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PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 164.10 MILLION
(US\$ 255 MILLION EQUIVALENT)

TO THE

REPUBLIC OF INDIA

FOR A

NATIONAL CYCLONE RISK MITIGATION PROJECT (I)

IN SUPPORT OF THE FIRST PHASE (APL-1) OF
NATIONAL CYCLONE RISK MITIGATION PROGRAM

May 20, 2010

**Sustainable Development Department
Urban and Water Unit
South Asia Region**

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CURRENCY EQUIVALENTS
(Exchange Rate Effective January 31, 2010)

Currency Unit = Indian Rupees (INR)
INR 46.17 = US\$1
US\$1.55419 = SDR 1.00

FISCAL YEAR

April 1 – March 31

ABBREVIATIONS AND ACRONYMS

AP	Andhra Pradesh	IMD	India Meteorological Department
APL	Adaptable Program Loan	INCOIS	Indian National Centre for Ocean Information Services
B/C	Benefit Cost	IPCC	Intergovernmental Panel on Climate Change
BME	Benefit Monitoring and Evaluation	IRC	Indian Roads Congress
CAAA	Controller Aid Accounts and Audit	IST	Implementation Support Team
CAS	Country Strategy	LD	Line Department
CBO	Community Based Organization	MHA	Ministry of Home Affairs
CDMA	Code Division Multiple Access	MIS	Management Information System
CRS	Central Receiving Station	NCB	National Competitive Bidding
DCO	District Collector's Office	NDMA	National Disaster Management Authority
DEA	Department of Economic Affairs	NIDM	National Institute of Disaster Management
DMA	Disaster Management Authority	O&M	Operation and Maintenance
DOT	Department of Telecom.	OSDMA	Orissa State Disaster Management Authority
DPR	Detailed Project Report	NGO	Non Government Organization
DRM	Disaster Risk Mitigation	PAF	Project Affected Families
EMP	Environment Management Plan	P&AO	Pay and Accounts Office
EOC	Emergency Operations Centre	PDO	Project Development Objective
ERR	Economic Rate of Return	PFS	Project Financial Statements
ESMF	Environment and Social Management Framework	PIU	Project Implementation Unit
EWDS	Early Warning Dissemination System	PMC	Project Management Consultants
FM	Financial Management	PMU	Project Management Unit
FMM	Financial Management Manual	PSC	Project Steering Committee
FY	Fiscal Year	RAP	Resettlement Action Plan
GAAP	Governance and Accountability Action Plan	R-PACs	Remote Public Alert Communication Systems
GFDRR	Global Facility for Disaster Reduction and Recovery	SBD	Standard Bidding Document
GDP	Gross Domestic Product	SDMA	State Disaster Management Authority
GOI	Government of India	SIA	Social Impact Assessment
GOO	Government of Orissa	SPIU	State Project Implementation Unit
GSDMA	Gujarat State Disaster Management Authority	SSC	State Steering Committee
IA	Implementing Agency	ST	Scheduled Tribe
IBRD	International Bank for Reconstruction and Development	TPQA	Third Party Quality Auditor
ICB	International Competitive Bidding	UNDP	United Nations Development Program
IDA	International Development Association	UNISDR	UN International Strategy for Disaster Reduction
IEC	Information Education and Communication	UT	Union Territory
IFR	Interim Financial Reports	VHF	Very High Frequency

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INDIA
National Cyclone Risk Mitigation Project (I)

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INDIA
NATIONAL CYCLONE RISK MITIGATION PROJECT (I)
PROJECT APPRAISAL DOCUMENT
SOUTH ASIA
SASDU

Date: May 20, 2010	Team Leader: N. V. V. Raghava / Christoph Pusch
Country Director: N. Roberto Zagha	Sectors: General water, sanitation and flood protection sector (100%)
Sector Manager/Director: William Kingdom	Themes: Natural disaster management (100%);
Project ID: P092217	Environmental category: A
Lending Instrument: Adaptable Program Loan	Joint IFC:
	Joint Level:

Program Financing Data

Loan Credit Grant Guarantee Other:

APL	Indicative Financing Plan				Estimated implementation period		Borrower
	IDA (US \$ Million)	%age	Borrower (US \$ Million)	Total	Commitment date	Closing Date	
APL - 1	255.00	80	64.00	319.00	07/01/10	04/30/15	India
APL - 2*	250.00	80	63.00	313.00	03/01/11	02/28/16	India
APL - 3*	275.00	80	69.00	344.00	03/01/12	02/28/17	India
Total:	780.00	80	198.00	976.00			

* Exact financing source: IDA and/or IBRD will be decided at the time of appraisal of APL-2 and APL-3.

Financing Plan (US\$m)

Source	Local	Foreign	Total
Borrower	64.00	0.00	64.00
International Development Association	229.00	26.00	255.00
	293.00	26.00	319.00

Tel: 26701711 Fax: 26701706

Estimated disbursements (Bank FY/US\$m)

FY	2011	2012	2013	2014	2015			
Annual	40	75	60	43	37			
Cumulative	40	115	175	218	255			

Does the project depart from the CAS in content or other significant respects? <i>Ref. PAD A.2</i>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Does the project require any exceptions from Bank policies? <i>Ref. PAD D.7</i>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Have these been approved by Bank management?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is approval for any policy exception sought from the Board?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Does the project include any critical risks rated “substantial” or “high”? <i>Ref. PAD C.6.</i>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Does the project meet the Regional criteria for readiness for implementation? <i>Ref. PAD D.7.</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Project development objective <i>Ref. PAD B.1, Technical Annex 3</i> The Project Development Objective (PDO) of the National Cyclone Risk Mitigation Project (I) (NCRMP-I) is to reduce the vulnerability of coastal communities in Andhra Pradesh and Orissa to cyclone and other hydro meteorological hazards.	
Project description <i>Ref. PAD B.3, Technical Annex 4</i> Component A – Early warning dissemination to coastal communities including communities’ capacity building for operation of the Early Warning Dissemination System (EWDS). Component B – Cyclone Risk mitigation infrastructure that includes multipurpose cyclone shelters, evacuation routes and missing bridges and coastal embankments. Component C – Technical assistance for strengthening capacity towards DRM. Component D - Project management and implementation support.	
Which safeguard policies are triggered, if any? <i>Ref. PAD D.6, Technical Annex 10</i> OP 4.01 Environmental Assessment OP 4.11 Physical Cultural Resources OP 4.12 Involuntary Resettlement OP 4.10 Indigenous Peoples	
Significant, non-standard conditions, if any, for: <i>Ref. PAD C.7</i> Board presentation: Nil Loan/credit effectiveness: Nil Covenants applicable to project implementation: <ul style="list-style-type: none"> • Project Management Unit (PMU) shall maintain a web based MIS system throughout the project implementation period, linking its office to the state Project Implementation Units (PIUs) and Line departments (LD) ; integrating information required on Project Progress, Procurement, Financial Management, Safeguard and Monitoring and Evaluation (M&E) requirements; and • Undertake Benefit Monitoring & Evaluation at the beginning (for baseline), mid-term and end of the project for monitoring and evaluating the outcomes/results. 	

A. STRATEGIC CONTEXT AND RATIONALE

1. Country and sector issues

1. India is highly vulnerable to natural hazards, particularly earthquakes, flood, drought, cyclone and landslides. Studies indicate that natural disaster losses equate to up to 2% of India's Gross Domestic Product (GDP) and up to 12% of federal government revenues. About 5,700 kilometers of the India's coastline is exposed to severe cyclones and approximately 40% of total population lives within 100 km of the coastline. Analyzed data for the period 1980-2000 indicates that on an average, annually, 370 million people are exposed to cyclones in India. As climate change and variability become more pronounced, hazard events are set to grow.

2. India's response to two of the biggest disasters in this current decade, the Gujarat earthquake and the Asian tsunami, has been efficient and very effective. Through this period India has made great strides in moving from reactive emergency response to being proactive and implementing disaster preparedness and risk reduction initiatives. India enacted the Disaster Management Act in 2005 and established the National Disaster Management Authority (NDMA) and State Disaster Management Authorities (State DMAs). NDMA has proactively formulated guidelines and procedures for dealing with specific calamities and is mandated to frame policies, plans and guidelines for Disaster Management. The Risk Management Framework developed in India has served as blue print and best practice model for other countries.

3. The 11th five year plan, 2007-2012, by the Planning Commission, Government of India (GoI), has clearly outlined the aim of consolidating progress made towards disaster preparedness, prevention and risk mitigation by integrating them into the development process. Significant levels of capacity need to be built and resources committed in order for India to make meaningful progress towards minimizing its overall risk and vulnerability to natural hazards.

4. The biggest cyclone to hit India over the last decade, the Orissa super-cyclone of 1999 killed over 8,900 people. Orissa, having created the Orissa State Disaster Management Authority (OSDMA), has started investing in strengthening cyclone mitigation infrastructure and mobilizing communities for disaster management across the coastal districts. Similar efforts are underway in the states of Andhra Pradesh (AP), Orissa, West Bengal, Gujarat, and Maharashtra.

5. GoI has formally requested for the World Bank assistance in implementing a cyclone risk mitigation program at the national level. The NCRMP is a flagship program being implemented by the NDMA with support from the Ministry of Home Affairs (MHA), GoI, to be implemented in cyclone prone coastal States/Union Territories (UTs), focusing on ex-ante risk mitigation interventions. The project is part of a broader national hazard mitigation program taken up by NDMA that includes programs on earthquakes, flood, landslides and establishment of a National Disaster Management Communication Network.

2. Rationale for Bank involvement

6. For more than a decade now, the Bank has been assisting GoI in effectively responding to disasters following the Latur (Maharashtra) earthquake in 1993, the AP cyclone in 1997, the Orissa super-cyclone in 1999, the Bhuj, Gujarat earthquake in 2001, and the Tsunami in South India in

2004. Globally, understanding has grown over the past decade around the important role played by disaster risk mitigation and preparedness projects in reducing the overall impacts of a disaster. In India too, this partnership between GoI and the Bank and their joint learning experience of disaster recovery and reconstruction are leading to an increased focus towards future oriented risk mitigation programs and strategies. The current legislative, institutional and policy regime created by the passage of the Disaster Management Act, formation of a nodal agency - the NDMA, and the shifting focus to disaster mitigation from disaster reconstruction is conducive to enter into partnership by the Bank with India.

7. The Bank is committed to continuing its efforts in reducing vulnerability of India to natural disaster events and its social and economic impacts by promoting a proactive and strategic approach to managing natural disaster risk. The underlying principles of the framework are that both loss of life and economic impact of disasters can be reduced by advance planning, improved policy and incentive framework, and targeted investment programs. This project supports India's major policy shift from reactive disaster response to proactive risk management and allows implementation of a demand-driven program aimed at reducing cyclone impacts in vulnerable areas and strengthening capacity various institutions. The Bank offers significant experience in translating national risk mitigation strategies into effective policies and implementable and sustainable investment programs. Hence, the Bank's support to India at this important juncture is likely to have benefits that are much larger than just measured by the financing. Furthermore, the design and implementation of the NCRMP will offer important lessons to be shared with other countries in their efforts to systematically address the reduction of disaster risks. The proposed project also creates a solid basis for a long term partnership with India that ultimately benefits millions of people exposed to natural disaster risks in India.

3. Higher level objectives to which the project contributes

8. The program aims to assist GoI and the vulnerable coastal states in mitigating cyclone related risks. This will be the first Bank funded program in India exclusively focusing on ex-ante disaster risk mitigation. NDMA is expected to strengthen policy environment in the country and build its capacities to manage various disaster risk reduction programs, while helping the states in effective implementation through its monitoring.

9. The program is part of the Bank's strategy to assist GoI in integrating disaster risk mitigation into the longer-term national development process. The program is directly linked and referenced in the Bank's Country Strategy (CAS) FY 2009-2012 Pillar II - Ensuring Development is Sustainable; states that "World Bank Group's assistance will help to increase the resilience of people and the economy to nature-related and man-made shocks"; and "Support India's comprehensive efforts to reduce the country's vulnerability to cyclones, earthquakes and other natural perils".

B. PROJECT DESCRIPTION

1. Program objectives and phases

10. Adaptable Program Loan (APL) is considered suitable to finance the National Cyclone Risk Mitigation Program (NCRMP). Starting with two states that are ready for implementation and later

expanding to the other states/UTs in second and third phase will allow building on the initial experiences and leveraging impact over time. The programmatic approach of APL will allow incorporation of lessons learned from earlier phases, and new ideas and technological advancements in management of risks in subsequent phases of the program. The programmatic approach will also help in gradual strengthening of monitoring and evaluation capacities of the NDMA and other state nodal agencies.

11. The objective of the NCRMP is to reduce vulnerability of coastal communities living in the vulnerable coastal states/Union Territories (UTs) of India, to cyclone and other hydro meteorological hazards through (i) improved early warning and communication systems, (ii) enhanced capacity of local communities to respond to disasters, (iii) improved access to emergency shelter, evacuation, and protection against wind storms, flooding and storm surge in high risk areas, and (iv) strengthening DRM capacity at central, state and local levels in order to enable mainstreaming of risk mitigation measures into the overall development agenda.

12. The program is expected to include at least three phases. Phase I includes the states of Orissa and Andhra Pradesh. Phase II will be open to the remaining high risk states or other coastal states that are ready to join. Rest of the coastal states will be covered under phase III. Each of the new phases will be appraised to confirm the implementation readiness and learn from the earlier phase. This will allow continuous adjustment of the project design, early risk identification if any, and implementation of corrective measures. All phases will cover the same development objective. The trigger indicators for subsequent Phases are:

Trigger	Indicators
Implementation readiness of participating states.	a.) Satisfactory appraisal of investment program: <ul style="list-style-type: none"> • Identification and approval of complete investment proposal. • Preparation of Detailed Project Reports (DPRs) for at least 30% of the proposed investments and related bidding documents. • Preparation of indicative procurement plan for all investments and detailed plan for first 30% of the proposed investments. b.) Operational procedures in place <ul style="list-style-type: none"> • Adoption and Disclosure of Environmental Social Management Framework (ESMF). • Adoption of Manuals: Operational, Procurement and Financial Management (FM). • Establishment of fully staffed implementing units and MIS • Initiate appointment of Third Party Quality Audit Consultants and Internal Auditors.

2. Project development objective and key indicators

13. The Project Development Objective of the National Cyclone Risk Mitigation Project (I) (NCRMP-I) is to reduce vulnerability of coastal communities in Andhra Pradesh and Orissa to cyclone and other hydro meteorological hazards. Achievement of the objective will be measured using the following key indicators:

- Proportion (%) of targeted coastal population covered by the Early Warning Dissemination System.
- Proportion (%) of people having access to emergency shelter.
- Number of people and hectare of land protected by strengthened/improved embankments.
- Increased awareness about warnings and emergency response.

3. Project components

14. The Project has four principal components: a) Early Warning Dissemination System (EWDS) and Capacity building for coastal communities; b) Cyclone Risk Mitigation Infrastructure; c) Technical Assistance for Strengthening Capacity towards DRM; and d) Project Management and Implementation Support. The early warning and cyclone risk mitigation infrastructure components will be implemented in two states – Orissa and AP while technical assistance for DRM capacity strengthening will be available to all of the 13 coastal states and UTs, but centrally managed by NDMA / NIDM. A short description of objectives and activities in each of the components is given below:

15. *Component A: EWDS and Capacity building for Coastal Communities (US\$16 million):* The overall objective of this component is to reduce the vulnerability of coastal communities by addressing the existing gap in dissemination of warning to the communities. The component will support: A.1) Installation and operation of EWDS allowing the state and/or district/sub district level control centre to send communication directly to the villages using Global System for Mobile Communications (GSM)/Code Division Multiple Access (CDMA) based technology including strengthening emergency operation centers to channelize the warning through different communication modes. The component also includes providing satellite phones to key officials to fail proof the EWDS and also pilot new radio based wireless communication technology in one block in each state; and A.2) Strengthening capacity: (i) in operating, maintaining and regular use of the EWDS equipment by officials and village representatives, and (ii) of communities in disaster preparedness and response by preparing disaster management plans and arranging mock drills etc.

16. *Component B: Cyclone Risk Mitigation Infrastructure (US\$275 million):* The objective of this component is to improve the access to emergency shelter, evacuation and protection against cyclone and other hydro meteorological hazards such as wind storms, flooding and storm surge in high risk areas. Each of the states reviewed the existing system and gaps and developed risk mitigation infrastructure portfolio. For emergency shelters, the identification mechanism included assessment of total requirements, assessing currently available shelters (including other government and private buildings) and then computing the gap. The portfolio includes a broad set of measures such as investments in multipurpose emergency shelters, up-grading of existing roads and providing bridges suitable for evacuation, drainage improvement measures and repair and up-grading of existing embankments, and creation of corpus funds for operation and maintenance of cyclone shelters.

17. *Component C: Technical Assistance for National and State Level Capacity Building and Knowledge Creation (US\$6 million):* The objective of this component is to help understand risk and vulnerabilities better, and prepare the key institutions for addressing them effectively across all coastal states and UTs. This component consists of studies, assessments, training and capacity building activities related to risk and damage assessments, development of training modules and action plans and implementing them through identified partner agencies.

18. *Component D: Project Management and Implementation Support (US\$22 million):* This component provides support for project management by financing incremental operating costs for PMU, PIUs, nodal units in LD and National Institute of Disaster Management (NIDM), office equipment, training and exposure visits and consulting services for specialist activities.

4. Lessons learned and reflected in the project design

19. The project has integrated lessons learned from Bangladesh's cyclone risk mitigation efforts. The cyclones that hit Bangladesh in November 1970 washed away close to 500,000 people and that in April 1991, killed close to 138,000 people. Cyclone Sidr, a cyclone of similar intensity to the 1970 cyclone, struck Bangladesh in November 2007. This time around, reported deaths were relatively less, close to 3,800 people. After 1970, Bangladesh focused strongly on cyclone risk mitigation and by 2007 around 2,500 cyclone shelters across 19 coastal districts were built. In addition, Bangladesh developed a robust EWDS along with coastal greenbelts and embankments. When Cyclone Sidr struck in 2007, close to 1.5 million people benefitting from the improved EWDS took refuge in the cyclone shelters across the coast. The relatively small number of lives lost, builds a clear and compelling case for increased investment in disaster risk mitigation – both in physical infrastructure such as emergency shelters, access routes and in improved EWDSs.

20. Experiences from previous disaster reconstruction operations, financed by the Bank in South Asia, have also provided several key lessons towards developing future disaster mitigation/management projects. Some important lessons drawn from the these projects are:

- i. Risk mitigation requires assessments. Participating states should conduct comprehensive analytical studies identifying physical and socio-economic vulnerabilities and best available and implementable mitigation initiatives;
- ii. Capacity of local governments and community should be strengthened to ensure sustainability of the interventions through a long-term strategy for operating and financing maintenance of the assets established under these special projects;
- iii. There is emerging experience regarding implementation of risk mitigation projects and Bank's global experience will be of particular importance in meeting project objectives. The project has received support from the Global Facility for Disaster Reduction and Recovery (GFDRR) in preparation and further in implementation.
- iv. Ownership of solutions by beneficiaries is essential to ensure sustainability of interventions at community levels. Emphasis should be given to community-based management of assets wherever possible;
- v. Maintaining flexibility and client ownership at the state level are essential for project development and implementation;

21. Some important lessons drawn from the disaster vulnerability reconstruction operations financed by the Bank in other regions include:

- i. DRM institutions are frequently over stretched between regular operations and emergencies. This means a project implementation/management units should have clear roles, so that staff can continue to work on the on-going projects independent of emergency. This would ensure continuity, and is especially important in countries with highly recurrent events.
- ii. Unlike emergency response, prevention entails a change in behavior. Establishing a culture of prevention therefore takes time, and requires dedication and resources over multiple years and activities.
- iii. A monitoring and evaluation (M&E) framework that includes outcome indicators is necessary to measure results, as is an effective supervision team.

5. Alternatives considered and reasons for rejection

22. The project design has evolved over time and the main alternatives considered were:

- a) *Multi-disaster Risk vs. Cyclone Risk*: The project considered addressing multiple DRM efforts including seismic risk mitigation and emergency preparedness. However, this proposal was jointly rejected by GoI and the Bank to limit the complexity of the project. It was therefore decided to focus the project on cyclone risk mitigation. While focusing on a single disaster specific response, the project would also look into institutional response systems and create multi hazard resistant infrastructure.
- b) *All vulnerable states vs. limited number of highly vulnerable states*: It was initially discussed whether to consider risk mitigation investments under component B in all Indian coastal states. In the interest of simplicity of management, readiness of the investment proposals in various states and variable degree of vulnerability of the various states towards cyclones, it was decided to start with risk mitigation investments in the two highly vulnerable states and later expand to other states.
- c) *Hi-tech disaster warning and response systems vs. reaching coastal communities*: During the initial period a comprehensive support was envisaged to support a hi-tech disaster forecasting and modeling systems of India Meteorological Department (IMD). However, independent of the Project, the GoI is financing a program to augment IMDs forecasting capacity. This will enable collection of sufficiently dense observational data with the help of Automatic Weather Stations, Doppler Radars and Wind Profilers etc., to run global and regional weather numerical prediction models. First phase of the program will complete by year 2010. Therefore, the focus in the project shifted to the other end, i.e., towards making sure that early warnings reach vulnerable coastal village communities. The project has opted to use efficient, modern and reliable GSM/CDMA based technology after evaluating the other technologies including the traditionally used Very High Frequency (VHF) radios. The project will also get the feedback of the beneficiaries and functionaries at the last mile to assess the effectiveness of the warning systems to enable improving the same.
- d) *Investment lending vs. programmatic lending*: A programmatic option to provide support to GoI and the states, where the new states come into the project as they become ready with investment proposals and detailed studies, and as the project's M&E capacity gets established was found to be more suitable than the normal investment lending. Normal investment lending requires readiness among all participating states and poses a big start up challenge for the project in terms of project monitoring capabilities. With the adaptation of the programmatic approach for scaling up the investments in priority and ready states, the project start up is fast tracked and allows the monitoring and evaluation capacity to be built gradually.

C. IMPLEMENTATION

1. Partnership arrangements

23. The project will partner with international organizations (to bring in international experiences), a key national research and training organization –NIDM, private sector (particularly for dissemination of warnings), management consulting firms (for audits and implementation

support), and Non Government Organizations (NGO) (to help involve the community and promote ownership).

- a) Center and the States: Strong partnerships exist between the MHA and the NDMA at the center, and between the NDMA and SDMA/Implementing departments at the state level.
- b) NIDM – The National Institute for Disaster Management will work on component C: Technical Assistance for Strengthening Capacity for DRM. The NIDM will work closely with the NDMA in managing risk and vulnerability and institutional capacity assessment studies; conduct specific risk reduction trainings as well as Training of Trainers modules.
- c) GFDRR – The GFDRR is supporting the Bank in preparation of the project. GFDRR has also agreed to support an Implementation Support Team (IST) for the Bank to augment its monitoring capacity, help the partner agencies in implementation and preparation of the next phase of the APL
- d) UN ISDR – The United Nations International Strategy for Disaster Reduction (UN ISDR) has supported project management structure during the preparatory phase. UN ISDR will support documenting lessons learned from project implementation.
- e) NGOs – The PIUs in each of the two states will make use of local NGOs and community-based organizations for awareness raising, information dissemination, training community volunteers and preparing participatory evacuation plans for communities.

2. Institutional and implementation arrangements

24. The project proposes to use the existing institutional arrangements both at the central and state levels. The NDMA, on behalf of MHA, will manage the project and will have overall responsibility for implementation. NDMA will have a PMU, headed by a Project Director and supported by technical experts and management staff. At state level the existing nodal agency for disaster management (e.g., State Disaster Management Authorities or Revenue/Relief Departments) would be responsible for managing the project and will have a SPIU playing the coordination/project management role. The SPIUs are headed by state Project Directors' reporting to the respective heads of the nodal agencies. To provide a strategic direction, oversight and approvals, Steering Committees are constituted both at the central and state levels, consisting of various key departmental/ministry heads. The execution of works and procurement of equipment will be undertaken by the relevant LD after approval from the state PIU. Detailed composition of each of the units is presented in Annex-6.

25. In order to utilize the special skills required for implementation of Components C, it is proposed to use NIDM, which was set up under MHA through the Disaster Management Act-2005 of India. NIDM functions within the broad policies and guidelines laid by the NDMA and is responsible for planning and promoting training and research and information management in the area of disaster management. It will act as an implementing agency (IA) for NDMA, for part of the activities under Component C. All in all, there will be only three nodal agencies – NDMA's PMU, and the two state PIUs.

Skill mobilization

26. PMU and the PIUs will have sector experts, supported by functional experts from procurement, FM, environmental and social domains. Adequate support staff will be hired, if

needed, for proper functioning of these units. The LD of the states will designate a small unit from within the department to collaborate with the SPIU.

27. In order to help plan and manage various project preparation activities, including providing assistance to the states in preparing the project proposals and undertake preparatory activities, NDMA has hired a Project Management Consultant (PMC), financed under a Project Preparation Facility (PPF) of US\$800,000. The PPF has also supported various Operating Costs at NDMA level. The PMC prepared various tool kits, manuals and guidelines and trained the state level units in applying these. The state units will also hire consultants to support Environmental and Social screening, Environmental and Social assessments, preparation of Environmental Management Plans, DPRs, bid documents, project management, third party quality audit and internal audit.

Implementation Support

28. The Bank offers a new and innovative approach of implementation support. GFDRR has agreed to finance a dedicated IST given the strategic relevance of the project for India, as well from a global perspective. IST will work under the oversight of the Bank task team and will provide support to the PMU, PIU and LD. This will among others include (i) technical advisory services, (ii) hands-on procurement training, (iii) quality control functions for efficiency and effectiveness, as well as (iv) policy advice on a broad range of related topics.

3. Monitoring and evaluation of outcomes/results

29. A Management Information System (MIS) linking NDMA and the states is being developed for providing regular updates on the project status. The MIS is proposed to be established in the PMU, in state PIUs and at each of the LD. The MIS will assist the implementing agencies in consolidation of implementation and feedback data (both from LDs' staff and beneficiary communities or their representatives) in the field, in addition to addressing procurement, safeguards compliance, and physical and FM needs of the project. This system will be further complemented with inputs from Third Party Quality Auditor (TPQA) consultants on the quality of the works executed under Components B. Reports generated from this system by the respective PIUs will be consolidated by the PMU for analysis and reporting to appropriate authorities/forums.

30. BME study will be outsourced by the PMU for monitoring and evaluating the outcomes/results from project activities vis-à-vis the goals, objectives and expected outcomes/outputs of the project. This study will be carried out in three stages viz. at the beginning to serve as baseline study developing qualitative and quantitative indicators to facilitate assessment of the effectiveness of the project during implementation (after 30 months) and at completion (4 months before closure of the project). The expected costs for implementation of these activities will be drawn from Component D of the project.

4. Governance structure

31. **Governance:** The project will use a two tier Project Management Structure consisting of the PMU at the national level as part of NDMA and at the state PIUs as part of the SDMA or the nodal department. PMU and PIUs will be the key implementing and monitoring agencies for the project. PMU and SPIUs will be headed by project directors while NDMA and SDMA or nodal departments

will monitor their functioning. LDs implementing the works will designate nodal officers within their departments to act as focal point for the project. In order to see that the risk mitigation priorities are properly captured in planning, Steering Committees have been formed at both national and state level to give directions to the program. Consultations took place at the village level to get the feedback of the community and acceptance of interventions.

32. **Procurement Arrangements:** Procurement of works will be done by the LDs under the overall guidance of the SPIU. The online procurement monitoring system that would be implemented as part of the web based MIS will help track the procurement progress and status, control the slippages and disseminate procurement related information. Procurement workshops and refresher courses will be organized for staff involved in procurement to update them with Bank's procurement procedures. The two phase-I states have already implemented the Bank funded projects and thus are experienced. A procurement manual has been prepared by the NDMA and agreed with the Bank, will be adopted by the participating states to help address the issues related to non-compliance of procurement procedures. Bank will carry out the post procurement reviews of contracts below the threshold value of prior review to ensure compliance of the procurement procedures. Grievance redress procedures are also being established at the PIU level.

33. **Monitoring and Evaluation System:** An online project monitoring and tracking system will be installed and operated by the PMU with the help of the SPIUs and the LDs. This MIS will include procurement monitoring, FM, progress monitoring, grievance redress tracking and key information on environmental and social aspects to enable effective functioning of various units. Access to real time information will help in identifying the delays and non compliances and will equip the project managers to take remedial measures. The MIS will also integrate payment and quality audit systems for better compliance of quality standards in works. BME will be carried out in three stages: to create a baseline at the beginning, to facilitate midterm corrections during midterm and to measure the outcomes of the interventions prior to the end of the project.

34. **Stakeholder Participation:** The communities would be involved during vulnerability assessments, identifying required mitigation infrastructure, shelter management, maintenance of Emergency Operations Centres, safeguarding and regular use of EWDS etc. NGOs will be used for awareness creating on EWDSs, their utilization by the community and post warning response.

35. **Environmental and Social:** The project is situated in coastal areas, which are generally environmentally sensitive and have vulnerable population. Particular attention has been given to addressing and managing social and environmental issues arising on account of project interventions. An ESMF has been developed, outlining an investigation framework consisting of – screening, detailed assessment of social and environmental aspects and EMP/RAP preparation which help as measures to mitigate the risks. Compliance monitoring will be carried out by the PMU and PIUs which will ensure compliance with environmental regulations and ESMF provisions.

36. **Governance and Accountability Action Plan (GAAP)** A detailed GAAP has been developed and is incorporated in the Operations Manual.

5. Sustainability

37. Sustainability of the interventions proposed has been enhanced due to the following:

- a) *Ownership*: NDMA has shown keen interest and appointed an experienced Project Director and PMC for project preparation. MHA, NDMA and Department of Economic Affairs (DEA) have given high importance to the project and to the partnership with the Bank in the area of disaster management. Participating states used their resources to hire technical advice and completed the required documentation. This indicates strong commitment.
- b) *Institutional Capacity*: Promulgation of the Disaster Management Act, in December 2005 facilitated creation of NDMA at central level and SDMAs/nodal disaster management departments at state level. Since NDMA and SDMA are legally empowered, they are developing as capable institutions and would help sustain investments in risk mitigation and its mainstreaming into development.
- c) *Central coordination*: The project will be coordinated by the NDMA at the central level and by the SDMA/ implementing departments at the state level.
- d) *Community participation and feedback mechanisms*: The project is designed to involve communities in selection and planning of investments, in maintenance of cyclone shelters and maintenance and use of EWDS communication etc. This is likely to promote local level ownership making the project sustainable.
- e) *Focus on infrastructure maintenance*: The project focuses on maintenance of the infrastructure built or assets created after their implementation, through regular maintenance budget provisions by the LD of the states as well as by creation of a corpus fund to cater to the specific needs of maintenance and operation of cyclone shelters. Community involvement (as mentioned above) as well as innovations such as use of multi-purpose buildings designed as cyclone shelters will lead to long term asset sustainability.

6. Critical risks and possible controversial aspects

38. There are no controversial aspects. The following risk factors have been identified:

Risk	Risk Mitigation Measure	Rating with Mitigation
To PDOs		
Change in government' priorities and commitment for investment on risk mitigation	<ul style="list-style-type: none"> • GoI, having enacted The Disaster Management Act 2005, and created NDMA is fully committed to risk mitigation. • States have been incentivized by GoI by providing 75% of the proposed investment cost under Component B as Grant. 	M
Political changes may adversely affect sector policies.	<ul style="list-style-type: none"> • Local communities have shown great interest in having access to risk mitigation infrastructure that can save lives and economic activities. • Proposed capacity building and risk assessment work under component 'C' will increase awareness among coastal states on the aspects of risk mitigation. 	L
To Component results		

Risk	Risk Mitigation Measure	Rating with Mitigation
Ambitious targets and low demand	<ul style="list-style-type: none"> • Project interventions cater to part of the demand and targets are realistic. • Communities have shown interest in having access to risk mitigation infrastructure and eagerness to participate in the asset management process. 	L
Target areas getting struck by a natural disaster - Cyclone	<ul style="list-style-type: none"> • Temporary setback in project activities in case of target areas getting struck by cyclone is unavoidable but will create positive demand and commitment. 	L
Low focus on Component C	<ul style="list-style-type: none"> • Involvement of specialist agency NIDM coordinated by PMU at central level for carrying out the related studies. • ToR for major studies have been formulated and agreed. • Project provides implementation support to NIDM. 	L
Governance and Controls		
Participation of multiple states and implementing agencies leading to lack of controls and accountability.	<ul style="list-style-type: none"> • Two tier governance structure: NDMA at central and SDMA or the nodal department at state level for project oversight. Two steering committees: one at national and other at state level for guiding and oversight. • Both PMU and state PIU to be headed by a Project Director. • NDMA/SDMA/Nodal departments to oversee functioning of PMU and PIU • Use of online MIS for monitoring. 	M
Uniform approach in implementation	<ul style="list-style-type: none"> • NDMA created various manuals: Operations, Procurement, Financial Management Manual; and templates: Investment Proposals, DPR etc. for use by states. 	M
Procurement		
Multi-institutional implementation could lead to delay in procurement	<ul style="list-style-type: none"> • Establishment of procurement monitoring database within the Project MIS. • Reports compiled from the MIS will be uploaded on NDMA and State websites for public viewing. (public pressure on performance) • Procurement Manual has been prepared to ensure consistency and adherence to agreed procedures. • Targeted training will be provided to staff involved in procurement. • All PIUs will be staffed with qualified procurement specialists 	M
Financial Management		
Project accounting guidelines are untested; staff not familiar with reporting requirements. This may lead to delays and non compliances.	<ul style="list-style-type: none"> • Financial Management Manual has been developed and adopted by all participating states. • Regular training will be provided to strengthen understanding of agreed FM requirements. • Qualified staff will be hired at both NDMA and PIUs to oversee and coordinate FM. • Annual Statutory Audit supported by regular internal audits for all implementing entities. 	M
Inadequate monitoring, evaluation and reporting system particularly with the involvement of multiple states and agencies.	<ul style="list-style-type: none"> • Centralized project subcomponent approval process at NDMA level, supported by consultants. • Use of on line MIS with PMU and PIUs deploying system managers to ensure updation. • NDMA will submit a quarterly progress report to the Bank comprising of updates on progress, procurements, finance, expenditure, claims and status of statutory clearances /permissions, environmental & social safeguards, etc. • Deployment of third party quality audit and BME consultants. • Compliance follow up of audit reports by state PIU and PMU. 	M
Environmental Management		
Significant adverse impact on environment.	<ul style="list-style-type: none"> • Integration of ESMF provisions including outputs from public consultation process in (a) project planning; (b) engineering design and; (c) sub-project implementation and operation. 	M

Risk	Risk Mitigation Measure	Rating with Mitigation
	<ul style="list-style-type: none"> • Preparation of EA and sub-project specific EMPs for projects with a potential for significant adverse impacts. • Dedicated staffing; capacity building and training for effective ESMF implementation; robust supervision arrangements; regular and systematic monitoring and evaluation. 	
Overall Risk Rating		M

H – High Risk, S – Substantial, M – Moderate, L – Low

7. Loan/credit conditions and covenants

- PMU shall maintain a web based MIS system throughout the project implementation period, linking its office to the state PIUs and LD; integrating information required on Project Progress, Procurement, Financial Management, Safeguards and M&E requirements; and
- Undertake Benefit M & E at the beginning (for baseline), mid-term and end of the project for monitoring and evaluating the outcomes/results.

D. APPRAISAL SUMMARY

1. Economic and financial analyses

39. The project is expected to bring significant economic benefits to the local communities in cyclone affected areas by reducing potential damages to physical, environment and human capital in the event of cyclones, and protecting the local economies from downturns as a result of disaster impacts. To estimate the benefits, the economic analysis first establishes the cyclone hazard intensity and frequency discharge relationship in selected local districts, then builds the vulnerability function, and finally estimates the cost and benefit under scenarios of with and without project in order to calculate the economic rate of return (ERR). Detailed analysis can be found in Annex 9.

40. The cases were selected based on the investment proposals prepared by the states for financing under NCRMP, and on the data availability. Three selected districts were: Kendrapara in Orissa, Jamanagar in Gujarat, and Vishakhapatnam in AP. The Orissa and AP cases illustrate technical features of the cyclone and vulnerability function on the east coast along the Bay of Bengal, while the Gujarat cases demonstrate the impact of the cyclone on the west coast in the Arabian Sea.

41. The ERR and the benefit/cost (B/C) ratio show significant positive results for all the embankment, shelter forest plantation and cyclone shelter components. (See table 1) Sensitivity analysis confirms the robustness of ERR by testing the scenarios in which benefit or cost variables changes 20%. (See Annex 9 for details).

Table 1: ERR and B/C ratio

Project component		Orissa	Gujarat	AP
		Kendrapara	Jamanagar	Vishakhapatnam
Embankment	ERR	31%	24%	-
	B/C	2	1.7	-
Shelter forest plantation	ERR	29%	-	-
	B/C	3	-	-
Cyclone Shelter	ERR	73%	15%	28%
	B/C	4	1.2	1.9

42. The result shows that the embankment and shelter forest components can achieve an ERR of about 30%, with positive B/C ratio. Embankment is more efficient in reducing the damage from storm surge, which causes the most capital loss during cyclone. Forest shelter plantation's initial investment cost is smaller than embankment component, and therefore has a higher B/C ratio.

43. The economic study uses S. Bhattacharya, A. Alberini and M Cropper (2007)'s estimation¹ of Value of Statistical Lives (VSL) in India in the human capital analysis. With this VSL estimates, results show that Orissa has a high ERR in cyclone shelter component (73%), followed by AP (28%), and then Gujarat.

2. Technical

Component A

44. The component includes establishing a system of dissemination of early warnings to the coastal communities. Existing systems that are in operation including the VHF system established under the United Nations Development Program's (UNDP) Tsunami recovery program in Tamil Nadu were reviewed. It was decided to use modern communication technology i.e. GSM/CDMA based warning system. It was also confirmed that GSM/CDMA coverage largely exists in the coastal areas of the participating states. The warning system will be activated by the state or district emergency operation centre through a Remote Public Alert and Communications Systems (R-PACS). Backup systems of satellite phones will be provided and new technologies like TETRA will be piloted. Exact specifications and operational protocols would be developed by NDMA in consultation with various states during the project, prior to the procurement. Capacity building of staff, strengthening of emergency operation centre and capacity building and awareness creation in the coastal communities for use of EWDS and disaster preparedness and response are part of this component.

Component B

45. This component includes various cyclone risk mitigation infrastructure such as cyclone shelters; saline embankments; missing roads culverts and bridges. The objective of providing this infrastructure is to minimize the damage and loss to lives and property in the event of a cyclone.

¹ S. Bhattacharya, A. Alberini and M Cropper (2007) in their paper "The value of mortality risk reduction in Delhi, India" (Journal of Risk and Uncertainty, 34:21-47) estimated that the value of a statistical life (VSL) in India is approximately 1.3 million Rupees or USD150,000 Purchasing Power Parity (PPP) USD. Due to time and resource availability, this study doesn't try a separated study, but cites this study result in the human capital valuation.

Such infrastructure has been designed to withstand the severe conditions caused by the cyclones and other expected natural disasters in the region. Cyclone shelters would be used in normal times for other activities such as schools, dispensary or health centre or village information/training centre. The objective is to keep the facility in use during normal times so that it is in a state of readiness in the event of a natural disaster. The Operations and Maintenance (O&M) of cyclone shelter is proposed to be taken up by Cyclone Shelter Management and Maintenance Committees. A corpus fund would be created by the states that would be used for the O&M of the cyclone shelters. Shelters have been designed based on relevant Indian standards and guidelines including those on hazard mitigation structures. Normally these are being built as framed concrete structures.

46. Saline bunds and embankments are structures designed to guide the flow in a manner so as to avoid flooding and ingress of salinity into the habitations and agricultural lands. Detailed studies will be carried out to identify the impacts specially the negative impacts, if any, of the proposed interventions or remedial/improvement measures. Mitigation plans will be prepared, finalized and implemented based on the findings of these studies which will be cleared by the Bank. Coastal canals, drains and saline embankments would be maintained by the concerned government agencies through their normal maintenance budgets.

47. Effective road connectivity ensures fast deployment of men, materials and machinery to the affected areas and also ensures speedy evacuation of vulnerable population to safer areas in the face of an impending disaster threat. The link roads to existing cyclone shelters are crucial during the evacuation operation. Roads constructions/restorations would also involve construction/restoration of en-route culverts and bridges. The objective of the construction of roads, culverts and bridges will be to provide all weather access to the villages and the cyclone shelters. Normally flexible pavements would be provided unless desired by considerations of rainfall and presence of unsuitable soil condition which would require use of rigid pavements. Bridges and culverts are being designed for appropriate class of loading in accordance with the provisions of Indian Road Congress (IRC) and height is based on navigational requirements. Prior soil investigations have been carried out to design the suitable foundations for roads, bridges and culverts. These structures would be maintained by the concerned government agencies through their normal budgetary support.

Component C

48. The objective of this component is to provide analytical support for further upgrading DRM in India. This will prepare/sensitize the stake holders in planning for hazard risk mitigation and increase their level of preparedness and works towards mainstreaming the risk mitigation in the overall development process. Primarily the studies include: (i) risk assessment (micro and macro level); (ii) identification and preparation of high priority risk mitigation investments; (iii) preparation and implementation of long term training and capacity building strategy; and (iv) damage and loss assessment techniques. These studies would be outsourced. Support would also be provided to the two participating states for specific assessments / capacity building activities based on the strategies evolved and implementation of training modules. Support would also be provided to build capacities of state and district officials. Need based support would be provided for evolution of State DMA in AP.

3. Fiduciary

49. **Financial Management:** Overall, FM arrangements as proposed for the project are considered to be adequate. The project will be implemented by the NDMA and various departments in the participating states of Orissa and AP. In each state, a Nodal agency in form of an SPIU will be set up to support and co-ordinate implementation. MHA shall make annual allocation for the project in its budget under a separate 'World Bank Project' Budget head. Similarly states will make a provision for their share of the program in their own budgets.

50. *Accounting* will be as per generally accepted accounting principles; this will follow a cash basis of accounting. To ensure consistency in the FM function across the project implementing entities, NDMA has prepared a Financial Management Manual (FMM) which compiles Project accounting policies/ procedures, funds flow arrangements, chart of accounts and formats for books of account/ reporting.

51. *Staff* at NDMA will consist of a Financial Controller who will be a qualified Chartered Accountant with at least 5 years of post qualification experience. His/her responsibilities will include supervision of the FM function at states including training, assistance in managing of the external and internal audits, reporting for reimbursement purposes, and discharge of the FM function at NDMA etc. Similarly, qualified staff will be hired to discharge the FM function at each state PIU.

52. *Funds* will flow from the Bank to the GoI and on to the MHA. A designated account would be opened by GoI with the Reserve Bank of India to receive funds under the project. MHA will in turn, transfer funds to NDMA or the States. In Orissa the GoI share will be transferred to the PIU; this PIU will receive the corresponding state share and will make payments for project expenditure. In AP, the GoI share will be provided through the Reserve Bank of India to the state budget. Implementing units will then be provided budgets and will incur expenditure as per the state's regular arrangements using office of the Pay and Accounts Officer.

53. *NDMA* would report on activities under the program under the system of quarterly Interim Financial Reports (IFRs). Quarterly *disbursements* would be made based on these IFRs, providing funds for two subsequent quarters after adjustment for past disbursements. IFRs will be submitted to the Bank within 45 days of close of the quarter.

54. The Project Financial Statements (PFS) will be *audited* by a firm of Chartered Accountants in case of NDMA and Orissa. In case of AP, the Comptroller and Auditor General will audit the PFS as per pre-agreed ToR. Audit Reports will be submitted to the Bank within six months of the close of each financial year (FY).

55. **Procurement:** Procurements under Component A will be done by NDMA and Component B will be carried out by the state concerned LD respectively. Procurement for Components C will be by NIDM & NDMA while it will be the responsibility of the respective PIUs and the nodal units of the LD for procurement under Component D. Procurement by these establishments will be carried out following procurement procedures agreed with (or satisfactory to) the Bank. These procedures and specific requirements have been incorporated in the draft procurement manual prepared by NDMA which describes the procedures and requirements/formats in detail to be

followed by the implementing agencies for procurements under the project.

4. Social

56. *Impacts on people and land:* Subprojects under component B will have major positive impacts on the community as a whole. Substantial portions of the infrastructure such as roads, bridges, canals and embankments will use the existing alignments and are therefore unlikely to involve land acquisition except for minor widening/up gradation where required by design. The new multipurpose shelters are planned either in the existing school or other government lands. Consequently the land acquisition under the project will be very limited. The adverse impacts, if any will therefore be largely restricted to a modest loss of land and livelihood disturbances for a few people from the construction of new infrastructure at few locations.

57. *Management of Social Risks:* An ESMF that includes safeguard instruments has been prepared to mitigate potential adverse impacts arising out of the implementation of the sub-projects. Prior to the preparation of the DPRs, the social impacts will be first identified using the screening checklist and certified by the Social Development Specialist (SDS) of the PIU. Where necessary full scale SIA and preparation of RAP will be undertaken and implementation of mitigation measures will be completed before the start of works. Third Party Auditors will assess the implementation of the RAPs. The Mid-term and end-of-project evaluations will be undertaken to assess the impact of RAP in mitigating the adverse affects on the project affected people.

58. *Indigenous Peoples/Tribal Development Framework.* The Project is unlikely to impact indigenous/tribal/ST populations. However, in case of possible impacts, there are sufficient provisions in the existing laws in the country to meet the objectives of the Bank's OP 4.10 which addresses the special concerns with regard to the Scheduled Tribes (STs)/indigenous peoples. Further, resettlement planning exclusive to indigenous/tribal peoples is proposed in the ESMF to safeguard the interests of the tribals. Following the OP/BP 4.10 on Indigenous Peoples/tribals, the ESMF detailed the need to consult the tribals for their broad community consent and, to ensure that they participate and benefit from Bank-funded operations in a culturally appropriate way - and that adverse impacts on them are avoided, or where not feasible, minimized or mitigated.

59. *Implementation Arrangements:* The Implementation of the ESMF provisions including the RAP is the responsibility of the SPIUs and will be monitored by the SDMA or the nodal department. The proposed web based MIS will include a module on the monitoring and tracking of the implementation of the provisions of the ESMF. The SPIUs will have a nodal SDS. Orissa has appointed the SDS while AP is in the process of recruitment. An orientation workshop on social and environment will be conducted in both the states for all levels of staff. Periodic training programmes will be conducted for reorientation on the issues and also to orient the new staff joining the project later.

60. *Grievance Redress:* In the project all efforts will be made by LDs so that the compensation/assistance package for Project Affected Families (PAF) is decided following the ESMF and in consultation with the community to avoid any dispute. In case of a potential dispute the matter will be brought to the notice of local tehsildar/Sub Divisional Magistrate (SDM). He/she shall hear the case in presence of (a) the affected party, (b) the officer in charge of LD who is acquiring the land/ in charge of the sub-project activity and (c) sarpanch of the village where the

sub-project is being implemented. He/she will try to reach an amicable solution to the issue. However, in case of non-satisfactory solution, the matter will be brought to the notice of the District Collector and he is the final authority to decide the case. The hearing will be attended by all members present for hearing with the SDM as well as the Social Management Specialist of the PIU. As required certain cases will be referred to a Grievance Redress Committee appointed by the State Steering Committee (SSC) which would examine and address the grievances. The Social Management Specialist from the PIU will be responsible for maintaining a record of the proceedings and the final decisions.

5. Environment

61. *Environmental Impacts.* Majority of the planned investment involves either construction of buildings (such as cyclone shelters) or repair/improvement of the existing infrastructure (such as in the case of saline embankments and roads providing connectivity to cyclone shelters) or tower installation for communication and therefore are unlikely to have significant or irreversible environmental impacts. However, implementation of the sub-projects may have some small-scale adverse environmental impacts, which may include: (i) direct/indirect impacts resulting due to poor site selection for sub-projects (example: salt water intrusion due to inappropriate planning and design of embankments); (ii) impact on the drainage pattern of the area, including impact on coastal flora and/or fauna due to changes in tidal water flow; (iii) felling of trees and clearance of vegetation for sub-project construction; (iv) impacts on water resources used by the people such as ponds, river/streams, canals and hand pumps; (v) occupational health and safety concerns that may arise during the construction stage; (vi) impacts due to construction material (sand, water, earth, aggregate) sourcing and transportation and; (vii) disposal of debris and other construction wastes.

62. *Environment Management.* In order to ensure effective environmental management in a scenario where multiple sub-projects are located in different parts of the coastal region across the states, the approach of ESMF preparation has been adopted in the project. The ESMF serves as a comprehensive and a systematic guide covering policies, procedures and provisions, which are being/will be integrated with the over-all project cycle to ensure that the environmental aspects are systematically identified and addressed in all the sub-projects funded under the project. It will also support and assist the compliance with applicable GoI and state laws/regulations apart from Bank policies. Appropriate measures have been developed to enhance positive impacts and to avoid, minimize and mitigate adverse impacts through a generic/standard activity-specific Environmental Management Plans (EMP). These activity specific EMPs address planning/design, construction and operation-stage impacts such as: (a) air and noise pollution; (b) water and soil pollution from spills of fuel, lubricants and other construction wastes; (d) operation and rehabilitation of material sources and construction campsites; (e) safety of workers and near-by residents and (f) drainage modification/s.

63. However, critical environmental issues, which may result on account of improper site selection (which is an important factor in coastal areas), have been avoided/considerably minimized by effectively using results from the Environment Screening exercise. This has ensured that no sub-project with any likely possibility of creating significant or irreversible adverse impact on environment is taken-up without a proper study (environment assessment/analysis). To meet this end, a robust methodology supported by use of scientific tools such as GIS and remote sensing techniques has been used in the project.

64. As part of the project preparation, extensive public consultation has been carried out to inform about project objectives and design interventions as well as to obtain feedback on the draft ESMF. The ESMF provisions and outputs from the consultation process are being integrated into the engineering design and contract documents of the individual sub-projects. The ESMF also includes institutional arrangements (required for effective ESMF implementation) and monitoring plan covering both construction and operation-stage activities. The implementation and monitoring arrangements required for environmental management in the project are summarized in Annex 10.

6. Safeguard policies

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	[X]	[]
Natural Habitats (OP/BP 4.04)	[]	[X]
Pest Management (OP 4.09)	[]	[X]
Physical Cultural Resources (OP/BP 4.11)	[X]	[]
Involuntary Resettlement (OP/BP 4.12)	[X]	[]
Indigenous Peoples (OP/BP 4.10)	[X]	[]
Forests (OP/BP 4.36)	[]	[X]
Safety of Dams (OP/BP 4.37)	[]	[X]
Projects in Disputed Areas (OP/BP 7.60)	[]	[X]
Projects on International Waterways (OP/BP 7.50)	[]	[X]

7. Policy exceptions and readiness:

65. No policy exceptions required and the project meets the South Asia Region’s criteria for readiness.

Annex 1: Country and Sector or Program Background
INDIA: National Cyclone Risk Mitigation Project (I)

Background

1. India is highly vulnerable to natural hazards, particularly earthquakes, flood, drought, cyclone and landslides. About 60% of the landmass is prone to earthquakes of varying intensities; over 8% is prone to floods; almost 5,700 kilometers of coastline is prone to cyclones and 68% of the area is susceptible to drought. Studies indicate that natural disaster losses equate up to 2% of India's GDP and up to 12% of federal government revenues.

2. Because of its long coastline, compounded by the rapid increase in population in these areas, cyclone is one of the most recurrent hazards in India. Nearly 300 cyclones (of which about 40 percent were severe) affected the country during the past century². The frequency of cyclones is the highest in the West Coast-Arabian Sea and East Coast-Bay of Bengal as compared to other cyclone-prone areas in the world. These cyclones are frequently associated with tidal waves. Low-lying lands, which are most common in the Eastern coast, allow storm surges to intrude far into the land, causing widespread flooding and seawater intrusion into the Indian soil.

Table 2: History of Largest Cyclones in India (1990-2000)

Sl. No.	State	Date	DAMAGE	Wind speed at land fall (kmph)
1	AP	1990, 4-10 May	Deaths: 967 people, 3.6 million livestock. 14,000 houses damaged. Loss of property Rs.2289.6 crores (USD 500 million equivalent)	235
2	AP	1996, June 12-16	Deaths: 68 people. Damages were mainly due to breach of tanks and reservoirs, not due to wind and surges. Property/infrastructure loss: Estimated to be Rs.82 crores (USD 18 million equivalent).	65
3	AP	1996, November 4-7	Heavy damages caused to infrastructure, roads, buildings, etc. 7 million families were affected. Deaths: About 1,057 people. 925 people (mostly fishermen) missing. 174,000 hectares of crops were damaged.	119
4	Gujarat	1996, June 17-20	Deaths: 47 people. 30,000 houses destroyed	109
5	Gujarat	1998, June 4-10	Deaths: 1,250 people, 11,700 animals. Total damage caused by the cyclone in Gujarat alone was estimated to be Rs.1334 crores (USD 300 million equivalent). The cyclone caused considerable damage in Rajasthan as well. The Kandla Port Area was the most severely affected area within the Kutchh District. About 257,000 houses were damaged.	165
6	Orissa	1995, November 7-10	Deaths: 96 people. 284,253 hectares of crops damaged.	104
7	Orissa	1999, October 15-19	Deaths: 205 people. 331000 houses damaged. 158,000 crop area damaged. 5,181 villages were affected.	182
8	Orissa	1999, October 25-31	Deaths: 8,900 people, 444,531 livestock. The super cyclone affected 15 million people and more than 2 million households in the state.	259

² The most recent super cyclone hit the Orissa coast in October 1999, killing more than 8,000 people and destructing 2 million houses.

3. Close to 500 million people, or half of the country's total population, live in the 13 cyclone-prone states³. These are coastal states that contribute significantly to the country's GDP and economic growth. Hence, the negative impact of recurrent cyclones, in terms of human casualties, damages, as well as social and economic losses, is clearly significant. Recurrent cyclones cause serious negative consequences as not only do they push large segments of population into economic distress, they also divert scarce resources from planned development activities into relief, rehabilitation and reconstruction.

India's Disaster Risk Management Achievements

5. India's response to two of the biggest disasters in this current decade, the Gujarat earthquake and the Asian tsunami, has been efficient and very effective. Through this period India has made great strides in moving from reactive emergency response to being proactive and implementing disaster preparedness and risk reduction initiatives. India passed the Disaster Management Act in 2005 paving the way for the establishment of the NDMA and State Disaster Management Authorities (SDMAs). The NDMA has proactively formulated guidelines and procedures for dealing with specific calamities. They are engaged in prioritizing and building capacity for risk mitigation programs across the country. GoI has approved the National Disaster Management Policy in 2009.

6. The 11th five year plan, 2007-2012, by the Planning Commission, GoI, has clearly outlined the aim of consolidating progress made towards disaster preparedness, prevention and risk mitigation by integrating them into the development process. Significant level of capacity need to be built and resources committed in order for India to make meaningful progress towards minimizing its overall risk and vulnerability to natural hazards.

Bank Involvement

7. For more than a decade now, the Bank has been assisting the GoI in effectively responding to disasters following the Latur, Maharashtra earthquake in 1993, the Orissa super-cyclone in 1999, the Bhuj, Gujarat earthquake in 2001, the AP cyclone in 2005 and the Tsunami in South India in 2004. Even when responding to these catastrophes the Bank's focus has shifted to future oriented risk mitigation programs and strategies. Following the Gujarat earthquake of 2001, the Bank supported the reconstruction project in adopting a forward looking management practice. Establishment of a strong Disaster Management institution - the GSDMA, seismic retrofitting of schools and public structures and creation of the hazard risk and vulnerability atlas are amongst many initiatives that have provided best practices in ex-post recovery to the global community. In response to the Tsunami of 2004, the Bank provided support in reviving livelihoods and in promoting recovery in Tamil Nadu and Puducherry, which has recently been restructured to include the new component: vulnerability reduction of coastal communities. This involves components similar to NCRMP-I such as evacuation shelters, evacuation routes and early warning.

8. The World Bank is committed to continuing its efforts of reducing vulnerability of India to

³ This includes 9 states: Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal; 2 UTs: Daman & Diu and Pondicherry; and 2 island groups: Lakshadweep and Andaman & Nicobar islands.

natural disaster events and its social and economic impacts by promoting a proactive and strategic approach to managing natural hazard risk in India. The underlying principles of the framework are that both loss of life and economic impact of disasters can be reduced by advance planning and investment. Some key areas are identified as needing further strengthening in order to help make the Indian population resilient against natural disasters:

- Governance
- Lack of Insurance and other Financial Mechanisms
- Early Warning and Dissemination of Information
- Community based DRM
- Mainstreaming Disaster Management into Development Planning
- High priority risk mitigation investment program

**Annex 2: Major Related Projects Financed by the Bank and/or other Agencies
INDIA: National Cyclone Risk Mitigation Project (I)**

1. ***AP Hazard Mitigation Project (1997-2003) (Cost-US\$ 175 million; Bank finance – US\$125 million):*** The project was approved in May 1997, to undertake reconstruction activities after the 1996 cyclone in AP. The project's objectives were to (i) assist Government of AP in preparing and implementing a long term hazard management program in high risk areas and with enhanced community participation; (ii) restore public infrastructure lost in the 1996 disaster, according to hazard resistant criteria; and (iii) enhance the capacity of GoI / IMD in early cyclone warning. The total project cost was US\$175 million at closing, consisting of a Hazard Management Program, Infrastructure restoration and Technical Assistance components. While the infrastructure restoration and enhancing GoI and IMD capacities' objectives were met satisfactorily, the first objective of implementing a Hazard Mitigation Program through this cyclone reconstruction project was not satisfactorily met; which has led to subsequent design of the disaster related programs in India, such that there will be restoration programs taken up early, followed by long term focused mitigation programs. However, the project has helped GoAP develop computer models for prediction impacts of cyclones and associated floods and high wind speeds; which were put to use later by GoAP and found to be satisfactory. GoAP is now developing a state Disaster Management Plan, which is likely to be ready by mid 2010, and is considering establishing SDMA in the state.
2. ***Orissa Emergency Cyclone Restoration (1999-2004) (Cost - US\$ 58 million; Bank finance - \$46 million):*** Subsequent to the Super Cyclone in Orissa in 1999, the Bank has reallocated a portion of funds (US\$46 million) from the ongoing Orissa Water Resources Consolidation Project, to finance the reconstruction activities in Orissa. Though the component made a slow start, by closing all the planned activities were satisfactorily completed. Project implementation was supported by creation of OSDMA which now coordinates all disaster management related activities in the state. OSDMA has since been performing well and built its capacity over years. Based on the experience gained on project management OSDMA has subsequently managed funding from other sources for construction of Cyclone Shelters and is taking up a number of disaster management and awareness raising activities.
3. ***Gujarat Emergency Earthquake Reconstruction project (2002-2005) (Cost- 480 million; Bank finance – US \$348 million):*** This project was approved by the Bank after a devastating earthquake in Gujarat in 2001. The Government of Gujarat developed a three phased strategy of Short, Medium and Long terms; to respond to this disaster aftermath and also build better capacities. Consistent with this strategy, the Bank assisted Gujarat in developing and financing Phase-I of the program and to assist in implementing the medium term strategy. Bank support in Phase-I focused on some sectors, while the other donors have supported the other sectors. The medium term support included taking up Emergency management activities, Hazard Management and Risk Transfer activities and development of disaster management institutions. The project's outcome was rated as satisfactory in the Implementation Completion Report.
4. ***Emergency Tsunami Reconstruction Project (ETRP):*** In the aftermath of Asian Tsunami of December 26, 2004, the World Bank approved \$465 million assistance from IDA sources for the states of Tamil Nadu and Puducherry in the form of the ETRP. The project was approved on May 03, 2005 and was made effective on August 09, 2005. The components of the project include: housing reconstruction, restoration of livelihoods and reconstruction of public buildings and basic

amenities. The project has since been restructured to include a new component titled Vulnerability Reduction of Coastal Communities (VRCC). The revised development objective is to 'revive livelihoods and promote recovery in the Tsunami-affected areas in the short-term and to reduce the vulnerability of coastal communities to a range of natural hazards such as cyclone, storm surge, flood and tsunami over the longer term'. Subcomponents under VRCC are: reconstruction of vulnerable houses; construction of evacuation shelters and routes; and provision of EWS and capacity building of coastal communities towards disaster response. Implementation of the restructured project is likely to be completed by December 2011. Currently the progress in achieving development objectives and implementation is rated moderately satisfactory.

Annex 3: Results Framework and Monitoring INDIA: National Cyclone Risk Mitigation Project (I)

1. Strategies for Results Planning and Monitoring

The Project is aiming at outcomes related to disaster mitigation aspects and improvements in institutional capacities that meet the overall Program outcomes under this APL; and specific outputs related to individual components.

Major Outcomes Expected from Project – The major outcomes expected from the project include: (a) Reduced vulnerability of coastal communities to cyclone and other hydro meteorological hazards through improved: (i) improved EWDSs, (ii) increased capacity of local communities to respond to disasters, and (iii) access to emergency shelter, evacuation, and protection against strong wind, flooding and storm surge in high risk areas; and (b) strengthened DRM capacity at central, state and local levels in order to enable mainstreaming of risk mitigation measures into the overall development agenda. Corresponding indicators (quantitative and qualitative) for the measurement of these outcomes are included in the Results Framework developed for project as described below:

Outputs: Outputs are defined for the three project components in terms of both physical progress and activities completed.

2. Overall Project Supervision, Reporting and Monitoring (SRM) Framework

The multi-tier implementation arrangements under the project include supervision and monitoring roles and responsibilities of the various players involved in implementation. Monitoring will occur as a periodic function, and will include process reviews/audits, reporting of outputs, and maintaining progressive records, covering the following thematic areas.

- I) Social and Environmental Monitoring
- II) Regular Quality Supervision & Independent Quality Monitoring
- III) Periodic Physical and Financial Progress Monitoring
- IV) BME

- I. **Social and Environmental Monitoring** - This will comprise of the following sets of activities:
 - a) Monitoring compliance with environmental regulations, social safeguards and ESMF provisions.
 - b) Social Impact Monitoring at the Community Levels and oversight at state/project level.
- II. **Regular Quality Supervision and Independent Quality Monitoring**– This will be carried out by the respective implementing agencies/state level PIUs and NDMA. Technical supervision staff shall be deployed by the implementing agencies to monitor quality of construction. Third party quality Audit by state level PIUs and independent certification of goods procured under the project shall form quality Management System.
- III. **Periodic Physical and Financial Progress Monitoring** – Physical progress monitoring will be carried out by the implementing agencies on a monthly basis and reported to state level

PIUs which will in turn provide the report to NDMA. SPIUs will be the nodal agencies for reporting to NDMA. Financial progress will be reported by the SPIU through the quarterly FMRs. NDMA will create a detailed MIS for management of the information database which will be an on line tool for updates by the SPIUs.

- IV. **BME** – A three stage BME study would be carried out by the NDMA in the project area. The study will be outsourced and will have three clear-cut stages. Stage I will setup the baseline data, Stage II will undertake midterm evaluations and Stage III will be the end of the project evaluation. The study will incorporate both qualitative and quantitative analysis and will also be used as a tool for mid course corrections.

Table 1: Results Framework

	Key Performance Indicator(s):	Means of Verification
Outcome Level:		
Reduced vulnerability of coastal communities in participating states to cyclone and climate related hazards	<ul style="list-style-type: none"> • Proportion (%) of targeted coastal population covered by the EWDS • Proportion (%) of people having access to emergency shelter • Number of people and hectare of land protected by strengthened/improved embankments • Increased awareness about warnings and emergency response 	Quantitative/Qualitative Surveys comparison with base line and SRM framework.
Output Level:		
Installation of EWDSs	<ul style="list-style-type: none"> • Number of EWDSs installed. 	SRM Framework
Construction of Risk Mitigation infrastructure	<ul style="list-style-type: none"> • Number of additional cyclone shelters provided • Km of access/evacuation roads completed. • Km of embankments strengthened/ improved. 	SRM Framework
Capacity built towards managing disasters	<ul style="list-style-type: none"> • % of targeted communities/people trained in use of early warning and evacuation • Number of government officials trained on specific disaster management skills • Preparation of long-term training and capacity building strategy • Completion of risk assessment studies 	SRM Framework

3. Arrangements for results monitoring

Institutional issues: The project monitoring and evaluation system will consist of three tier system at the NDMA, PIUs, Field level, and supplemented with consultants. The regular reporting of these agencies and updating of implementation progress data drawn from the updates by the stakeholders in the project at different levels/activities will assist the NDMA in providing timely interventions at appropriate levels to remove impediments in project implementation and building capacity of stakeholders involved and benefitted from the project.

Data collection: Primary data relating to population, demography and other scientific studies will be drawn from national accredited institutions and local administration to develop project plans.

During implementation, project progress and impact data will be collected from all stakeholders viz: beneficiary communities, NGOs, Community Based Organizations (CBOs), implementing agencies (IAs), Consultants, implementation progress reports. The costs towards supplementary support and impact assessment reports are financed under Component D of the project including costs of establishment of MIS which is expected to generate reports based on the inputs drawn from all stakeholders in the project consolidated by the IAs, SPIUs and NDMA on a monthly and quarterly basis.

Capacity: Institutions engaged/associated in the project have capacities to avail necessary information/data. To ensure timely completion of envisaged activities under the project, the institutions are also supplemented by consultants, and other community level stakeholders proposed to be engaged in the project. The costs towards supplementary support will be drawn from Component D under the project.

Arrangements for results monitoring

Project Outcome Indicators	Baseline	Target Values					Data Collection and Reporting		
		YR1	YR2	YR3	YR4	YR5	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
Proportion of the targeted coastal population ⁴ covered by the EWDS (%)	0			80	100		Quarterly updating of installations;	Print data/recordings of transmission from the EWDS system; questionnaires from stakeholders in the community; record of activities executed by local administration; overall supervision report of PIUs/EA.	PIUs staff, ToTs, consultants, IAs field staff, NGOs, local administration, community representatives
Proportion of people having access to emergency shelters (%).	Establish baseline in Yr. 1 (present assessment is 30% - project's addition 30% in Orissa. In AP presently 84% to become 100% in project)	Orissa	35	45	55	60	Quarterly Progress reports by EA to WB;	Work progress data sheets against each contract;	IAs field staff,
		AP	90	95	98	98	TPQA consolidated quarterly report; monthly field inspection / review by PIU staff; Field review by WB.	TPQA reports; Consolidated data drawn from MIS system; Social Impact Monitoring reports;	TPQA consultants PIUs staff NDMA staff/BME consultants
Protected by strengthened/improved embankments. <ul style="list-style-type: none"> Number of people and 	Targets will be established based on base-line						Progress reports by EA to WB; TPQA consolidated	Work progress data sheets against each contract; TPQA reports; Consolidated data drawn from MIS system;	IAs field staff,

⁴ Within 5 km distance from the coastline

• hectares of land								quarterly report; monthly field inspection / review by PIU staff; Field review by WB.	Social Impact Monitoring reports	NDMA staff/BME consultants
Increased awareness about warnings and emergency response.	Not applicable	Qualitative assessments, showing incremental progress						NGO training and monthly progress reports, PIU/NDMA quarterly progress reports.	Records of the people trained and participated in mock drills' members trained; Reports of effectiveness of mock drills conducted	PIUs/IAs/NDMA/NGOs, community representatives and consolidated MIS reports;
Results Indicators for Each Component										
Component A: Last Mile Connectivity										
Number of R-PACS Installed	0	680	2720	3400				Monthly Installation / commissioning reports; TPQA's monthly reports	Installation test reports; Site hand over reports; TPQA assessment/ inspection reports	Contractor, TPQA, PIU-IAs and NDMA
Component B: Cyclone Risk Mitigation Infrastructure										
Number of cyclone shelters completed under the project	0	60	180	265	297			Monthly progress reports; TPQA reports; PIU inspection reports;	Construction/implementation progress questionnaires; IA field staff reports; Consolidated reports of PIUs EMP compliance reports;	TPQA Consultants, IAs, PIUs, EA
Km of roads completed	0	210	525	840	1050			Monthly progress reports;	Construction/implementation progress questionnaires; IA field staff reports;	TPQA Consultants, IAs, PIUs, EA

											TPQA reports; PIU inspection reports;	Consolidated reports of PIUs EMP compliance reports;	
Km of embankment completed	0		36	90	144	180					Monthly progress reports; TPQA reports; PIU inspection reports;	Construction/implementation progress questionnaires; IA field staff reports; Consolidated reports of PIUs EMP compliance reports;	TPQA Consultants, IAs, PIUs, EA
Component C: Capacity Building on Hazard Risk Management													
% of targeted communities / people trained in use of early warning and evacuation	t.b.d during BME			25%	60%	100%							
No. of government officials trained on specific disaster management skills	t.b.d. during BME			25%	60%	100%							
Preparation of long term training and capacity building strategy	NA		completed										
All studies launched	NA		By beginning of second year										
All studies completed	NA				By end of fourth year								

Note: Baseline figures are subject to adjustment through the BME study.

Annex 4: Detailed Project Description
INDIA: National Cyclone Risk Mitigation Project (I)

1. The Project has four principal components: a) Early Warning Dissemination to Coastal Communities; b) Cyclone Risk Mitigation Infrastructure; c) Technical Assistance for Strengthening Capacity on DRM; and d) Project Management and Implementation Support.

A. EWDS and Capacity Building of Coastal Communities *(Total cost US\$16 million)*

Background

2. About 5,700 kilometers of the India's coastline is exposed to cyclones and approximately 40% of the total population lives within 100 km of the coastline. Analyzed data for the period 1980-2000 indicates that on an average, annually, 370 million people are exposed to tropical storms and cyclones in India. Dissemination of early warnings in time is critical for preparing coastal communities and reducing losses during a cyclone event.

3. In India, different agencies have been identified to spearhead early warning and forecasting based on the type of natural hazard. The IMD is mandated to monitor and give early warnings regarding tropical cyclones. Following the Asian tsunami of 2004, a National EWS for Tsunami and Storm Surges in the Indian Ocean has been set up at the Indian National Centre for Ocean Information Services (INCOIS). INCOIS is linked to the Central Receiving Station (CRS) of the Indian Meteorological Department to receive real-time earthquake data through the IMD seismic network.

4. The IMD uses meteorological satellite based observations, moored buoys, Doppler radars, MST radars and other equipment to continuously monitor tropical cyclone buildups. IMD transmits early warnings to the MHA and NDMA. Simultaneously, the regional centers of IMD directly communicate the information to the State Relief Commissioners, Department of Revenue / the State Disaster Management Authority (SDMA) and office of the District Collectors (DC). Each state has a 24/7 functioning Emergency Operating Center (EOC). The District Collector's Office (DCO) then disseminates the warning systems down to the community level using existing communication lines through sub-district government officials and the police system.

5. Experience from the tsunami of 2004 shows that one of the weakest links in early warning dissemination existed in the inability of local authorities in being able to send warnings down to coastal community levels. Warnings, if sent did not clearly explain what actions communities needed to take. Not all coastal districts are well-equipped to disseminate early warnings down to the community level in a timely and effective manner. This greatly increases the vulnerability of coastal communities during a cyclonic event. Majority of the Indian coastline is vulnerable to cyclones (in varying degrees of occurrence and intensity).

Objective

6. The overall objective of this component is to reduce the vulnerability of coastal

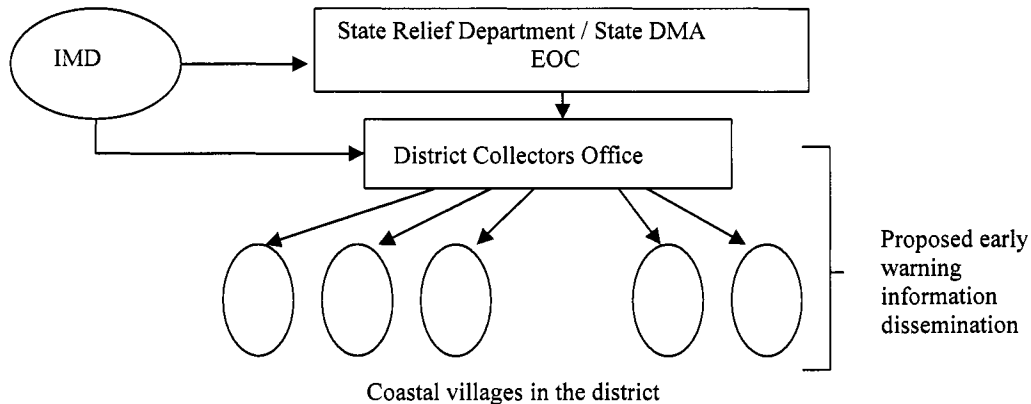
communities by addressing this gap of early warning dissemination in a timely, reliable and efficient manner. The component will support A1) the installation of EWDS allowing the DCO to send communication directly to the village level; and A2) strengthening of community capacity in maintaining and operating the EWDS as well as community mobilization during an emergency. This component has incorporated lessons learned from the experience of various states in India such as Tamil Nadu into its overall design.

A1 Installation of EWDS

7. The NDMA and the UNDP piloted a similar project in one district each in Tamil Nadu and AP following the 2004 Tsunami. Building on the successes from this pilot initiatives, UNDP facilitated consultative workshops on “EWDSs: Communication and Dissemination” drawing technical participants from various states and Union Territories (UTs) in 2006 and 2007. Utility and limitations of the VHF based EWDSs established with the assistance from UNDP in Tamil Nadu as part of the tsunami recovery program was also studied. Experiences from the other countries have also been evaluated. Finally, it was decided that modern technology available in the form of GSM/CDMA will be used for dissemination of the early warnings to coastal communities. GSM/CDMA based technology is easy to maintain and has a wider reach than the VHF based communication. Department of Telecommunication (DoT) has confirmed that communication towers are designed to withstand cyclonic winds up to 180 km/hr. Additional communication channel in the form of satellite phones will also be included as a back-up arrangement, to be given to key officials for operational purposes. Piloting of new communication technology such as TETRA will also be undertaken in one block each in both states. This component will also support establishing a Command and Control Unit in the existing State Emergency Operations Centers, which would be accessible by District Collectors also. This unit will connect seamlessly with various models of communication with the last mile villages.

8. About 1740 villages (760 in AP and 980 in Orissa within five km of coast line) will be covered by the EWDS. The warnings customized by the state/district emergency centers will be broadcasted through public address systems in the coastal villages/habitations using CDMA/GSM based Remote Public Alert and Communications Systems (R-PACS). Two R-PACS will be provided in each of the villages. About 2100 mobile phones with special SIM cards with customized applications will be provided to officials and villagers. The receiver at the village level will be installed in a public location like the gram panchayat office or the cyclone shelter etc. An alarm and public broadcast system will be attached to the receiver making it possible for someone at the district or state operations centre to make direct announcements on the loudspeaker system. The remotely triggered public address and alarm system will eliminate the need for 24/7 physical monitoring at the village level. Text based customized warnings through Short Messaging Service (SMS) would be disseminated by State and District level EOCs, in addition to dissemination through radio and Television. Feedback of the beneficiaries and functionaries at the last mile will be obtained to assess the effectiveness of the warning systems to enable improving the same.

Figure 1: Early Warning dissemination from IMD down to the coastal village level



A2 Community Mobilization and Training on use of EWDS

9. Community members and officials will need training in the regular use and safeguarding of the EWDS. Technology training will be provided to all staff handling the equipment and about five number community members in the villages. Support will also be needed in mobilizing the community for disaster preparedness and response. Communities will be prepared for post warning responses. The SPIUs will utilize NGOs/CBOs and other organisations involved in similar activities for community mobilisation and aware generation. Regular mock drills, standard operating procedures and awareness rising exercises such as those followed in Orissa will be utilized and scaled up as a sustainable public awareness program.

Implementation Arrangements

10. The sub-component A.1 and A.2 will be implemented by SPIUs with support from NDMA coordination to each state. NDMA will have an agency identified to support equipment procurement and installation. Training module is planned to be disseminated through a ToT process of training local government officials first who will then conduct trainings for community volunteers. For community mobilization PIUs will use NGOs/CBOs and other available organizations that are involved in similar works.

Expected Outcome

11. The component is expected to reduce the vulnerability of communities in about 1740 coastal villages (about 980 in Orissa and 760 in AP) by providing them with access to timely, effective and efficient early warnings. The component will also mobilize and train communities in these villages to be better organized and prepared during an emergency.

B. Cyclone Risk Mitigation Infrastructure *(Total cost US\$275 million)*

Background

12. With its long coastline, compounded by the rapid increase in population in these areas, cyclone is one of the most recurrent hazards in India. Nearly 300 cyclones (of which about 40

percent were severe) affected the country during the past century⁵. Over the past 50 years India has recorded 119 cyclone events which caused almost 52,000 deaths and affected more than 75 million people.

13. Based on the frequency of occurrence of cyclones, size of population and the existing institutional mechanism for disaster management, coastal states and UTs have been classified into 'Higher Vulnerability Category I' and 'Lower Vulnerability Category II'. Communities in Category I have a higher exposure to cyclones and their impacts. Cyclones are frequently associated with storm (surge tide). Low-lying lands, which are most common in the eastern coast, allow storm surges to intrude far into the land, causing widespread flooding and seawater intrusion.

14. Following the Orissa super cyclone of 1999 and the AP cyclone of 2005, both state governments adopted some risk mitigation measures in their reconstruction program. Lessons learned from these reconstructions indicate the need for greater investments in risk mitigation infrastructure that will provide protection to increase the resilience of coastal communities to cyclone impacts.

Objective

15. The objective of this component is to mitigate cyclone risks through strengthening infrastructure along the coastal areas, presently in the states of Orissa and AP (Category I)⁶. Each of the states has come up with specific infrastructure requirements after analyzing existing gaps in coastal infrastructure necessary to reduce cyclone impacts. These are cyclone shelters and evacuation routes; improving access to key roads and bridges; strengthening coastal embankments; and drainage improvement measures. These identified cyclone mitigation investments will be implemented by the respective states, approved by the SSCs. Both the states of AP and Orissa have agreed to provide adequate budget for maintenance of infrastructure created under the project. For maintenance of cyclone shelters, both the states have agreed for creation of corpus fund (Orissa has this mechanism in place already).

Investment Portfolio

Orissa

16. The investment proposals in Orissa include the following:
- Construction of about 150 multipurpose cyclone shelters to service the uncovered population of 160,000 across 286 villages including provision of corpus fund⁷ for O&M;
 - Strengthening/upgrading of 260 kilometers of access roads to cyclone shelters that will serve 191 cyclone shelters;
 - Rehabilitation and strengthening of 23 saline embankments, total length about 160 km in 6 coastal districts benefiting 221,000 people;

⁵ The most recent super cyclone hit the Orissa coast in October 1999, killing more than 8,000 people and causing damage to 2 million houses.

⁶ The other Category I states are Gujarat, Tamil Nadu and West Bengal.

⁷ @ of Rs.300,000 per cyclone shelter

AP

17. The investment proposals in AP include the following:
- Construction of about 150 multipurpose cyclone shelters to service about 100,000 populations.
 - Construction/strengthening of almost 800 kilometers of all-weather roads
 - Construction of 23 new bridges at critical crossings, benefiting about 500,000 populations.
 - Restoration/strengthening of 2 tidal banks, Kona and Kruthivenu tidal banks totaling to about 35km benefiting about 35,000 persons and 32,000 acres of land from salinity ingress.

Expected Outcome

18. This project in first phase is expected to build protection and increase resilience against cyclone impacts for about 1 million people across the two participating states.

C. Technical Assistance for Strengthening Capacity for DRM *(Total cost US\$6 million)*

Background

19. India passed the Disaster management Act in 2005, paving the way for the creation of the NDMA. The NDMA has a clear mandate for spearheading disaster management efforts in the country. Lessons learned from reconstruction projects over the past decade, especially the 1999 Orissa cyclone, the 2001 Bhuj earthquake, and the 2004 Asian tsunami emphasize the need for strengthening capacity at the national, state and local level towards disaster risk mitigation.

Objective

20. The objective of Component C is to provide analytical support for further upgrading DRM in India. The following activities have been identified as part of this component:

C 1.1 Risk Assessment

21. A disaster risk assessment study will be conducted up to the village level in coastal districts of Category I states. The study will be limited to the taluka (sub-district) level in Category II states. Such a study was already conducted in Gujarat following the 2001 Bhuj earthquake. Lessons learned from that project will help better design the proposed study and the dissemination strategy of the output document. The output from the study will include hazard zonation maps, community vulnerability assessments, individual hazard risk assessments and disaster mitigation action plans at the local level. The study output is intended to become an information and policy tool for decision-makers.

C 1.2 Technical Assistance to States for preparing high priority risk mitigation investments

22. The proposed project is a new and innovative project for all the participating states. States will need support in preparing and planning infrastructure investments and other project components. Assistance will be extended to states towards undertaking feasibility studies, DPRs, EIA, SIA and other project requirement.

C 2.1 Preparation of long term training and capacity building strategy (13 States/UTs)

23. Needs assessments will be carried out (on a demand driven basis) to identify training needs and existing gaps at the state and local government level towards risk reduction, emergency response and disaster recovery.

C 2.2 Implementation of High Priority Training and Capacity Building Programs

24. Specific modules will be designed to strengthen the capacity of state and local government officials in better preparing for and responding to disasters. Initially modules will be implemented as pilots. Subsequently SPIUs in partnership with identified agencies will implement the training modules in AP and Orissa.

C 2.3 Strengthen capacity for damage and needs assessment

25. A review of existing damage and needs assessments will be conducted. Following that, a uniform system of standards along with a database will be developed relevant to Indian conditions. A panel of experts will be trained to strengthen the national and state capacity towards conducting these assessments post-disaster.

Expected Outcome

26. The component will strengthen the overall capacity of NDMA and state agencies in reducing risk and better responding to disasters.

D. Project Management Implementation Support Cost *(Total cost US\$22 million)*

Objective

27. This Component's objective is to support project implementation through provision of necessary offices including equipment and financing of associated incremental cost of project management teams with NDMA, SPIUs, nodal units of various Implementing Agencies and NIDM, and their training and exposure visits etc. This component would also finance the cost of related consulting services for design, planning, implementation support, management, evaluation and monitoring.

Annex 5: Project Costs
INDIA: National Cyclone Risk Mitigation Project (I)

Amounts in US\$ million

Component	Andhra Pradesh	Orissa	PMU (NDMA)	NIDM	Total	Bank Financing	Govt. Financing
A. – Early Warning Dissemination System	7.00	8.00	-	-	15.00	15.00	-
A.1 – EWDS	4.00	5.00					
A.2 - Community mobilization and training	3.00	3.00					
B. - Cyclone Risk Mitigation Infrastructure	138.00	112.00	-	-	250.00	186.00	64.00
B.1 - Cyclone Shelters	30.50	31.00					
<i>B.1.1 Construction of Cyclone Shelters</i>	<i>29.50</i>	<i>30.00</i>					
<i>B.1.2 Cyclone Shelter Management Cost (Corpus Fund by state governments)</i>	<i>1.00</i>	<i>1.00</i>					
B.2 - Roads and Bridges	87.00	47.00					
<i>B.2.1 - Roads to cyclone shelters & habitations</i>	<i>62.00</i>	<i>47.00</i>					
<i>B.2.2 - Connecting roads</i>	<i>2.00</i>						
<i>B.2.3 - Bridges</i>	<i>23.00</i>						
B.3 – Repair and Up-grade of Saline Embankments	20.50	34.00					
C. - Technical Assistance for Capacity Building on Disaster Risk Management	0.50	0.50	2.50	2.50	6.00	6.00	-
C.1 - Risk Assessment			2.50				
C.2 - Capacity building on disaster management and damage and needs assessment	0.50	0.50		2.50			
D. - Implementation Assistance	7.50	6.90	5.80	0.50	20.70	20.70	-
D.1 - Incremental Operating Cost	3.00	2.50	3.00	0.50	9.00		
D.2 - Technical Assistance Cost	4.20	4.10	2.00		10.30		
D.3 - IEC and Capacity building for Management of Cyclone Shelters	0.30	0.30			0.60		
D. 4 Refinancing of PPF			0.80		0.80		
Unallocated and Contingency @ 10% of overall cost	14.10	12.10	0.80	0.30	27.30	27.30	-
Total	167.10	139.50	9.10	3.30	319.00	255.00	64.00

Note: 1. Totals may not match due to rounding off

Annex 6: Implementation Arrangements
INDIA: National Cyclone Risk Mitigation Project (I)

1. The Project primarily has three investment components: Component A – Last Mile Connectivity; Component B – Cyclone Risk Mitigation Infrastructure; and Component C – Technical Assistance for Capacity Building on Hazard Risk Mitigation. The implementation arrangements will be:

- Component A will be implemented by the PIUs in respective states with the procurement and coordination by the NDMA; B will be implemented in the participating states by state implementing agencies (line departments), under the coordination and management role by the SPIUs; and
- Component C will be implemented at the national level through assessments in all the 13 coastal states/UTs (in a demand driven manner) with central role by NDMA. NIDM will be used for managing specific studies. Specific assessments / capacity building activities needed for the participating states, will be implemented by the respective PIUs, based on the strategies evolved under Activity C.2.2 (refer Annex-4).

2. Detailed implementation arrangements are discussed in the following sections. Detailed sub-activity wise implementation responsibilities of various agencies are defined in the Project's Operations Manual.

A. Two tier Project Management structure.

3. Since the project will be implemented in multiple states, 2 states in the first phase and likely addition of other states in second and third phase, national level and state level coordination, monitoring and supervision assume significance. Therefore, at the central level, this role will be played by NDMA, based at New Delhi and at states by a nodal agency, OSDMA in Orissa and Revenue (Disaster Management) Department in AP. The key implementing and monitoring agencies are therefore represented by the PMU at central level and PIUs at the state level.

4. Both PMU and PIUs will have a steering committee for the overall guidance and monitoring of the project. They will be headed by the Secretary of NDMA and the respective Chief Secretaries. The SSCs have formally approved the project investments and have taken an active role in speeding up the implementation arrangements. At the implementation stage, the Project Steering Committee (PSC) will provide strategic oversight over the operations of the NCRMP-I. This shall be done through annual/semi-annual review meetings, where the PSC shall:

- Review the annual/revised budgets
- Review progress against the defined milestones
- Review critical findings of the audit and evaluation reports
- Provide such guidance, as it may deem necessary for the Project

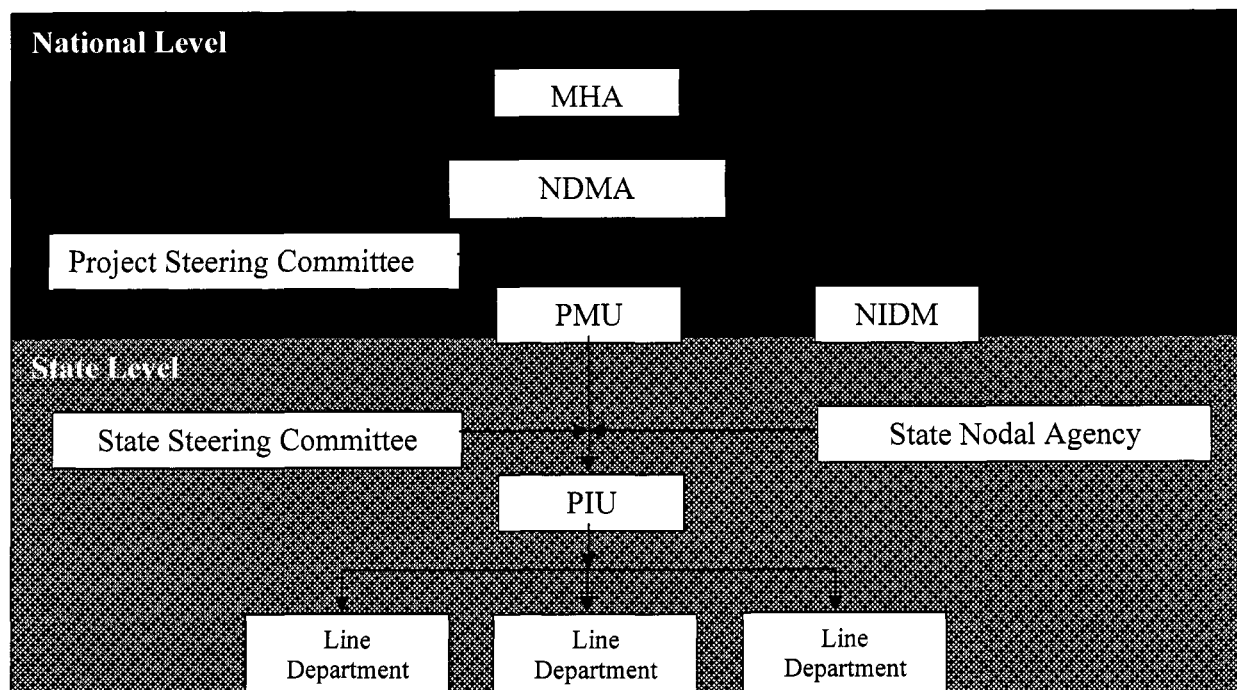
5. Similarly, at the state level, the SSC will give strategic oversight to the project during the

implementation stage. The key functions will include the following:

- Review critical findings of the audit and evaluation reports
- Supervise, guide and approve proposals of various LD
- Reviewing project implementation progress and giving guidance for achieving project goals and targets

6. In order to use the special skills required for implementation of components C, it is also proposed to employ a partner IA, NIDM for their technical expertise.

7. An overall project management structure is given in the following Figure 1.



B. National Level Project Management and Implementation

8. At national level, PMU has been setup within NDMA. PMU is responsible for overall coordination, monitoring and reporting and is headed by a Project Director, supported by specialists. The principal tasks defined for PMU include:

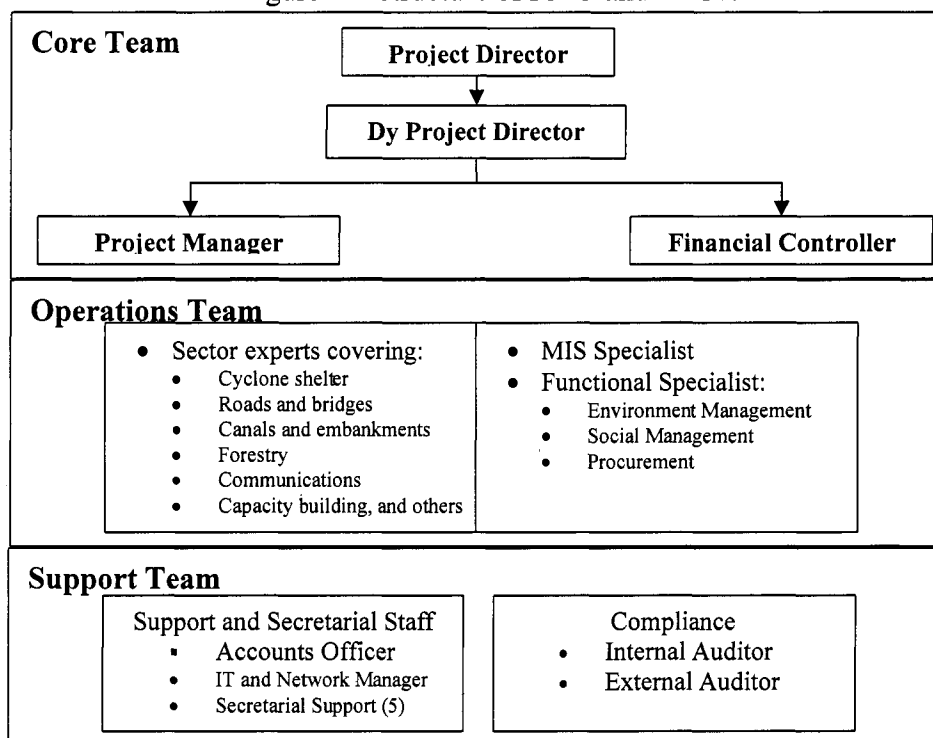
- *Planning:*
 - Overseeing and monitoring the preparation of the planning documents for the NCRMP-I, controlling their quality and ensuring their justification. These include investment proposals, DPRs, implementation plans etc.
 - Preparing the framework for project implementation including documentation requirements, operationalizing the same and training the stakeholders.
- *Project implementation:*
 - For Components A and C - define requirements, derive specifications for equipments,

prepare guidelines for operation and maintenance and required protocols, interact with state nodal agencies, partner agencies and carry out centralized procurement. Also implement part of component C by instituting the studies and coordination with state agencies and departments.

- Coordination with various other implementation units.
- Monitoring the physical and financial progress on the project including reporting.
- Provide periodic, collated reports to the Bank.
- Ensuring that mechanisms exist to provide assurance on operations in line with the requirements set forth in the various manuals.
- *Financial management:*
 - Preparation of the consolidated NCRMP-I budget and revisions thereto.
 - Manage the overall fund flow, coordinate the sanction of funds to the states and partner agencies.
 - Managing audits, preparation of financial disclosures.
- *Environment and Social Management* – ensure that the provisions of ESMF are complied in project preparation and implementation through reviews, supervision, monitoring, reporting and training support.
- *Coordination, communication and interacting* with other associated agencies/organizations such as CAAA, DEA, MHA etc.
- *Overall monitoring and reporting*
 - Have oversight on project progress, monitor overall progress and outcomes
 - Establish and operationalize the web based MIS and ensure its regular updating from the SPIUs and implementing agencies. Train the user staff and manage the public viewing portal.
 - Proactively gauge the problem areas, undertake preventive / control actions
 - Prepare consolidated reports and update PSC/NDMA/GoI and the Bank

9. The structure of PMU at NDMA is depicted in the following Figure 2.

Figure 2 – Structure of PMU and NDMA



C. State Level Project Management and Implementation

10. Participating states will set up an SPIU. PIUs will be vested in disaster management agencies⁸ in states where these have been setup and in other nodal departments in other states. PIUs will have reporting responsibility to the head of the nodal department and would be responsible for overall project management and implementation within the state. Each PIU will be headed by a Project Director and supported by sector experts drawn from each of the LD implementing the project investments, functional specialists to coordinate fiduciary and safeguard issues and other support staff. Need based support will be provided for evolution of SDMA in the state of AP.

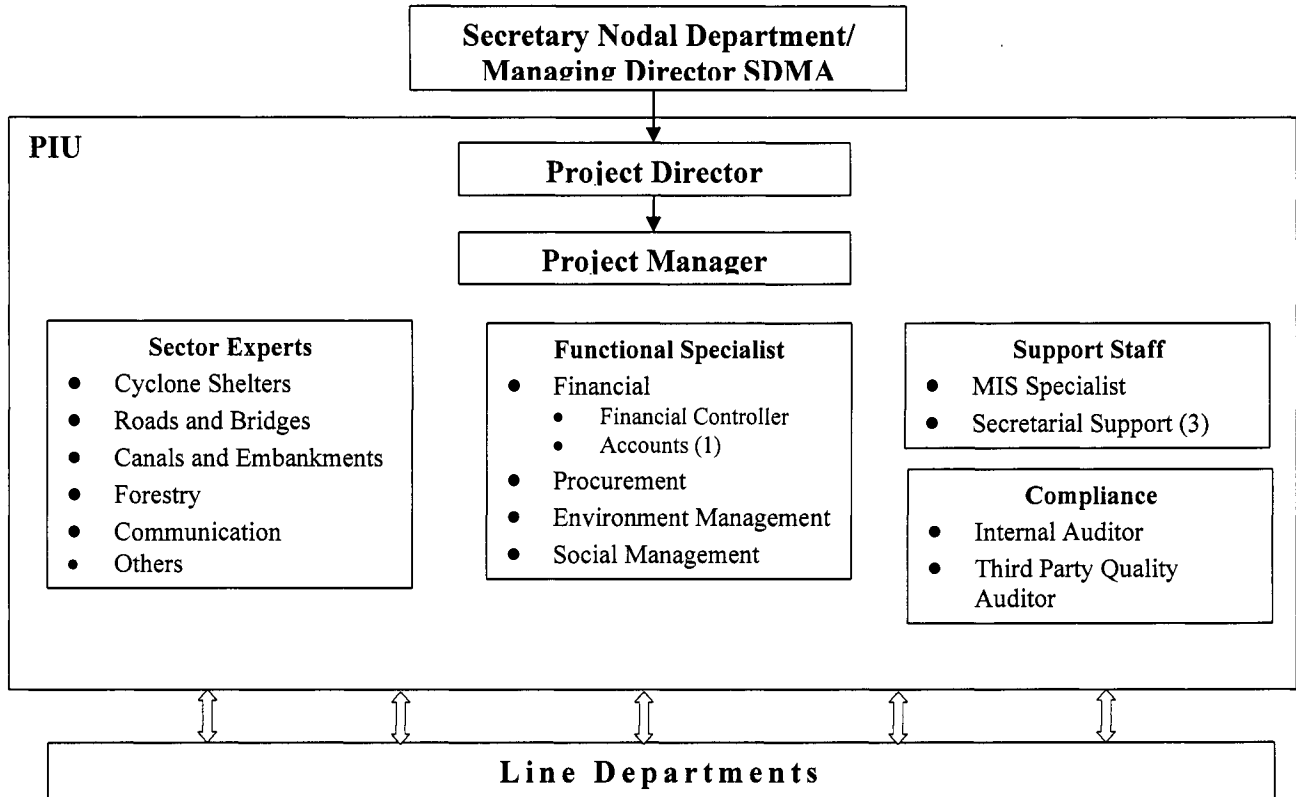
11. Key tasks of the PIU would include:

- *Planning:*
 - Preparation of the investment proposals, DPRs, bidding documents and implementation plans etc.
- *Project implementation:*
 - Coordinate with the LD for implementation of Component A and B
 - Coordination and reporting to the PMU
 - Monitoring the physical and financial progress on the project and seeking corrective action, where applicable
 - Monitoring Procurement and award of packages and purchase orders for the State
 - Ensuring that mechanisms exist to provide assurance on operations in line with the requirements set forth for implementation of NCRMP-I
- *Financial management:*
 - Preparation of the NCRMP-I budget and revisions thereto
 - Coordinating the sanction of funds to the implementing agencies
 - Maintenance of books of accounts and records for the project
 - Preparation of financial disclosures for submission to the PMU
 - Conduct of the internal audits and manage external audits
- *Environment and Social Management* – ensure that the requirements set forth in the ESMF are complied with during project preparation and implementation.
- *Coordination and liaison* with the SSC and other Government departments.
- *Overall monitoring and reporting*
 - Have oversight grip on project progress in the state, monitor overall progress and outcomes.
 - Establish and operationalize the web based MIS and ensure its regular updating from the implementing agencies in coordination with the PMU.
 - Proactively gauge the problem areas, undertake preventive / control actions.
 - Prepare consolidated reports and update PMU/respective state governments and the Bank.
 - Provide necessary support to the visiting missions from central agencies / the Bank

⁸ OSDMA for Orissa and, Revenue (Disaster Management) Deptt for AP

12. Structure of the PIU is given in following Figure – 3.

Figure 3 – Structure of PIU



D. Line Departments in the States

13. The LD in the states shall be responsible for the actual execution of works and further maintenance of the infrastructure created. LD will appoint nodal officers for NCRMP-I and will execute the project through the respective field office. LD are responsible for:

- Undertaking necessary assessments and preparation of project documents i.e. Investment Proposals, Sector Summaries, DPRs,
- Updating the environment and social screening criteria (where directed by the PIU),
- Providing technical updates on the DPRs and bid documents to the PIU. Participating in the bid evaluation and signing the contracts with contractors/suppliers,
- Implementation and monitoring, including contract management and recommending payments to the contracting agencies;
- Providing regular project progress updates to the PIU through the nodal person,
- Ensuring regular updation of the web based MIS.
- Ensuring compliance with environmental and social requirements set out in the ESMF in the construction phase, and
- Ensuring quality of the outputs and their timely implementation.

Overall list of implementing agencies along with the components that would be implemented by them is as below:

Component	Implementing Agency	
	Andhra Pradesh	Orissa
Component A		
Early warning equipment.	Govt of AP, Revenue (Disaster Management) Department	OSDMA
Awareness generation and training in the use of EWDSs and disaster preparedness and response	1. First round of technical/technology training by the respective vendor to limited set of people of state EOC 2. Awareness generation/operational training- SPIU through identified trainers. Technical training to end users will also be provided by SPIU through identified trainers.	
Component B		
Cyclone shelters	Panchayati Raj Engineering Department (PRED)	Rural Development (RD) Dept.
Roads to cyclone shelters	Panchayati Raj Engineering Department (PRED)	Rural Development (RD) Dept.
Connecting Roads	Roads and Buildings Dept. (RB)	Rural Development (RD) Department.
Bridges	Roads and Buildings Dept. (RB)	N/A
Repair of embankments	Irrigation and Command Area Development Department.	Water Resources Dept. (WR)
Component C		
Risk assessment (Activity I)	NDMA	
Technical Assistance to States for preparing high priority risk mitigation investments (Activity II)	NDMA	
Long term training and capacity building (Activity III)	NIDM	
Implementation of High Priority Training and Capacity Building Programs (Activity IV)	NIDM/PIU	
Damage and Loss assessment (Activity V)	NIDM	
State Specific Technical Assistance, training and capacity building activities in the two participating sates	PIUs	

E. Community in the Project Area

14. The community in the project area are important stakeholders in implementation. The community would be mainly involved for consultation during vulnerability assessments, giving feedback for the required mitigation infrastructure, forming cyclone shelter management committees, safeguarding and use of equipment under Last Mile Connectivity (under Component A), and for effective response to disaster warnings etc. The capacity of the community will be built to respond to these requirements.

F. Partner Agency (NIDM)

15. NIDM will implement three activities under Component C under the overall guidance of NDMA as listed below.

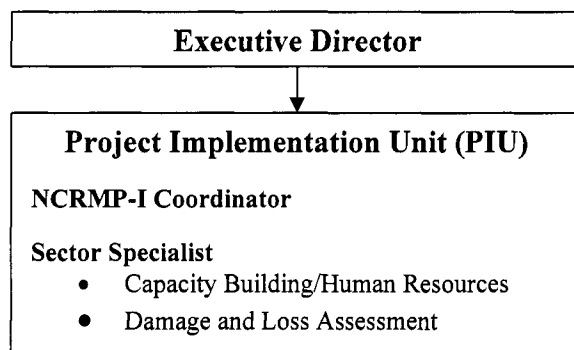
- Activity III – Preparation of long term training and capacity building strategy (13 States/UTs).
- Activity IV - Implementation of High Priority Training and Capacity Building Programs.
- Activity V – Strengthen capacity for damage and loss assessment.

16. As an IA, procurement for the services will be done by NIDM and will be the responsible for monitoring progress, implementation and achievements of results.

17. NIDM will set up a PIU headed by a Project Coordinator, who would be responsible for timely delivery, regular oversight and progress reporting on the project and interactions with the PMU. He will also be responsible for preparing the budget and revisions thereto for the project and would be nodal contact point for PMU. The Project Coordinator will update the Executive Director of NIDM on the progress and take his input.

18. Separate sector specialists will be appointed as needed, who would be responsible for technical oversight of the project, interactions with external consultants and reviewing their works to ensure timely completion and quality in task being performed. Structure of the PIU at NIDM is given in Figure -4.

Figure 4: Structure of PIU at NIDM



19. NDMA will implement the remaining two activities under this component, with responsibilities of monitoring progress and achievements, in coordination with NIDM and the participating states.

Activity I Risk Assessment

Activity II Technical Assistance to States for preparing high priority risk mitigation investments

**Annex 7: Financial Management and Disbursement Arrangements
INDIA: National Cyclone Risk Mitigation Project (I)**

Financial Management (FM) Assessment

1. Assessment of the project FM arrangements has been carried out through visits to the two states, review of documents, meetings, discussions etc. Further, it is expected that additional states will join this project at a later date as part of the APL arrangements. As and when states are considered, an assessment of the institutional and FM arrangements will need to be carried out to evaluate their ability to adhere to the project requirements, and readiness for implementation.

Country Issues

2. The issue applicable to this project is the timely availability of funds. Adequacy of Budget at level of MHA as well as at the states will need to be constantly monitored. NDMA and states have however confirmed that availability of funds should not be a problem for this project.

Implementing Entities

3. The project will be implemented by the NDMA and various departments in the participating states. In each state, a Nodal agency in form of SPIU has been set up to support and co-ordinate implementation.

Risk Assessment and Mitigation

Risk	Risk Rating	Risk Mitigation Measures incorporated into Project Design	Residual Risk
In case of inadequate provision in the state budget or delay in release of funds, adequate funds may not be available to the PIUs.	S	Budget provisions and funds releases will be constantly monitored and followed up in case of delays.	M
Project accounting systems are untested and staff not familiar with reporting requirements.	S	A FMM has been developed and adopted by the project. Further regular trainings will strengthen understanding of project FM requirements.	M
Monitoring of project FM arrangements will be a significant challenge and there is a risk of delays and non-compliance.	M	A qualified chartered accountant will be hired at NDMA on full-time basis to oversee implementation at states. In addition the Project will have periodic internal audits undertaken by a firm of Chartered Accountants.	M
Overall Risk Rating	S		M

H – High, S – Substantial, M – Modest, N – Negligible

4. As explained in the subsequent sections, financial flows and payments under the project will be limited to the NDMA and the SPIU in Orissa and use of mainstream accounting system in AP. Therefore Project FM risk has been rated as Modest. This may need to be reassessed in context of the implementation experience and as additional states join in.

Budgeting

5. The MHA shall make an annual allocation for the project in its budget under a separate 'World Bank Project' Budget head. Orissa will make a provision for its share of the project expenditure and AP will make a provision of the entire project expenditure; in their respective budgets.

Accounting

6. Accounting will be as per generally accepted accounting principles; this will follow a cash basis. To ensure consistency in the FM function across the project implementing entities, NDMA has prepared a FMM which will compile Project accounting policies/ procedures, funds flow arrangements, chart of accounts and formats for books of account/ reporting. Key aspects of FM under the project are as follows:

- All payments to contractors, consultants and suppliers are considered as expenditure, other transfers are considered as advances.
- All sources of funds and all expenditure, advances will be reflected in the PFS.
- Standard Books of Account/ Records will be maintained at NDMA as well as the Project Implementing Offices. A register of fixed assets, indicating assets created/ acquired through the project will also be maintained. Particular attention will be given to maintenance of works and contractor's registers.
- Orissa: While activities will be implemented by various LD, all payments will be centralized at the SPIU. The implementing departments will be required to send documents, payments instructions to the PIU. The PIU will perform an accounting and back office function and release payments/ issue checks as directed by the departments. In case (low value) operation and maintenance expenditure needs to be incurred, then opening of imprest (Bank) accounts will be permitted at other departments. This will however be done on a case to case basis after prior approval of NDMA. Arrangements as described above will ensure that there is only one accounting location, for the purposes of implementation of a financial accounting software, and statutory audit.
- AP: GoAP has decided to use its mainstream accounting and payments systems. Budget will be released by the Finance Department to the Nodal (Revenue) Department which will in turn provide budget to the implementing departments (Panchayati Raj, Roads & Bridges, Irrigation). Implementing offices of these departments (15 from PRI, 5 from R&B and 1 from Irrigation) will approve bills and request the local P&AO (based on a Letter of Credit) to make payments to suppliers/ contractors.

7. Staff at NDMA will consist of a Financial Controller who will be a qualified Chartered Accountant with at least 5 years of post qualification experience. His/ her responsibilities will include supervision of the FM function at states including training, assistance in managing of the external and internal audits, reporting for reimbursement purposes, discharge of the FM function at NDMA etc. He will be assisted by appropriate accounts staff (for book-keeping) at NDMA. At Orissa, FM function will be discharged by a qualified accountant whose responsibilities will include payment processing, record retention, periodic reporting to NDMA etc. At AP, a Finance

Controller (on deputation from Finance Department) will oversee adherence to Project FM arrangements.

Internal Control and Internal Auditing

8. Project FM arrangements will include arrangements regarding internal controls including safeguarding of cash, control over inventories, segregation of duties and joint signature of two officers on all significant payments under the project.

9. The Internal Audit function under the project will be entrusted to a firm of Chartered Accountants. Qualifications of the firm of Chartered Accountants would be subject to review by the Bank. Terms of Reference of the auditors will be prepared by NDMA and approved by the Bank. The audit will be on a periodic (at least semiannual) basis and would cover all project locations and will review transactions on a reasonable sample basis; results of this audit would form the basis for management action. Action taken by the management will be reviewed by the Bank during regular project supervision.

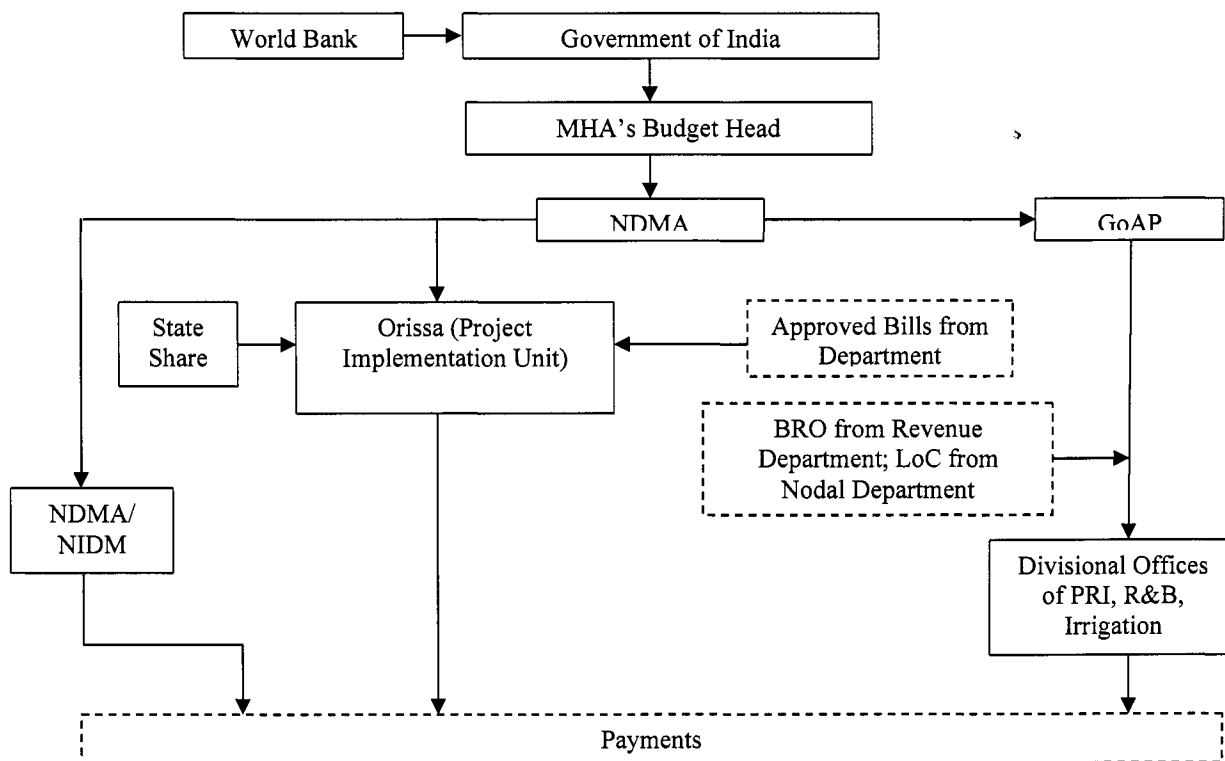
Funds Flow and Disbursement Arrangements

10. Funds will flow from the Bank to the GoI; a designated account would be opened by GoI with the Reserve Bank of India to receive funds under the project. Unutilized balance if any at completion of the project activities would be repaid to the Bank. Project funds will be budgeted under the budget head of MHA and this head will be operated to transfer funds to the states. The funds transfer will follow specific pre-determined criteria which will ensure that project funds are transferred to the implementing entities in regular installments as described in the FMM.

11. Depending on the nature of the activity, payments may be made at the NDMA or at the States. NDMA will make payments relating to consultancy services and goods procured centrally. At the states, payments will be released to suppliers/ contractors by the PIU (in Orissa) or by the implementing departments (AP)

12. Funds flow arrangements are given in form of the figure below:

NCRMP-I: Fund Flow Arrangements



13. NDMA would report on activities under the project under system of quarterly IFRs. The IFRs would report on activities of the project and provide information on expenditure made in the previous quarter and forecast for two subsequent quarters. Quarterly disbursements would be made based on these IFRs, providing funds for two subsequent quarters after adjustment for past disbursements.

Proposed Disbursement Schedule

Category	Amount of the Financing Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, consultants' services, Incremental Operating Costs, and Training (under Components A, C and D)	30,201,000	100%
(2) Goods and Works (under Component B)	133,379,000	75%
(3) Refund of Preparation Advance (Amount payable pursuant to Section 2.07 of the General Conditions)	520,000	100%
TOTAL AMOUNT	164,100,000	

Retroactive Financing

14. A retroactive financing not exceeding SDR 28,960,000 (equivalent to US \$ 45 million) for eligible expenditure incurred on or after January 1, 2010 will be allowed by the Bank for which claims can be made after the project has been declared effective.

Financial Reporting

15. Information on project related advances and expenditure will be compiled by the NDMA i.e. for payments made by itself or by the States. This information will be utilized to prepare quarterly IFRs for the project. The IFRs will report opening and closing bank balances, expenditure incurred during the period and the level of advances. IFRs will be submitted to the bank within 45 days of close of the quarter.

Disclosure of information

16. With passing of the Rights to Information Act, 2005 in India the project would need to disclose certain information regarding its activities. The Act makes departments/ projects responsible not only to provide information on request but also to *suo moto* disclose as much information as possible. To increase the transparency regarding project activities, NDMA will disclose certain financial information on project activities on a regular basis; this will include Project FMM, quarterly IFR, and annual Audited Financial Statements etc.

Auditing

17. The PFS of NDMA and Orissa will be audited by a firm of Chartered Accountants. The Terms of Reference (ToR) as well as the selection criteria for the auditors will be formulated by NDMA in consultation with the Bank. In case of AP, since expenditure will be made using the mainstream Government systems, audit will be conducted by the Comptroller and Auditor General (C&AG) of India. Audit ToRs for all Bank funded projects in India have been pre-agreed with the C&AG. Audit Reports will be submitted to the Bank within six months of the close of each FY. In deciding scope of their work, the Statutory Auditors are expected to consider the work done by the Internal Auditors.

18. The following audit reports will be monitored in the Audit Reports Compliance System (ARCS):

Borrower/Implementing Agency	Audit	Auditors
PFS; NDMA, NIDM, Orissa	Project Audit	A firm of Chartered Accountants
PFS; AP	Project Audit	Comptroller and Auditor General of India
Department of Economic Affairs/GoI	Designated account	Comptroller and Auditor General of India, New Delhi

Supervision Plan

19. From a FM perspective, the project will initially need intensive review looking at internal controls, fund flows, auditing arrangements, and training. This will be through a combination of desk reviews and periodic field visits. Special focus will be given to building of staff capacity and timely compilation/ submission of financial information.

Annex 8: Procurement Arrangements
INDIA: National Cyclone Risk Mitigation Project (I)

A. General

1. The project consists of three main components and support to project implementation. The three main components relate to last mile connectivity for dissemination of cyclone warnings, physical infrastructure creation for cyclone risk mitigation and technical assistance for capacity building on hazard risk management.

2. Procurement for the proposed project would be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004 revised October 2006 and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004 revised October 2006, and the provisions stipulated in the Legal Agreement. The general description of various items under different expenditure category is described below. For each contract to be financed by the Loan/Credit, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank project team in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

3. **Procurement of Works:** Works procured under this project would include small scattered civil works under physical infrastructure creation for cyclone risk mitigation component B. This will include investments such as construction of cyclone shelters as safe habitation places during cyclones, missing road and bridge links to improve the access, embankments for protection against salinity ingress, drainage improvement measures and retrofitting of key installations. The procurement is not likely to involve International Competitive Bidding (ICB) for civil works. The procurement will be done using National Standard Bidding Document (SBD) agreed with (or satisfactory to) the Bank and satisfying the National Competitive Bidding (NCB) conditions as under:

- Invitations to bid shall be advertised in at least one widely circulated national daily newspaper, at least 30 days prior to the deadline for the submission of bids;
- No special preference will be accorded to any bidder either for price or for other terms and conditions when competing with foreign bidders, state-owned enterprises, small-scale enterprises or enterprises from any given State;
- Except in exceptional circumstances, there will be no negotiations of price with bidders, even with the lowest evaluated bidder.
- Extension of bid validity: (a) for the first request for extension if it is longer than four weeks; and (b) for all subsequent requests for extension irrespective of the period (such concurrence will be considered only in cases of Force Majeure and circumstances beyond the control of the purchaser or employer) will require prior approval by bank.
- Re-bidding: the system of rejecting bids outside a pre-determined margin or 'bracket' of prices shall not be used.

- The two-or-three envelope system will not be used.
- Rate contracts entered into with DGS & D are not acceptable as substitute for NCB procedures. This may be used in lieu of shopping.

4. **Procurement of Goods:** Goods procured under this project would include supply and installation of early warning equipment and public address systems for relaying the warning/advisories to the communities. The system would be installed in the vulnerable villages in the coast and would be activated remotely by the state or district/sub-district officials. The procurement will be done using Bank's SBD for all ICB and National SBD agreed with (or satisfactory to) the Bank, satisfying NCB conditions as stated above. The Project may involve procurement of Satellite images, survey maps etc. from National Remote Sensing Agency, Hyderabad, Survey of India and other such designated agencies. These agencies may not meet the eligibility conditions of the Guidelines clause 1.8(c). Since inputs from these agencies are critical to meet the project objectives, GOI would request for a waiver allowing the financing of such procurement under the Project.

5. **Selection of Consultants:** Consultants will be procured under Components C and D to help undertake risk and damage assessment studies, and to build institutional capacities of the various stakeholders involved. The consultancies may cover Risk Assessment studies, Technical Assistance to States for preparing high priority risk mitigation investments, Implementation of High Priority Training and Capacity Building Programs, Strengthening capacity for damage and loss assessment. The consultants may also be procured for third party quality audit of works and internal audit purposes.

6. Short lists of consultants for services estimated to cost less than \$500,000 or equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. The Bank's Standard Request for Proposal Document will be used as a base for all procurement of Consultancy services to be procured under the Project.

Particular Methods of Procurement of Consultant Services:

7. Quality- and Cost-based Selection: Consultant Services may be procured under contracts awarded on the basis of Quality- and Cost-based Selection in accordance with the provisions of Section II of the Consultant Guidelines.

Other Procedures

8. Quality-based Selection: Services required under the Project that meet the requirements set forth in paragraph 3.2 of the Consultant Guidelines shall be procured under contracts awarded on the basis of Quality-based Selection in accordance with the provisions of paragraphs 3.1 through 3.4 of the Consultant Guidelines.

9. Selection under a Fixed Budget: Services required under the Project that meet the requirements set forth in paragraph 3.5 of the Consultant Guideline shall be procured under the

contracts awarded on the basis of Selection under a Fixed Budget in accordance with provisions of paragraph 3.5 of the Consultant Guidelines.

10. Least-Cost Selection: Services required under the Project that meet the requirements set forth in paragraph 3.6 of the Consultant Guideline shall be procured under the contracts awarded on the basis of Selection under a Least-Cost in accordance with provisions of paragraph 3.6 of the Consultant Guidelines.

11. Selection Based on Consultants' Qualifications: Services under Part A.3 of the Project estimated to cost less than \$100,000 equivalent per contract may be procured under contracts awarded in accordance with the provisions of paragraphs 3.1, 3.7 and 3.8 of the Consultant Guidelines.

12. Single Source Selection: Services for tasks in circumstances which meet the requirements of paragraph 3.9 and 3.10 of the Consultant Guidelines for Single Source Selection, may, with the Bank's prior agreement, be procured in accordance with the provisions of paragraphs 3.9 through 3.13 of the Consultant Guidelines.

13. Individual Consultants: Services for assignments that meet the requirements set forth in paragraph 5.1 of the Consultant Guidelines may be procured under contracts awarded to individual consultants in accordance with the provisions of paragraphs 5.2 and 5.3 of the Consultant Guidelines. Under the circumstances described in paragraph 5.4 of the Consultant Guidelines, such contracts may be awarded to individual consultants on a sole source basis.

14. **Incremental Operating Costs**: The project will support project implementation costs and such other project related costs of recurring nature of project management teams with NDMA, NIDM State PIU's, and LD (Project Implementation Cells) provided such expenditures are incurred following Government's own procedures.

B. Assessment of the agency's capacity to implement procurement

15. At the national level, the project will be coordinated and implemented by NDMA while at the state level it will be by the SDMA or the other identified nodal agency. A dedicated PIU will be created for this purpose in each of the nodal departments/SDMA for managing the project implementation. The staffing will include functional specialists drawn from each of the LD, whose investments are proposed for implementation; and fiduciary and safeguard specialists covering procurement, FM, environmental and social sectors. As part of project preparation, NDMA has prepared a Procurement Manual, which has been reviewed and found to be acceptable.

16. Procurement activities will be carried out by various LD, SPIUs, NDMA and NIDM. These agencies will be staffed by procurement officers who will receive adequate training in bank funded procurement. Refresher training will be imparted as agreed with the Bank to account for possible staff rotation and based on feedback of ex-post reviews carried out by the Bank.

17. Procurement under Component A will be carried out by NDMA who will engage a partner agency. This firm is expected to be in place well before the start of procurement action by NDMA. NDMA has drawn up procurement schedules which indicate commencement of activities in the latter half of 2010. NIDM will undertake capacity building activities under component C and will procure a few consultants. NIDM has inducted staff to exclusively deal with the procurement and will train the staff for bank funded procurement. NDMA will also extend necessary support to NIDM for procurement.

18. OSDMA, the identified nodal agency for Orissa, had responded to procurement assessment questionnaire in Nov 2008. An assessment of the capacity of this Agency to implement procurement actions for the project has been carried out by Senior Procurement Specialist from Feb 3 to Feb 6, 2009. This agency had handled an earlier bank funded project Orissa Water Resources Consolidation Project (OWRCP), closed about two years back, which also has a Cyclone Reconstruction Component – which is similar to the current project component B. The assessment reviewed the current staffing and resources of OSDMA for implementing the project and measures needed to bridge the gap. Process of assessment involved interaction between the project's staff responsible for procurement and the Ministry's relevant central unit for administration and finance.

19. It was assessed that the capacity is retained in essence and has been used to model OSDMA's own procurement arrangements to a large extent. A well developed Operation manual setting out procurement procedures exists and in use for its own procurement. The bidding documents are generally of acceptable standard notwithstanding some key difference with bank practices on negotiations, two envelop bidding, absence of Fraud & corruption clauses as required in the current Guidelines. Delegations of Powers are well evolved with adequate delegation at various levels with full power vested with the Managing Director of OSDMA.

20. For better control, accountability and sensitivity issues, the procurement by the LD will be overseen by OSDMA by being co-opted at the bidding documents preparation, bid evaluation, quality of the process and co ordination with the Bank for procurement and procurement audit. The bid invitation, award of contracts and execution will continue with the line department as in the last bank funded project with monitoring by OSDMA. The procurement arrangements proposed for the project have been given in the Operations Manual. The staffing plan of the OSDMA and LD has been provided to the Bank on October 13, 2009.

21. OSDMA has worked out the training needs of staff in bank funded procurement at ASCI/NIFM. Bank will assist OSDMA for enrollment on priority. In addition, OSDMA will arrange one procurement workshop at Bhubaneswar for all staff [including LD] and disseminate the Procurement Manual. OSDMA has arranged workshops for the works contractors to familiarize them with Bank funded procurement before bidding process commences for the project. OSDMA/ LD have produced sample documents using NCB which have been found acceptable for preparing similar documents and take up procurement.

22. AP Revenue (DM) Department R(DM)D of Government of AP, the identified nodal agency for AP, had responded to procurement assessment questionnaire in August 2009. An assessment of the capacity of this Agency, Roads and Bridges (R&B), Panchayati Raj

Engineering Department (PRED) and Irrigation Department (line departments) to implement procurement actions for the project has been carried out on December 1 to December 2, 2009 by Senior Procurement Specialist. The LD had handled earlier bank funded projects AP Hazard Risk Mitigation Project (closed in 2003), and AP Economic Restructuring Project. The assessment reviewed the current staffing and resources of R(DM)D and LD for implementing the project and measures needed to bridge the gap. Process of assessment involved interaction between the project's staff responsible for procurement and the Department's relevant central unit for administration and finance. The Nodal department R(DM)D will not carry out any procurement of works as assessed at project preparation. R(DM)D will act as coordinating cell to facilitate and monitor procurement by the LD and to co-ordinate with the Bank on procurement. R(DM)D will engage experienced staff on deputation for procurement in the PIU and will train him in bank funded procurement. Staffing and resources of the Irrigation Department will be assessed later when this department takes up procurement activities after the first year during project implementation.

23. Based on structure and staffing plan submitted by R&B and PRED departments, the existing structure will be extended to undertake procurement activities for the project. The staff in the LD will be made familiar by training to understand the difference with bank procedures. The Procurement Manual for this project has been disseminated to the line department which will reduce gaps.

24. It is assessed that a separate delegation to the LD are provided for Bank funded project. Accordingly the procurement decisions will fully vest with LD and meets Bank's requirement.

25. The LD will be fully responsible for preparation the bidding documents, bid invitation bid evaluation, award of the contract which will be overseen from the office of the Chief Engineers and staff is dedicated for the same. This staff will ensure quality of the process and co ordination with the Bank for procurement and procurement audit. The execution will continue with the LD as in the last Bank funded projects in AP. While working out the staffing plan, R(DM)D and the line department has worked out the training needs of staff in bank funded procurement at ASCI / NIFM. Bank will assist R(DM)D for enrollment on priority. In addition, R(DM)D will arrange one procurement workshop at Hyderabad for all staff [including LD]. Considering large number of bank funded projects in AP, it is assessed that contractors are familiar with Bank funded procurement.

26. Most of the issues/ risks concerning the procurement component for implementation of the project have been identified including the corrective measures which have been agreed are described in the GAAP.

27. Procurement Monitoring System – An on line web enabled MIS is being developed for the project by the NDMA. The contract management system will be one of the important modules of the information system. The MIS will be installed and maintained by the NDMA with support from the SPIUs and the line agencies. All procurement related actions will be reflected in this system including automated reminders and critical stages. NDMA will prepare quarterly procurement monitoring reports and provide information on the procurement status.

28. Procurement Manual – A procurement manual has been developed and agreed with NDMA. Participating states will follow the Procurement Manual. This will help address deficiencies related to the use of procurement procedures.

29. Training and Capacity Building - Staff of the SPIUs and LD dealing with the procurement will be provided with training in the Bank procedures and annual refresher courses will also be arranged.

30. Disclosure – SPIU and NDMA will ensure that relevant information is disclosed on the project’s web site to ensure transparency.

31. Complaint Redress – A complaint redress mechanism will be put in place and will be linked to web enabled MIS so that the redress process is monitored.

32. Procurement review and audit – Post review of the procurement for contracts below the prior review threshold will be carried out by the Bank to ensure compliance with the Bank’s procedures.

33. Although large number of procurement will be carried out decentralized LD the overall project risk for the procurement is considered moderate as procurements are mostly NCB and due to the familiarity of the implementing agencies in bank funded earlier projects. With monitoring by PMU and the SPIU and the mitigation measures put in place the residual risk will be maintained. The overall project risk for procurement is Moderate.

C. Procurement Plan

34. The participating agencies have developed draft Procurement Plans for project implementation which provides the basis for the procurement methods. This plan which will be finalized between the Borrower and the Project Team and will be available at the office of the agencies and NDMA; and will also be available in the Project’s database and in the Bank’s external website. The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

D. Frequency of Procurement Supervision

35. In addition to the prior review which may cover few procurement under component A, procurement will be predominantly below prior review threshold. Supervision to be carried out from Bank offices will include sample ex-post reviews and annual ex-post review commensurate with the risk rating for the project.

E. Details of the Procurement Arrangements Involving International Competition

1. Goods, Works, and Non Consulting Services

(a) List of contract packages to be procured following ICB and direct contracting:

1	2	3	4	5	6	7	8	9
Ref. No.	Contract (Description)	Estimated Cost US\$ Million	Procurement Method	P-Q	Domestic Preference (yes/no)	Review by Bank (Prior / Post)	Expected Bid-Opening Date	Comments
1	Remote Public Alert & Communication System	4.0	ICB	NA	No	Prior	May 2010	
2	PCCU Application Development & Maintenance	0.91	ICB	NA	No	Prior	June2010	

(b) ICB contracts estimated to cost above US\$ 200,000 for goods per contract and all direct contracting will be subject to prior review by the Bank.

2. Consulting Services

(a) List of consulting assignments involving international firms.

1	2	3	4	5	6	7
Ref. No.	Description of Assignment	Estimated Cost US\$ Million	Selection Method	Review by Bank (Prior / Post)	Expected Proposals Submission Date	Comments
1	Consultancy for Hazard, Risk & Vulnerability Analysis	1.95	QCBS	Prior	August 2010	
2	Long Term Training & Capacity Building	0.78	QCBS	Prior	August 2010	
3	Consultancy for Damage loss & needs assessment	0.49	QCBS	Prior	October 2010	

(b) Consultancy services estimated to cost above US\$ 100,000 per contract and single source selection of consultants (firms) for assignments will be subject to prior review by the Bank.

(c) Short lists composed entirely of national consultants: Short lists of consultants for services estimated to cost less than US\$500,000 per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

Annex 9: Economic and Financial Analysis
INDIA: National Cyclone Risk Mitigation Project (I)

A COST-BENEFIT STUDY

1 Introduction of the study

Tropical cyclones⁹ are storms that often inflict tremendous damages to human society particularly in coastal regions with strong winds, heavy rains and storm surges. Over the past two centuries, tropical cyclones have claimed the lives of about 1.9 million people worldwide. They frequently strikes the northern reaches of the Indian Ocean, causing heavy loss of lives and property in the Indian costal states such as Orissa, Gujarat, AP, Tamil Nadu and West Bengal.

To mitigate the cyclone risks, the GoI has proposed a nationwide cyclone risk mitigation project. The project is expected to bring significant economic benefits to the local communities in cyclone affected areas by mitigating cyclone risks to prevent the loss of lives, damages to property and adverse impact on local economies.

This study uses cost-benefit analysis method to assess the project benefit in selected project districts. At the same time, ERR of the project activities is calculated, and project impact to local economy is accessed. A probability model is used to address the risk factor of the cyclone events.

2 Background of cyclone risks in the study areas

Tropical cyclone

Tropical cyclones has devastating impact on India's coastal regions, particularly in the northern reaches of the Indian Ocean in and around the Bay of Bengal. Many cyclones, including the 1737 Calcutta cyclone, the 1970 Bhola cyclone, the 1991 Bangladesh cyclone and 1999 Orissa cyclone have led to widespread devastation along parts of the Eastern coast of India. In the past 100 years, India has experienced about 1019 cyclones, 890 of them struck the Eastern coast while only 129 landed on Western coast. Widespread death and property destruction is reported every year in exposed coastal states such as Andhra Pradesh, Orissa, Tamil Nadu and West Bengal. India's Western coast, bordering the more placid Arabian Sea, experiences cyclones only rarely; these mainly strike Gujarat and, less frequently, Kerala.¹⁰ Therefore, we choose three states, namely Orissa, AP from the East coast and Gujarat from the West coast, for the case study.

Orissa

Due to its sub-tropical littoral location, the state of Orissa is prone to tropical cyclones and storm surges. Even though its coastal line represents roughly 17% of the East coast, nearly 35% of cyclonic and severe cyclonic storms with core of hurricane winds crossed along this stretch.

⁹ A tropical cyclone is referred to by names such as hurricane, typhoon, tropical storm, cyclonic storm, and simply cyclone, depending on its location and strength, http://en.wikipedia.org/wiki/Tropical_cyclone

¹⁰ Wikipedia: http://en.wikipedia.org/wiki/Climate_of_India, 01.08/2008; IMD reports

Between 1900 and 2000, the state has experienced a very large number of cyclonic storms, and more than 20 of these can be classified as severe cyclonic storms and super cyclones.¹¹ Super Cyclone of 29 October, 1999 was the most devastating. It affected around 12.6 million people and caused devastation in about 1,200 square kilometers of land. The super cyclone claimed the lives of about 8,900 people in the state and damaged 14,000 villages/wards.¹²

When cyclone strikes Orissa, the winds always come together with storm surges and heavy rains. Orissa's densely populated and flat coastal plains are very vulnerable to the storm surges and floods. The poorly structured farmers' houses can be easily taken by the strong wind.

Andhra Pradesh

AP is one of the states that had suffered the most from the adverse effects of severe cyclones. About 44% of the territory is affected by cyclones while the coastal belt is the most vulnerable to this natural disaster. Almost 29 million people are vulnerable to cyclones and their impacts in coastal AP and 3.3 million of them lives within 5km of the seashore. More than 70 cyclones have affected AP in 20th century. In the past decades, both the frequency and intensity of cyclones have increased. The most devastating cyclone in the last 20 years occurred in November 1977, killing about 10,000 people. A more recent cyclone in 1990 causes 1,000 deaths and USD 1.25 billion in economic loss. Between 1977 and 1992, about 13,000 lives and 338,000 cattle were lost due to cyclones and floods, and nearly 3.3 million houses were damaged.¹³

Several factors have combined to contribute to the natural disaster vulnerability in AP: (i) the low-lying lands of the shore, particularly in the deltas, are subject to widespread flooding and deep inland sea water incursion that even a few meters high storm surge can create; (ii) limited capacity for disaster management and integrated planning and (iii) high concentration of population, infrastructure and economic activities along the shoreline. (iv) lack of maintenance of infrastructure and key elements, such as drains, embankment of the flood protection and irrigation systems and (v) the lack of coastal zone and delta management that has led to destruction of mangroves as natural mitigation against storm surges¹⁴.

Gujarat

The frequency and severity of cyclones that landed on Gujarat, located on the Western coast, is relatively less than those in Orissa and AP. In the past 120 years, about 75 cyclones have struck Gujarat land, most of them originates from the Arabian Sea; 35 cyclones closed to the Gujarat coast but missed. Among these cyclone disasters in Gujarat, 1,173 people were killed by the June 1998 cyclone and 453 people by May 1999 cyclone.

Although the cyclone frequency is less, there are two gulfs on Gujarat coast that receive much

¹¹ Orissa state disaster mitigation authority: Investment proposal on national cyclonic risk mitigation program, state of Orissa; author analysis

¹² Government of Orissa: Memorandum on damages caused by the super cyclonic storm of rarest severity in the state of Orissa.

¹³ Government of Andhra Pradesh: Cyclone Risk Mitigation Investment Proposals.

¹⁴ Government of Andhra Pradesh: Cyclone Risk Mitigation Investment Proposals.

higher storm tide than the rest coastal areas when cyclone lands. As an example, storm surge, when accompanied by coastal flooding and cyclonic winds is the second most devastating, rapid onset hazard in Gujarat. It accounts for 12 percent of the risk to the state and a potential loss of over 11,000 lives for a probabilistic 100-year event (GSDMA/TARU, 2005). Losses could rise considerably with increased migration to the coast, drawn by huge investments in coastal infrastructure, settlements and enterprise located largely unmindful of future risk distribution.¹⁵

Risk mitigation and the economic analysis

To mitigate the cyclone risks, Indian government proposed the NCRMP-I. The proposed project activities include: A) EWDS and Capacity building for coastal communities; B) Cyclone Risk Mitigation Infrastructure: multipurpose cyclone shelters, and evacuation routes; C) Technical Assistance for Strengthening Capacity towards DRM; and (D) Project Management and Implementation Support.

To assess the cost and benefit, as well as the economic efficiency of the proposed project activities, this economic analysis use case study method in some selected districts and villages including Orissa Kendrapara district, Gujarat Jamanagar district and AP Vishakhapatnam district. These districts were suggested by state and local government as candidate for the cyclone project. Orissa and AP examples present well the cyclones characters in Bay of Bengal along east coast, while Gujarat examples present the cases in Arabian Sea along west coast.

3 Assessing cyclone and its risk vulnerability

Cyclone damage and damaging agent

Tropical cyclones cause damages mainly through three agents: winds, storm surge, and flood. On land, strong winds can damage or destroy vehicles, buildings, infrastructure, and other outside objects, turning loose debris into deadly flying projectiles. The broad rotation of a land falling tropical cyclone, and vertical wind shear at its periphery, spawns tornadoes. The storm surge, or the increase in sea level due to the cyclone, is typically the worst effect from land falling tropical cyclones, historically resulting in 90% of tropical cyclone deaths¹⁶.

While tropical cyclones can also produce extremely powerful torrential rain. They develop over large bodies of warm water, and lose their strength if they move over land. This is the reason coastal regions can receive significant damage from a tropical cyclone, while inland regions are relatively safe from receiving strong winds. Heavy rains, however, can produce significant flooding inland, and storm surges can produce extensive coastal flooding up to 40 kilometers from the coastline.

¹⁶ http://en.wikipedia.org/wiki/Tropical_cyclone#cite_note-oxfo-72#cite_note-oxfo-72

Risk

Cyclone can happen sometime, but when, where is the path, what intensity is, or whether it will be in our lifetime or even our children's, is unclear¹⁷. Catastrophic risk is the risk inherent in the event and its effects.

A specific cyclone occurrence and the site intensity of that occurrence are hard to predict, long term in advance. While we don't know exactly when a cyclone may occur, nor the impact to a community, or precisely which building, road, or farm may suffer most in one exact event, we do know that some regions are more likely than others to suffer a cyclone or sustain a major storm, flood, wind, based on current available data of historical events. By collecting these statistics and scientific data, we can make informed estimation of the frequency of these events and the event intensity, for a specific location, region or a country. In short, the next cyclone occurrence is uncertain, but the cyclone risk can be assessed based on the historical data.

Figure 1 shows the frequency of cyclone occurrences and their site intensity, in terms of wind speed, in Orissa and in Gujarat, based on the historical data from 1901 to 2000 in Orissa, 1880 to 1999 in Gujarat, and 1891 to 2000 in AP respectively.

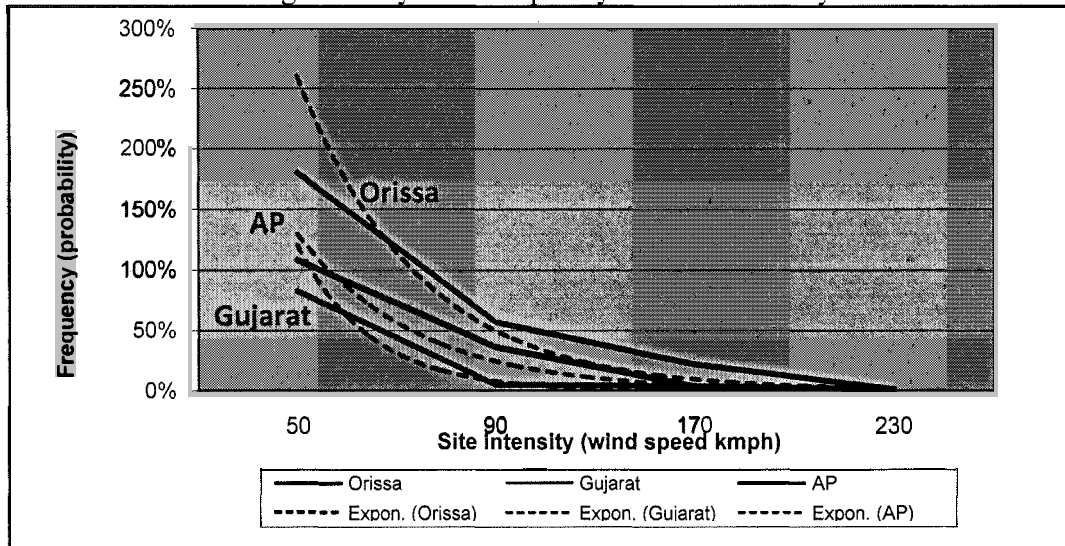
The data shows that Orissa has higher cyclone probability in all wind intensity categories than AP and Gujarat. In Orissa, super cyclone storm with wind speed higher than 223 kmph happens about 1% annually¹⁸ (or once per one hundred years), severe storm with wind speed from 119 to 222 kmph happens about 22% annually. While in Gujarat, super cyclone and severe storms are much fewer in the past history. No super cyclone has landed, and severe storm is only about 4% annually¹⁹. Thus Orissa exposes to higher cyclone risk.

¹⁷ Exacerbating this risk is that climate is changing: an overwhelming body of scientific evidence indicates that the earth's climate is rapidly changing predominantly as a result of increase in greenhouse gases caused by human activities (stern Review p3) . While the scientific evidence shows climate change presents very serious global risks (stern review), precisely how climate will change, and what the impact of such changes are for any specific place/regions, for example the selected sites in the case study, are still very uncertain.

¹⁸ The available historical data in Orissa shows that from 1901 to 2000, the super cyclone with wind speed higher than 233 kmph only happened once, which was in 1999. Because of the date availability, the paper only reviews the cyclone events in the past 100 years. Some research calls it once per hundred year event, or 100 year return period event. This study uses the probability concept, and names the event occurrence probability as 1% annually. This concept is used through the C-B study.

¹⁹ The analysis is based on the historical cyclone occurrences data since 1880, provided by Gujarat DMA. The future occurrence of super cyclone or sever storm is uncertain.

Figure 1: Cyclone frequency and site intensity



Note:
damaging agent: wind; presented as wind speed: kmph;
---: trend line
Orissa data: historical data 1901-2000;
Gujarat data: historical data 1880-1999;
AP data: 1891-2000;
Source: Orissa, Gujarat, AP governments; Author's analysis.

Storm surge with high tide

In most case, the wind speed risk and storm surge risk of cyclone are correlated, especially those on the Eastern coast (see figure 2). Research shows that in general, the number of peak storm surges estimated on Western coast is much smaller than that in Eastern coast, such as Orissa, AP, West Bengal, and Bangladesh. However, the storm surge models suggest some locations may receive much higher and intensive storm surges than the average, for example in the Gulf of Khambhat and Kachchh in Gujarat. The storms in these areas can be quite severe if they occur during the high tide. And the damage to the coastal towns and villages can be quite significant.

figure 2: Orissa: Cyclone probability and intensity

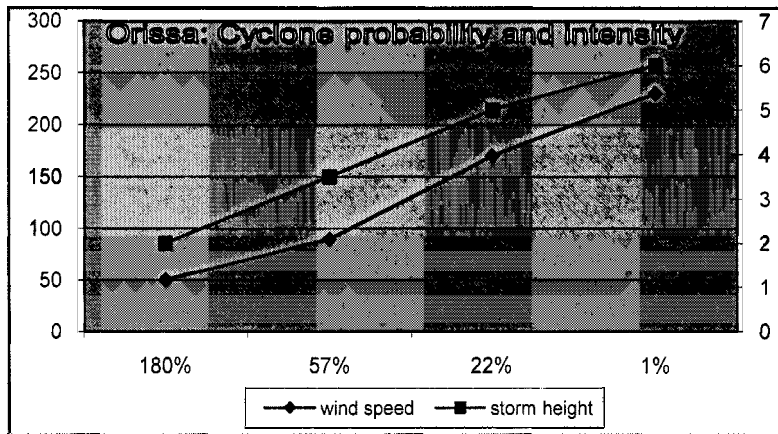
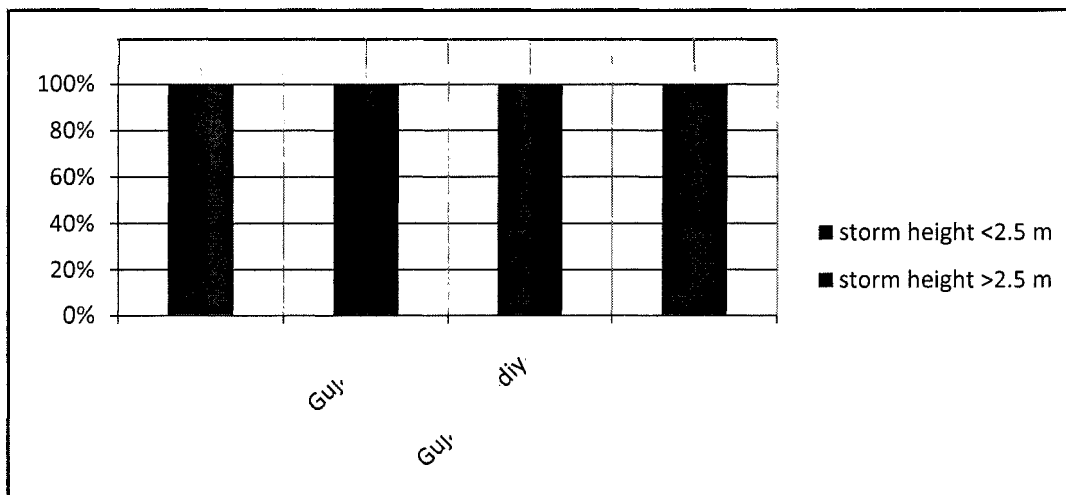


Figure 3 shows that the high storms (storm height > 2.5 m) in Gujarat state in general are much less than those from AP and Orissa. But Jodiya and Jamnagar districts, located in the Gulf of Kachchh, have a much higher storm probability than the average of Gujarat and other states. The surge in these areas is more severe than AP and Orissa average.



Damage function

By combining the intensity data on a specific object, such as land, housing and infrastructure, we will understand to what extent these physical objectives will be affected, or damaged, when a cyclone occurs. The damage is a function of the event intensity (for example wind).

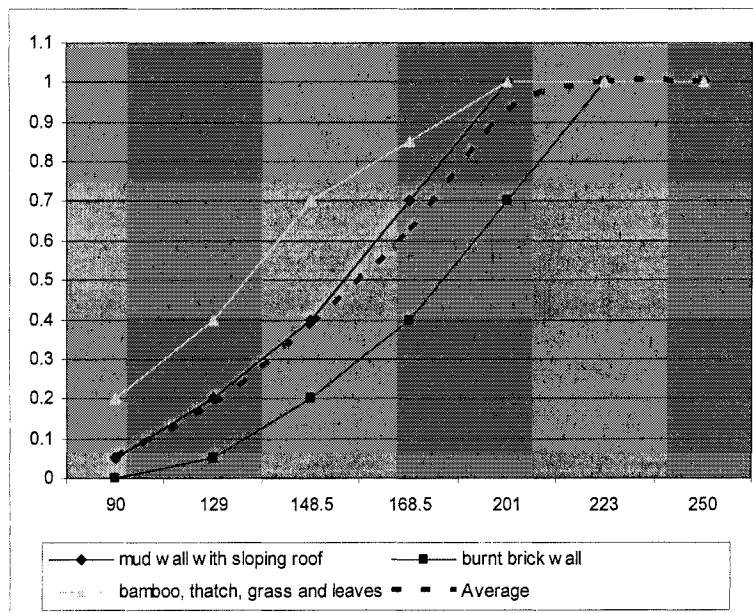
$$D = f(i)$$

D: damage

i: cyclone event site intensity

Figure 4 shows that the damage of a building is related to the intensity of a cyclone when it occurs in Orissa. This study estimates a building damage function (presented by the red --- line in Figure 4) for the coastal districts of Orissa. Figure 4 shows when the wind speed is higher than 200 kmph²⁰, more than 90% of the buildings in the coastal areas of Orissa will collapse. When the wind speed is lower than 200 kmph, the damage (as % of a building) is positively related to wind speed in almost a linear relation: the higher the wind speed is, the high percentage of damages it makes to a building. Figure 4 also shows that the structure and materials factors of building roofs and walls also shifts the damage function by moving the damage line upward or downward.

Figure 4: Damage function for Orissa coastal buildings



Note: Damaging agent: wind;
 X Axis: Wind speed, kmph;
 Y Axis: percentage of damage
 Data source: Orissa State Disaster Management Agency; author's analysis

Vulnerability

With cyclone frequency data, intensity data, and damage function, we can make informed estimations of the expected vulnerability of a cyclone event under the catastrophic risk condition²¹.

The expected vulnerability at location X in year N is a function of damage times the probability of damage.

$$E[V_{xn}] = \int_n \int_x \text{MAX}_{i=1}^3 \{ f(i) \text{Pr}(i) \} dx dn$$

²⁰ Kilometer per hour

²¹ In this study, we use the historical data to estimate the risk. The study further explores the risk uncertainty under the global climate change impact.

x: location that cyclone is to land

n: year

i: cyclone event site intensity, i_1 = wind, i_2 = storm surge, and i_3 = flood;

f(i) : damage function

Pr(i): probability of i

$E[V_{xn}]$: expected vulnerability at location x in year n

4 Cost-benefit study for risk mitigation

Cost

The cost here is mainly the cost of the project investment in the selected district plus the annual O&M cost to maintain the mitigation activities perform at its designed capacity. Both the investment cost and the O&M cost are estimated based on the project design and interviews with the local engineers²².

The cost of technical assistant, capacity building and EWDS are included in the cost-benefit analysis of the cyclone shelter component.

Benefit

The benefit is mainly the cost savings from reducing or preventing the expected cyclone vulnerabilities. The expected vulnerability, as discussed in the early part, is determined by the damage function, the probability of cyclone event intensity, and the impact areas and project time horizon. To calculate the vulnerability, the study tries to give it an economic value, which includes the vulnerability of:

- (a) Physical capital: the value of the physical assets that might be damaged during cyclone events. Physical assets assessed include houses and public buildings, infrastructure, household assets, agriculture products, and household animals. This estimation is done through expert interview.
- (b) Environment capital: the value of environmental and natural resources. In this study, the environment capital is mostly land: recovery cost for land degradation, agriculture production loss from land degradation, loss from land erosion. The estimation is also done through expert opinion methods.
- (c) Human and social capital: value of statistical lives and social value. In this study, human capital is analyzed based on literature review²³. Due to data availability, this study doesn't include social capital.

²² These engineers come from the Orissa and Gujarat government agencies. They are responsible to the engineering design of the project activities in the selected districts.

²³ S. Bhattacharya, A. Alberini and M Cropper (2007) in their paper "The value of mortality risk reduction in Delhi, India" (Journal of Risk and Uncertainty,34:21-47) estimated that the value of a statistical life (VSL) in India is approximately 1.3 million Rupees or USD150,000 Purchasing Power Parity (PPP) USD. Due to time and resource availability, this study doesn't try a separated study, but cites this study result in the human capital valuation. Study on VSL various from country to country. Most of the documented research are for developed countries. For example, there are about 117 studies in the US on VSL with estimation various from 0.1 to 37.7 million USD.

The project benefit can be presented as

$$B_{nx} = E[V_{nx \text{ [without project]}}] - E[V_{nx \text{ [with project]}}]$$

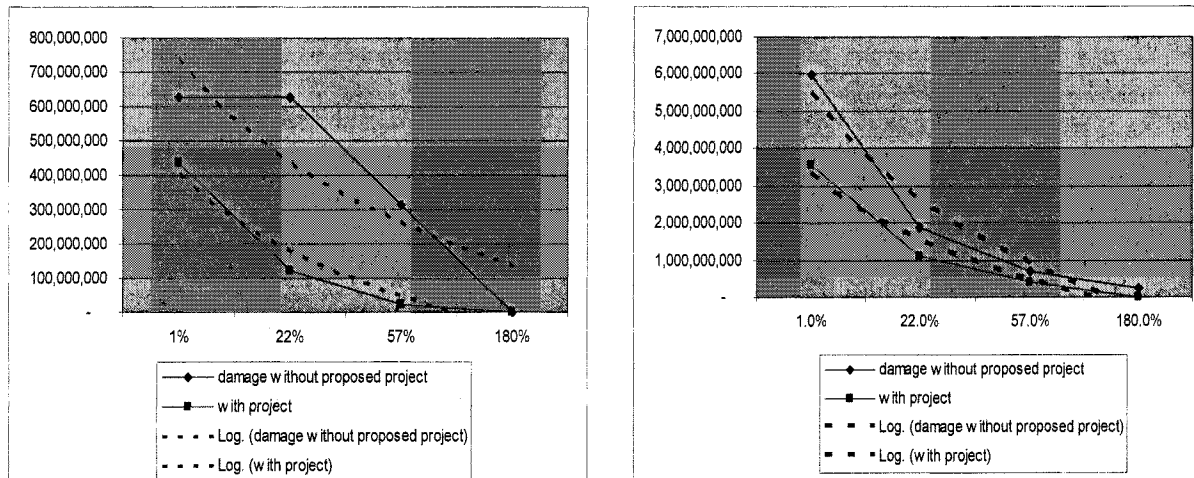
B_{nx} : benefit at location x in year n

$EV_{nx \text{ [without project]}}$: expected vulnerability at location x in year n without proposed mitigation activities

$EV_{nx \text{ [with project]}}$: expected vulnerability at location x in year n with proposed mitigation activities

Figure 5 shows the reduced expected vulnerability in Kendrapara district of Orissa by the project cyclone risk mitigation activities. Both the embankment (3-a) and shelter forest (3-b) components can shift the expected vulnerability line downward. The areas between the two lines are the project benefits.

Figure 5: Reduced vulnerability by mitigation methods
 (a) Embankment (b) Shelter forest plantation



Data source: author analysis

Results: Benefit/Cost ratio, and ERR

Table 1 show the ERR and Benefit/cost ratio of the three components: embankment, shelter forest plantation, and cyclone shelter. The discount rate is set at 10%. The embankment and cyclone shelter components are discounted over a time horizon of 10 years. The forest plantation component is discounted at 15 years, as it takes longer time for the plantation forest to grow to its full capacity.

The result shows that all these three components have very positive ERR and B/C ratio. With the objective of preventing loss of human lives during cyclone, the cyclone shelter component in Orissa achieves high ERR and B/C. In addition to investment cost for shelters, the cost of capacity building and EWDS is also included in the shelter component when calculated the ERR. In this project, an EWDS will give local communities at least two additional hours, therefore, even the most remote villages can evacuate to the nearby shelters before cyclone strikes.

The embankment components can achieve an ERR of about 31% in Orissa, 24% in Gujarat with higher than 1 B/C ratio; and the shelter forest component can also achieve about 29% ERR in Orissa with B/C ratio of 3. The ERR of embankment is bit higher than forest component, as it is technically more efficient in reducing the damage from storm surge, which is the most serious damaging agent. Forest shelter plantation component has a higher B/C ratio as it has a smaller initial investment cost than embankment component.

Table 1: ERR and B/C ratio

Project component		Orissa	Gujarat	AP
		Kendrapara	Jamanagar	Vishakhapatnam
Embankment	ERR	31%	24%	-
	B/C	2	1.7	-
Shelter forest plantation	ERR	29%	-	-
	B/C	3	-	-
Cyclone Shelter	ERR	73%	15%	28%
	B/C	4	1.2	1.9

Sensitivity Analysis

The sensitivity of the ERR to changes in input variables is presented in Table 2. Development scenario might change in the project areas. For example, rapid economic growth in India could increase the household assets and land value, and therefore increase the physical capital; urbanization and migration process may increase population density and infrastructure in some areas, while reduce the density in some other areas, which may change the physical, environment and human capital status. Sensitivity analysis results show that under the worst case scenario, all these components assessed have passed 10% rate of return, except Gujarat shelter component when benefit reduces to 20%.

Table 1: Sensitivity Results

Sensitivity analysis	Embankment (ERR%)	Forest (ERR %)	Shelter (ERR %)
Orissa			
Benefit +20%	38	32	88
Benefit -20%	24	24	57
Cost +20%	26	25	60
Cost -20%	39	33	92
Gujarat			
Benefit +20%	30		20
Benefit -20%	18		9
Cost +20%	19		10
Cost -20%	31		21
AP			
Benefit +20%			35
Benefit -20%			20
Cost +20%			22
Cost -20%			37

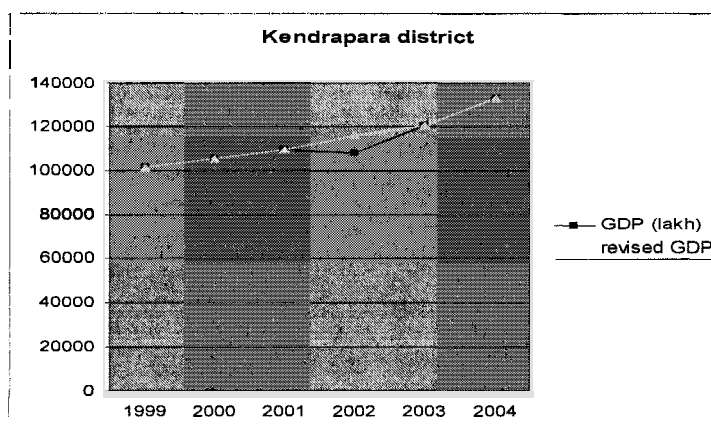
Note: Four sensitivity test cases were examined: change in benefit by $\pm 20\%$, and change in project investment and O&M costs by $\pm 20\%$.

5 Some other factors

The impact to local economy

Cyclone events have significant impact to local economy. Kendrapara district experienced a severe cyclone in 2002. As a result, the district GDP dropped 1.6% in 2002 because of the physical damages and loss caused by the cyclone. If the project activities were in place during that period, these losses can be significantly reduced. Chart 4 shows that project activities could shift the GDP down turn in Kendrapara in 2002 with a GDP growth of more than 4%.

Figure 6: GDP Growth in Kendrapara with vs. without project



Climate change

In this study, the cyclone risk is estimated based on the historical data, with an assumption that cyclone events will happen as they were in the past. However, the frequency and intensity of the cyclone events are increasing because of the global climate change.

The Intergovernmental Panel on Climate Change (IPCC 2007) cites a trend since the mid-1970s toward longer duration and greater intensity of storms, and a strong correlation with the upward trend in tropical sea surface temperature. In addition, it notes that hurricanes/cyclones are occurring in places where they have never been experienced before. Overall, using a range of model projections, the report asserts a probability greater than 66% that continued sea-surface warming will lead to tropical cyclones that are more intense, with higher peak wind speeds and heavier precipitation²⁴ (IPCC 2007; see also Woodworth and Blackman 2004; Woth, Weisse, and von Storch 2006; and Emanuel et al. 2008).

In the expected vulnerability function, the climate change will increase the event intensity (i),

²⁴ IPCC. 2007. *Climate Change 2007: The Physical Science Basis, Summary for Policymakers*.

Woodworth, P. L., and D. L. Blackman, 2004. Evidence for systematic changes in extreme high waters since the mid-1970s. *Journal of Climate* 17(6), 1190-97.

Woth, K., R. Weisse, and H. von Storch. 2006. Climate change and North Sea storm surge extremes: An ensemble study of storm surge extremes expected in a changed climate projected by four different regional climate models. *Ocean Dynamics* 56(1): 3-15.

Emanuel, K., 2005. Increasing destructiveness of tropical cyclones over the past 30 years. *Nature*: 436, 686-688.

frequency of the cyclone event ($p(i)$), and likely the affected areas (more cyclone landing location (x)). As a result, the $E[V_{xn}]$ will increase²⁵. Therefore, the expected project benefit of the project, presented by $E[V_{nx \text{ [without project]}}] - E[V_{nx \text{ [with project]}}]$, will increase over time.

Although the project activities will, to some extent, mitigate the increasing cyclone vulnerability due to climate change, because lack of the exact climate change information for the project sites, it is not yet ready to calculate the exact number.

²⁵ Based on the IPCC (2007) estimation, the probability of the increase is 66% worldwide.

Annex 10: Safeguard Policy Issues
INDIA: National Cyclone Risk Mitigation Project (I)

A. Social

1. **Impacts on people and land:** The project will have a major positive impact (through sub-projects under component B) on the community as a whole as it will help them to be better prepared to face the challenges of cyclone and other disasters and reduce the adverse impacts on the community. Community participation in disaster management at local level will also make the efforts sustainable. The sub-projects proposed under the NCRMP-I will have overall positive impacts on the community as a whole but may also adversely impact a limited section of the community or individual members of the community. The subprojects proposed under Component B are: (a) construction of multipurpose Cyclone Shelters; (b) construction/repair of Coastal Canal and embankments for improved drainage; and (c) construction/ repair of missing road links and bridges. Substantial portion of the infrastructure such as roads, bridges, canals and embankments will use the existing alignments and therefore are unlikely to involve land acquisitions except for minor widening/up gradation where required by design. The new multipurpose shelters are also planned either within existing school premises or on other government land. Consequently, the implementation of these subprojects might have adverse social impacts largely restricted to a modest loss of land and livelihood disturbances for some people from the construction of new infrastructure. The preliminary review and assessment identified possible adverse impacts of the proposed sub-project activities as:

- Loss of land and/or shelter, specifically in relation to the potential for displacement, rehabilitation and habitat fragmentation
- Potential livelihood losses
- Displacement/loss of Common Property Resources
- Impact on the community health and wellbeing due to construction activities and migrant labor
- Demographic changes - size and composition of resident population, influx of temporary work force or new users (disrupts the cohesion of a small, stable community).

2. **Management of Risk - Mitigation and Enhancement:** To understand and assess the issues relating to land requirement, displacement and resettlement, the NDMA has conducted a study through consultants to assess existing social conditions in participating project states and also prepared an ESMF with associated safeguard instruments to mitigate adverse impacts that might occur. The ESMF aims at ensuring equitable and sustainable development and also to improve the outcomes of the proposed risk mitigation activities. The ESMF outlines a set of activities that if adhered to in a sequential manner would help in addressing the social impacts expected to arise out of the project activities. Required land will be arranged either through voluntary donation or acquisition or direct purchase. The ESMF has adequate provisions for consultations and disclosures if the land is arranged through donation. It also has sufficient provisions to safeguard the vulnerable. Annual review of the functioning of the framework will be carried out and will be modified, if necessary.

3. The social impacts due to the sub-project activities will be first identified using the screening checklist. This will be used to determine the requirement of full scale Social Impact Assessment and preparation of RAPs.

4. The Participating States have conducted the screening exercise and classified the sub projects into two categories: (i) subprojects with no adverse social issues; and (ii) the subprojects with likely adverse social impacts. First category projects are planned to be taken up during the first year of the project period and the balance during the remaining period of the project life.. Social Development Expert at the SPIU will certify all the DPRs prepared and will be responsible for the implementation of the ESMF including RAPs. Implementation of mitigation measures will be completed before the start of civil works.

5. Third Party Auditors will assess the implementation of the RAPs. Mid-term and end of project evaluations will be undertaken to assess the impact of the RAP implementation in mitigating the adverse affects on the project affected people.

6. **Indigenous Peoples/Tribal Development Framework.** The Project is unlikely to impact indigenous/tribal/ST populations. However, in case of possible impacts, guiding principles enshrined in the Constitution of India, and also in various plans and policies, safeguard the interests of indigenous people, referred to as STs in the Constitution. These principles and policies encourage State governments to pass suitable legislation, wherever possible, to create legal and administrative arrangements that assist the STs in various situations.

7. There are sufficient provisions in the existing laws to meet the objectives of the Bank's OP 4.10 which addresses the special concerns with regard to the STs/indigenous peoples. However, in order to tie these in with the project activities at different stages, resettlement planning exclusive to indigenous/tribal peoples is proposed in the ESMF. The resettlement plans for tribal's will be developed to safeguard their interests. It will also be ensured that these plans are effectively implemented. These plans consider the customary systems of these peoples in decision making and their participation in project planning. This Indigenous/Tribal Peoples Development Framework (I/TDF) would be applicable in areas that are inhabited by STs.

8. Following the OP/BP 4.10 on Indigenous Peoples/tribal's, the ESMF detailed the need to consult the tribal's for their broad community consent and, to ensure that they participate in, and benefit from Bank-funded operations in a culturally appropriate way - and that adverse impacts on them are avoided, or where not feasible, minimized or mitigated. This project will have major positive social impacts. The proposed consultations with the people at all stages of development would facilitate the possibilities for further enhancement of the positive benefits.

9. **Prevention of Spread of HIV/AIDs:** To safeguard the occupational health of the workers, particularly women workers, the contractors will undertake all necessary measures. Among several others measures it includes a measure that the contractor/ PIU will inform the District Health authorities / District AIDS control organizations about the location of the construction camp and the number of workers likely to reside in such camps. They shall arrange to hold awareness training of the workers and provide all assistance to the states AIDS control organization to carry out effective surveillance.

Implementation Arrangements

10. The NDMA will provide technical and monitoring support and will coordinate the overall Program. Implementation of the ESMF, including the RAP is the responsibility of the SPIUs and will be monitored by the SDMA or the nodal department. The proposed web based MIS will include a module on the monitoring and tracking of the implementation of the ESMF provisions.

11. SPIUs in all states will have Social Development Expert. Orissa has appointed Social Development Expert. AP is in the process of recruiting the Social Expert either from the State Agencies or from the market. As part of capacity building, an orientation workshop on social and environment will be conducted in both the states for all levels of staff. Such trainings will be conducted periodically by SPIUs to ensure that new staff entering the program becomes familiar with the provisions of the ESMF.

12. **Grievance Redressing:** In the project all efforts will be made by LD, so that the compensation/assistance package for PAF's is decided following the ESMF and in consultation with the community so as to avoid any dispute. In case of a potential dispute the matter will be brought to the notice of local tehsildar/Sub Divisional Magistrate (SDM). He/she shall hear the case in presence of (a) the affected party, (b) the office in charge of line department who is acquiring the land/in charge of the sub-project activity and (c) sarpanch of the village where the sub-project is being implemented. He/she will try to reach an amicable solution to the issue. However, in case of non-satisfactory solution, the matter will be brought to the notice of the District Collector and he is the final authority to decide the case. The hearing will be attended by all members present for hearing with the SDM as well as the Social Management Specialist of the PIU/SDMA. As required certain cases will be referred to a Grievance Redress Committee appointed by the SSC which would examine and address the grievances. The Social Management Specialist from the PIU/SDMA will be responsible for maintaining a record of the proceedings and the final decisions.

13. **Consultation and Disclosure.** State level Stakeholder consultation workshops on ESMF were conducted in AP and Orissa. The ESMF has been disclosed on NDMA and SDMA's web sites.

14. **First Year sub projects.** The Social Screening Reports of the Project States - Orissa and AP - indicates that the Phase I/first year sub projects have no requirement for private land. All the sub projects will be located on public/government land which are free from encumbrances and have no displacement issues. For subsequent phases the social screening exercise is still to be undertaken. Appropriate RAPs will be prepared as required and implemented for these sub projects following the ESMF.

B. Environment Management and Safeguards

15. **Process.** The NCRMP-I proposes to support multiple sub-projects covering activities such as construction/repair of cyclone shelters, repair/rehabilitation of saline embankments and construction/rehabilitation of missing road links and bridges in the coastal areas under

Component B. The program scope may also include activities like shelter belt plantation and plantation/regeneration of mangroves in future. In order to ensure effective environmental management in a scenario where multiple sub-projects are located across different parts of the coastal region in various states (Orissa and AP in the first phase), the approach of ESMF preparation has been adopted in the project.

16. The ESMF has been prepared for supporting the integration of environmental aspects within the decision making and implementation process of various sub-projects. It will also support compliance with applicable laws and regulations of GoI and State Governments apart from meeting the requirements of the relevant Bank policies. The over-all environment management approach for the project under the ESMF includes the following key steps:

- (i) Environment screening, which helps in early identification of key environmental issues at the sub-project level. The screening process forms the first step in the environment management process for the project and is being carried out in parallel with the project identification/engineering feasibility studies for the proposed sub-projects. Proposed investments have been screened and sub-projects with no significant adverse environmental impact have been identified for Phase I. The environment screening process for the project has used a robust methodology supported by use of scientific tools such as GIS and remote sensing techniques, which has helped in avoiding environmentally sensitive sites.
- (ii) For sub-projects with the potential for significant adverse environment impacts (as it emerges from the screening results), an Environment Assessment (EA) and sub-project specific Environment Management Plan (EMP) will be prepared in accordance with Bank's OP 4.01. The EA will include an assessment of baseline conditions, analysis of alternative options, assessment of potential impacts, identification of mitigation measures and preparation of sub-project specific environmental management plans. However, it is expected that sub-projects with the potential for significant adverse environment impacts will be few in number. These are expected to be limited to saline embankment works only.
- (iii) Based on screening results, if a sub-project does not require an EA, the generic/standard activity-specific EMP, developed as part of the ESMF, will apply. These generic/standard activity-specific EMPs provide an overall guidance on avoidance, minimization and mitigation measures to be adopted during the planning, design, implementation and operation stages of the concerned sub-project.

17. The ESMF serves as a comprehensive guide covering policies, procedures and provisions, which are being/will be integrated within the over-all project cycle to ensure that the environmental aspects are systematically identified and addressed in all the sub-projects. The project is being designed and will be implemented in a manner that will ensure compliance with the agreed ESMF.

18. **Environmental Parameters.** Some of the key environmental parameters/aspects considered in the preparation of the ESMF include - sensitive natural habitats including National Parks, Sanctuaries, Wetlands, Reserved and Protected Forests; trees and vegetation; water resources and their use by people; water logging, flooding and drainage issues; soil resources including erosion and siltation; physiographic conditions; material sources and their requirement (earth, sand, stone, water) for construction; management and disposal of spoils and wastes; pre-

dominant land use and; presence of sensitive receptors such as education and health facilities.

19. **Environmental Impacts.** The project may have some adverse environmental impacts and these may include: (i) direct/indirect impacts resulting due to poor site selection for sub-projects (example: salt water intrusion due to inappropriate planning and design of embankments); (ii) impact on the drainage pattern of the area, including impact on coastal flora and/or fauna due to changes in tidal water flow; (iii) felling of trees and clearance of vegetation for sub-project construction; (iv) impacts on water resources used by the people such as ponds, river/streams, canals and hand pumps; (v) occupational health and safety concerns that are associated with the construction stage; (vi) impacts due to construction material (sand, water, earth, aggregate) sourcing and transportation and; (vii) disposal of debris and other construction wastes.

20. **Key Environmental Inputs to Project Design.** Some specific interventions to reduce environmental impacts that have been integrated into project design (particularly, in terms of selection of sub-project location and prioritization) and engineering include:

- Use of Environment Screening Results to ensure that no sub-project with any likely possibility of creating significant adverse impact on environment is taken-up without proper study (environment assessment/analysis) – activities/sub-projects without significant negative impacts have been selected for first year investment while EA will be carried-out for other sub-projects (such as saline embankments or activities near sensitive environs), which will be part of second phase of investments, depending on the findings/recommendations of such a study.
- Use of GIS mapping and remote sensing technology to finalize the exact location of a sub-project – has been done in both Orissa and AP for all first year investments, thereby avoiding impacts on natural resources/features of the local area.
- Reuse and disposal of construction debris in suitable pre-identified dumping areas in tune with the local condition to avoid land degradation and water pollution.
- Provision of embankment protection measures in case of road/bridge works.

21. **Stakeholder Consultation.** In accordance with the applicable Bank policies, public consultations at local level (in areas where specific investments will be made) have been carried out for all proposed Phase I investments in both Orissa and AP. The consultation process for the project included a range of formal and informal on-site discussions, focus group discussions/meetings and targeted stakeholders such as local residents; farmers, roadside and embankment side communities; local bodies like village Panchayats; and selected government departments such as Public Works, Panchayati Raj and Irrigation.

22. The public consultation was designed in a way that: (i) affected people are included in the decision making process; (ii) links between communities and their natural resource base adjacent to project locations are explored; (iii) public awareness and information sharing on project alternatives and benefits are promoted; and (iv) views on designs and solutions from the communities are solicited.

23. A state level workshop was organized (both in Orissa and AP) to obtain inputs on the draft ESMF and to seek views on the approach towards minimization/ mitigation of potential negative impacts on people and environmental resources. Expert opinion on specific issues related to the over-all design/components of the project and applicability of environmental regulations was also sought during the said workshops. Outputs from this process are being integrated into the project design, where technically feasible. Public involvement process will continue through the project implementation stage as well.

24. **Disclosure:** The final ESMF document (February 28, 2010 version) has been made public through websites of NDMA, OSDMA and AP's nodal department (Revenue) replacing the previous draft versions. The final version of the executive summary of ESMF has been made available in the districts where sub-projects have been proposed under the project. The executive summary of the ESMF will also be translated in Hindi and other local languages and will be disclosed along with the full report. The summary of Environment Screening Reports for Phase I investments and Public Consultation reports have been disclosed through NDMA and SDMA/Nodal Department websites apart from Bank's PIC.

25. **Statutory Clearances.** A summary of the key statutory clearances that may be required for the project is provided in Table 10-1 below.

Table 10-1: Key Statutory Clearances
(requirement will depend on the area, type and extent of the sub-project)

S. No.	Clearance Required	Statute under which clearance is required	Statutory Authority
Clearances Required to be taken by SDMA/State's Line Departments			
1	Environment Clearance/NOC for the sub-project*	EIA Notification, 2006 (including amendments) issued under Environment Protection Act, 1986	State Pollution Control Board; MOEF, Govt. of India
2	Coastal Regulation Zone Clearance	Coastal Regulation Zone Notification (Issued under Environment Protection Act, 1986)	Coastal Regulation Zone Authority
3	Forest clearance	Forest Conservation Act, 1980	State Forest Department and/or MOEF, Govt. of India
4	Tree Cutting Permission	Forest Conservation Act, 1980	State Forest Department and/or MOEF, Govt. of India
Clearances Required to be taken by the Contractor			
4	Hot mix plants, WMM plants, Crushers and Batch Mix Plants	Air (Prevention and Control of Pollution) Act, 1981 and Noise Pollution (Regulation and Control) Rules, 2000	State Pollution Control Board
5	Storage, handling and transport of hazardous materials	Hazardous Waste (Management and Handling) Rules, 1989 and Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989	State Pollution Control Board
6	Location/ layout of workers camp, equipment and storage yards	Environment Protection Act, 1986 and Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989	State Pollution Control Board
7	Quarries (in case of	Environment Protection Act, 1986	Dept. of Mining, State Govt.;

S. No.	Clearance Required	Statute under which clearance is required	Statutory Authority
	opening of new quarries)		Concerned District Administration
8	Discharges from Labor Camp	Water (Prevention and Control of Pollution) Act, 1974	State Pollution Control Board
9	Permission for withdrawal of groundwater for construction	Environment Protection Act, 1986	State Ground Water Board
10	Permission for sand mining from river bed	Environment Protection Act, 1986	Irrigation Department, State Govt.

** Environmental Clearance may be required for some sub-projects such as saline embankments (subject to their precise location and proposed magnitude of work).*

26. **Common Property Resources (CPRs).** Impacted common property resources (such as water sources and religious properties) will be either relocated in as good or better condition. Local communities/stakeholders will be consulted and involved in this process. No CPRs are getting affected in Orissa and AP due to proposed Phase I works. The same will be ascertained for Phase II works, for which the detailed screening exercise has been recently initiated.

27. **ESMF implementation.** For effective implementation, the relevant ESMF provisions will be appropriately integrated and cross-referenced in the project design documents, contract conditions and Bills of Quantities (as required). The over-all supervision and monitoring requirements have been outlined in the ESMF. Reporting formats are being currently developed, which will help in maintaining uniformity in documentation across the participating states.

28. **Monitoring and Evaluation Mechanism.** The ESMF provides monitoring and evaluation parameters for various sub-project/investment categories and describes the institutional arrangements that would be required to facilitate the 'process' and 'progress' monitoring. Monitoring reports will be prepared by the PIU's Environment Officer once in every six months covering all investment categories. A comprehensive monitoring and evaluation report will be prepared by the Environment Management Unit of NDMA at mid-term and end-term. Additionally, key parameters with regard to ESMF implementation will also be included in the on-line monitoring system (MIS) that would be developed for the project.

29. The Bank's monitoring strategy with regard to application and implementation of ESMF will include: (a) review of various outputs such as screening reports, stakeholder consultation documents, EAs, EMPs, DPRs and Bidding Documents; (b) review of status/quarterly reports and ToRs for various studies/activities and; (c) regular participation in supervision missions (once in six months and interim missions, if and as required).

30. **Staffing and Training for Environmental Management.** Staffing arrangements for environment management in the project are given below.

31. At PMU, an Environmental Specialist will be deployed to handle all matters pertaining to environmental management in the project, including activities related to project planning and preparation, supervision, monitoring, evaluation, reporting, documentation, training and over-all co-ordination with the concerned PIU. This specialist will also deal with matters pertaining to

training and capacity building; regulatory clearances; integration of ESMF into project design and contract documents; preparation of ToRs for studies (such as for EA); co-ordination with the participating SDMAs and; over-all monitoring and supervision of environmental activities in the project.

32. At the state level, an Environment Specialist (ES) will be appointed as part of the PIU's team, whose main responsibilities will include co-ordination with Department of Environment and Forest (DoEF)/other state agencies to obtain regulatory clearances and regular supervision, monitoring and co-ordination of environmental aspects related to pre-construction, construction and operation stages of the concerned sub-project. The state level ES shall also be responsible for data collation and documentation on environmental aspects of the sub-projects in the state.

33. During implementation, a TPQA would audit implementation of the works in accordance environmental, health and safety management provisions set out in the respective contracts. The contractor would be responsible for planning, executing and coordinating the implementation of the ESMF provisions as laid out in the contract documents; overseen by the line department staff.

34. **Capacity Building for Environmental Management.** A detailed training plan will be prepared incorporating the short (project specific) and longer term capacity building needs of the PIUs and NDMA. The plan will consist of different training modules specific to the needs of various target groups. An outline of this plan has already been provided in the ESMF. The capacity enhancement initiative also includes provision for induction modules to take care of staff turn over issues during the course of the project.

**Annex 11: Project Preparation and Supervision
INDIA: National Cyclone Risk Mitigation Project (I)**

	Planned	Actual
PCN review	11/30/2004	12/14/2004
Initial PID to PIC		12/16/2004
Initial ISDS to PIC		01/19/2005
Appraisal	12/15/2009	12/23/2009
Negotiations	02/02/2010	05/17/2010
Board/RVP approval	06/24/2010	
Planned date of effectiveness	07/01/2010	
Planned date of mid-term review	12/17/2012	
Planned closing date	10/31/2015	

Key institutions responsible for preparation of the project:

Recipient:

Government of India,
Ministry of Finance, New Delhi

Responsible Agency:

National Disaster Management Authority
NDMA Bhawan, A-1, Safdarjung Enclave
New Delhi
India

Bank staff and consultants who worked on the project included:

Name	Title	Unit
N.V.V. Raghava	Task Team Leader	SASDU
Christoph Pusch	Task Team Leader	SASDU
Deepak Singh	Infrastructure Specialist	SASDU
Saurabh Suresh Dani	Disaster Management Specialist	SASDU
Debabrata Chakraborti	Sr. Procurement Specialist	SARPS
Tanuj Mathur	Sr. Fin. Mgt. Specialist	SARFM
Neha (Vyas) Mishra	Environmental Specialist	SASDI
Venkata Rao Bayana	Social Dev. Specialist	SASDI
Sonia Chand Sandhu	Sr. Environmental Specialist	SASDI
Da Zhu	Senior Economist	SASDU
Kishore Uprety	Senior Counsel	LEGES
Anil Das	Consultant	SASDU
Ranu Sinha	Operations Analyst	SASDI
Saroj Kumar Jha	Peer Reviewer	GFDRR
Francis Ghesquiere	Peer Reviewer	LCSUW
Niels B. Holm-Nielsen	Peer Reviewer	LCSUW
Javier Zuleta	Peer Reviewer	SASDA
Richard Andrews	Peer Reviewer	SASDU
Mamata Baruah	Program Assistant	SASDU
Lilian MacArthur	Program Assistant	SASDU

Bank funds expended to date on project preparation:

1. Bank resources: US\$425,000
2. DFID Trust Funds: US\$63,000
3. GFDRR Trust funds: US\$120,000
4. Total:US\$608,000.00

Annex 12: Documents in the Project File
INDIA: National Cyclone Risk Mitigation Project (I)

1. Disaster Management Act of Government of India
2. Proceedings of the Workshop on EWSs in Hyderabad, and in Bhubaneswar
3. Tool Kits for Investment Proposals and DPRs
4. Note on National Disaster Communication Network of NDMA
5. Note on Capacity Augmentation of IMD
6. NDMA's National Disaster Management Guidelines – Management of Cyclones

Annex 13: Statement of Loans and Credits
INDIA: National Cyclone Risk Mitigation Project (I)

Project ID	FY	Purpose	Original Amount in US\$ Millions					Difference between expected and actual disbursements		
			IBRD	IDA	SF	GEF	Cancel.	Undisb.	Orig.	Frm. Rev'd
P096021	2010	AP Road Sector Project	320.00	0.00	0.00	0.00	0.00	304.20	-15.00	0.00
P101650	2010	A. P. RWSS	0.00	150.00	0.00	0.00	0.00	131.23	-15.00	0.00
P102549	2010	Tech Engr Educ Quality Improvement II	0.00	300.00	0.00	0.00	0.00	286.00	10.00	0.00
P102771	2010	IIFCL - India Infrs Finance Company Ltd	1,195.00	0.00	0.00	0.00	0.00	1,192.01	0.00	0.00
P110051	2010	Haryana Power System Improv Project	330.00	0.00	0.00	0.00	0.00	302.21	-26.97	0.00
P110371	2010	Sustainable Urban Transport Project	105.23	0.00	0.00	0.00	0.00	104.97	0.00	0.00
P071250	2010	Andhra Pradesh Municipal Development	300.00	0.00	0.00	0.00	0.00	279.25	-6.67	0.00
P115566	2010	POWERGRID V	1,000.00	0.00	0.00	0.00	0.00	988.00	-12.00	0.00
P094360	2009	National VBD Control&Polio Eradication	0.00	521.00	0.00	0.00	0.00	404.69	54.35	0.00
P096023	2009	Orissa State Roads	250.00	0.00	0.00	0.00	0.00	235.36	2.82	0.00
P100101	2009	Coal-Fired Generation Rehabilitation	180.00	0.00	0.00	0.00	0.00	179.55	15.00	0.00
P093478	2009	Orissa Rural Livelihoods Project	0.00	82.40	0.00	0.00	0.00	73.46	4.45	0.00
P100735	2009	Orissa Community Tank Management Project	56.00	56.00	0.00	0.00	0.00	103.57	1.63	0.00
P102331	2009	MPDPIP-II	0.00	100.00	0.00	0.00	0.00	87.66	-13.56	0.00
P112033	2009	UP Sodic III	0.00	197.00	0.00	0.00	0.00	189.93	-3.18	0.00
P101653	2008	Power System Development Project IV	1,000.00	0.00	0.00	0.00	0.00	374.68	-131.65	65.01
P102547	2008	Elementary Education (SSA II)	0.00	1,350.00	0.00	0.00	0.00	722.72	-92.06	0.00
P095114	2008	Rampur Hydropower Project	400.00	0.00	0.00	0.00	0.00	290.82	56.82	0.00
P100789	2007	AP Community Tank Management Project	94.50	94.50	0.00	0.00	0.00	170.77	56.41	0.00
P078539	2007	TB II	0.00	170.00	0.00	0.00	0.00	90.69	-13.76	0.00
P096019	2007	HP State Roads Project	220.00	0.00	0.00	0.00	0.00	195.63	64.98	0.00
P083187	2007	Uttaranchal RWSS	0.00	120.00	0.00	0.00	0.00	100.92	65.05	0.00
P099047	2007	Vocational Training India	0.00	280.00	0.00	0.00	0.00	185.44	25.16	0.00
P071160	2007	Karnataka Health Systems	0.00	141.83	0.00	0.00	0.00	67.63	-0.73	0.00
P078538	2007	Third National HIV/AIDS Control Project	0.00	250.00	0.00	0.00	0.07	162.26	137.41	0.00
P090768	2007	TN IAM WARM	335.00	150.00	0.00	0.00	0.00	362.37	122.59	0.00
P090764	2007	Bihar Rural Livelihoods Project	0.00	63.00	0.00	0.00	0.00	47.95	-7.69	0.00
P090592	2007	Punjab Rural Water Supply & Sanitation	0.00	154.00	0.00	0.00	0.00	129.56	102.81	0.00
P090585	2007	Punjab State Roads Project	250.00	0.00	0.00	0.00	0.00	135.79	24.29	0.00
P075060	2007	RCH II	0.00	360.00	0.00	0.00	0.00	208.83	130.65	0.00
P102768	2007	Stren India's Rural Credit Coops	300.00	300.00	0.00	0.00	0.00	223.97	140.16	0.00
P078832	2006	Karnataka Panchayats Strengthening Proj	0.00	120.00	0.00	0.00	0.00	59.59	-47.31	0.00
P079675	2006	Karn Municipal Reform	216.00	0.00	0.00	0.00	0.00	168.05	111.72	0.00
P079708	2006	TN Empwr & Pov Reduction	0.00	120.00	0.00	0.00	0.00	57.66	33.04	0.00
P086414	2006	Power System Development Project III	400.00	0.00	0.00	0.00	0.00	14.72	-45.28	0.00

P092735	2006	NAIP	0.00	200.00	0.00	0.00	0.00	148.13	65.32	0.00
P093720	2006	Mid-Himalayan (HP) Watersheds	0.00	60.00	0.00	0.00	0.00	27.09	8.10	0.00
P083780	2006	TN Urban III	300.00	0.00	0.00	0.00	0.00	164.44	120.19	8.85
P073651	2005	DISEASE SURVEILLANCE	0.00	68.00	0.00	0.00	8.31	40.12	44.42	-0.76
P084632	2005	Hydrology II	104.98	0.00	0.00	0.00	0.00	78.99	73.37	55.27
P073370	2005	Madhya Pradesh Water Sector Restructuring	394.02	0.00	0.00	0.00	6.62	258.61	234.50	0.00
P094513	2005	India Tsunami ERC	0.00	465.00	0.00	0.00	0.00	360.58	358.93	-21.38
P077977	2005	Rural Roads Project	99.50	300.00	0.00	0.00	0.00	54.73	46.19	0.00
P084790	2005	MAHAR WSIP	325.00	0.00	0.00	0.00	0.00	188.73	150.73	0.00
P077856	2005	Lucknow-Muzaffarpur National Highway	620.00	0.00	0.00	0.00	0.00	133.52	100.19	0.00
P086518	2005	SME Financing & Development	520.00	0.00	0.00	0.00	0.00	248.03	-150.97	-34.31
P075058	2005	TN HEALTH SYSTEMS	0.00	228.53	0.00	0.00	20.06	120.50	19.89	-3.00
P084792	2005	Assam Agric Competitiveness	0.00	154.00	0.00	0.00	0.00	56.14	49.11	0.00
P050655	2004	RAJASTHAN HEALTH SYSTEMS DEVELOPMENT	0.00	89.00	0.00	0.00	0.00	32.57	28.69	0.56
P078550	2004	Uttar Wtrshed	0.00	69.62	0.00	0.00	0.00	23.65	2.17	0.00
P082510	2004	Karnataka UWS Improvement Project	39.50	0.00	0.00	0.00	0.00	6.76	6.76	0.00
P071272	2003	AP RURAL POV REDUCTION	0.00	315.03	0.00	0.00	0.00	86.48	-96.21	-31.21
P050649	2003	TN ROADS	398.70	0.00	0.00	0.00	0.00	71.16	20.46	0.00
P067606	2003	UP ROADS	488.00	0.00	0.00	0.00	0.00	66.73	66.73	0.00
P050647	2002	UP WSRP	0.00	149.20	0.00	0.00	40.11	43.39	56.12	0.00
P050653	2002	KARNATAKA RWSS II	0.00	151.60	0.00	0.00	15.04	11.98	-0.19	0.00
P050668	2002	MUMBAI URBAN TRANSPORT PROJECT	463.00	79.00	0.00	0.00	0.00	171.27	159.36	172.36
P040610	2002	RAJ WSRP	0.00	159.00	0.00	0.00	25.84	50.93	20.66	0.00
P069889	2002	MIZORAM ROADS	0.00	78.00	0.00	0.00	0.00	1.28	-28.30	-4.33
P071033	2002	KARN Tank Mgmt	32.00	130.90	0.00	0.00	25.07	107.38	47.01	-4.70
P072539	2002	KERALA STATE TRANSPORT	255.00	0.00	0.00	0.00	0.00	70.73	70.73	0.00
Total:			10,991.43	7,776.61	0.00	0.00	141.12	11,256.06	2,202.44	202.36

INDIA
STATEMENT OF IFC's
Held and Disbursed Portfolio
In Millions of US Dollars

FY Approval	Company	Committed				Disbursed			
		IFC				IFC			
		Loan	Equity	Quasi	Partic.	Loan	Equity	Quasi	Partic.
2005	ADPCL	39.50	7.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	AHEL	0.00	5.08	0.00	0.00	0.00	5.08	0.00	0.00
2005	AP Paper Mills	35.00	5.00	0.00	0.00	25.00	5.00	0.00	0.00
2005	APIDC Biotech	0.00	4.00	0.00	0.00	0.00	2.01	0.00	0.00
2002	ATL	13.81	0.00	0.00	9.36	13.81	0.00	0.00	9.36
2003	ATL	1.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00
2005	ATL	9.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	Atul Ltd	16.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2003	BHF	10.30	0.00	10.30	0.00	10.30	0.00	10.30	0.00
2004	BILT	0.00	0.00	15.00	0.00	0.00	0.00	15.00	0.00
2001	BTVL	0.43	3.98	0.00	0.00	0.43	3.98	0.00	0.00
2003	Balrampur	10.52	0.00	0.00	0.00	10.52	0.00	0.00	0.00
2001	Basix Ltd.	0.00	0.98	0.00	0.00	0.00	0.98	0.00	0.00
2005	Bharat Biotech	0.00	0.00	4.50	0.00	0.00	0.00	3.30	0.00
1984	Bihar Sponge	5.70	0.00	0.00	0.00	5.70	0.00	0.00	0.00
2003	CCIL	1.50	0.00	0.00	0.00	0.59	0.00	0.00	0.00
2006	CCIL	7.00	2.00	0.00	12.40	7.00	2.00	0.00	12.40
1990	CESC	4.61	0.00	0.00	0.00	4.61	0.00	0.00	0.00
1992	CESC	6.55	0.00	0.00	14.59	6.55	0.00	0.00	14.59
2004	CGL	14.38	0.00	0.00	0.00	7.38	0.00	0.00	0.00
2004	CMScomputers	0.00	10.00	2.50	0.00	0.00	0.00	0.00	0.00
2002	COSMO	2.50	0.00	0.00	0.00	2.50	0.00	0.00	0.00
2005	COSMO	0.00	3.73	0.00	0.00	0.00	3.73	0.00	0.00
2006	Chennai Water	24.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2003	DQEL	0.00	1.50	1.50	0.00	0.00	1.50	1.50	0.00
2005	DSCL	30.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00
2006	DSCL	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2005	Dabur	0.00	14.09	0.00	0.00	0.00	14.09	0.00	0.00
2003	Dewan	8.68	0.00	0.00	0.00	8.68	0.00	0.00	0.00
2006	Federal Bank	0.00	28.06	0.00	0.00	0.00	23.99	0.00	0.00
2001	GTF Fact	0.00	1.20	0.00	0.00	0.00	1.20	0.00	0.00
2006	GTF Fact	0.00	0.00	0.99	0.00	0.00	0.00	0.99	0.00
1994	GVK	0.00	4.83	0.00	0.00	0.00	4.83	0.00	0.00
2003	HDFC	100.00	0.00	0.00	100.00	100.00	0.00	0.00	100.00
1998	IAAF	0.00	0.47	0.00	0.00	0.00	0.30	0.00	0.00
2006	IAL	0.00	9.79	0.00	0.00	0.00	7.70	0.00	0.00
1998	IDFC	0.00	10.82	0.00	0.00	0.00	10.82	0.00	0.00
2005	IDFC	50.00	0.00	0.00	100.00	50.00	0.00	0.00	100.00
	IHDC	6.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	IHDC	7.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	Indecomm	0.00	2.57	0.00	0.00	0.00	2.57	0.00	0.00
1996	India Direct Fnd	0.00	1.10	0.00	0.00	0.00	0.66	0.00	0.00
2001	Indian Seamless	6.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00
2006	JK Paper	15.00	7.62	0.00	0.00	0.00	7.38	0.00	0.00
2005	K Mahindra INDIA	22.00	0.00	0.00	0.00	22.00	0.00	0.00	0.00
2005	KPIT	11.00	2.50	0.00	0.00	8.00	2.50	0.00	0.00
2003	L&T	50.00	0.00	0.00	0.00	50.00	0.00	0.00	0.00
2006	LGB	14.21	4.82	0.00	0.00	0.00	4.82	0.00	0.00
2006	Lok Fund	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
2002	MMFSL	7.89	0.00	7.51	0.00	7.89	0.00	7.51	0.00
2003	MSSL	0.00	2.29	0.00	0.00	0.00	2.20	0.00	0.00
2001	MahInfra	0.00	10.00	0.00	0.00	0.00	0.79	0.00	0.00
	Montalvo	0.00	3.00	0.00	0.00	0.00	1.08	0.00	0.00
1996	Moser Baer	0.00	0.82	0.00	0.00	0.00	0.82	0.00	0.00
1999	Moser Baer	0.00	8.74	0.00	0.00	0.00	8.74	0.00	0.00
2000	Moser Baer	12.75	10.54	0.00	0.00	12.75	10.54	0.00	0.00
	Nevis	0.00	4.00	0.00	0.00	0.00	4.00	0.00	0.00

2003	NewPath	0.00	9.31	0.00	0.00	0.00	8.31	0.00	0.00
2004	NewPath	0.00	2.79	0.00	0.00	0.00	2.49	0.00	0.00
2003	Niko Resources	24.44	0.00	0.00	0.00	24.44	0.00	0.00	0.00
2001	Orchid	0.00	0.73	0.00	0.00	0.00	0.73	0.00	0.00
1997	Owens Corning	5.92	0.00	0.00	0.00	5.92	0.00	0.00	0.00
2006	PSL Limited	15.00	4.74	0.00	0.00	0.00	4.54	0.00	0.00
2004	Powerlinks	72.98	0.00	0.00	0.00	64.16	0.00	0.00	0.00
2004	RAK India	20.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
1995	Rain Calcining	0.00	2.29	0.00	0.00	0.00	2.29	0.00	0.00
2004	Rain Calcining	10.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00
2005	Ramky	3.74	10.28	0.00	0.00	0.00	0.00	0.00	0.00
2005	Ruchi Soya	0.00	9.27	0.00	0.00	0.00	6.77	0.00	0.00
2001	SBI	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1997	SREI	3.21	0.00	0.00	0.00	3.21	0.00	0.00	0.00
2000	SREI	6.50	0.00	0.00	0.00	6.50	0.00	0.00	0.00
1995	Sara Fund	0.00	3.43	0.00	0.00	0.00	3.43	0.00	0.00
2004	SeaLion	4.40	0.00	0.00	0.00	4.40	0.00	0.00	0.00
2001	Spryance	0.00	1.86	0.00	0.00	0.00	1.86	0.00	0.00
2003	Spryance	0.00	0.93	0.00	0.00	0.00	0.93	0.00	0.00
2004	Sundaram Finance	42.93	0.00	0.00	0.00	42.93	0.00	0.00	0.00
2000	Sundaram Home	0.00	2.18	0.00	0.00	0.00	2.18	0.00	0.00
2002	Sundaram Home	6.71	0.00	0.00	0.00	6.71	0.00	0.00	0.00
1998	TCW/ICICI	0.00	0.80	0.00	0.00	0.00	0.80	0.00	0.00
2005	TISCO	100.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00
2004	UPL	15.45	0.00	0.00	0.00	15.45	0.00	0.00	0.00
1996	United Riceland	5.63	0.00	0.00	0.00	5.63	0.00	0.00	0.00
2005	United Riceland	8.50	0.00	0.00	0.00	5.00	0.00	0.00	0.00
2002	Usha Martin	0.00	0.72	0.00	0.00	0.00	0.72	0.00	0.00
2001	Vysya Bank	0.00	3.66	0.00	0.00	0.00	3.66	0.00	0.00
2005	Vysya Bank	0.00	3.51	0.00	0.00	0.00	3.51	0.00	0.00
1997	WIV	0.00	0.37	0.00	0.00	0.00	0.37	0.00	0.00
1997	Walden-Mgt India	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00
2006	iLabs Fund II	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00
Total portfolio:		956.52	249.41	42.30	536.35	604.74	175.91	38.60	236.35

FY Approval	Company	Approvals Pending Commitment			
		Loan	Equity	Quasi	Partic.
2004	CGL	0.01	0.00	0.00	0.00
2000	APCL	0.01	0.00	0.00	0.00
2006	Atul Ltd	0.00	0.01	0.00	0.00
2001	Vysya Bank	0.00	0.00	0.00	0.00
2006	Federal Bank	0.01	0.00	0.00	0.00
2001	GI Wind Farms	0.01	0.00	0.00	0.00
2004	Ocean Sparkle	0.00	0.00	0.00	0.00
2005	Allain Duhangan	0.00	0.00	0.00	0.00
Total pending commitment:		0.04	0.01	0.00	0.00

Annex 14: Country at a Glance

INDIA: National Cyclone Risk Mitigation Project (I)

India at a glance

12/9/09

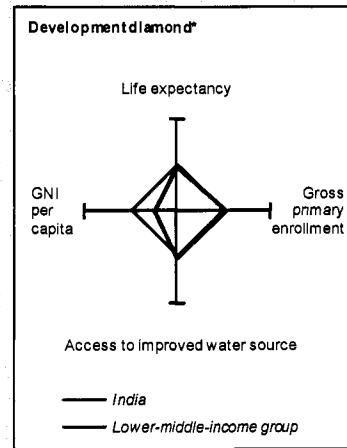
POVERTY and SOCIAL	India	South Asia	Lower-middle-income
2008			
Population, mid-year (millions)	1,400.0	1,543	3,702
GNI per capita (Atlas method, US\$)	1,040	986	2,078
GNI (Atlas method, US\$ billions)	1,866.7	1,522	7,692

Average annual growth, 2002-08

	India	South Asia	Lower-middle-income
Population (%)	14	15	12
Labor force (%)	19	2.2	16

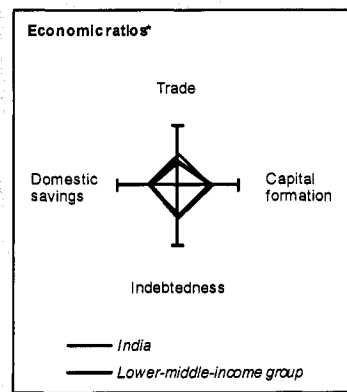
Most recent estimate (latest year available, 2002-08)

	India	South Asia	Lower-middle-income
Poverty (% of population below national poverty line)	..	..	..
Urban population (% of total population)	29	30	41
Life expectancy at birth (years)	64	65	68
Infant mortality (per 1,000 live births)	52	59	46
Child malnutrition (% of children under 5)	44	41	26
Access to an improved water source (% of population)	89	87	86
Literacy (% of population age 15+)	66	63	83
Gross primary enrollment (% of school-age population)	113	108	109
Male	115	111	112
Female	111	104	106



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

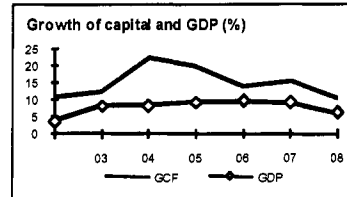
	1988	1998	2007	2008
GDP (US\$ billions)	293.1	416.3	1,176.9	1,592
Gross capital formation/GDP	23.6	22.6	38.7	39.7
Exports of goods and services/GDP	6.1	11.2	21.2	22.7
Gross domestic savings/GDP	22.2	21.0	35.2	34.3
Gross national savings/GDP	22.0	22.6	38.1	37.6
Current account balance/GDP	-2.9	-1.0	-1.5	-2.6
Interest payments/GDP	1.0	1.2	0.6	0.6
Total debt/GDP	21.0	23.7	17.4	19.9
Total debt service/exports	28.8	20.5	13.0	9.0
Present value of debt/GDP	..	..	..	17.5
Present value of debt/exports	..	..	..	58.5



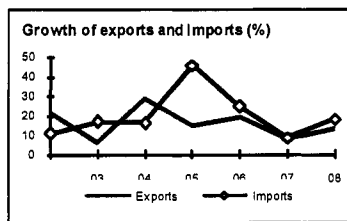
	1988-98	1998-08	2007	2008	2008-12
(average annual growth)					
GDP	5.5	7.2	9.1	6.1	7.3
GDP per capita	3.5	5.6	7.6	4.7	5.3
Exports of goods and services	11.6	15.2	7.5	12.8	5.6

STRUCTURE of the ECONOMY

	1988	1998	2007	2008
(% of GDP)				
Agriculture	30.5	26.0	18.1	17.5
Industry	26.2	26.1	29.5	28.8
Manufacturing	16.2	15.5	16.3	15.8
Services	43.4	47.9	52.4	53.7
Household final consumption expenditure	65.8	66.7	54.7	54.1
General gov't final consumption expenditure	12.0	12.3	10.1	11.6
Imports of goods and services	7.5	12.8	24.7	28.0



	1988-98	1998-08	2007	2008
(average annual growth)				
Agriculture	3.1	2.7	4.9	1.6
Industry	6.1	7.6	8.1	3.9
Manufacturing	6.6	7.2	8.2	2.4
Services	7.0	8.9	10.9	9.7
Household final consumption expenditure	5.6	6.0	6.0	3.6
General gov't final consumption expenditure	4.9	4.5	8.4	20.2
Gross capital formation	6.4	12.6	15.6	10.7
Imports of goods and services	13.6	15.1	8.6	17.9



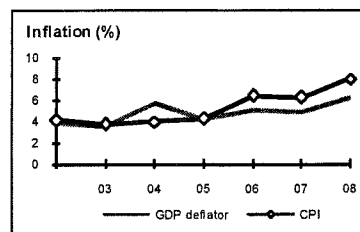
Note: 2008 data are preliminary estimates.

This table was produced from the Development Economics LDB database.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

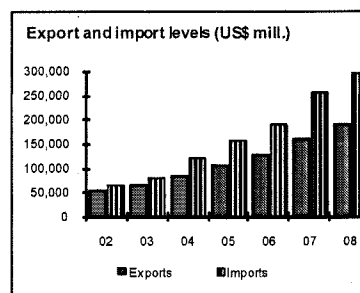
PRICES and GOVERNMENT FINANCE

	1988	1998	2007	2008
Domestic prices (% change)				
Consumer prices	11.2	13.1	6.2	8.0
Implicit GDP deflator	8.2	8.0	4.9	6.2
Government finance (% of GDP, includes current grants)				
Current revenue	19.0	..	21.9	20.9
Current budget balance	-2.8	..	-3.2	-7.6
Overall surplus/deficit	..	..	-6.0	-9.6



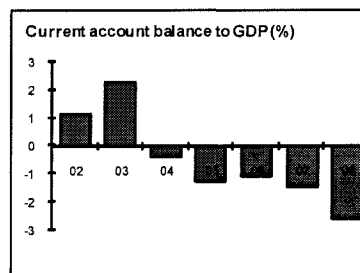
TRADE

	1988	1998	2007	2008
<i>(US\$ millions)</i>				
Total exports (fob)	14,257	33,219	159,007	190,000
Tea	435	1,038	1,703	..
Iron	825	893	9,005	..
Manufactures	10,110	25,792	102,943	108,281
Total imports (cif)	23,618	47,544	257,789	296,614
Food	1,304	2,524	4,575	..
Fuel and energy	3,009	6,399	79,641	..
Capital goods	4,803	10,064	58,393	71,237
Export price index (2000=100)	..	..	152	161
Import price index (2000=100)	..	..	162	182
Terms of trade (2000=100)	..	..	93	89



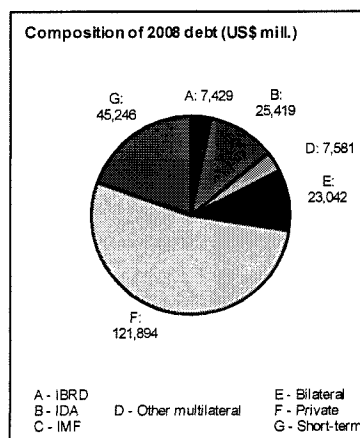
BALANCE of PAYMENTS

	1988	1998	2007	2008
<i>(US\$ millions)</i>				
Exports of goods and services	18,210	47,484	256,240	276,408
Imports of goods and services	26,842	58,565	310,301	345,993
Resource balance	-8,632	-11,081	-54,061	-69,585
Net income	-2,519	-3,544	-4,917	-4,511
Net current transfers	2,652	10,280	41,944	44,279
Current account balance	-8,499	-4,345	-17,273	-30,049
Financing items (net)	7,495	8,174	10,437	9,969
Changes in net reserves	1,004	-3,829	-92,164	20,080
Memo:				
Reserves including gold (US\$ millions)	4,802	32,490	309,287	351,259
Conversion rate (DEC, local/US\$)	14.5	42.1	40.1	45.9



EXTERNAL DEBT and RESOURCE FLOWS

	1988	1998	2007	2008
<i>(US\$ millions)</i>				
Total debt outstanding and disbursed	61,659	98,774	204,992	230,611
IBRD	5,590	7,991	6,680	7,429
IDA	12,186	18,562	25,378	25,419
Total debt service	6,055	12,039	39,036	31,076
IBRD	777	1,377	702	703
IDA	179	423	894	970
Composition of net resource flows				
Official grants	700	490	1,145	1,169
Official creditors	2,661	948	2,565	3,539
Private creditors	5,679	3,187	29,798	11,782
Foreign direct investment (net inflows)	91	2,635	25,127	41,169
Portfolio equity (net inflows)	0	-601	34,986	-15,030
World Bank program				
Commitments	2,648	1,755	3,309	1,200
Disbursements	2,478	1,399	1,805	2,083
Principal repayments	383	1,129	1,050	1,169
Net flows	2,095	270	754	924
Interest payments	573	671	546	514
Net transfers	1,522	-401	208	410



Note: This table was produced from the Development Economics LDB database.

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MAP SECTION

