6.5 Expected Outcome of the study

This will enhance the capacity of states/UTs' for taking proper investment decision in Disaster Management Planning. A Catastrophe Risk Atlas of the state should be

prepared. The atlas should provide detailed maps of exposures, hazards and risks that help in planning and devising mitigation strategies. The Atlas should contain information in microscale (Block/Talukwise). A detailed report discussing the risks involved and recommended mitigation options to reduce these risks should be prepared. While the target audience for the risk atlas is all the stakeholders in general, the report is aimed at the policy makers, insurance companies and administrators.

B6.6 Planning assumption:

Availability of data, assimilation of data, identification of institution with adequate capability for carrying out the study.

- (i) Learn from the experience of states that undertook similar studies in the past – AP, Gujarat, etc.
- (ii) Review of data availability – historical data (event, damage), hazard parameters, inventories of buildings and structures, etc.
- (iii) Identification of a champion department within the state administration to initiate, monitor and implement the studies.
- (iv) Identification of an agency with adequate capability and experience for carrying out the studies.

B6.7 Proposed Studies:

- i. Risk assessment study for housing, business and public infrastructure due to cyclones.
- ii. Disaster mitigation study to reduce vulnerability to cyclone impacts.

B6.8 Environment and Social Impact

No adverse environmental impact is anticipated.
Positive social impact

B6.9 Risk Factor

Non availability of basic data in time may delay the completion of such study. Good data is key for good modeling. Availability, accessibility and reliability of data are major hurdles for the success of such study.

B6.10 Project Management Arrangement

By Disaster Management Department/Institution/ Authority in this State .
Such study can be executed by hiring the services of Agencies having adequate experience and expertise in executing such study.

B6.11 Quality Control and Monitoring

Through progress report and time to time presentation of interim results and peer review.

B6.12 Project Costs:

Cost estimates for different elements/ Cost sharing-Project/ State/Central

The estimated cost of study No. 1(Ref. B6.7) could be around Rs.30 lakhs for one state.

The estimated cost of study No.2(Ref.B6.7) could be around Rs.15 lakhs for one state.

Note:

If the project is executed for several states/all these states by one agency total cost could be less.

B6.13 Time line:

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B7. Investment Proposal Guidelines for strengthening of onshore warning system

B 7.1 General

Early reliable warning is one of the important short term mitigation measures that can reduce the severity of the cyclone related disasters if acted upon timely. The degree to which this reduction can be effected will depend upon the interplay of three main elements. Namely, the accuracy of the warning, the length of time between the warning's being issued and the expected onset of the event and the state of pre-disaster planning and readiness. The public response to warning in the form of correct precautionary action is another important component for the reduction of losses of lives and properties due to tropical cyclone impact.

It is often seen that the fishermen out at sea and unorganized weaker section of the coastal communities, salt pan workers, migratory labourer etc are among the first casualties of tropical cyclone disasters, when caught unaware. The strengthening of onshore warning communication system is therefore is an important intervention that can save many valuable human lives. Under the project the States/UTs may consider strengthening the below-district level warning dissemination system through appropriate interventions.

B7.2 Description of the Project investment:

Need and rationale for undertaking this activity, status of existing onshore warning system in the State, system of warning to fishermen in coastal waters and the high seas and coastal communities up to village level, gap areas, future needs and possible interventions.

Description should include the existing system of receiving cyclone warnings in the state from warning originating Agency (IMD), mode of communications, time delay in receipt, accuracy and adequacy of warnings, sustainability of the communication system, standby arrangements if any, name of air stations and T.V. stations from where warnings are broadcast, coverage area of AIR broadcast, system of dissemination warnings from State Headquarters up to community, method of warning by the state govt. to fisherman, salt pan workers, migratory labourer and nomadic population along coast if any.

B7.3 Objectives

The main objective is that warning should reach every one in least possible time and in right (understandable language) format particularly to people living in the shoreline/coastline. Time taken to process the input data and transmission of warning to the vulnerable people should be bare minimum. Second important objective the format and language of the warning messages. It is also important that fishermen in the coastal water and high seas (those who have ventured out for fishing) should be warned about an approaching cyclone so that they return back to home before disaster strike. Therefore, a

system needs to be put in place so that warnings reach the target group at regular intervals with minimum time delay if possible on real-time basis, and in a language or code which could be easily understandable by them.

B7.4 How it will address the goal of reducing State's vulnerability to cyclones:

- Increase lead time of warnings for taking precautions.
- Communities will be warned well before in time.
- Scope for precautionary actions and preparedness will increase.

B7.5 Expected Outcome, including social and economic benefits:

- Minimize the loss of lives, live stocks, harvested and harvestable crops.
- Economically weaker sections will be benefited most as they are most vulnerable to cyclone disasters and need intervention.
- Reduction in expenditure on relief, rehabilitation and reconstruction leading to availability of more funds for developmental work.

B7.6 Planning assumption: (some points which should include)

- Reasonably accurate and timely warning will be available from IMD*
- Population, communities and areas likely to be affected.
- Sustainability of equipment and communication set up proposed.
- Identification of gaps and future needs.
- Sustainability of proposed system under adverse cyclonic weather conditions (strong winds, storm surge inundation and heavy rain).
- Integration of existing/planned (for the improvement) communication network so as to maximize benefit and avoid duplication.

* Upgradation of cyclone warning/tracking and warning will be a separate project to be executed by IMD under the project.

B7.6 Planning assumption: (some points which should include)

- Population, communities and areas likely to be affected and need to be warned (all coastal population including communities living in inaccessible/remote/island village, salt pan workers, fishing community, fishermen those who are in high seas, etc.)
- Review of existing warning dissemination below district level.
- Identification of gaps and future needs.
- Sustainability of proposed system under adverse cyclonic weather conditions (strong winds, storm surge inundation and heavy rain).

B7.7 Proposed activities:

- Strengthening of communication systems by linking State HQ up to Block / Taluka /Panchayat level by a system sustainable to adverse weather (such as a use

of fibre optics/ satellite links/wireless links up to block/taluka/village level along the coast.)

- Networking of existing and planned (for improvement) communication system in the State.
- Wide Area Computer Networking upto Taluka/Mandal level.
- Raising of power of AIR Stations broadcasting cyclone warnings in the State to extend the range of broadcast, if insufficient.
- Modernization of State Control Rooms by upgrading them to State Control Centre (SCC) / Emergency Operation Centre (EOC) and by installing equipments to receive and display warnings, satellite pictures, other information, weather maps etc. (one such equipment is the installation of World Space Receiver) and immediate dissemination of warnings from EOC to community.
- Promotion of HAM radio system/
- Fail proof communication link between State Control Centre and warning provider (IMD, CWC etc.). (Satellite / Fiber Optic links).
- Fail proof communication system between State Control Centre and block / taluka/ village .
- Installation of adequate number (in close spacing) digital Cyclone Warning Dissemination System (CWDS).
- Provide World Space Radio Receivers and/or windup Radios like the one manufactured by Philips India Limited to fisherman (This would be a fail-proof communication option to warn fishermen out at sea and along the)

B7.8 Environmental and Social Impact:

Issue of land acquisition, displacement of people, negative environmental impacts
(Normally adverse impacts are not likely).

B7.9 Risk factors:

Non-availability of adequate funds (recurring cost).
Non-availability of trained manpower.
Non-placement of trained manpower.

B7.10 Project Management Arrangement:

Phasing of activities/ responsible institutions/ implementation arrangements
(As indicated under Part-A, Para 6)

B7.11 Quality Control & Monitoring

Timely preparation of bid documents, timely procurement of equipments, timely training and timely completion of periodic reports on implementation and peer review.

B7.12 Training Needs

For instrument operation and maintenance staff

B7.12 Project Costs:

Cost estimates for different elements/ Cost sharing-Project/ State/Central

(This should include)

cost of equipments, buildings, operational cost, maintenance cost, training cost etc under two heads viz. , (a) Capital cost and (b) Recurring cost

B7.13 Time line:

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B7.14 Sustainability:

The utility and maintenance of the proposed system during non-disaster period (peace time utilizations).

B.8. Guidelines for Undertaking Inspection, Repair and Retrofitting Works of Distressed Existing Cyclone Risk Mitigation Infrastructure (Roads, Culverts and Bridges)

B.8.1 General Note:

Roads/culverts/bridges in the cyclone prone areas need to be maintained well and if they are in a bad shape their repair and strengthening works also to be given utmost attention. Roads are always associated with culverts and bridges as the terrain demands, and routine maintenance of these infrastructures is crucial for post disaster response. Concrete members, mainly in the coastal region are most vulnerable to reinforcement corrosion. Bridge foundations in alluvial soils lead to deep scour near some piers when large discharges due to cyclonic storms occur which may result in tilting of foundations and consequent distress to the bridge deck.

Where the general road condition is found to be bad due to poor sub grade, and the bridges and culverts are in a distressed condition their restoration work has to be accorded high priority.

Repair and retrofitting work is a specialized job and requires the use of special materials and expertise. Before taking up the work, one has to complete visual inspection, find the causes of distress, establish the degree of distress, through relevant tests and work out appropriate remedial measures to be taken.

B 8.2 Description:

- (i) Need and rationale for undertaking this activity.
- (ii) Present status of roads in cyclone prone areas.
- (iii) Present status/number of villages not linked with all weather roads in cyclone prone areas.
- (iv) Assessment about the need, requirement and road length (km) to be repaired/ retrofitted.
- (v) Assessment about the need, requirement and the number of culverts and bridges to be repaired/retrofitted.
- (vi) Involvement of other departments while deciding the assessment needs.
- (vii) Key issues such as location of cyclone prone areas, design criteria, range of tests to be carried and methodology for repair and retrofitting works.

B8.3 Objectives:

- (i) To restore all weather serviceability of roads, culverts and bridges.
- (ii) To ensure timely and fast movement of men, materials and machinery in the post disaster period.

B8.4 How it will address the goal of reducing State/UTs vulnerability to cyclones.

- (i) Reduce vulnerability of cyclone prone areas through upgradation of key access and feeder rural roads.
- (ii) The repair and retrofitting of culverts and bridges provides all weather access to the villages that are cyclone prone.

B8.5 Expected outcome including Social and Economic benefits.

- (i) Minimization of loss of life and livestock
- (ii) Provides all weather access to the cyclone prone villages
- (iii) Helps the artisans, farmers and fishermen in transporting their produce to market centers ensuring them daily livelihood.
- (iv) Help in the movement/evacuation of vulnerable people to safer places.

B8.6 Planning Assumptions

- (i) Routine, principal and special inspections have been carried out by competent authority using conventional tools as indicated in IRC: SP: 35 –1990 (Guidelines for inspection and maintenance of bridges).
- (ii) Inspections of roads, culverts and bridges are done thrice a year, once before monsoon and once after monsoon and cyclone, if cyclone occurs, otherwise after monsoon only.
- (iii) Number and length of roads, culverts and bridges to be repaired and retrofitted in the cyclone prone areas, condition of road and sub grade.
- (iv) Inspection report for bridges/culverts in fixed format (IRC SP 35-1990) is available. Such a report covers the following elements. (a) Foundations (b) Abutments (c) Wing walls/return walls (d) Piers, columns and bearings (e) Soffit of the deck including beams (f) Condition of road surface, drainage and parapets (g) Expansion joints (h) Condition of approaches and condition of protective works. If it is a pre-stressed concrete bridge, then, the end -blocks also to be inspected.
- (v) Damaged Road will be repaired and retrofitted by (i) raising submerged sections (ii) building protection walls, (iii) revetments for vulnerable sections (v) re-construction of bridges that are unfit for repair and retrofitting (iv) repair and retrofitting of distressed bridges that are fit for carrying out repair and retrofitting work.

- (vi) The culverts and bridges that have reflected the signs of distress through stains, cracks, spalling etc have been under observation and records of the details of the action taken to rectify the defects are available.
- (vii) Observations on foundations are being made to see whether or not excessive scour beyond designed level is taking place.
- (viii) Protective works are being inspected and recorded on their past history as well as the behaviour of the stream/channel are available.

Performance Criteria

To withstand the fury of cyclones floods, storm-surge, wind speed and seismic forces, of the locality, dead and live loads, breaking forces etc as indicated in relevant IRC and BIS Codes of practice after implementing repair and retrofitting works (IRC:5-1998 and IRC:6-2000 standard specifications & code of practice for Road Bridges section I & Section II respectively and IS 875-1987 and IS 1893-1984 which deal with wind and Earthquake resistant design of structures respectively).

Design Criteria

The reinforcement cover of the foundations, substructure and superstructure to be brought to the level specified in IRC:SP: 33-1989 by guiniting to restore the expected level durability.

The inspection /condition survey of Bridges and Roads is to be done in accordance with IRC:SP: 18-1978 (Manual for Highway Bridge Inspection) IRC: SP:35 –1990 and IRC:SP:20-2002 (Rural Road Manual). The retrofitting of the bridge is to be done in accordance with IRC:SP:40 –1993 Guidelines on the technologies for strengthening and rehabilitation of bridges.

The materials used and the technique for repair and retrofitting works the relevant IRC/BIS specifications are to be followed. In the absence of specific guidelines in these codes, the manufacturers guidelines are to be followed.

B 8.7 Proposed Activities

- Inspection of Roads/Culverts/Bridges.
- Study of the original design Report if available. If not development of likely design report from the actually observed dimensions of the bridge.
- Preparation of inspection report which includes details of the distressed elements of Roads/Culverts/Bridges such as damaged road surface, road formation strata and embankment, crack patterns and degradation of approaches, then the proposed remedial action involving repair and retrofitting.
- Distress pattern of foundations and substructure and proposed remedial action which includes repair and retrofitting work.

- If it is a pre-stressed concrete bridge, then the condition of end blocks and the proposed remedial action.
- Tests on repair materials.
- Selection of competent agency for the development of repair and retrofitting methodology and cost estimates
- Selection of an experienced agency to carryout the relevant repair and retrofitting work.
- Repairing and retrofitting activity and completion of work.

B8.8 Environmental and Social Impact

Generally it does not involve large scale land acquisition or displacement of people, hence no negative environmental and ecological impact is envisaged. However, in the case of road-widening or upgradation, it may involve the borrow areas and land acquisition in which case necessary remedial steps are to be taken.

B8.9 Risk Factors

While executing the repair and retrofitting work, new site problems such as observation of further more structural distress and deciding about course of action, fresh land acquisition problems may also crop-up. Unfavourable climate, untimely supply of repair and retrofitting materials, lack of cooperation and coordination among concerned agencies etc may crop-up.

B8.10 Management and Maintenance

(vii) Management

The responsible line Depts. may be made responsible day-to-day management regarding all the actual work of repair and retrofitting may be entrusted to the District Public Works Department /Roads and Building Department/ Panchayat Raj Engineering Department which-ever deals with roads/culverts/bridges in the concerned State/ UTs.

(ii) Maintenance

(a) The State/ UTs have to make a separate provision for carrying out the maintenance work of Road/Culverts/Bridges of cyclone prone areas in their annual budget.

(b) The District Public Works Department /Roads and Buildings Departments/Panchayat Raj Engineering Department whichever deals with roads/culverts/bridges in the concerned States/UTs is to be entrusted with the maintenance work.

B8.11 Quality Control and Monitoring Strategy.

The State/ UTs will follow for recording and presentation of relevant inspection, repair retrofitting works and materials. the proformas of the (i) IRC:SP:57-2001 Guidelines for quality systems for road construction; (II) IRC:SP:47-1998 (Guidelines on Quality Systems for Road Bridges (Plain, Reinforced, pre-stressed and composite concrete) (III) IRC:SP:52-1999 Bridge Inspectors Reference Manual; (iv) IRC:SP:-40-1193 Guidelines

on Techniques for Strengthening and Rehabilitation of Bridges; (v) IRC:SP: 35-1990 Guidelines for Inspection and Maintenance of Bridges; (vi) IRC:21-2000 Standard Specifications and Code of Practice for Road Bridges; Section (iii) – Cement concrete (Plain and Reinforced); (vii) IRC:18-2000 Design Criteria for pre-stressed concrete road bridges (post concrete) and for material standards relevant latest BIS codes. The protocol and standards for quality assurance and monitoring of the works and bench marking and expected norms, the direction of PIU will be followed.

B8.12 Project Cost: Cost estimates for different elements/cost sharing – Project /State/Central.

State/ UTs will work out estimates and include the items (following standard practices and norms) in their budget and submit the proposal to MHA.

B8.13 Time Frame

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B8.14 Sustainability

- (i) The roads/culverts/bridges that are properly inspected, proof checked and retrofitted by an expert agencies will restore the distressed infrastructures to a level of normality and restore expected serviceability and durability for a long period with least maintenance.
- (ii) Regular allocation of funds for inspection, repair and retrofitting works of roads, culverts and bridges through a provision in their annual budget.
- (iii) Collection of nominal cess from the road users helps in routine maintenance like removing of weeds and plants from the road/bridge deck and cleaning of drain spouts of bridges.

B 9. Investment Proposal Guidelines for awareness generation:

B 9.1. General Note:

The public awareness programme is an important component of disaster risk management. Involvement of community under threat is essential for the success of any disaster risk reduction programme. Prior knowledge about the warning system and its limitations, source of warnings, meaning of language and the steps that need to be taken on the receipt of warnings makes the community better equipped to fight a disaster.

Mechanisms like distribution of circulars, Dos and Don'ts, posters and publicity about precautionary measures through media and by screening short films are in existence but past experience shows that such actions are not sufficient and more need to be done. Man to man contact is essential for the success of awareness programme. Such activities not only to be continued but also these are to be frequent and regular.

A well informed awareness programme involving the community is essential. A "Task Force" is needed to implement such drawn up programme in its initial phase.

B 9.2. Description of the Project investment:

Proposed Investment initiatives should address need and rationale for undertaking the activity; indicate status of ongoing awareness generation activities in the State/UT. Emphasis should be given for involvement of NGOs/CBOs for carrying out awareness generation activities. Project should be designed in such a way that it should target the most vulnerable communities.

B. 9.3 Objectives

To spread awareness on cyclone risk mitigation in the vulnerable groups of people and help the community in adapting practices to ensure better prevention.

Aim is to promote an informed, alert and self-reliant community, capable of playing its full part in support of and in coordination with government, in all relevant disaster management activities.

B. 9.4 How it will address the goal of reducing State's vulnerability to cyclones:

Community will be knowledgeable and will be better equipped to fight the disaster situation. Community will know what a cyclone disaster will do, what actions they need to take, what actions they need to take immediately on receipt of an alert or warnings from the source of warnings or government, what the government has planned to do to assist the community, how to respond effectively to cyclone warnings and where to take shelter in the case of cyclone threat.

B. 9.5 Expected Outcome, including social and economic benefits:

Community will be knowledgeable to fight a cyclone disaster and take advantage of advance warning for precautionary measures. These will lead to reduction of their vulnerability and loss of lives and properties in the State.

B. 9.6 Planning assumption:

- Identification of target population
- Appropriate use of medium (print, audio, visual, through mass media like radio, television, street plays etc.)
- Use of vernacular language (local language/people friendly messages for better comprehension)
- Acceptable format.
- Development of area/region specific awareness campaigns keeping in view the target population/literacy/vulnerability etc.
- Involvement of NGOs/CBOs in awareness generation

B. 9.7 Proposed activities:

Awareness generation is the key to disaster risk reduction. An effective disaster risk mitigation may be developed in consultation with all stakeholders of the selected States for public education to take preventive measures in the event of a cyclone. Massive and sustained awareness campaigns may be taken up through out the selected coastal districts for preparedness through various mass medias, rallies, mass meetings, audio-visual shows, distribution of pamphlets, posters covering various aspects of cyclones, their effects, Do's and Don'ts in local language to create awareness among the people about vulnerability to cyclones.

Proposed activities should include.

- Formulation of state specific awareness campaigns and strategies for implementation of cyclone risk mitigation
- Awareness generation programmes at different levels including villages/wards through workshops/seminars/training, poster/leaflets, wall painting, street play, use of mass media etc.
- Development of school primers/ sensitization of school teachers etc.
- Development of IEC materials for circulation among various stake holders.
- Development of manuals for design and construction of cyclone resistant houses, retrofitting etc.
- Formation and Training of village volunteer group specially constituted to fight natural disasters like cyclone, floods etc.
- Programme for updating such trainings from time to time.

B. 9.8 Environmental and Social Impact:

No negative environmental impact is anticipated. Social impact will be positive. Community risk to cyclone disasters will be reduced. Bonds of community living will be increased.

B. 9.9 Risk factors:

Expectancy and dependency factors, which may lead to communities to become over dependent on government assistance may erode self-reliance of community and individuals' self-reliance. Over expectation from the government assistance programme may lead to frustration.

B. 9.10 Project Management Arrangement:

Phasing of activities/ responsible institutions/ implementation arrangements

It should be implemented in phases. Timings of training and place of training should be decided in consultation with the communities. Implementation should be through an identified institution or through a Task Force especially constituted for the above programme, in its initial phase.

B. 9.11 Quality Control & Monitoring

By time to time monitoring the progress of work in various activities

B. 9.12 Project Costs:

Cost estimates for different elements/ Cost sharing-Project/ State/Central

Cost would be programme and state specific. Some costs will be of recurring type.

B. 9.13 Time line:

Implementing Agency should identify suitable activities and prioritise them, identify institutional mechanism and draw a feasible Work Programme for its effective implementation indicating Phasing of activities for the entire duration of the Project (Give PERT Chart)

B. 9.14 Sustainability:

Effectiveness of public awareness programme needs to be checked. The activities of programmes to gain and maintain the interest of targeted people need to be monitored.

Adequate awareness levels need to be continuously maintained so that public interest is not faded out.

Annexure-I

Environmental/Social Screening Assessment of Investment Proposals

All proposals proposed for financing will be subjected to an environmental/social screening. The screening exercise shall be carried out by concerned line Depts. prior to initiation of detailed investment proposals. The screening exercises shall be a useful tool to identify the environmental and social issues, and thereby integrate them into the project preparation, and not as an exclusion criterion for avoiding environmental and social impacts.

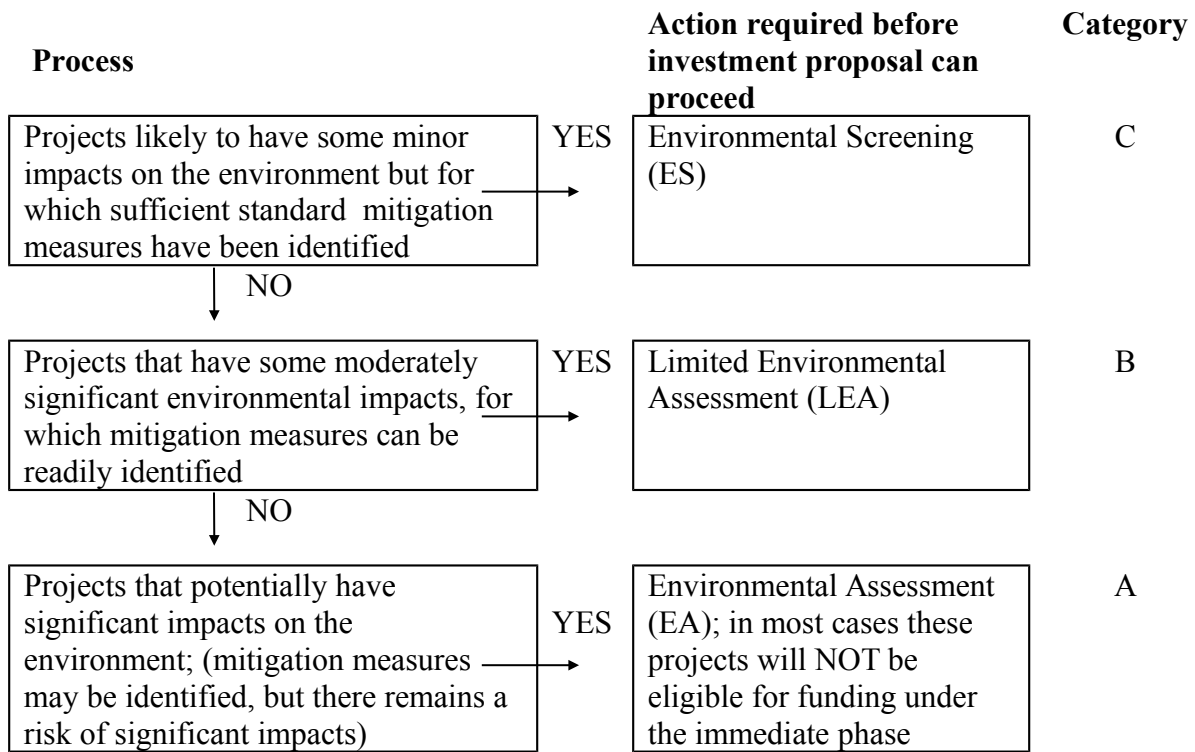
Objectives of the screening exercise:

- Prevent execution of projects with significant negative environmental impacts;
- Decrease potential negative impacts through adaptations in investment proposal design, location or execution;
- Enhance the positive impacts of investment proposals;
- Prevent additional stress on environmentally sensitive areas.
- Screening of social factors such as land availability, loss of structure, loss of livelihood, impact on indigenous population, impact on common property resources etc.

Environmental/social screening involves classifying an investment proposal into one of several categories of likely environmental impact. For this project, three investment proposal categories have been identified:

- ‘C’ those whose expected impacts are small in scale, do not require special studies other than filling-in an Environmental Screening (ES) form, and can be addressed through standardized environmental mitigation/management measures;
- ‘B’ those whose impacts are larger and more complex than ‘C’, requiring preparation of a Limited Environmental Assessment (LEA) and incorporation of recommended mitigation/management measures into investment proposal design; and,
- ‘A’ those whose potential impacts involve significant environmental risk, normally requiring a full Environmental Assessment (EA), and which will normally not receive funding under the immediate phase of this project.

The screening process is shown in the figure below:



Investment Proposals shall be subjected to the existing provisions of the EIA Notification, 1994 as well as Coastal Regulation Zone Notification, 1991 as amended from time to time besides other Acts and Rules formulated by the Central/State/UT as applicable for the respective activities.

Implementation Steps

The environmental screening procedure consists of the following steps:

- Step 1:** Filling out the Routing Slip by the proponent
- Step 2:** Filling out the Environmental Screening Form by the proponent
 - determination of scores on specific issues
 - determination of the overall environmental category
- Step 3:** Limited Environmental Assessment, or
- Step 4:** Environmental Assessment

All investment proposal proposals will have a Routing Slip attached, which visualizes the environmental history of the investment proposal.

The line departments can under most circumstances carry out steps 1-2 of the instructions. For the vast majority of investment proposals (which are Category C), an Environmental Screening will suffice. For a small percentage of investment proposals (environmental screening categories B and A), Limited Environmental Assessments or Environmental Assessments will be required, and proponents need to follow steps 3 or 4. In practice, however, local capacity for carrying out LEAs and EAs may be lacking, and these may need to be carried out by consultants, contractors or other environmental specialists. Projects that require an EA are unlikely to be financed under the immediate phase of the project.

Institutional Arrangements

Investment proposals, along with Routing Slips, Environmental Screening forms, Limited Environmental Assessments and Environmental Assessments will be submitted by the line departments, and will need to be reviewed by State Steering Committee/ PIU. The State Steering Committee/PIU together will have responsibility to clear category C projects.

All category A and B projects will be referred to the respective State Coastal Zone Management Authority for consideration and forwarding the same to the Ministry of Environment and Forest Government of India through the State Dept. of Environment and Forest for environmental clearance as applicable.

The review undertaken by the State Coastal Zone Management Authority/State Steering Committee/PIU involve assessing if impacts have been scored correctly, and if the mitigation actions proposed are sufficient to alleviate the potential impacts. If shortcomings are detected during the review, the environmental documents (usually a Routing Slip with attached ES, or LEA) should be returned to the line Depts. who formulated the project. After modifications have been made, the proposal and Routing Slip with revised ES, or the revised LEA, may be re-submitted. If the review assesses that sufficient mitigation measures have been incorporated in the project design, the environmental assessment of the proposal is to be approved by the State Steering Committee/PIU in consultation with the Dept. of Environment and Forest.

Implementation and Supervision

The monitoring/management measures will need to be implemented and supervised by the line department. In theory, this would require a monitoring/management plan for each investment proposal.

During the construction or implementation phase, it is possible that certain unforeseen impacts may occur due to the investment proposal. If significant, these should be reported to the State Steering Committee/PIU along with proposed mitigation measures, if these are known, and budget implications.

Environmental/Social Screening of investment/proposals

ROUTING SLIP

1 – Investment proposal:

Name	
Location (enclose a sketch map)	
Nature of Work	
Financial Outlay	
Modifications (in design, siting etc.) to reduce vulnerability to future natural disasters	

2 - Proponent:

Department	
Designated contact for this activity	

3 - Environmental Screening on (date) by:

Name	
Address	

4 - Results of Environmental Screening (circle both category and follow-up):

Screening category	<u>C</u>	B	A
Follow-up required	ES	LEA	EA

5 - ES progress:

ES report delivered	(date)	Carried out by:
Main mitigation/management measures in proposal and proposed budget		

6 - LEA/EA progress:

Requested from/contracted to:	(name)
(Date)	(address)

Report/format delivered to:	(name)
(Date)	

Decision/remarks/actions:

ENVIRONMENTAL/SOCIAL SCREENING FORM

1.Cyclone Shelters

Sl. No.	Issues	Score (0-5)*	Mitigation/Management Measures (tick/add as applicable)
1	Clogging of drainage works		<ul style="list-style-type: none"> ➤ Construction during dry season if possible ➤ Proper disposal of waste/debris
2	Decline in water quality leading to health risks		<ul style="list-style-type: none"> ➤ Proper design and siting of investment proposals ➤ Provision for waste water treatment
3	Loss of productive agricultural land		<ul style="list-style-type: none"> ➤ Avoiding productive agricultural land
4	Loss of natural habitat and damage to ecologically sensitive areas/heritage sites		<ul style="list-style-type: none"> ➤ Avoiding natural habitat sites/ ecologically sensitive areas/heritage sites/sand dunes at the site if any, should not be disturbed
5	Solid waste management (esp. municipal waste)		<ul style="list-style-type: none"> ➤ Adequate Provision of disposal (e.g. land filling etc)
6	Sewerage and sanitation facilities		<ul style="list-style-type: none"> ➤ Adequate provision and connection to existing facilities ➤ Proper design and siting of latrines to avoid any contamination
7	Handling/disposal of construction debris (esp. asbestos)		<ul style="list-style-type: none"> ➤ Proper waste handling codes to be followed as per the norms of the construction industry
8	Quality of drinking water supply		<ul style="list-style-type: none"> ➤ Connection to adequately treated domestic water supply systems
9	Impact on cultural heritage/vulnerable groups		<ul style="list-style-type: none"> ➤ Principle of avoidance to be followed ➤ Extensive public consultations before proceeding
10	Social conflict (e.g. due to loss of congenial environment, increase in unsociable activities, competition etc)		<ul style="list-style-type: none"> ➤ Public consultation at different stages ➤ Creation of management committees with active public participation
11	Provision for livestock		<ul style="list-style-type: none"> ➤ Provision of adequate shelter for livestock also provided
12	Air Pollution due to domestic fuel use		<ul style="list-style-type: none"> ➤ Provision of access to cleaner fuels (e.g. kerosene and LPG)
13	Design considerations		<ul style="list-style-type: none"> ➤ In order to make them cyclone resistant, special engineering/design considerations have been followed.
CATEGORY		C/B/A	

*Score: environmentally beneficial/benign - 0; increasing severity of adverse impact – 1 to 5; not applicable - NA

**Category: please use your judgment to provide a category based on the scores provided.

While assigning Category and assessing an environmental impact existing provisions of EIA Notification, 1994 and CRZ Notification, 1991 as amended from time to time along with other relevant Acts as applicable shall be strictly adhered to.

2. Saline embankments

Sl. No.	Issues	Score (0-5)*	Mitigation/Management Measures (tick/add as applicable)
1	Siltation during construction		<ul style="list-style-type: none"> ➤ Appropriate construction and operation practices to be adopted ➤ If possible, undertake construction in the dry season
2	Saltwater intrusion – flushing		<ul style="list-style-type: none"> ➤ Appropriate construction and operation practices to be adopted
3	Flooding of low lying areas		<ul style="list-style-type: none"> ➤ Proper design and siting ➤ Community involvement in operation and maintenance
4	Impacts on ecosystem(e.g. fisheries, wetlands), bio-diversity (flora/fauna)		<ul style="list-style-type: none"> ➤ Proper design and siting of sub-projects to avoid any impact on ecosystem (sensitive habitats) and bio-diversity (flora/fauna)
5	Erosion and soil run-off		<ul style="list-style-type: none"> ➤ Proper design and siting ➤ Physical provision to improve stability (e.g. turfing/pitching)
6	Impediment to movement of people and animals		<ul style="list-style-type: none"> ➤ Proper design and siting of sub-projects
7	Impact on cultural heritage/vulnerable groups		<ul style="list-style-type: none"> ➤ Principle of avoidance to be followed if any adverse impact foreseen ➤ Extensive public consultations before proceeding
8	Conflict among communities water usage/quantity and quality		<ul style="list-style-type: none"> ➤ Water user rights of affected communities to be clearly defined before project implementation
9	Impact of ecological sensitive areas e.g. Mangroves and Coral reefs		<ul style="list-style-type: none"> ➤ Construction of saline embankments should be strictly prohibited along mangrove/coral reef areas.
10			➤
11			➤
12			➤
CATEGORY		C/B/A	

*Score: environmentally beneficial/benign - 0; increasing severity of adverse impact – 1 to 5; not applicable - NA

**Category: please use your judgment to provide a category based on the scores provided.

While assigning Category and assessing an environmental impact existing provisions of EIA Notification, 1994 and CRZ Notification, 1991 as amended from time to time along with other relevant Acts as applicable shall be strictly adhered to.

3. Coastal canal

Sl. No.	Issues	Score (0–5)*	Mitigation/Management Measures (tick/add as applicable)
1	Siltation during construction and during operation		<ul style="list-style-type: none"> ➤ Appropriate construction and operation practices to be adopted ➤ If possible, undertake construction in the dry season ➤ Community involvement in the operation phase for operation and maintenance
2	Saltwater intrusion – flushing		<ul style="list-style-type: none"> ➤ Appropriate construction and operation practices to be adopted
3	S/G water quality		<ul style="list-style-type: none"> ➤ Appropriate monitoring and maintenance
4	Flooding of receiving areas		<ul style="list-style-type: none"> ➤ Community involvement in operation and maintenance
5	Impacts on sensitive habitats (e.g. fisheries, wetlands), flora and fauna dues to alteration in water quality		<ul style="list-style-type: none"> ➤ Proper design and siting of sub-projects to avoid any impact on sensitive habitats ➤ Community involvement and awareness to ensure that water quality in not altered
6	Contamination by agricultural run-off , industrial effluents, livestock/poultry, and human waste		<ul style="list-style-type: none"> ➤ Community involvement and awareness about associated risks ➤ Proper design and siting of sub-projects
7	Eutrophication/clogging by weeds		<ul style="list-style-type: none"> ➤ Community involvement in monitoring and maintenance
8	Water logging during operation		<ul style="list-style-type: none"> ➤ Proper design and siting of sub-projects ➤ Community involvement in monitoring and maintenance
9	Impediment to movement of people and animals		<ul style="list-style-type: none"> ➤ Proper design and siting of sub-projects
10	Impact on cultural heritage/vulnerable groups		<ul style="list-style-type: none"> ➤ Principle of avoidance to be followed if any adverse impact foreseen ➤ Extensive public consultations before proceeding
11	Conflict among communities water usage/quantity and quality		<ul style="list-style-type: none"> ➤ Water user rights of affected communities to be clearly defined before project implementation
12	Impact on ecosystem (e.g fisheries, wetland), bio-diversity Impact on ecologically sensitive areas e.g. mangroves and coral reefs		<ul style="list-style-type: none"> ➤ Proper design and siting of sub-projects to avoid any impact on ecosystems and bio-diversity ➤ Construction of saline embankment should be strictly prohibited along Mangrove/coral reef areas
CATEGORY		C/B/A	

*Score: environmentally beneficial/benign - 0; increasing severity of adverse impact – 1 to 5; not applicable - NA

**Category: please use your judgment to provide a category based on the scores provided.

While assigning Category and assessing an environmental impact existing provisions of EIA Notification, 1994 and CRZ Notification, 1991 as amended from time to time along with other relevant Acts as applicable shall be strictly adhered to.

4. Coastal Shelter Belt Plantations/Mangroves

Sl. No.	Issues	Score (0-5)*	Mitigation/Management Measures (tick/add as applicable)
1	Introduction of exotic species		➤ Only local species used
2	Monoculture, hence increased susceptibility to insects		➤
3	Social conflict (e.g. due to alteration in community power structure, ownership of resource etc)		➤ Public consultation at different stages ➤ Equitable distribution of benefits ➤ Creation of management committees with active public participation
4	Excessive extraction of G/S water during nursery raising		➤ Regulating the use of water
5	Use of insecticide and chemical fertilizers		➤ Only biological/organics to be used
6	Biodiversity impacts/ impact on rare, endangered and threatened species of flora and fauna as well as nesting and breeding grounds of turtles/horse shoe crabs		➤ Biodiversity impact should be assessed and minimized before initiation of the activities
7	Fuel wood impacts		➤ Make public aware of fuel wood as a resource
8	Air pollution		➤ Encourage communities to refrain from open burning of leaves and needles ➤ Provision of access to cleaner domestic fuels (e.g. LPG and Kerosene)
9	Impact of change of drainage pattern and diversion of freshwater/marine water supply		➤ Activities leading change in the drainage pattern and diversion of freshwater/marine supply should not be allowed so as to provide healthy grown of mangroves
10	Impact on grazing by cattle		➤ Alternate options for cattle food and fodder be provided
11	Impact of developmental activities viz. Ports/harbors/jetties/sand mining, mineral mining/industries etc		➤ No developmental activities should be permitted in the mangrove areas.
12	Impact of land based activities on Mangrove ecosystem		➤ Impact of land based activities including disposal of sewage, solid wastes and oil pollution as well as ballast water and industrial effluents should be assessed and reduced to a minimum
13	Livelihood dependence on mangrove ecosystem		➤ Alternate sustainable livelihood options for the community should be identified and supported so as to reduce pressure on mangrove ecosystem

14	Community participation		➤ Community participation for conservation and management should be ensured using joint mangrove management approach
CATEGORY		C/B/A	

*Score: environmentally beneficial/benign - 0; increasing severity of adverse impact – 1 to 5; not applicable - NA

**Category: please use your judgment to provide a category based on the scores provided.

While assigning Category and assessing an environmental impact existing provisions of EIA Notification, 1994 and CRZ Notification, 1991 as amended from time to time along with other relevant Acts as applicable shall be strictly adhered to.

5. Roads/culverts/bridges (construction/repair and upgrading)

Sl. No.	Issues	Score (0-5)*	Mitigation/Management Measures (tick/add as applicable)
1	Erosion of land downhill from the road bed, or in burrow areas; landslides, slips or slumps		<ul style="list-style-type: none"> ➤ Construction in the dry season ➤ Protection of soil surface during construction ➤ Slope stabilization through turning, vegetation, and creating slope breakers
2	Dust during construction, and due to transport		<ul style="list-style-type: none"> ➤ Appropriate construction practices (including sprinklers) ➤ Physical stabilization during construction ➤ Vegetation and plantation along road side
3	Increase sedimentation in streams affecting fish habitat and movement		<ul style="list-style-type: none"> ➤ Appropriate construction practices and proper attention to drainage ➤ Prevention of erosion ➤ Proper design and siting to minimize impact on fisheries
4	Clogging of drainage by soil run-off, increasing the chances of flooding		<ul style="list-style-type: none"> ➤ Appropriate construction practices and proper attention to drainage ➤ Prevention of erosion
5	Water-logging and creation of mosquito breeding grounds		<ul style="list-style-type: none"> ➤ Immediate rehabilitation of borrow areas
6	Increase in noise level		<ul style="list-style-type: none"> ➤ Vegetation and plantation along roadside
7	Possible ground water contamination (by oil and grease), especially during the construction phase		<ul style="list-style-type: none"> ➤ Proper waste management and disposal of oil, bitumen and other hazardous wastes
8	Threat to rare and endangered species		<ul style="list-style-type: none"> ➤ Minimize loss of natural vegetation during construction
9	Increase in road accidents and animal/livestock/poultry “road kills”		<ul style="list-style-type: none"> ➤ Proper sign-posting for safety ➤ Provision of underpasses for crossing
10	Induced impact (on land-use) of “ribbon development”		<ul style="list-style-type: none"> ➤ Demarcating clusters with ribbon development by proper sign-posting
11	Aesthetic impact of marred landscape and debris		<ul style="list-style-type: none"> ➤ Proper waste/debris management practices to be employed
12	Social conflicts/Land ownership and land use		Public hearing/consultations to be carried out at all stages so as to ensure public participation
CATEGORY		C/B/A	

*Score: environmentally beneficial/benign - 0; increasing severity of adverse impact – 1 to 5; not applicable - NA

**Category: please use your judgment to provide a category based on the scores provided.

While assigning Category and assessing an environmental impact existing provisions of EIA Notification, 1994 and CRZ Notification, 1991 as amended from time to time along with other relevant Acts as applicable shall be strictly adhered to.

Limited Environmental Assessment (LEA) Format

NOTE: The LEA requires short descriptions, and should not exceed a total of 10 pages. This means that (some) descriptions may consist of only several lines/sentences (e.g. regarding groundwater: "the village has two tube wells with good quality water"). Information may not be available for all listed items; for example, groundwater resources may be unknown because only reserve pond water is being used by the local community.

1. General description of the Investment proposal

- 1.1 Investment proposal location, size, title, and date of LEA completion
- 1.2 Identity of the formulators of the investment proposal proposal
- 1.3 Identity of LEA compilers
- 1.4 Immediate need for investment proposal (justification) and investment proposal objective(s)
- 1.5 Investment proposal Components or the various phases of construction
- 1.6 Alternatives rejected by the formulators of the Investment proposal
- 1.7 Considerations being used to reduce vulnerability to future cyclones

2. Baseline description of the affected environment

2.1 Description of the physical-chemical environment

- surface water
- groundwater
- soil
- geomorphology (description of slopes, steepness, special landscape features)

2.2 Description of the biological environment

- flora (general description of main plant species, mention rare, endangered or economically important species)
- vegetation (natural vegetation coverage in investment proposal area; special mention of forests, wetland vegetation, special wildlife habitats, etc...)
- fauna other than fish (general description of main wildlife species; special mention of rare, endangered or economically important species)
- fish (general description of main fish species occurring; main economic species;

special mention of rare species)

2.3 **Description of socio-economic environment**

- size and composition of community (population, gender ratio, ages groups, ethnic groups)
- economic aspects (main economic activities)
- public health aspects (related to potable water, other domestic water resources, sanitation, waste disposal, latrines, incidence of diseases, accidents)
- infrastructure (existing system: roads, bridges, electrical supply, fuel, water sources)
- presence of culturally or historically important sites, buildings or objects

3. Identification of Negative Environmental Impacts

3.1 **Impacts on the physical-chemical environment**

- surface water resources (stagnation of water, drainage, blockage of flow, contamination with disease sources, siltation, pollution, increased flooding, etc.)
 - groundwater resources (contamination, increased water logging, over-utilization, salinity ingress, salinization, etc...)
- soil (contamination, enhanced erosion, effects on steep slopes, etc...)
 - Coastal erosion, accretion, inundation etc.
 - Physical alteration of sand dunes

3.2 **Impacts on the biological environment**

- impacts on flora, fauna and ecosystems
- impacts on ecological sensitive areas and rare, endangered and threatened species of animals and plants
 - Impact on important natural habitats: wetlands, Forest Reserves, National Parks, Wildlife Reserves, fisheries reserves, beaches)
 - impacts on wildlife
 - impacts on livestock and poultry
- impacts on fish or fisheries

3.3 **Impacts on the socio-economic environment**

- impacts on culturally or historically important sites, buildings or objects
- impacts on economic livelihood (property, sources of livelihood, domestic animals, fisheries, etc...)
- impacts on public health (effects on potable water sources, other domestic water resources, sanitation, waste disposal, incidence of diseases, accidents)
- impacts on infrastructure (blocking of waterways, fuel supplies, roads)

4. Mitigation measures

Description of impacts	Mitigation measures proposed
Impact #1	Mitigation measure #1
Impact #2	Mitigation measure #2
Impact #3	Mitigation measure #3
etc...	etc...

5. Institutional framework

Who is responsible for funding/multiple funding by various National/International Agencies for similar activities (at the same site/location) to be ascertained?

- 5.1 Who is responsible for implementation ?
- 5.2 Who is responsible for supervision ?
- 5.3 Who is responsible for monitoring ?
- 5.4 Who is responsible for Operation & Maintenance ?

Instruction Manual for Environmental/Social screening of Investment proposals

All investment proposals proposed for financing are to be subjected to an environmental assessment, with the objectives

- to prevent execution of projects with significant negative environmental impacts;
- to decrease potential negative impacts through adaptations in investment proposal design or execution;
- to enhance the positive impacts of investment proposals;
- to prevent that environmentally sensitive areas receive additional stress from human activities.

The environmental assessment procedure consists of a number of steps, specified in this manual.

Step 1: Filling out the Routing Slip (by the proponent)

Each and every investment proposal requires its own Routing Slip. To all investment proposal proposals a Routing Slip has to be connected: one is not valid without the other. The intention of the Routing Slip is to visualize the environmental history of a investment proposal. The Routing Slip has to be part of the investment proposal, and has to be filled out as follows:

- the first two components by the investment proposal proponent during investment proposal preparation;
- the third, fourth and fifth component by the proponent during investment proposal preparation.

Step 2: Filling out the Environmental Screening Form (by the proponent)

The purpose of environmental screening of investment proposal proposals is to determine at an early stage:

- whether the investment proposal is environmentally qualified for financing;
- whether the investment proposal is only qualified for financing if some expected negative impacts are excluded or minimized through “mitigating measures”;
- whether qualification for financing requires further environmental guidance through a Limited Environmental Assessment (LEA) or a full-fledged Environmental Assessment (EA).

The environmental screening requires the following crucial sub steps:

Sub step 2a: Determination of the scores

The second column of the screening form shows a list of issues relevant to the proposed investment proposal. The proponent should check if this a complete list, and add other issues if the list is incomplete. The third column needs to be filled by the project proponent, giving scores ranging from 0 to 5, where 0 signifies beneficial impact and 5 signifies significant adverse impact. The proponent has to use his knowledge and judgment to provide scores on each issue. These scores will later be crosschecked.

Sub step 2b: Determination of the category

The last row of the form provides the overall environmental category for the project.

C means that relatively little impact is expected, an ES will suffice;

B means that some moderate impacts might evolve; an LEA needs to be carried out;

A means that severe negative environmental impacts might evolve; a full-fledged EA is required. Category A investment proposals are unlikely to be financed under the immediate phase of the project

The proponent needs to use his judgment based on the scores provided on each issue to assign an overall environmental category to the investment proposal. The category will later be crosschecked.

Step 3: Limited Environmental Assessment

LEAs will be required for all investment proposals that potentially have moderate environmental impacts, and hence are categorized as B.

LEA requires more environmental expertise than an ES, and may have to be carried out by an environmental specialist (consultant or contractor) or a large national NGO with relevant in-house capacity. This will need to be contracted out by the line department. General terms of reference for a LEA are attached. Because of its limited scope, a LEA should not take more than two weeks (including field work) to be finalized. The results should be presented to the investment proposal approving authorities in the form of a report (maximum 10 pages).

Step 4: Environmental Assessment

Only in some cases (mainly in connection with larger or new infrastructure) a full EA will be required. They will be contracted out by the line department to consultants, with specific Terms of Reference. The EAs will have to follow the formats provided by the national laws of the country, replenished with specific guidelines from the World Bank.

Annexure-II

PROFORMA FOR PREPARATION OF MANAGEMENT ACTION PLAN FOR MANGROVES		
1	Name of the Mangrove area:	
2	Location: (Please enclose site Map with Geographical coordinates)	
	2.1	Survey Numbers
	2.2	Village
	2.3	Tehsil/Block
	2.4	District
	2.5	State
3	Ownership Details:	
	3.1	Private/ Revenue/Forest
	3.2	Unknown/ disputed
4	Land Use Pattern:	
	4.1	Aquaculture/Agriculture/ Housing/Industry/ Mineral /Sand Mining/ Any other
5	Legal Status:	
	5.1	Reserve Forest/ Biosphere Reserve/ National Park/ Sanctuary/ Marine Protected Area/Heritage Site
6	Ecological features of the proposed site:	
	6.1	Mudflat Creek/ estuary/ lagoon
	6.2	Physical structure of soil: Sandy, loamy
	6.3	Chemical structure of soil: Salinity, Acidity,
	6.4	Source of freshwater

Proposed Activities/ Work Plan

Development of a Nursery:

S. No	Location/ Village / Block/ District	Area Available	Species of Plants to be grown	No. of Seedlings/ to be raised	Rate per Seedling Rs.	Total Cost Rs.
Total						

Regeneration/ Refilling of Mangroves (Enclose Location Map)

S. No	Location/ Village /Block/ District	Survey Nos	Species to be Planted	Area (ha)	Unit Rate Rs./ha	Total Cost Rs.
Total						

Potential area available for Plantation : (Enclose Location Map)

S. No	Location/ Village /Block/ District	Survey Nos	Land Ownership (Private/Revenue/ Forest)	Protected area Status	Ecological Characteristics	Area (ha)
<i>Total</i>						

Mangrove Plantation : (Enclose Location Map)

S. No	Location/ Village /Block/ District	Survey Nos	Species to be Planted	Method of Plantation	Area (ha)	Unit Rate Rs. /ha	Total Cost Rs.

<i>Total</i>	
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Trenching required if any,

S. No.	Location/ Village / District / Block Survey Nos	Justification	Specifications of proposed Civil Works	Area of Trenching	Rate per unit area	Total Cost Rs.
<i>Total</i>						

Protection Measures:

S.No.	Activity	Specifications	Physical Targets	Rate per unit area	Total Cost
1.	Watch & Ward/ Manpower				
2.	Construction of Watch Towers				
3.	Purchase of Boats and Equipments				
4.	Communication Systems				
5.	Fencing/ Bio-fencing				
6.	De-silting of Channels				
Total					

Education / Awareness/ Community Participation :

S.No.	Activity	Target Groups	Physical Targets	Unit Cost Rs.	Total Cost Rs.
1.	Education & Awareness Programmes/Campaigns Community Workshops				
2.	Establishment of Database/ GIS/ remote Sensing Interpretation Centre				
3.	Establishment of a Mangrove Interpretation Centre				
4.	Training Programmes				
Total					

Socio-economic / Extension Activities /Livelihood / Employment Opportunities

S.No.	Activity	Specifications	Physical Targets	Unit Cost Rs.	Total Cost Rs.
1.	Providing Fishing Nets to Fisher Community				
2 .	Commercial Plantations	Fuel wood/ Fodder/ Cash crops/			
3.	Alternate livelihood to Coastal Community	Tourism/ etc.			
6.	Sea ranching/ Weed Harvesting etc.				
7.	Other Employment Opportunities				
Total:					

Training and Capacity Building :

S.No.	Activity	Specifications	Physical Targets	Unit Cost Rs.	Total Cost Rs.
1.	Training of Government Officials / Forest Officials	Conservation and Management of Mangroves			
2.	Training of Government Officials / Forest Officials	Application of GIS/ Remote Sensing			
3.	Training of Community for Conservation , Management and	Joint Mangrove Management			

Establishment of Database Network and GIS / Remote Sensing Interpretation Centre

S.No	Activity	Institution	Physical Requirements	Unit Cost Rs.	Total Cost Rs.
1.	Establishment of Database Network and GIS / Remote Sensing Interpretation Centre				

Monitoring Implementation of the Mangrove Management Action Plan (MAP)

S. No	Activities	Physical Targets	Unit Rate Rs.	Total Amount Rs.	Sources of Funding
Total					

Summary of the Budget:

S. No	Activity Code	Activities	Physical Targets	Unit Rate Rs.	Total Amount Rs.	Sources of Funding
1.	B.4.II.2.1	Nursery Development				
2.	B.4.II.2.2	Regeneration / Refilling				
3.	B.4.II.2.4	Mangrove Plantation				
4.	B.4.II.2.5	Trenching (if required)				
5.	B.4.II.2.6	Protection Measures				
6.	B.4.II.2.7	Education & Awareness/ Community Participation				
7.	B.4.II.2.8	Socio-Economic activities				
8.	B.4.II.2.9	Training and Capacity Building				
9.	B.4.II.2.10	Establishment of Database Network/ GIS /Remote Sensing Interpretation Centre				
10.	B.4.II.2.11	Monitoring				
Total						

Status of Existing Mangroves

Existing Implementation Mechanism:

B.4.I .1.1	Implementing / Sponsoring Agency		
B.4.I .1.2	Name and Designation of the Officer		
B.4.I .1.3	Name of the Institution		
B.4.I .1.4	Address		
B.4.I .1.5	E-mail:		
B.4.I .1.6	Telephone Nos	STD Code:	Tel. No.
B.4.I .1.7	Fax No.	STD Code:	Fax. No.

Constitution of the National Steering Committee

(Enclose copy of the composition and TORs)

Constitution of the State level Steering Committee

(Enclose copy of the composition and TORs)

Constitution of the Village level Committees so as to ensure Community Participation/ with specific reference to Stake holders/ Women/ NGOs/ Weaker Sections/ SC/ST/OBC/EBC etc. by adopting Joint Mangrove Management approach

(Enclose copy of the composition and TORs)

Monitoring Mechanism:

Conservation Status:

Details of Existing Mangrove Plantation (Enclose Location Map)

S. No	Location/ Village /Block/ District	Year of Plantation	Species Planted	Method of plantation	Area (ha)	Cost Rs.	Source of Funding/ Scheme
Total							

Sources of Funding for Implementation of the activities:

S.No	Funding Agency	Scheme/ Programme Project	Duration Year	Activities Supported	Total Cost Rs.
1.2.1	Govt. of India , Ministry of Environment & Forests				
1.2.2	Finance Commission				
1.2.3	State Government				
1.2.4	UNDP/GEF				
1.2.5	World Bank				
1.2.6	India-Canada Environment Facility				
1.2.7	European Union				
1.2.8	Danida				
1.2.9	Any other Source				

Ecological Status :

2.1	<u>Vegetation status:</u> Dense/ sparse/ degraded	
2.2	<u>Species composition:</u> Mono culture/ mixed forest	
2.3	<u>IUCN Status:</u> <u>Rare/Endangered /Threatened /</u> <u>Endemic Species</u>	
2.4	Breeding/ nesting sites of Turtles /Horse Shoe Crabs	
2.5	Roosting/ Nesting / Breeding site of Migratory Birds	
2.6	Associated Biodiversity: Flora, Fauna, Wildlife, Ecosystems	

Socio-economic Activities :

3.1	Aquaculture/Fishing/ Bee-keeping/ Crab fattening/ Weed culture/ Any other	
3.2	Industry/ Port/ Harbour Development	
3.3	Tourism	
3.4	Other Employment Opportunities/ Livelihood options	

Ecological Benefits (as perceived by people)		
4.1	Shore line protection/ Stabilization/ Prevent Erosion	
4.2	Act as a Bio-shield against Cyclones, Hurricanes/	
Economic Benefits (as perceived by the Community)		
5.1	Provide Food and Fodder	
5.2	Enhance Fisheries potential	
5.3	Provide Fuel /Fire Wood	
5.4	Provide employment opportunities & livelihood	
5.5	Sources of Traditional Medicines	
5.6	Any other	
Threats to Mangroves:		
6.1	Anthropogenic pressures	
6.2	Freshwater source (reduction/ diversion, etc.)	
6.3	Developmental Activities Industry, Sand/Mineral Mining Port, Aquaculture, Agriculture, Housing etc.)	
6.4	Grazing/ cutting of trees for fuel/firewood etc.	
6.5	Pollution : sewage/ industrial/ oil, solid waste disposal etc.)	