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IDA/R2015-0119/1

May 8, 2015

Closing Date: Thursday, May 28, 2015 at 6 p.m.

FROM: The Corporate Secretary

India - National Cyclone Risk Mitigation Project - Phase II

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed credit to India for a National Cyclone Risk Mitigation Project - Phase II (IDA/R2015-0119), which is being processed on an absence-of-objection basis.

Distribution:

Executive Directors and Alternates
President
Bank Group Senior Management
Vice Presidents, Bank, IFC and MIGA
Directors and Department Heads, Bank, IFC and MIGA

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The World Bank

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Report No: PAD952

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF

US$308.4 MILLION
SDR 219.3 MILLION, ESTIMATE

TO

INDIA

FOR A

NATIONAL CYCLONE RISK MITIGATION PROJECT - PHASE II

May 7, 2015

Social, Urban, Rural and Resilience (SURR) Global Practice
India Country Management Unit
South Asia Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective April 29, 2015)
Currency Unit = Indian Rupees (INR)
INR63.19 = US$1
FISCAL YEAR
April 1 – March 31

ABBREVIATIONS AND ACRONYMS

AP	Andhra Pradesh	GoKa	Government of Karnataka
APL	Adaptable Program Loan	GoKe	Government of Kerala
B/C	Benefit Cost	GoM	Government of Maharashtra
BME	Benefit Monitoring and Evaluation	GoWB	Government of West Bengal
CAAA	Controller Aid, Account and Audit	GSDMA	Gujarat State Disaster Management Authority
C&AG	Comptroller of Auditor General	IA	Implementing Agency
CAPRA	Comprehensive Approach to Probabilistic Risk Assessment	IDA	International Development Association
CBO	Community Based Organization	IEC	Information Education and Communication
CDMA	Code Division Multiple Access	IUFR	Interim Unaudited Financial Reports
CSM&MC	Cyclone Shelter Management and Maintenance Committee	IMD	India Meteorological Department
DGVCL	Dakshin (South) Gujarat Vij Company Ltd.	IBRD	International Bank for Reconstruction and Development
DMA	Disaster Management Authority	ICB	International Competitive Bidding
DPR	Detailed Project Report	INCOIS	Indian National Centre for Ocean Information Services
DRM	Disaster Risk Management	IST	Implementation Support Team
DGVCL	Dakshin (South) Gujarat Vij Company Ltd.	LD	Line Departments
DMA	Disaster Management Authority	MDRR	Maharashtra Department of Relief and Rehabilitation
ESMF	Environment and Social Management Framework	MHA	Ministry of Home Affairs
EWDS	Early Warning Dissemination System	MI	Minor Irrigation
FM	Financial Management	MPCS	Multi-Purpose Cyclone Shelter
FMM	Financial Management Manual	MSEDCL	Maharashtra State Electricity Distribution Company Ltd.
GDP	Gross Domestic Product	NCB	National Competitive Bidding
GFDRR	Global Facility for Disaster Reduction and Recovery	NDMA	National Disaster Management Authority
GIS	Geographic Information System	NIDM	National Institute of Disaster Management
GOI	Government of India	O&M	Operation and Management
GoG	Government of Goa	PSC	Project Steering Committee
GoGu	Government of Gujarat	PFS	Project Financial Statements

PGVCL	Paschim (West) Gujarat Vij Company Ltd.	SPMU	State Project Management Unit
PIU	Project Implementation Unit	SRRD	State Relief and Rehabilitation Department
PMC	Project Management Consultants	SSC	State Steering Committee
PMU	Project Management Unit	ST	Scheduled Tribe
PWD	Public Works Department	TPQC	Third Party Quality Consultant
RAP	Resettlement Action Plan	UNDP	United Nations Development Program
R&DMD	Department of Revenue and Disaster Management	UT	Union Territory
SBD	Standard Bidding Document	VHF	Very High Frequency
SDMA	State Disaster Management Authority	WBDDM	West Bengal Department of Disaster Management
SPIU	State Project Implementation Unit	WRD	Water Resource Department

Regional Vice President:	Annette Dixon
Country Director:	Onno Ruhl
Senior Global Practice Director:	Ede Jorge Ijjaz-Vasquez
Practice Manager:	Bernice K. Van Bronkhorst
Task Team Leader:	Saurabh Suresh Dani
Co-Task Team Leader:	Deepak Singh

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National Cyclone Risk Mitigation Project-II

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National Cyclone Risk Mitigation Project-II (P144726)

PROJECT APPRAISAL DOCUMENT

SOUTH ASIA

0000009081

Report No.: PAD952

Basic Information		
Project ID P144726	EA Category A - Full Assessment	Team Leader(s) Saurabh Suresh Dani
Lending Instrument Adaptable Program Loan	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [X]	
Project Implementation Start Date 01-Jun-2015	Project Implementation End Date 15-Mar-2021	
Expected Effectiveness Date 31-Jul-2015	Expected Closing Date 15-Mar-2021	
Joint IFC No		

Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Bernice K. Van Bronkhorst	Ede Jorge Ijjasz-Vasquez	Onno Ruhl	Annette Dixon

Borrower: Department of Economic Affairs			
Responsible Agency: National Disaster Management Agency			
Contact : Mr. S. P. Vasudeva		Title: Project Director	
Telephone: 011-26701791		Email:spvasudeva@gmail.com	
Responsible Agency: Goa: Water Resources Department			
Contact:	Mr. R K Srivastava	Title:	Principal Secretary
Telephone No.:	0832-2419439	Email:	rk-srivastava@nic.in
Responsible Agency: Gujarat: Gujarat State Disaster Management Authority			
Contact:	Ms. Anju Sharma	Title:	Chief Executive Officer
Telephone No.:	079-23259276	Email:	ceo@gsdma.org

Responsible Agency: Karnataka: Department of Revenue and Disaster Management			
Contact:	Mr. Ritesh Kumar Singh	Title:	Secretary
Telephone No.:	080-22251958	Email:	Secy.dm@gmail.com
Responsible Agency: Kerala: Department of Revenue and Disaster Management			
Contact:	Dr. Vishwas Mehta	Title:	Principal Secretary
Telephone No.:	0471-2518549	Email:	revenuedmdk@gmail.com
Responsible Agency: Maharashtra: Department of Relief and Rehabilitation			
Contact:	Mr. K H Govinda Raj	Title:	Secretary
Telephone No.:	022-22025274	Email:	Sec.rnr@maharashtra.gov.in
Responsible Agency: West Bengal: Department of Disaster Management			
Contact:	Mr. S. Suresh Kumar	Title:	Principal Secretary
Telephone No.:	033-22143674	Email:	secrelief@wb.gov.in

Project Financing Data(in USD Million)

[ ]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[X]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	387.00	Total Bank Financing:	308.40
Financing Gap:	0.00		

Financing Source	Amount
BORROWER/RECIPIENT	78.60
International Development Association (IDA)	308.40
Total	387.00

Expected Disbursements (in USD Million)

Fiscal Year	2015	2016	2017	2018	2019	2020	2021
Annual	0.00	35.00	40.00	60.00	65.00	70.00	38.40
Cumulative	0.00	35.00	75.00	135.00	200.00	270.00	308.40

Institutional Data

Practice Area (Lead)

Social, Urban, Rural and Resilience Global Practice

Contributing Practice Areas

Cross Cutting Topics

[X] Climate Change

[ ] Fragile, Conflict & Violence

[X] Gender

[ ] Jobs

[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Water, sanitation and flood protection	Flood protection	50	80	
Transportation	Rural and Inter-Urban Roads and Highways	40	50	
Information and communications	Telecommunications	10	20	
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Social protection and risk management	Natural disaster management	50
Environment and natural resources management	Climate change	20
Rural development	Rural services and infrastructure	20
Social protection and risk management	Social Protection and Labor Policy & Systems	10
Total		100

Proposed Development Objective(s)

The Project Development Objective is to reduce vulnerability to cyclone and other hydro-meteorological hazards of coastal communities in project States, and increase the capacity of the State entities to effectively plan for and respond to disasters.

Components

Component Name	**Cost (USD Millions)**
Early Warning Dissemination Systems	18.10
Cyclone Risk Mitigation Infrastructure	314.80
Technical Assistance for Multi-Hazard Risk Management	29.50
Project Management and Implementation Support	24.60

Systematic Operations Risk- Rating Tool (SORT)	
Risk Category	**Rating**
1. Political and Governance	Moderate
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Moderate
8. Stakeholders	Substantial
9. Other	
OVERALL	Moderate

Compliance		
Policy		
Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]
Does the project require any waivers of Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No [ ]

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

Legal Covenants			
Name:	**Recurrent**	**Due Date**	**Frequency**
Implementation Units – I (PSC & PMU)	Yes	N/A	Project duration
Description of Covenant			
The Recipient to: (i) vest overall responsibility for Project implementation in MHA acting through NDMA; and (ii) maintain a Project Steering Committee (for policy guidance) and a Project Management Unit for day-to-day implementation of the Recipient's respective parts of the Project.			
Name:	**Recurrent**	**Due Date**	**Frequency**
Implementation Units –II (SPSCs & SPIUs)	Yes	Three (3) months after Effectiveness	Project duration
Description of Covenant			
The PIEs to establish/maintain State Project Steering Committees (for policy guidance) and State Project Implementation Units for day-to-day implementation of their respective activities under the Project.			
Name:	**Recurrent**	**Due Date**	**Frequency**
Quality Audit Consultant	Yes	Six (6) months after Effectiveness	Project duration
Description of Covenant			
The PIEs to hire and retain the services of a quality consultant to carry out monitoring and supervision activities on contractor's performance, the quality of goods and works procured, and compliance with the Safeguards Documents.			
Name:	**Recurrent**	**Due Date**	**Frequency**
Project Documents	Yes	N/A	Project duration
Description of Covenant			
The Recipient and the PIEs to implement the Project in accordance with the Operations Manual, Safeguards Documents, FM Manual, and Procurement Manual and shall refrain from amending, suspending, waiving and/or voiding any of those documents without the prior concurrence of the Association.			
Name:	**Recurrent**	**Due Date**	**Frequency**
Safeguards	Yes	N/A	Project duration
Description of Covenant			
The Recipient and the PIEs shall carry out their respective parts of the Project in accordance with the various safeguard documents, i.e. ESMF, EMPs and RAPs and refrain from taking any action which would prevent or interfere with their implementation.			
Name:	**Recurrent**	**Due Date**	**Frequency**
Screening of Activities-Government Permits/Clearances and Social and Environmental Documents	Yes	Prior to commencing of activities/civil works	Project duration
Description of Covenant			
The PIEs to ensure that, prior to commencement of any activities under the Project, (i) the activities have been screened as per the ESMF; (ii) the necessary EMP(s) and/or RAP(s) have been prepared and			

disclosed (for 30 days prior to the contract award); (iii) all relevant government permits/clearances obtained, and/or any conditions imposed have been fulfilled/met; and (iv) all resettlement measures identified have been properly implemented (including full payment of any resettlement compensation).

Name:	Recurrent	Due Date	Frequency
Contractor's Safeguard Obligations	Yes	N/A	N/A

Description of Covenant

The PIEs shall include compliance with the Safeguard Documents as part of the contractors' obligations pursuant to the bidding documents.

Name:	Recurrent	Due Date	Frequency
Safeguard Reporting & Monitoring	Yes	N/A	Project duration

Description of Covenant

The PIEs shall maintain monitoring and evaluation protocols and record keeping procedures to supervise and assess compliance with Safeguard Documents; and to report on an ongoing basis, on compliance with Safeguard Documents.

Name:	Recurrent	Due Date	Frequency
Ineligible Expenditures	Yes	N/A	Project duration

Description of Covenant

The PIEs to pay any land purchase/acquisition, and resettlement compensation payments out of its own resources.

Name:	Recurrent	Due Date	Frequency
Underground Cabling	Yes	N/A	Project duration

Description of Covenant

For the States of Maharashtra, Gujarat and West Bengal to enter into written agreements with their respective Power Utilities responsible for the carrying out of the replacement of overhead power lines with underground cables; such agreements to require that the Utilities comply with all the fiduciary and safeguard standards, procedures and requirements set out in the legal agreements, project documents, the relevant guidelines, and the General Conditions.

Conditions

Source Of Fund	Name	Type
Credit	NDMA's Legislation	Add. Event of Suspension

Description of Condition

NDMA's Legislation not to be amended, suspended, abrogated, repealed or waived so as to affect adversely and materially the ability of NDMA to perform its obligations under the project.

Team Composition

Bank Staff

Name	Role	Title	Unit
Saurabh Suresh Dani	Team Leader (ADM Responsible)	Senior Disaster Risk Management Specialist	GSURR

Deepak Singh	Team Member	Senior Disaster Risk Management Specialist	GSURR
Jurminla Jurminla	Procurement Specialist	Procurement Specialist	GGODR
Tripti Chopra	Financial Management Specialist	Financial Management Specialist	GGODR
Martin M. Serrano	Counsel	Senior Counsel	LEGES
Venkata Rao Bayana	Safeguards Specialist	Consultant	GSURR
Muthukumara S. Mani	Team Member	Lead Economist	SARCE
Neha Pravash Kumar Mishra	Safeguards Specialist	Senior Environmental Specialist	GENDR
Sangeeta Kumari	Gender Specialist	Senior Social Development Specialist	GSURR
Mehul Jain	Team Member	E T Consultant	GENDR
Augustin Maria	Peer Reviewer	Sr Urban Spec.	GSURR
Christoph Pusch	Peer Reviewer	Lead Disaster Risk Management Specialist	GSURR
Sameer Akbar	Peer Reviewer	Senior Environmental Specialist	GCCPT
Michel Matera	Peer Reviewer	Senior Disaster Risk Management Specialist	GSURR
Vidya Mahesh	Team Member	Program Assistant	SACIN
Ignacio M. Urrutia	Team Member	E T Consultant	GSURR
Latha Sridhar	Team Member	Program Assistant	SACIN

Extended Team

Name	Title	Office Phone	Location
Alok Pattanaik	Consultant, Disaster Risk Management		New Delhi, India
Dasarathi Mandayam Annadorai	Consultant, Underground Electrical Cabling		New Delhi, India
Malini Nambiar	Consultant, Disaster Management Specialist		New Delhi, India
Peeyush Sekhsaria	Consultant, Operations Support		New Delhi, India
Prabir Joardar	Consultant, Embankments Specialist		New Delhi, India
S.V. Anil Das	Consultant, Disaster Risk Management		New Delhi, India
Sushenjit Bandyopadhyay	Economist		Washington, DC

Locations					
Country	**First Administrative Division**	**Location**	**Planned**	**Actual**	**Comments**
India	Goa	Goa		**X**	
India	Gujarat	Gujarat		**X**	
India	Karnataka	Karnataka		**X**	
India	Kerala	Kerala		**X**	
India	Maharashtra	Maharashtra		**X**	
India	West Bengal	West Bengal		**X**	

Consultants (Will be disclosed in the Monthly Operational Summary)	
Consultants	Consulting services to be determined

I. STRATEGIC CONTEXT

A. Country Context

1. India is the second most populated countries in the world with over one billion people and is vulnerable to a wide range of natural hazards particularly cyclones, floods, earthquakes, drought and landslides. The Global Climate Change and Vulnerability Index 2011, ranked India second in 'extreme risk' countries in the world[1] vulnerable to natural and climate change hazards. As storm surges and climate change induced sea level rise become more pronounced, hazard events are set to grow in frequency and intensity. Economic losses due to disaster are also on the rise both from an increase in the number of disaster events and from an increase in the average loss associated with each disaster event, coupled with a greater concentration of exposed assets.

2. India's level of poverty, rapid urban infrastructure growth, high population density, and limited community awareness, further increases the vulnerability of its people to the impacts of natural hazards and climate change. New residents, urban poor living in peri-urban areas, and informal settlements concentrated in high risk zones are particularly vulnerable to natural hazards due to lack of adequate infrastructure, insufficient enforcement of building codes, a near absence of financial and insurance mechanisms that help transfer risk, and limited access to basic emergency services. It is estimated that around 200 million city dwellers in India will be exposed to storms and earthquakes by 2050 (World Bank and United Nations 2010)[2].

3. In the past decade, the Government of India (GoI) has shifted from a reactive emergency response to being proactive in implementing disaster preparedness and risk reduction initiatives. This change has led to an increased focus towards future oriented risk mitigation programs and strategies aimed at ultimately benefitting millions of people vulnerable to natural disaster risks at the national, state and district - including village - level. Recent events illustrate the benefits of this approach.

4. On October 12 2013, Cyclone Phailin hit the states of Odisha and Andhra Pradesh with wind gusts up to 220km. per hour, heavy rains measuring up to 25cm. and storm surge over 3m; the sea pushed in as much as 40m along parts of the coast. It was the strongest cyclone to hit the Indian coast in the past 14 years: a category 4 cyclone similar to the Super Cyclone 05B of 1999 to hit Odisha which killed more than 10,000 people, destroyed 275,000 homes and left 1.67 million homeless. The cyclone hit a densely populated area, with 4.5 million people within the hurricane force wind path and significant informal housing.

5. Reports however came of a death toll of 44, 0.5 percent that of the 1999 cyclone. The ongoing NCRMP-I, and the Odisha Cyclone Reconstruction Project that closed in the year 2004, contributed to this enhanced resilience through: a) improved communication systems; b) construction of multi-purpose cyclone shelters and evacuation routes; c) enhancing response capacity of the local communities; and d) strengthen disaster risk management at the center. Before cyclone Phailin made landfall, the state governments, in collaboration with the National Disaster

[1] Maplecroft's Climate Change Risk Atlas, 2011. Available at http://maplecroft.com/about/news/ccvi.html.
[2] Natural Hazards and Unnatural Disasters: The Economics of Effective Prevention – Overview (2010) World Bank & United Nations, 2010. Available at http://www.gfdrr.org/sites/gfdrr.org/files/nhud/files/NHUD-Overview.pdf

Management Agency (NDMA) evacuated over 1 million people from low-lying coastal areas in the states of Odisha and Andhra Pradesh, the largest such operation in India's history.

NCRMP II Focus States

6. The NCRMP is structured in phases, based on the risk levels of the states and their implementation readiness. Phase I, under implementation since 2010, includes the states of Odisha and Andhra Pradesh, and in Phase II the states of Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal are being included. Following is a short description of the states:

7. **Goa**. The state has a total area of 3,702 km^2, divided in two administrative districts, and a total population of 1,457,000 as per 2011 census. Goa has a coastline of 105km with seven of its twelve *talukas* having a proximity to the sea. Goa has also a floating population of about 1,500,000 as the state is a famous international tourist destination. Though Goa has experienced only two cyclones in the last 75 years, its risk level is driven by high levels of exposure with concentration of population (around 60%) and assets (particularly tourism infrastructure) along the coastline. Goa also has about 20,000 ha of Khazan lands, which are below the mean sea level, and are protected by 420 km of bunds.

8. **Gujarat.** The State has the largest share (1,600km, 23%) of the total Indian coastline. Its coast has a high diversity of terrain, shelf depths and hydrology, with some extremely flat and low lying sections. The highest tidal ranges in the Indian coast are witnessed in the Gulf of Khambat (up to 8m). These characteristics can amplify storm surges and impact wide stretches unlike many other coastal regions of India. Two cyclone seasons are experienced in Gujarat: March to July (advancing southwestern monsoon) and September to November (retreating monsoon). The state has a large number of key ports and coastal settlements and it serves as gateway for importing petroleum, gas and other bulk goods to North India. About 90,000 houses, spread over 1,300 settlements, are vulnerable to severe damages.

9. **Karnataka.** The state has a total area of 191,791 km2. The total coast length is 320km, along which there is one major port, the New Mangalore Port Trust, and more than 10 medium and small ones. The three coastal districts (Uttar Kannada, Udupi, and Dakshina Kannada) have a total population of about 5 million. Of these, the people at highest risk (the ones 5km from the coastline) are about 2.8 million, of which close to 40% are below the poverty line. The state falls under moderate and low risk zones for cyclones, however it has experienced floods related to low pressure systems and cyclonic circulation over the Bay of Bengal and Arabian Sea. The last major hydro-meteorological event, in 2009, affected more than 4,000 houses causing major damage.

10. **Kerala.** The state has a geographical area of 38,863 km^2. It lies between the Arabian Sea on the west and the Western Ghats on the east. Kerala's coast runs 580km in length, while the state itself varies between 35km –120km in width. Kerala receives an average annual rainfall of 3,100mm mostly through seasonal monsoons and averages 120–140 rainy days per year. The excessive rainfall that the state receives every season, including from tropical cyclones, makes it prone to severe landslides, flooding and coastal erosion. The density of coastal urban population is 4,228 persons per km^2, nearly twice the average urban density in the state. Continuous occurrence of high intensity rainfall for a few days is the primary factor contributing to extreme floods in the State. Between the year 1891 to 2007, 31 Cyclonic Storms/Severe Cyclonic Storms

have affected the Kerala coast. Cyclones are usually accompanied by tidal waves which, on occasion, enter land up to a distance of 10km, along with heavy rains and winds with speeds exceeding 50km/h.

11. **Maharashtra.** Located in the north of India along the west coast, the state is the second largest in terms of population (114.2 million) and the third largest in terms of area (307,713km^2). The State has the country's second largest urban population, and is about 43% urbanized. Mumbai, Maharashtra's capital city is the principal financial center and a major commercial hub of the country. The state is prone to a host of hazards, being at moderate risk to Cyclones and storms. During the period from 1890 to 1995, 210 cyclonic depressions were recorded in the Arabian Sea. Out of these, 19 (including 6 major ones) affected the Maharashtra-Goa coast. The Konkan region lies in the cyclone moderate to low damage risk zone with wind speeds rarely exceed 155km/h. Heavy urbanization has also increased vulnerability to hazards, in particular urban flooding.

12. **West Bengal (WB).** The coastal stretch of WB is highly vulnerable to cyclones and the frequency of storms crossing this belt is high. The most destructive element associated with an intense cyclone is storm surge which leads to inundations and coastline washout/erosion. High storm surge in coastal WB is due to its peculiar bathymetry and the nature of the coastal belt. The northern part of the Bay of Bengal is very shallow. The coast is also landlocked on three sides. As a result, when a very severe cyclonic storm or cyclone approaches the coast, the storm surge generated by the wind pressure submerges the coastal belt. Another peculiar characteristic of this coast are the high number of rivers and rivulets crisscrossing islands that have elevations of 4 to 5m above sea level. This makes these islands and the populations inhabiting them highly vulnerable.

13. Coastal communities in WB are usually poor and often live in houses made of mud walls and thatched roofs, making them highly vulnerable to cyclones, high speed winds, precipitation and inundation. The state has a population of more than 90 million and it is amongst the highest density states in the country. WB has suffered from cyclones, floods, droughts and earthquakes. On May 25th 2009, a severe cyclone, "AILA" lashed the WB coast causing destruction not only in the coastal blocks but also far inland.

14. **Social and Gender Context**. The coastline of India plays a significant role in India's economy by virtue of its resources. Many economic sectors and major urban areas are located within the coastal zone hence, the demand from the coastal resources are high. Progress towards social and economic development among coastal States and UTs are not uniform across poverty, literacy and other socio – economic variables. Socio-economic development in coastal States is a multi-dimensional phenomenon. Some of its major dimensions include: i) number of coastal industries, ii) number of ports, iii) level of economic growth, iv) level of education, v) level of health services, vi) degree of modernization, vii) status of women, viii) nutrition levels of women and children, ix) quality of housing, x) distribution of goods and services, xi) access to communication, xii) urbanization, and xiii) migration. Approximately 20 percent of India's population lives in coastal areas, with a large proportion based in coastal urban centres like Mumbai, Chennai and Kolkata. For those who live along the coastal belts, the fisheries and aquaculture sector are vital providing employment to over 6 million people and accounts for 1.07%

of India's total GDP and 5.30% of agriculture and allied activities.[3] Women participate actively in fisheries related activities, especially in tasks like fish seed collection. Other livelihood activities where women play an equally important role is in honey collection (Sunderbans) and in coastal timber production. According to Census 2011, coastal States and UTs combined have a population of 560 million.[4] The average household size is 4.63. The overall sex ratio is 928 females per 1000 males. Among the coastal States, Kerala (1084) has the best sex ratio.[5] Males constitute 51% of the total population. In terms of literacy, Kerala performs the best with a percentage of 93.91. Andhra Pradesh ranks the lowest with a literacy rate of 66.67%.[6] Poverty rates vary dramatically between the coastal States with Goa ranking first at 5.06% and Dadra & Nagar Haveli ranked at the bottom with 39.31%.[7]

B. Sectoral and Institutional Context

15. India's commitment to disaster preparedness and risk reduction at the national and state levels prompted the enactment of the Disaster Management Act in 2005, establishing the NDMA and State Disaster Management Authorities (SDMAs). NDMA has proactively formulated guidelines and procedures for dealing with specific natural disasters and is mandated with framing policies, plans and guidelines for Disaster Management.

16. The World Bank has significantly increased its support to India in advancing its Disaster Risk Management (DRM) capacity. The Bank is financing five projects under implementation: NCRMP I, Tamil Nadu and Puducherry Coastal Disaster Risk Reduction Project, Bihar Kosi Flood Recovery Project, Uttarakhand Disaster Recovery Project, and the Odisha Disaster Recovery Project. In addition to reconstruction and adaptation infrastructure, all of these projects finance activities to improve DRM capacity at the state and national levels, including analytical work, equipment, training, and in particular the establishment of systems for better risk management such as improved forecasting, early warning systems, community based DRM, multi-hazard risk assessments for planning, and decision support systems.

17. The NCRMP is a flagship program, the first Bank funded project in India exclusively focusing on ex-ante disaster risk mitigation. It is being implemented by the NDMA with support from the Ministry of Home Affairs (MHA), GoI, focusing on cyclone prone coastal States and UTs. The project is part of a broader national multi-hazard mitigation program taken up by the NDMA that includes understanding hazards like seismic risk, floods, landslides and establishment of a National Disaster Management communication network.

Implementation Progress of NCRMP I

18. NCRMP I is on course to achieve its Project Development Objective despite some initial delays and the impact of cyclone Phailin. The Project amount is US$455 million (US$359 million

[3]See 'Fisheries and Fishing Communities in India', available at: http://indianfisheries.icsf.net/
[4] See 'Database on Coastal States of India', Centre for Coastal Zone Management and Coastal Shelter Belt. Available at: 'http://iomenvis.nic.in/index2.aspx?slid=758&sublinkid=119&langid=1&mid=1
[5] Census 2011
[6] Census 2011
[7] Annual Report, Reserve Bank of India (2013), Government of India. The ranking has been calculated according to the percentage of people below the poverty line and is based on MRP–consumption.

IDA credit and US$96 million counterpart funds) being implemented through the NDMA in coordination with the states of Andhra Pradesh and Odisha and the National Institute of Disaster Management (NIDM), New Delhi. It includes a US$319 million project (US$255 million IDA credit and US$64 counterpart funds) approved in 2010, and Additional Financing of US$136 million (US$104 million IDA credit and US$32 million counterpart funds) approved in 2013 after Cyclone Phailin.

19. The project achieved significant progress: the construction of 128 shelters has already been completed as well as 550km of evacuation roads and 11 bridges. Odisha has awarded all of its contracts while Andhra Pradesh has only 3 contracts remaining to be awarded. As of December 2014, the original project has a committed amount of almost 95% and 43% disbursement (US$106.5 million).

C. Higher Level Objectives to which the Project Contributes

20. The project aims at assisting the GoI and the target coastal states to increase their resilience to cyclones, storm surge, and floods in coastal areas, and to increase their capacity for DRM at the national level. This project, along with NCRMP I and Additional Financing, Tamil Nadu and Puducherry Coastal Disaster Risk Reduction Project, and the Odisha Disaster Reconstruction Project, will provide support in reducing coastal vulnerability for India's entire mainland coast.

21. NDMA is expected to strengthen the policy environment in the country and build its capacities to manage various disaster risk reduction programs, while helping the states in effective implementation. Additionally, the project will aim to further strengthening India's understanding of the risks of other hydro-meteorological and geophysical hazards in non-coastal areas, enabling the GoI to start planning and designing future risk mitigation initiatives.

22. The Project is aligned with the GoI's 12th Five Year Plan, 2012- 2017, which clearly outlines the aim of consolidating progress made towards disaster preparedness, prevention and risk mitigation by integrating them into the development process; and with the Bank's Country Partnership Strategy (CPS) 2013-2017 (Report #76176-IN, discussed by the Board of Executive Directors on April 11, 2013) to enhance disaster risk management systems. The Project is solidly anchored within the "Strategic Engagement Area 3: Inclusion" of India's CPS, which states that the World Bank's investments in this area will: "(i) help build institutional capacity to prepare for and manage the impact of natural disasters, and (ii) help people protect themselves from natural disasters and recover quickly from them."

II. PROJECT DEVELOPMENT OBJECTIVE

A. PDO

23. The Project Development Objective (PDO) is to reduce vulnerability to cyclone and other hydro-meteorological hazards of coastal communities in project States, and increase the capacity of the State entities to effectively plan for and respond to disasters.

B. Project Beneficiaries

24. The primary beneficiaries will be coastal communities, including the aged, differently abled, women and children, in the target states benefitting from cyclone risk mitigation infrastructure and early warning systems. Site selection for investments is based on population density and availability of alternatives for evacuation and shelter, thus benefitting poorer communities with higher stocks of *kutcha*[8] housing.

C. PDO Level Results Indicators

25. The achievement of the PDO will be monitored by the following indicators (more detail in Annex 1):

- Proportion of the targeted coastal population covered by the EWDS.
- Proportion of vulnerable coastal population with access to emergency shelters.
- Results of the vulnerability assessment presented to officials of NDMA and MHA for investment planning.
- Results of the comprehensive multi-hazard risk financing strategy for policy making.

III. PROJECT DESCRIPTION

A. Project Components

26. The project has the following four components: A) Early Warning Dissemination Systems; B) Cyclone Risk Mitigation Infrastructure; C) Technical Assistance for Multi-Hazard Risk Management; and D) Project Management and Implementation Support. Component C will be implemented by NDMA with support from the states. Component A and B will be implemented by the six participating states: Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal. All infrastructure proposed under the Project[9] has been screened for potential short and long term climate impacts, mainly the increase in frequency and severity of hydro-meteorological disasters, and their design has been adjusted appropriately. The Technical assistance for DRM capacity and understanding Multi-hazard Risk Management will be managed by NDMA. A short description of the components is given below:

Component A: Early Warning Dissemination Systems (EWDS) - US$18.1 million

27. The objective of this component is to reduce the vulnerability of coastal areas by addressing the existing gap in dissemination of warning to the communities. Currently NDMA is leading the development of EWDS for the states of Andhra Pradesh and Odisha, as part of NCRMP I, which includes the necessary equipment and training. This component will support the expansion of EWDS to Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal. It will assist in the installation and operating EWDS allowing the state and/or district/sub district level control center to send communications directly to the villages using Global System for Mobile Communications (GSM)/Code Division Multiple Access (CDMA) based technology including strengthening emergency operation centers to channel the warning through different communication channels. The component also includes providing satellite phones/alternative technology to key officials to

[8] Semi-permanent houses of wattle and daub construction with thatched roofs or asbestos sheets.
[9] Screening of Goa's investments will be finalized during implementation.

fail proof the EWDS and also expand a new radio based wireless communication technology in coastal areas in each state; and strengthening the capacity of officials and village representative in operating, maintaining and using these EWDS equipment in disaster preparedness and response by preparing disaster management plans and organizing mock drills and similar exercises.

Component B: Cyclone Risk Mitigation Infrastructure – US$314.8 million (US$236.2 million Bank financing)

28. The objective of this component is to increase the preparedness and reduce the vulnerability of coastal communities through strategic infrastructure investments, i.e., improving their capacity/access to emergency shelter, evacuation routes and protecting critical infrastructure against cyclones and hydro meteorological hazards to reduce potential damages and ensure continuation of services. To determine the number, characteristics and location of risk mitigation infrastructure, in each of the project states, identification mechanisms included vulnerability assessment of the areas, availability and current status of structures, land availability, access to the sites, public consultations, and other ongoing programs in the coastal areas. The portfolio of risk mitigation infrastructure under this component includes a broad range of investment such as multipurpose emergency shelters, up-grading roads, underground electric cabling, bridges, up-grading saline embankments and bunds.

29. *Subcomponent B.1: Cyclone Risk Mitigation Infrastructure in Goa – US$18.2 million (US$13.7 million Bank financing).* To finance: i) 40 MPCS, ii) rehabilitation of 30 km of bunds; iii) 25km of underground electrical cabling; and iv) construction and rehabilitation of 30km of roads and bridges.

30. *Subcomponent B.2: Cyclone Risk Mitigation Infrastructure in Gujarat – US$93.4 million (US$70.0 million Bank financing).* To finance: i) 112 multi-purpose cyclone shelters (MPCS), ii) 170km of access roads and bridges, and iii) 65km of underground electrical cabling.

31. *Subcomponent B.3: Cyclone Risk Mitigation Infrastructure in Karnataka – US$18.6 million (US$14.0 million Bank financing).* To finance: i) 11 MPCS, ii) rehabilitation of 11km of embankments; and iii) construction and rehabilitation of 110km of roads and 3 bridges.

32. *Subcomponent B.4: Cyclone Risk Mitigation Infrastructure in Kerala – US$22.3 million (US$16.7 million Bank financing).* To finance: i) 27 MPCS (including rehabilitation of 13km of access roads and footbridges).

33. *Subcomponent B.5: Cyclone Risk Mitigation Infrastructure in Maharashtra – US$55.6 million (US$41.8 million Bank financing).* To finance: i) 13 MPCS, ii) 130 km of underground electrical cabling, and iii) 50km of saline embankments and bunds.

34. *Subcomponent B.6: Cyclone Risk Mitigation Infrastructure in West Bengal – US$106.7 million (US$80.0 million Bank financing).* To finance: i) 150 MPCS and flood shelters; and ii) 60km of underground electrical cabling.

Component C: Technical Assistance for Multi-Hazard Risk Management - US$29.5 million

35. The objective of this component is to improve the quality of available information on multi-hazard risks for decision making, and strengthen multi-hazard risk management at a national level.

36. *Subcomponent C.1:Multi-hazard risk modeling and assessment – US$8 million.* The objective of this subcomponent is to help understand risk and vulnerabilities better, and prepare the key institutions for addressing them effectively across all coastal states and UTs. As part of NCRMP I, NDMA is undertaking a hazard and risk assessment of coastal India. The understanding of risk and vulnerabilities from NCRMP I will be carried forward through improved probabilistic risk modeling allowing for modeling of multi-hazard and cascading impacts of disasters along coastal India.

37. *Subcomponent C.2: Strengthening Emergency Recovery Capacity – US$2 million.* This subcomponent will finance the implementation of the key findings from the Capacity Building study (at national, state and local level) undertaken by NIDM in NCRMP I focused on risk and damage assessment. The findings will feed into implementing training modules that will focus on strengthening capacity of the State's disaster responders.

38. *Subcomponent C.3: Enhancing the Capacity for Disaster Risk Management and response in non-coastal states – US$ 14.5 million.* This will entail the following: a) *Multi-hazard risk assessment*– This will finance a systematic assessment of the current and future disasters and climate risks, focusing on urban areas in non-coastal states. A web-based GIS platform will be established to store and manage the data gathered. Modeling will also be undertaken on a pilot basis for high risk flood areas and potentially landslide risk areas to factor in cascading multi-hazard disaster impacts; b) *Pilot physical structural assessment*– entailing a pilot initiative to train engineers on the assessment of the physical vulnerability of identified public buildings and critical infrastructure to seismic and other hazardous events. This will entail the development of identifying vulnerable critical infrastructure, a comprehensive multi-hazard check-list and accepted assessment guidelines; and c) *Strengthening capacity for disaster response* – This would entail the strengthening the capacity of emergency responders (local governments, first responders and other agencies involved in disaster response) in selected urban areas that are considered highly vulnerable to the impacts of earthquakes or landslides. It will include: (i) operating, maintaining and regular use of the EWDS equipment by officials and village representatives, including equally qualified women and men from socially marginalized groups; and (ii) of communities, represented by women and men from all social groups, in disaster preparedness and response through disaster management plans, arranging mock drills etc. It will also facilitate upgrading search and rescue equipment's coupled with proper training in the use and deployment of these tools.

39. *Subcomponent C.4: Hydro-meteorological Resilience Action plans – US$3 million*. This subcomponent would assist states in preparing resilience action plans that will focus on extreme weather events; develop resilience solutions/recommendations for sectors impacted by disasters such as agriculture, livelihoods, energy, infrastructure etc.; focus on urban hot-spot areas in helping develop urban resilience plans; and feasibility studies that would review options to improve the management and financial protection against multi-hazards. It will assist in estimating annual expected losses caused by adverse natural events, and the probable maximum loss which will enable the development of comprehensive Multi-Hazard Risk Financing strategies.

40. *Subcomponent C.5: Design of a National Seismic Risk Mitigation Program – US$2 million.* This subcomponent would assist the MHA and the NDMA in the design of a comprehensive National Seismic Risk Mitigation Program. This will encompass activities that will strengthen risk assessment capabilities, raising public awareness, strengthening of building codes and land-use

regulations, piloting retrofitting of critical infrastructure, and developing risk financing framework.

Component D: Project Management and Implementation Support - US$24.6 million

41. This component will finance the incremental operating costs of the Project Management Unit (PMU) and the State PIUs. In addition, the component will include consultancies required for the preparation and supervision of specific activities, trainings, exposure visits and knowledge exchange programs.

B. Project Financing

Lending Instrument:

42. The lending instrument is Investment Project Financing. The Project is the second in a series of Projects, which started with an ongoing Adaptable Program Loan. The implementation period is five years.

Project Cost and Financing:

43. A summary of the financing per component, IDA financing, and percentage is presented in the table 1 below:

Table 1: Finances per Project Component

Project Components	**Total Cost (US$ M)**	**IDA financing (US$M)**	**Financing**
Component A: Early Warning Dissemination Systems	**18.1**	**18.1**	100%
Goa	3.1	3.1	
Gujarat	3.3	3.3	
Karnataka	1.5	1.5	
Kerala	2.5	2.5	
Maharashtra	4.4	4.4	
West Bengal	3.3	3.3	
Component B: Cyclone Risk Mitigation Infrastructure	**314.8**	**236.2**	75%
Subcomponent B.1: Goa	18.2	13.7	
Subcomponent B.2: Gujarat	93.4	70.0	
Subcomponent B.3: Karnataka	18.6	14.0	
Subcomponent B.4: Kerala	22.3	16.7	
Subcomponent B.5: Maharashtra	55.6	41.8	
Subcomponent B.6: West Bengal	106.7	80.0	
Component C: Technical Assistance for Multi-Hazard Risk Management	**29.5**	**29.5**	100%
Subcomponent C.1: Multi-hazard risk modeling and assessment	8.0	8.0	
Subcomponent C.2: Strengthening Emergency Recovery Capacity	2.0	2.0	
Subcomponent C.3: Enhancing the Capacity of Disaster Risk Management and Response in Non-Coastal States	14.5	14.5	
Subcomponent C.4: Hydro-meteorological Resilience Action Plans	3.0	3.0	

Project Components	Total Cost (US$ M)	IDA financing (US$M)	Financing
Subcomponent C.5: Design of a National Seismic Risk Mitigation Program	2.0	2.0	
Component D: Project Management and Implementation Support	**24.6**	**24.6**	
NDMA	5.4	5.4	
Goa	1.6	1.6	
Gujarat	4.6	4.6	
Karnataka	1.0	1.0	
Kerala	1.3	1.3	
Maharashtra	5.3	5.3	
West Bengal	5.4	5.4	
Total	***387.0***	***308.4***	

C. Lessons Learned and Reflected in the Project Design

44. The proposed project incorporates lessons learnt from the on-going NCRMP-I and the other on-going disaster risk management projects in India, as well as international best practice. Some of the lessons incorporated are detailed below.

45. Investment in Disaster mitigation infrastructure – Post-Cyclone Phailin in Odisha in 2013, close to 1 million people benefitted from the improved EWDS and the cyclone shelters across the coast. The relative small number of casualties builds a clear and compelling case for increased investment in disaster risk mitigation - both physical infrastructure (emergency cyclone shelters, access routes) and in improved EWDSs.

46. Engagement of local communities – Evidence from Bangladesh, NCRMP –I, and other projects all highlight the important benefits of involving the local community in infrastructure location and design. These lessons will be incorporated in the proposed project under multiple components; construction of cyclone shelters, strengthening early warning systems, capacity building and others. The consultation process to finalize the location and design in targeted coastal areas will involve engagement with the community.

47. 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 projects. Odisha has demonstrated an effective model of community ownership of Cyclone Shelters through the Cyclone Shelter Management & Maintenance Committee (CSM & MC) established around each shelter. Relevant lessons from the same and other such interventions have been adopted in the NCRMP and are being integrated for the management and maintenance of evacuation shelters and EWDS.

48. DRM institutions are frequently overstretched between regular operations and emergencies. This means a dedicated implementation/ management units should have clear roles, so that staff can continue to work on the on-going projects independent of emergencies. This would ensure continuity and is especially important in states with highly recurrent natural hazards.

49. Globally, there is evidence that some flood response programs have focused too heavily on rebuilding infrastructure and not enough on better adaptation and preparedness for the future in complementary investments, such as water and flood management, rural finance, enhancing capacities of water users groups, early warning communication systems, etc. A strong disaster response mechanism play a crucial role in not only saving lives and livelihoods but also for achieving sustainable recovery and long-term disaster risk reduction. The project would focus on providing technical assistance in sustainable risk mitigation and response.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

50. The project proposes to replicate the existing institutional arrangements under NCRMP I 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 strengthen their existing 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 implementing Components A and B and will have State Project Implementation Units (SPIUs) 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 line departments after approval from the SPIUs. Implementation of Component C will be managed by NDMA.

B. Results Monitoring and Evaluation

51. The result framework (Annex 1) will be used to monitor and evaluate the achievement of the PDO. Project monitoring will occur as a periodic function, and will include process reviews/audits, reporting of outputs, and maintaining progressive records. Broad thematic areas that will be supervised and monitored include the following: i) Social and Environmental Monitoring; ii) Regular Quality Supervision & Certification; iii) Periodic Physical Progress Monitoring & Third Party Quality Consultants; and iv) Monitoring and Evaluation for results.

52. A Management Information System (MIS) linking NDMA and the states was developed under NCRMP I for providing regular updates on the project status. The MIS will be adapted for the proposed second phase. 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 TPQC consultants on the quality of the works executed under Component B. Reports generated from this system by the respective PIUs will be consolidated by the PMU for analysis and reporting to appropriate authorities/forums.

C. Sustainability

53. The sustainability of the Project is assured through: i) selection of investments based on a detailed assessment of real demand, ii) institutionalizing the capacity for the necessary maintenance within the government structure, independently of the Project and iii) promoting the equal participation of targeted women and men at the stage of planning, management, and maintenance.

54. The governments of Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal have shown keen interest and initiative in taking this project forward. The Department of Economic Affairs (DEA) has given high importance to the project and to the partnership with the Bank in the area of disaster risk management. All this indicates a strong commitment and a sense of ownership which enhances the sustainability of the project.

55. Additional specific mechanisms under the Project to support sustainability are: i) community managed and maintained of cyclone shelters, ii) creation of a corpus fund to attend to specific needs of operation and maintenance of infrastructure, and iii) the adaptation of investments for the minimum disruption of livelihood activities, and their enhancement when feasible for the vulnerable and marginalized groups in the project area.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary

Table 2: Operational Risk Rating

Political and Governance	Moderate
Macroeconomic	Moderate
Sector Strategies and Policies	Moderate
Technical Design of Project or Program	Moderate
Institutional Capacity for Implementation and Sustainability	Substantial
Fiduciary	Substantial
Environment and Social	Moderate
Stakeholders	Substantial
Other	
OVERALL	**Moderate**

B. Overall Risk Rating Explanation

56. Though all these states have taken steps towards creation of robust investment proposals, model DPRs have been created and first year investments have been identified, permissions and clearances are yet to be obtained for some of the proposed infrastructure works. There are risks associated with this and the complexity of the multi-state, multi-sectoral approach, the involvement of multiple states, multiple line departments all of which may delay decision-making due to bureaucratic processes in place.

57. In addition the wide geographical spread of the program (coasts of Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal) and a large number of direct beneficiaries, the project may face implementation and delivery monitoring challenges. Though nodal agencies:

NDMA's PMU, and the six state PIUs do not have much experience in the sustained involvement of local communities in the running of various risk mitigation infrastructure, the concerned Governments have demonstrated institutional will and a proactive and dynamic attitude towards involving communities with a substantial project proposed on the same as part of the project.

58. With mitigation measures being planned which include training and capacity building of the concerned Government institutions and civil society institutions involved, the risk at implementation is expected to be moderate in view of earlier mentioned weaknesses and constraints and the remedial measures already taken and being planned to address the same.

VI. APPRAISAL SUMMARY

A. Economic Analysis

59. Economic analysis was performed to assess the rate of return of capital investments in the new multipurpose shelters, roads and bridges. The main benefit of constructing new shelters is to save human lives at the time of cyclones. For the rest of the year, the shelters will be used for other purposes. The connecting roads will allow for quicker evacuation during cyclones including provision of immediate emergency and relief supplies. The roads will also provide access to the market and other facilities during the rest of the year. There will be two main benefit areas from the shelters: (i) Number of human lives saved by shelters; (ii) Other ancillary benefits from multipurpose use of the cyclone shelters.

60. As for the construction of the roads connecting to the existing road network will have following benefits: (i) Faster evacuation of people; (ii) Provision of emergency food and other supplies to before disaster (preparedness); (iii) Faster relief delivery after disaster; and (iv) effective access to the market and other facilities the rest of the year. For the purposed of this analysis we only consider the main benefit of the project, saving human lives. The intangible benefits from road construction are not quantified and to that extent the benefits are underestimates.

61. We calculate the project benefits based on the design capacity of the shelters. The project benefits are based on the following assumption: The new shelters will each have the design capacity of 1,000 individuals. Since probability of occurrence and intensity of a cyclone would determine the use of the shelters we consider five cyclone scenarios: one in 400 years, one in 200 years, one in 100 years, one in 50 years, and one in 20 years. Sensitivity analysis was conducted separately for the six states as well as for the overall project. As shown in Annex 7, for 1 in a 400 year cyclone in the next twenty years, the project fairs very well with IRR of 18 percent and NPV of about 79 million dollars.

B. Technical

62. *MPCS*. Designs were based on best practices in India and adapted to the local context for each site. Each MPCS will be equipped with facilities like kitchen, water storage and toilets (in a gender segregated way) so as to facilitate a safe and hygienic shelter. Arrangements to accommodate livestock will be included to the extent possible. These structures will be multipurpose utility buildings so that they can be used for activities like class rooms, community function hall, meeting rooms for community/SHGs, vocational trainings and other such community

activities on a regular basis, making this infrastructure a vital part of the development of the communities. Regular usage will also facilitate its proper upkeep and regular maintenance. Arrangements for the proper operation and maintenance of the shelters are an integral part of the investment, which includes the establishment of community based committees and training.

63. *Roads and bridges*. 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 construction/restoration would also involve construction/ restoration of en-route culverts and bridges. 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. These structures would be maintained by the concerned government agencies through their normal budgetary support.

64. *Underground Cabling.* During cyclones, the electrical infrastructure gets badly affected resulting in breakdown of electricity, causes injury and even death and hampers relief and rescue. Re-establishing of infrastructure is not only time consuming, affecting business, industry, school, hospitals and everyday living but also costly. The conversion of HT (high tension) & LT (low tension) overhead lines into HT&LT underground cables will be carried out based on the vulnerability assessment of existing electrical infrastructure.

65. *Saline Embankments and Bunds.* These 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 (technical, environment and social) will be carried out to prepare appropriate design and identify the 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 saline embankments and bunds would be maintained by the concerned government agencies through their normal maintenance budgets.

C. Financial Management

66. The guiding principles for the design of the financial management arrangements for this project are twofold: (i) build upon the successful implementation of the NCRMP I project with the same implementing agency at the center (NDMA) and (ii) use the country fiduciary systems, to the extent feasible and considered satisfactory for meeting the essential fiduciary requirements. NDMA (at the center) under MHA will have the overall financial management responsibility for the project. At the state Goa Water Resources Department (WRD) under the oversight of Revenue Department in Goa, Gujarat State Disaster Management Authority (GSDMA) in Gujarat, Department of Revenue and Disaster Management (R&DMD) in Kerala, Revenue Department (Disaster Management) in Karnataka, Maharashtra Department of Relief and Rehabilitation (MDRR) in Maharashtra, West Bengal Department of Disaster Management (WBDDM) in West Bengal, and will have the respective states financial management responsibility. These agencies along with strengthening measures proposed are assessed to have adequate financial management system for reporting project funds and expenditure and providing fiduciary assurance over the use of project funds. Further there are multiple line departments within a state which will come

together for implementation. Considering these aspects, the overall financial management risk rating of the project is 'Substantial'.

67. *Budget:* At the central level, Ministry of Home Affairs (MHA) shall make an annual allocation for the project in its budget under externally aided assistance. Similarly, states will make a provision for the central as well state share of the program in their own budgets. Wherever the state is operating through the mainstream accounting and payment system, budget codes have to be opened to record component wise transactions. In case they operate through single budget line then they will have to maintain memorandum registers to track project expenditures by component/activity wise to facilitate reporting and monitoring.

68. *Fund flow arrangements.* The approved budget based on NDMA proposal will be released by MHA to states. State treasury will further release the budget to the nodal agency or directly to the line departments (based on nodal agency proposal).

69. *Accounting.* Accounting for project expenditures will be maintained on cash basis of accounting and separate books of accounts/ ledgers will be maintained for the project. To ensure consistency in the financial management 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.

70. *Reporting*: Each state will prepare quarterly Interim Unaudited Financial Reports (IUFR) on the basis of actual expenditure information received from the line departments and actual expenditure incurred at the SPIU and will send the same to NDMA. NDMA will send consolidated IUFR to the Bank, within 45 days from the end of each calendar quarter.

71. *Audit.* The Project Financial Statements (PFS) will be audited by a firm of Chartered Accountants in case of GSDMA. In case of states where nodal agency is a department, the Comptroller and Auditor General will audit the PFS as per pre-agreed Terms of Reference. The audit reports will be submitted to the Bank within nine months of the close of each financial year. The internal audit of the Bank project will be done six monthly by a firm of Chartered Accountant to be agreed with the Bank and under TOR to be agreed with the Bank.

72. *Staffing and training*. Considering that there are six states under NCRMP II, the existing finance staff strength at NDMA needs to be augmented. Finance manager either from the center finance services or a qualified Chartered Accountant with at least 8 years of post-qualification experience needs to be appointed. Similarly, each state finance function will be headed by a finance controller and supported by an accountant. These staff need to be on board within 3 months of project effectiveness.

73. *Disbursement*. Each state budget will pre-finance all the project expenditure through its own funds (through the budget line) and reimbursements from the credit will be made on the basis of actual expenditure reported in the quarterly IUFRs, subject to audit certification at the end of each financial year. Expenditure categories eligible for financing under the credit agreement and as per the disbursement percentage will be financed out of the proceeds of the credit. The actual expenditure will be reimbursed to the project and no advances will be provided. The project will

submit withdrawal application to CAAA in DEA for onward submission to the World Bank for reimbursement.

D. Procurement

74. Procurement of goods, works and non-consulting services required for the proposed project and to be financed out of the proceeds of this Financing shall be done in accordance with the requirements set forth or referred to in the Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers (January 2011 updated July 2014). Selection of consulting services required for the proposed project and to be financed out of the proceeds of the Financing shall be done in accordance with the requirements set forth or referred to in the Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits by World Bank Borrowers (January 2011 updated July 2014); and the provisions stipulated in the Financing Agreement.

75. The NCRMP II shall be implemented with similar institutional and implementation arrangements under NCRMP I both at central and state level. The NDMA on behalf of MHA will manage the project and will have overall responsibility for implementation of NCRMP II. The NDMA shall strengthen their existing PMU, headed by a Project Director and supported by technical expert and management staff.

76. At the state level the existing nodal agency for disaster management (e.g. State Disaster Management Authorities or Revenue/Relief Departments) would be responsible managing the project and will have a State Project Implementation Units (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.

77. Procurement activities under Components A and B shall be conducted by respective state government/line departments while, NDMA shall undertake procurement of goods, works and services under Components C and D.

78. As a part of preparation process, procurement capacity assessment was carried out on all the IAs using PRAMS and accordingly, the risk mitigation measures were proposed. The overall risk is rated as “substantial”.

79. The procurement of goods works and services shall be carried out using e-procurement platform if agreed by the Bank. The NIC system was assessed and approved by the Bank for its use for all Bank funded projects across all states in India. If the IAs is using e-procurement platform which is not cleared by the Bank, the IAs shall use manual bidding until such time, the e-procurement system is assessed and cleared by the Bank.

80. The proposed project shall use procurement plan (PP) monitoring and execution software (SEPA) to strengthen the management of PP. The Bank will arrange training on use of SEPA when the focal persons are identified. The PP of West Bengal is already in SEPA.

81. The IAs shall use their own procedures for expenses incurred on incremental operating cost that are recurrent in nature. .

E. Social (including Safeguards)

82. The follow up project NCRMP II presents similar set of social aspects and issues in terms of scope and range as documented and addressed under NCRMP I. The assessments of NCRMP II in the Project States Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal reveal maximum benefits to project population with minimum safeguard risks. Assessment in Goa will have to be taken up after the sub-projects are identified during project implementation (see Annex 3).

83. *Impacts on people and land:* The inherent safeguard risks posed by the project include: (i) obtaining private land in few cases; (ii) addressing implementation capacity issues at the state level; (iii) having to apply the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013, for taking private land; (iv) ensuring community participation in the reconstruction process; (v) addressing differential impacts of the affected vulnerable/ marginalized families and groups.

84. Assessments and experience till date from NCRMP I and for the reviewed sub projects under NCRMP II indicates that no private land has ever been acquired, except one case in Andhra Pradesh under NCRMP I.

85. *Management of Social Risks*: Small parcels of lands required for sub projects will be preferably pursued through voluntary land donation or land purchase and also through LA and R&R Act, 2013 as a last resort to avoid time overruns. The Bank Operational Policy on Involuntary Resettlement (OP 4.12) has been triggered to deal with involuntary resettlement. OP 4.10 has not been triggered as there are no tribal habitations with unique socio-cultural identity vis-à-vis the mainstream population in the Project locations.

86. The ESMF which has been in use for NCRMP I, has been revised/updated for usage for Project States under NCRMP II. The salient features of the revised ESMF include compensating and assisting the title and non-titleholders at replacement cost and R&R assistance along with relocation support for the community/commonly owned properties. It also has the measures to address the special needs of the vulnerable families, Scheduled Castes communities, single women headed and other vulnerable families along with GRC systems and consultation mechanisms.

87. Prior to the preparation of the DPRs the social impacts will be first identified using the screening checklist. If adverse impacts found, full scale SIA and preparation of RAP will be undertaken. All measures proposed in the RAP to mitigate adverse impacts will be completed before the start of works.

88. *Implementation Arrangements*: The Implementation of the ESMF provisions including the RAP is the responsibility of the SPIUs. The SPIUs will have a nodal Social Management Officer. An initial orientation workshop on social and environment will be conducted for concern officers in all the Project States.

89. *Grievance Redress:* In case of a 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 in charge 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. 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. As required certain cases will be referred to a Grievance Redress Committee appointed by the State Project Steering Committee (SPSC) which would examine and address the grievances. The Social Management Specialist from the PMU will be responsible for maintaining a record of the proceedings and the final decisions.

F. Environment (including Safeguards)

90. *Potential Issues/Impacts.* While the project is expected to benefit the coastal communities in the participating states by reducing their vulnerability to cyclone and other hydro-meteorological hazards through creation of cyclone risk mitigation infrastructure and early warning systems, the proposed investments may have some adverse environmental impacts. Since works would be largely carried out in the coastal realms of states that are marked by various degrees of vulnerability and some sensitive environmental features, there are some risks or issues that need to be managed through appropriate planning and upfront care during the site selection process, particularly in case of sub-projects located close to the shoreline or high tide line influence area or in low lying area/s.

91. Potential adverse impacts on account of activities/works proposed under the project (specifically under Component B) 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 (including the possibility of impact on endangered fauna); (iii) felling of trees and clearance of vegetation for sub-project construction; (iv) impacts on water resources used by the people; (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) concerns arising out of improper disposal of debris and other construction wastes.

92. In view of the potential impacts on the environment, Bank's OP 4.01 on Environmental Assessment, OP 4.04 on Natural Habitats, and OP 4.11 on Physical Cultural Resources have been triggered, and the project is designated as Category A. On the whole, with proper planning and implementation of management measures, the project interventions are not likely to cause large scale, significant or irreversible damage to natural and/or physical environment.

93. *Management of Environmental Issues.* In order to ensure effective environmental management in a scenario where multiple sub-projects are proposed along different locations in the coastal areas of six participating states and their specific locations are not known at the time of over-all project design, an approach for preparation, application and implementation of an Environment and Social Management Framework (ESMF) has been adopted for the project.

94. The ESMF was originally prepared for NCRMP I, wherein it was applied and implemented in the two participating states of Odisha and Andhra Pradesh. The framework has now been

revised/updated and is being used for NCRMP II. The revised document reflects the changes in regulatory requirements/ procedures that have come into effect post-2009 and takes into account the experiences/lessons learnt from the implementation of the first project. The revision/updating has also considered the baseline or existing environmental and social characteristics of the participating states (Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal) proposed to be covered under NCRMP II.

95. 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 concerns/issues are systematically identified and integrated into the project/sub-project cycle. It has been designed to ensure compliance to applicable GoI and state laws/regulations apart from achieving the requirements set forth in various applicable Bank policies.

96. Appropriate measures have been developed to enhance positive impacts and to avoid, minimize and mitigate adverse impacts through generic/standard activity-specific Environmental Management Plans (EMPs), which form a part of the ESMF. These activity-specific EMPs will help in addressing various construction and operation-stage impacts. However, critical environmental issues, which may result on account of improper site selection (an important factor of consideration in a coastal area), will be considerably avoided and/or minimized by effectively using results from the Environment Screening Exercise. This will ensure that no sub-project with the likely possibility of creating significant or irreversible adverse impact on environment is taken-up without a proper study (environment assessment/analysis). Towards this end, a robust methodology supported by use of scientific tools such as GIS and remote sensing techniques has been/will be used in the project. Accordingly, sub-projects without significant or irreversible adverse impacts have been selected for investment under Phase I while others, which are located in/close to environmentally sensitive zones are being either dropped from the project scope or may be considered for inclusion only after duly completing the environment assessment studies.

97. The ESMF describes institutional arrangements, including roles and responsibilities of various players and monitoring requirements, required for effectively managing the environmental aspects of project planning and execution. These arrangements include Independent/Third Party Audits to assess the application and implementation of the ESMF and its instruments such as generic or sub-project specific EMPs, as the case may be. Also, mid-term and end-term project assessment/evaluation will be undertaken by the NDMA and the report will be shared with the Bank.

98. *Consultation and Disclosure.* As part of the project preparation, extensive public consultation is being carried out to appraise people about the over-all project objectives, inform sub-project selection and design. The draft ESMF (March 12, 2014 version) was disclosed in the Bank's Infoshop and in Project Authority's website. The final version was disclosed on October 7, 2014, with a further updated version prepared on February 18, 2015. Other relevant project documents such as screening reports (which also include documentation from the public consultation exercises), EAs and EMPs will be disclosed on the NDMA and the state websites in line with the requirements of Bank's Operational Policies.

G. World Bank Grievance Redress

99. In addition to seeking to resolve their grievances through the Grievance Redress Service (GRS) established by the PIE, "communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project such as this operation may also submit complaints to the GRS established by the World Bank. The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may also submit their complaint to the WB's independent Inspection Panel, after having brought the complaint to the World Bank's attention through its GRS. Information on how to submit complaints to the World Bank's Grievance Redress Service is available at http://www.worldbank.org/GRS. Information on how to submit complaints to the World Bank Inspection Panel is available at www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

Country: India

Project Name: National Cyclone Risk Mitigation Project-II (P144726)

Table 3: Results Framework

Project Development Objectives							
PDO Statement							
The Project Development Objective is to reduce vulnerability to cyclone and other hydro-meteorological hazards of coastal communities in project States, and increase the capacity of the State entities to effectively plan for and respond to disasters.							
These results are at	Project Level						
Project Development Objective Indicators							
		Cumulative Target Values					
Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Proportion of the targeted coastal population covered by the EWDS (Percentage)	TBD						75.00
Proportion of vulnerable coastal population with access to emergency shelters (Percentage)	TBD						30.00
Results of the vulnerability assessment presented to officials of	No						Yes

NDMA for investment planning (Yes/No)							
Results of the comprehensive multi-hazard risk financing strategy for policy making (Yes/No)	No						Yes
Intermediate Results Indicators							
		Cumulative Target Values					
Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Number of R-PACS installed (Number)	0.00						750.00
Number of multi-purpose cyclone and flood shelters completed (Number)	0.00						340
Number of people with access to multi-purpose cyclone and flood shelters built or rehabilitated under the Project (Number - Sub-Type: Supplemental)	0.00						500000

Roads rehabilitated, Rural (Kilometers) - (Core)	0.00						310.00
Number of bridges completed under the project (Number)	0.00						13.00
Kilometers of embankments rehabilitated under the Project (Kilometers)	0.00						90.00
Square kilometers protected by embankments rehabilitated by the Project (Square kilometer(km2) - Sub-Type: Supplemental)	0.00						1600.00
Kilometers of HT and LT lines moved underground (Kilometers)	0.00						280.00
Probabilistic risk model for selected areas completed (Yes/No)	No						Yes

Number of training modules on disaster damage assessment implemented (Number)	0.00						8.00
Multi-hazard risk assessment for selected areas completed (Yes/No)	No						Yes
Physical structural assessment of lifeline infrastructure completed (Yes/No)	No						Yes
Hydro-meteorological Resilience Action Plans completed (Yes/No)	No						Yes

Table 4: Indicator Description

Project Development Objective Indicators				
Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Proportion of the targeted coastal population covered by the EWDS	Percentage of the targeted population who is aware of EWDS, measured by a household survey. The baseline will be provided by the BME consultant, following the same model as NCRMP I	At mid-term and completion	Monitoring Evaluation consultant report	NDMA
Proportion of vulnerable coastal population with access to emergency shelters	Access is determined by a distance of no more than 2km from locality, accessible by all-weather roads, and with sufficient capacity of the shelter. The baseline will be provided by the BME consultant, following the same model as NCRMP I	At mid-term and completion	M&E consultant report	NDMA
Results of the vulnerability assessment presented to officials of NDMA for investment planning	The results of the vulnerability assessment of lifeline infrastructure will be presented to officials from NDMA in order to inform investment planning	Once, at project completion	Vulnerability assessment produced by consulting firm	NDMA
Results of the comprehensive multi-hazard risk financing strategy for policy making	The results of the comprehensive multi-hazard risk financing strategy will be presented in order to inform policy making	Once, at project completion	Multi-hazard risk financing strategy produced by consulting firm	NDMA
Intermediate Results Indicators				
Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Number of R-PACS installed	Number of Remote Public Alert Communication Systems installed in the participating states. The	Quarterly	Project monitoring report, based on field supervision	NDMA

	target number will be determined during implementation based on the consultant's results.			
Number of multi-purpose cyclone and flood shelters completed	A completed shelter includes the hand-over of a completed shelter to an established and trained community group	Quarterly	Reports from supervision firm	NDMA
Number of people with access to multi-purpose cyclone and flood shelters built or rehabilitated under the Project	Based on vulnerable people, distance to shelters (under 2km), access roads, and capacity of the shelters	Quarterly	Project's quarterly report and supervision firm reports	NDMA
Roads rehabilitated, Rural	Kilometers of all rural roads reopened to motorized traffic, rehabilitated, or upgraded under the project. Rural roads are roads functionally classified in various countries below Trunk or Primary, Secondary or Link roads, or sometimes Tertiary roads. Such roads are often described as rural access, feeder, market, agricultural, irrigation, forestry or community roads. Typically, rural roads connect small urban centers/towns/settlements of less than 2,000 to 5,000 inhabitants to each other or to higher classes of road, market towns and urban centers.	Quarterly	Quarterly reports and supervision firm report	NDMA
Number of bridges completed under the project	Number of bridges constructed under the project	Quarterly	Project's quarterly report and supervision firm report	NDMA
Kilometers of embankments rehabilitated under the Project	Kilometers of embankments rehabilitated under the Project	Quarterly	Project's quarterly report and supervision firm report	NDMA

Square kilometers protected by embankments rehabilitated by the Project	Square kilometers protected by embankments rehabilitated by the Project	Quarterly	Project's quarterly reports and supervision firm report	NDMA
Kilometers of HT and LT lines moved underground	Total number of kilometers of high and low tension lines moved underground by the Project	Quarterly	Project's quarterly reports and supervision firm reports	NDMA
Probabilistic risk model for selected areas completed	The probabilistic risk model is completed and presented to NDMA authorities	Once, at project completion	Consultant's report	NDMA
Number of training modules on disaster damage assessment implemented	Number of training modules implemented by NIDM to state disaster management officials	Quarterly	Project's quarterly report	NIDM
Multi-hazard risk assessment for selected areas completed	The multi-hazard risk assessment financed under Component C is completed and presented to NDMA authorities for decision making	Once, at Project completion	Consultant's report	NDMA
Physical structural assessment of lifeline infrastructure completed	Physical structural assessment of lifeline infrastructure in high risk zones completed and presented to NDMA and MHA for decision making	Once, at Project completion	Consultant's report	NDMA
Hydro-meteorological Resilience Action Plans completed	Hydro-meteorological Resilience Action Plans, financed under Component C, is completed and presented to State Authorities, NDMA, A for decision making	Once, at Project completion	Consultant's report	NDMA

Annex 2: Detailed Project Description

INDIA: National Cyclone Risk Mitigation Project-II

Component A: Early Warning Dissemination Systems (EWDS) - US$18.1 million

1. The objective of this component is to reduce the vulnerability of coastal areas by addressing the existing gap in dissemination of warning to the communities. Currently NDMA is leading the development of EWDS along with the states of Andhra Pradesh and Odisha, as part of NCRMP I, which includes the necessary equipment and training.

2. This component will support the expansion of EWDS to Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal. It will assist in the installation and operating EWDS allowing the state and/or district/sub district level control center to send communications directly to the villages using Global System for Mobile Communications (GSM)/Code Division Multiple Access (CDMA) based technology including strengthening emergency operation centers to channel the warning through different communication channels. The component also includes providing satellite phones/alternative technology to key officials to fail proof the EWDS and also expand a new radio based wireless communication technology in coastal areas in each state; and strengthening the capacity of officials and village representative in operating, maintaining and using these EWDS equipment in disaster preparedness and response by preparing disaster management plans and organizing mock drills and similar exercises.

Component B: Cyclone Risk Mitigation Infrastructure – US$314.8 million (US$236.2 million Bank financing)

3. The objective of this component is to increase the preparedness and reduce the vulnerability of coastal communities through strategic infrastructure investments, i.e., improving their capacity/access to emergency shelter, evacuation routes and protecting critical infrastructure against cyclones and hydro meteorological hazards to reduce potential damages and ensure continuation of services.

4. To determine the number, characteristics and location of risk mitigation infrastructure, in each of the project states, identification mechanisms included vulnerability assessment of the areas, availability and current status of structures, land availability, access to the sites, public consultations, and other ongoing programs in the coastal areas. The portfolio of risk mitigation infrastructure under this component includes a broad range of investment such as multipurpose emergency shelters, up-grading roads, underground electric cabling, bridges, up-grading saline embankments and bunds.

5. *Subcomponent B.1: Cyclone Risk Mitigation Infrastructure in Goa – US$18.2 million (US$13.7 million Bank financing).* To finance: i) 40 MPCS, ii) rehabilitation of 30 km of bunds; iii) 25km of underground electrical cabling; and iv) construction and rehabilitation of 30km of roads and bridges.

6. *Subcomponent B.2: Cyclone Risk Mitigation Infrastructure in Gujarat – US$93.4 million (US$70.0 million Bank financing).* To finance: i) 112 multi-purpose cyclone shelters (MPCS), ii) 170km of access roads and bridges, and iii) 65km of underground electrical cabling.

7. *Subcomponent B.3: Cyclone Risk Mitigation Infrastructure in Karnataka – US$18.6 million (US$14.0 million Bank financing).* To finance: i) 11 MPCS, ii) rehabilitation of 11km of embankments; and iii) construction and rehabilitation of 110km of roads and 3 bridges.

8. *Subcomponent B.4: Cyclone Risk Mitigation Infrastructure in Kerala – US$22.3 million (US$16.7 million Bank financing).* To finance: i) 27 MPCS (including rehabilitation of 13km of access roads and footbridges).

9. *Subcomponent B.5: Cyclone Risk Mitigation Infrastructure in Maharashtra – US$55.6 million (US$41.8 million Bank financing).* To finance: i) 13 MPCS, ii) 130 km of underground electrical cabling, and iii) 50km of saline embankments and bunds.

10. *Subcomponent B.6: Cyclone Risk Mitigation Infrastructure in West Bengal – US$106.7 million (US$80.0 million Bank financing).* To finance: i) 150 MPCS and flood shelters; and ii) 60km of underground electrical cabling.

11. The activity breakdown for Component B for the six States under Phase II is as follows:

Table 5: Activity Breakdown State wise for Component B

No.	State	Proposed Activities	World Bank Financing (in USD)	State Contribution (in USD)	Total (in USD)
1.	Goa	Multi-purpose cyclone shelters	5.7	4.5	18.2
		Roads and bridges	1.7		
		Bunds	5.2		
		Underground cabling	5.6		
2.	Gujarat	Multi-purpose cyclone shelters	39.4	23.4	93.4
		Access roads and bridges	18.3		
		Underground Cabling	12.3		
3.	Karnataka	Multi-purpose cyclone shelters	2.5	4.6	18.6
		Roads and bridges	9.6		
		Saline Embankments	1.9		

4.	Kerala	Multi-purpose cyclone shelters, including access roads and bridges	16.7	5.6	22.3
5.	Maharashtra	Multi-purpose cyclone shelters	4.6	13.8	55.6
		Underground Cabling	11.4		
		Saline Embankments and Rehabilitation of Bunds	25.8		
6.	West Bengal	Multi-purpose cyclone shelters	68.4	26.7	106.7
		Underground Cabling	11.6		
	Grand Total		**236.2**	**78.6**	**314.8**

Component C: Technical Assistance for Multi-Hazard Risk Management - US$29.5 million

12. The objective of this component is to improve the quality of available information on multi-hazard risks for decision making, and strengthen multi-hazard risk management at a national level.

13. *Subcomponent C.1:Multi-hazard risk modeling and assessment – US$8 million.* The objective of this subcomponent is to help understand risk and vulnerabilities better, and prepare the key institutions for addressing them effectively across all coastal states and UTs. In NCRMP I, NDMA is undertaking a hazard and risk assessment of coastal India. The understanding of risk and vulnerabilities from NCRMP I will be carried forward through improved probabilistic risk modeling allowing for modeling of multi-hazard and cascading impacts of disasters along coastal India.

14. This subcomponent will assist in developing a manual on building classification and undertake micro-level assessments of highly exposed areas, including residential assets, public buildings, and critical infrastructure. Open source platforms for probabilistic risk analysis, which are modular and extensible such as the Comprehensive Approach to Probabilistic Risk Assessment (CAPRA), will be used. This methodology will help the targeted state, district, and local self-governance institutions in improving the design and implementation of development programs in the long run and improve their sustainability.

15. The above analysis' would assist/advice National and state agencies to make informed decisions in urban planning and service delivery, approvals for new buildings and infrastructure, building codes and zoning and environment planning. The sub-component's results will also help in the development of loss exceedance analysis that helps in modeling maximum loss for specific return periods of disaster events.

16. *Subcomponent C.2: Strengthening Emergency Recovery Capacity – US$2 million.* This subcomponent will finance the implementation of the key findings from the Capacity Building study (at national, state and local level) undertaken by NIDM in NCRMP I focused on risk and damage assessment. The findings will feed into implementing training modules that will focus on strengthening capacity of the State's disaster responders.

17. *Subcomponent C.3: Enhancing the Capacity for Disaster Risk Management and response in non-coastal states – US$ 14.5 million.* This will entail the following: a) *Multi-hazard risk assessment*; b) *Pilot* physical *structural assessment*; and c) *Strengthening capacity for disaster response*.

18. The Multi-hazard risk assessment will finance a systematic assessment of the current and future disasters and climate risks, focusing on urban areas in non-coastal states. A web-based GIS platform will be established to store and manage the data gathered. Modeling will also be undertaken on a pilot basis for high risk flood areas and potentially landslide risk areas to factor in cascading multi-hazard disaster impacts

19. The Pilot physical structural assessment for non-coastal states would assist in a pilot initiative to train engineers on the assessment of the physical vulnerability of public buildings and critical infrastructure to seismic and other hazardous events. This detailed assessment will be carried out following the development of a methodology for identification of critical infrastructure, a comprehensive multi-hazard check-list and accepted assessment guidelines. A pilot initiative would also train engineers on the assessment of vulnerability of communities to landslide events. The purpose of the assessment will be to identify areas that are prone to land slip, based on the steepness of slopes, soil dynamics and propensity for exposure to high rainfall events. This subcomponent would be implemented by initiating small projects and training state-level department engineers in selected districts. To benefit the wider national population of engineers, the subcomponent will also include an easy-to-understand technical document, known as a 'Practice Guidelines' report.

20. Strengthening capacity for disaster response includes strengthening the capacity of emergency responders (local governments, first responders and other agencies involved in disaster response) in selected urban areas that are considered highly vulnerable to the impacts of earthquakes or landslides. The capacity gaps that are highlighted during the institutional analysis would be addressed under this subcomponent. This subcomponent would also facilitate upgrading search and rescue equipment's for fire-fighters, police, the National Disaster Response Force, and other first responders. Equipment upgrades will also be coupled with proper training in the use and deployment of these tools in pilot selected cities.

21. *Subcomponent C.4: Hydro-meteorological Resilience Action Plans – US$3 million***.** This subcomponent would assist states in preparing resilience action plans that will focus on extreme weather events; develop resilience solutions/recommendations for sectors impacted by disasters such as agriculture, livelihoods, energy, infrastructure etc.; and focus on urban hot-spot areas in helping develop urban resilience plans.

22. *Subcomponent C.5: Design of a National Seismic Risk Mitigation Program – US$2 million.* This subcomponent would assist the MHA and the NDMA in the design of a comprehensive National Seismic Risk Mitigation Program. This will encompass activities that will strengthen risk assessment capabilities, raising public awareness, strengthening of building codes and land-use regulations, piloting retrofitting of critical infrastructure, and developing risk financing framework.

Component D: Project Management and Implementation Support - US$24.6 million

23. This component will finance the incremental operating costs of the Project Management Unit (PMU) and the State PIUs. In addition, the component will include consultancies required for the preparation and supervision of specific activities, trainings, exposure visits and knowledge exchange programs.

Annex 3: Implementation Arrangements

INDIA: National Cyclone Risk Mitigation Project-II

1. Component C will be implemented by NDMA with support from the states. Components A and B will be implemented by the six participating states: Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal.

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, 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: Gujarat State Disaster Management Authority (GSDMA) in Gujarat, Maharashtra Department of Relief and Rehabilitation (MDRR) in Maharashtra, Department of Revenue and Disaster Management (R&DMD) in Kerala, West Bengal Department of Disaster Management (WBDDM) in West Bengal, Karnataka Department of Revenue and Disaster Management in Karnataka, and Water Resources Department in Goa. The key implementing and monitoring agencies are therefore represented by the PMU at central level and SPIUs at the state level.

4. SPIUs will have a state Project steering committee (SPSC) for the overall guidance and monitoring of the project. They will be headed by the respective Chief Secretaries. The SPSCs formally approve the project investments and take an active role in speeding up the implementation arrangements. At the implementation stage, the Project Steering Committee (PSC), formed for the PMU for NCRMP I and headed by the Secretary of NDMA, will provide strategic oversight over the operations of NCRMP II. This shall be done through quarterly 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

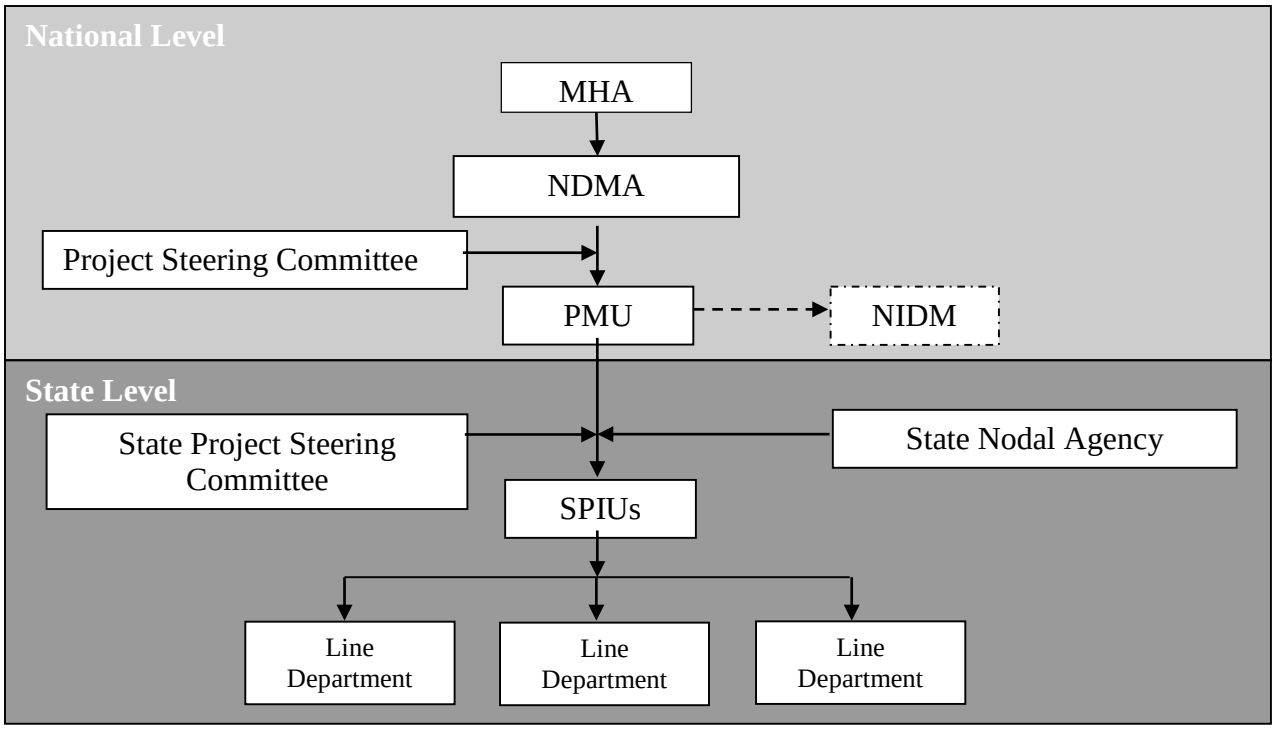
5. Similarly, at the state level, the SPSC will give strategic oversight to the project during the implementation stage. The key functions will include the following:

- Review critical findings of the audit and evaluation reports
- Supervise, guide and approve proposals of various Line Departments
- 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 component C with regards to training, NIDM will support, if required, as an Implementing Agency for Subcomponent C.2., building on the ongoing DRM capacity building role on the NCRMP I.

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

Figure 1: Project Management Structure



B. National Level Project Management and Implementation

8. At national level a PMU has been in operation within NDMA since 2010 for the NCRMP I, and the same will expand its functions for NCRMP II. The 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, 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 Component C - define requirements, derive specifications for equipment, prepare guidelines for operation and maintenance and required protocols, interact with state nodal agencies, partner agencies and carry out centralized procurement. Also implement, with support from NIDM, if required, 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.
- Facilitate communication and knowledge exchange between SPIUs.

Financial management:

- Preparation of the consolidated NCRMP 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 the ESMF are complied with in project preparation and implementation through reviews, supervision, monitoring, reporting and training support.

Overall monitoring and reporting:

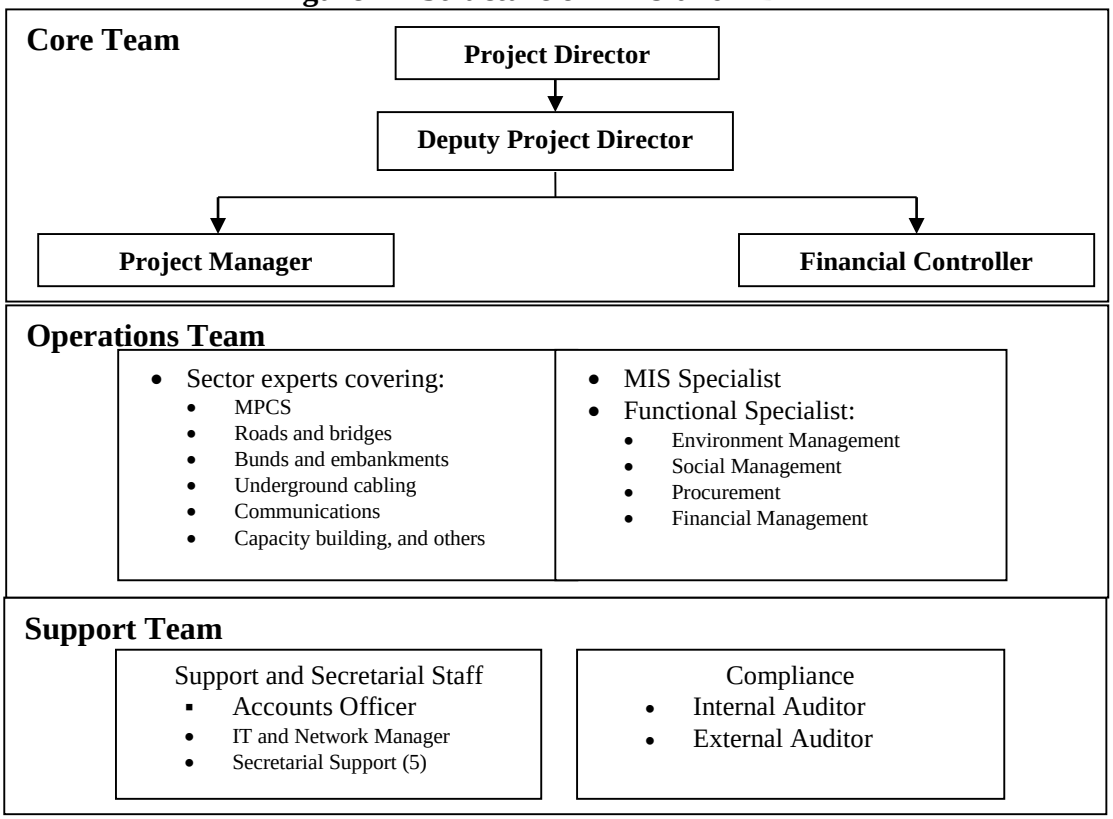
- Have oversight on project progress, monitor overall progress and outcomes.
- Establish and operationalize the web based MIS and ensure its regular updating from the SPIUs and implementing agencies. Train the user staff and manage the public viewing portal.
- Proactively gauge the problem areas, undertake preventive/control actions.
- Prepare consolidated reports and update PSC/NDMA/GoI and the Bank.

Coordination, communication and interacting with other associated agencies/organizations such as CAAA, DEA, MHA etc.

9. The structure of PMU at NDMA is depicted in the following Figure 2[10].

[10] The Sector Specialists can be full-time staff, deputed, short-time consultants, or part of a specialized firm contracted with this purpose, depending on the need and project cycle, in agreement with the Bank.

Figure 2 – Structure of PMU and NDMA



C. State Level Project Management and Implementation

10. Participating states will set up an SPIU. SPIUs[11] will be vested in disaster management agencies 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 line departments implementing the project investments, functional specialists to coordinate fiduciary and safeguard issues and other support staff.

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 line departments for implementation of Components A and B

[11] Gujarat State Disaster Management Authority (GSDMA) in Gujarat, Maharashtra Department of Relief and Rehabilitation (MDRR) in Maharashtra, Department of Revenue and Disaster Management (R&DMD) in Kerala, West Bengal Department of Disaster Management (WBDDM) in West Bengal, Department of Revenue (Disaster Management) in Karnataka, and Water Resources Department in Goa.

- 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

Financial management:

- Preparation of the 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.

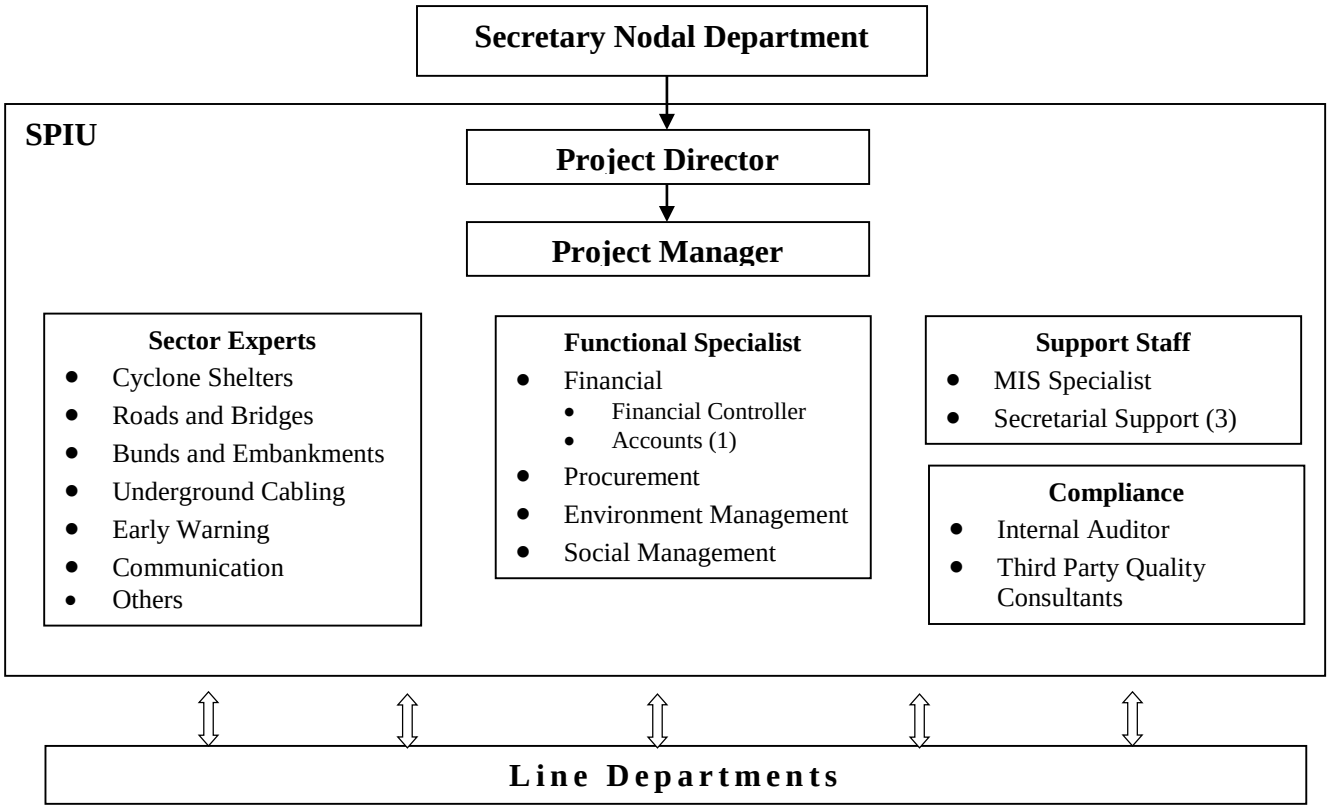
Overall monitoring and reporting

- 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

Coordination and liaison with the SPSC and other Government departments.

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

Figure 3 – Structure of SPIU[12]



D. Line Departments in the States

13. The line departments in the states shall be responsible for the actual execution of works and further maintenance of the infrastructure created. Line departments will appoint nodal officers and will execute the project through the respective field office. Line departments 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 SPIU),
- Providing technical updates on the DPRs and bid documents to the SPIU. 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 SPIU through the nodal person,
- Ensuring regular updating 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.

[12] The figure presents the sample of core staff, which will then be adapted by each SPIU in line with their respective subcomponent, and reflected in the Operations Manual.

14. *Goa*. The State PIU will be housed within the Water Resource Department (WRD) of Goa and will be the nodal agency in-charge of implementation in Goa. The construction works of MPCS and Bunds will be executed by WRD, Underground Cabling by Electricity Department of Goa, and Roads and Bridges by Public Works Department (PWD).

15. *Gujarat.* The State PIU will be housed within the Gujarat State Disaster Management Authority and will be the nodal agency in charge of implementation. The MPCS and access roads subcomponents will be implemented by the Roads & Building Department under the overall guidance of GSDMA. Underground cabling will be implemented by DGVCL and PGVCL.

16. *Karnataka*. The State PIU will be housed within the Department of Revenue (Disaster Management) in Karnataka and will be the nodal agency in charge of implementation in the state. The construction of MPCS and roads and Bridges will be executed by PWD through their line agencies while embankments will be executed by Minor Irrigation (MI) Department.

17. *Kerala*. The State PIU will be housed within the Department of Revenue and Disaster Management (R&DMD) and will be the nodal agency in charge of implementation in Kerala. The MPCS, including access roads, and footbridges subcomponents will be implemented by District Nirmiti Kendras.

18. *Maharashtra.* The State PIU will be housed within the State Relief & Rehabilitation Department and will be the nodal agency in charge of implementation in Maharashtra. The Underground Cabling subcomponent will be implemented by Maharashtra State Electricity Distribution Company Ltd, the Multi-purpose Cyclone Shelter (MPCS) subcomponent will be implemented by the Public Works Department, and the Saline Embankments subcomponent by the State's Water Resources Department.

19. *West Bengal*. The State PIU will be housed within the West Bengal Department of Disaster Management and will be the nodal agency in charge of implementation in West Bengal. The shelters subcomponent will be implemented by the Public Works Department, which is headed by the same government official. Underground Cabling subcomponent will be implemented by West Bengal State Electricity Distribution Company Ltd.

Financial Management, Disbursements and Procurement

20. The guiding principles for the design of the financial management arrangements for this project are twofold: (i) build upon the successful implementation of the NCRMP I project with the same implementing agency at the center (NDMA) and (ii) use the country fiduciary systems, to the extent feasible and considered satisfactory for meeting the essential fiduciary requirements. NDMA (at the center) will have the overall financial management responsibility for the project. At the state Gujarat State Disaster Management Authority (GSDMA) in Gujarat, Maharashtra Department of Relief and Rehabilitation (MDRR) in Maharashtra, Department of Revenue and Disaster Management (R&DMD) in Kerala, West Bengal Department of Disaster Management (WBDDM) in West Bengal, and Revenue Department (Disaster Management) in Karnataka and Goa Water Resources Department under the oversight of Revenue Department in Goa will have the respective states financial management responsibility. These agencies along with strengthening

measures proposed are assessed to have adequate financial management system for reporting project funds and expenditure and providing fiduciary assurance over the use of project funds. Further, there are multiple line departments within a state which will come together for implementation. Considering these aspects, the overall financial management risk rating of the project is 'Substantial'.

21. The parameters of the financial management arrangements are as described below.

22. **Budgeting**: At the central level, Ministry of Home Affairs (MHA) shall make an annual allocation for the project in its budget under externally aided assistance. Similarly, states will make a provision for the central as well state share of the program in their own budgets. Wherever the state is operating through the mainstream accounting and payment system, budget codes have to be opened to record component wise transactions. In case they operate through single budget line then they will have to maintain memorandum registers to track project expenditures by component/activity wise to facilitate reporting and monitoring.

23. **Fund flow arrangements.** The approved budget based on NDMA proposal will be released by MHA to states. State treasury will further release the budget to the nodal agency or directly to the line departments (based on nodal agency proposal). The funds transfer will follow specific pre-determined criteria as defined in the Financial Management Manual (FMM).

24. **Accounting.** Accounting for project expenditures will be maintained on cash basis of accounting and separate books of accounts/ ledgers will be maintained for the project. To ensure consistency in the financial management function across the project implementing entities, NDMA has prepared a FMM which compiles Project accounting policies/ procedures, funds flow arrangements, chart of accounts and formats for books of account/ reporting. Any advances paid will be classified as advances and will be charged to expenditure only upon receipt of actual expenditure detail. However, mobilization advance given as per contract terms and generally paid against bank guarantee are taken to expenditure at the time of payment. Subsequently, deductions are made from the running bills of the contractor and net amount is then booked to expenditure. The actual expenditure will be reported in quarterly IUFR and will be subject to audit certification at the end of the year. 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.

25. **Reporting:** Each state will prepare quarterly Interim Unaudited Financial Reports (IUFR) on the basis of actual expenditure information received from the line departments and actual expenditure incurred at the SPIU and will send the same to NDMA. NDMA will send consolidated IUFR to the Bank, within 45 days from the end of each calendar quarter.

26. **Staffing and training**: Considering that there are six states under NCRMP II, the existing finance staff strength at NDMA needs to be augmented. Finance manager either from the center finance services or a qualified Chartered Accountant with at least 8 years of post-qualification experience needs to be appointed. Similarly, each state finance function will be headed by a finance controller and supported by an accountant. These staff needs to be on board 3 months of project

effectiveness.

27. **Internal Controls including Internal Audit**: Reconciliation of expenditure with the AG is concurrent and would be an essential control mechanism in the Project and would be regularly followed up with the implementing department. The SPIU would maintain a contract register centrally, tracking all contracts and mobilization advances paid, settled and outstanding against these contracts together with the ageing of advances. This will provide the project with information required on pending payments and help track project progress. The Bank project will be audited six monthly by an in-house internal audit team or a firm of Chartered Accountant as agreed with the Bank. The auditors will be responsible for completing the audit at the SPIU and at the line departments divisions under TOR agreed with the Bank, and review and comment on the adherence to the rules and procedures of the state and the effectiveness of internal controls.

28. **External Auditing.** The annual external audit of the Project Financial Statements (PFS) of GSDMA will be carried out by a firm of Chartered Accountant appointed based on selection criteria agreed with the Bank and their TOR will also be agreed with the Bank. In case of states where nodal agency is a department, the C&AG of India through the office of the Accountant General (Audit state will be the external auditor. The C&AG's office will conduct an annual audit of the financial statements of the project according to the standard Terms of Reference (TORs) agreed by the Bank with the C&AG and the Government of India (Ministry of Finance/DEA) for audit of all the World Bank projects. The audit reports will be submitted to the Bank within nine months of the close of the financial year i.e. by December 31. The following audit reports will be monitored in ARCS.

Table 6: Audit Arrangements

Implementing Agency	Audit	Auditors
GSDMA, Govt. of Gujarat	Audit of project financial statements	Private Auditors
Maharashtra Department of Relief and Rehabilitation (MDRR), Govt of Maharashtra	Audit of project financial statements	CAG of India through the Accountant General Maharashtra
Revenue and Disaster Management Department (R&DMD), Govt of Kerala	Audit of project financial statements	CAG of India through the Accountant General Kerala
West Bengal Department of Disaster Management (WBDDM), Govt of West Bengal	Audit of project financial statements	CAG of India through the Accountant General West Bengal
Revenue Department, Govt of Karnataka	Audit of project financial statements	CAG of India through the Accountant General Karnataka
Water Resources Department, Govt of Goa	Audit of project financial statements	CAG of India through the Accountant General Goa
NDMA	Audit of project financial statements	CAG

29. **Implementation Support Plan**. Initially, the Bank will undertake quarterly missions in a manner that each of the states is visited at least once in a year. The focus during the supervision will be on reviewing the adequacy and operation of procedures and internal controls at SPIU and field divisions, functioning of project financial reporting system, reviewing the funds flow position

and reviewing that the observations of the external and internal auditors are addressed timely.

30. **Disbursement Arrangements.** Each state budget will pre-finance all the project expenditure through its own funds (through the budget line) and reimbursements from the credit will be made on the basis of actual expenditure reported in the quarterly IUFRs, subject to audit certification at the end of each financial year. Expenditure categories eligible for financing under the credit agreement and as per the disbursement percentage will be financed out of the proceeds of the credit. The actual expenditure will be reimbursed to the project and no advances will be provided. The project will submit withdrawal application to CAAA in DEA for onward submission to the World Bank for reimbursement.

31. **Retroactive Financing**. Retroactive financing up to a limit of US$61 million (max is 20%) of the credit will be available to the project to cover eligible project expenditures as agreed with the Bank, provided (a) the payments are made not more than 12 months before the expected date of signing of the legal agreements; (b) the activities financed by retroactive financing are related to the DOs and are included in the Project description; (c) the payments are for items procured in accordance with the applicable Bank procurement procedures. Retroactive financing of all expenditure would be based on a separate, stand-alone audited project financial statements.

32. **Public Disclosure.** In line with the Bank's Access to Information policy the annual audit report and project financial statements issued by the auditors will be disclosed in the project's website.

The agreed actions and the dates for completion of the issues are indicated in the table below:

Table 7: Financial Management Arrangements

S.No.	Description	By whom
1.	Create budget code with allocation for project at state	Participating States
2.	Sanction the post of finance controller and accountant	Participating States
3.	Modify Financial Management Manual	NDMA
4.	Discuss and finalize any changes in financial power delegations	NDMA & Participating States
5.	Discuss and finalize changes in tranches of releases to the States	NDMA
6.	Appoint internal auditors	NDMA and participating States

Procurement

33. Procurement of all goods, works and non-consulting services required for the proposed Project and to be financed out of the proceeds of the Financing shall be done in accordance with the requirements set forth or referred to the Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers (January 2011 updated July 2014). Selection of consulting services required for the proposed Project and to be financed out of the proceeds of the Financing shall be done in accordance with the requirements set forth or referred to in the Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits by World Bank Borrowers (January 2011 updated July 2014); and the provisions stipulated in the Financing Agreement.

34. For each contract to be financed by the loan/credit, the different procurement methods or consultants selection methods, prior review threshold, timeframe etc. are agreed 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. General Procurement Notice (GPN) was published on October 16, 2014 in UNDB and Specific Procurement Notice (SPN) shall be published against corresponding contract packages when it becomes ready. All goods, works and services financed under the proposed project shall be procured using the Bank's Standard Bidding Documents (SBDs) and Standard Request for Proposals (SRFPs).

Implementation Arrangement for the Project:

35. The project shall be implemented using similar institutional and implementation arrangements under NCRMP I both at central and state level. At the central level, NDMA on behalf of MHA will house the PMU with the mandate to manage the project with overall responsibility for implementation. The existing PMU which headed by a Project Director and supported by technical expert and management staff shall be strengthened.

36. At the state level the existing nodal agency for disaster management (e.g., State Disaster Management Authorities or Revenue/Relief Departments) would be responsible managing the project and will have a State Project Implementation Units (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.

37. **Procurement Cell and Staffing:** The PMU/SPIU shall establish procurement cell with adequate procurement staff. The procurement cell shall operate under the overall directions and guidance of Project Director in PMU and state Project Director in SPIU. All procurement activities under this project shall be processed through this cell in coordination with technical units/line departments.

Procurement arrangements and Capacity Assessment of the Implementing Agencies at the State level

38. At the central level, the project will be coordinated and implemented by NDMA while at the state level (Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal), 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 State Project Implementation Units (SPIU) playing the coordination/project management role. Procurement activities will be carried out by various agencies (NDMA, SPIU, line departments in different states). These agencies will be staffed by procurement officer who will receive adequate training in Bank funded procurement. A one-day induction course on Bank funded procurement procedures had been conducted in May 2014 and refresher training course shall be conducted as and when required during the implementation stage.

39. The existing PMU established under NCRMP I in NDMA will be implementing Components C and D of the project. The procurement risk assessment was carried out using Procurement Risk Assessment Management System (PRAMS) questionnaire. Considering the exposure to Bank procurement procedures and experience gained during implementation of NCRMP I, the procurement risk rating for PMU in NDMA is moderate. However, as the implementation of NCRMP II is spread over six costal states, there is need to strengthen the capacity of the existing PMU by recruiting technical experts and management staff to cover up the work load in six states Goa, Gujarat, Karnataka, Kerala, Maharashtra, West Bengal.

40. ***Goa***: The State PIU will be housed within the Water Resources Department (WRD) of Goa and will be the nodal agency in-charge of implementation in Goa. Procurement in Goa involves construction of MPCS, rehabilitation of Bunds, underground electrical cabling and construction and rehabilitation of Roads and Bridges. The construction works of MPCS and Bunds will be executed by WRD, Underground Cabling by Electricity Department of Goa, and Roads and Bridges by Public Works Department (PWD).

41. Capacity assessment of the SPIU was carried out using PRAMS questionnaire, face to face discussion and desk review. The government of Goa is using CPWD specification which defines the legal framework for public procurement. The existing PMU for Hydrology Project II (P4749) will be the PMU for NCRMP II as well and the staff working in PMU are familiar with Bank Procurement procedures. However, agencies like Electricity Department and PWD are not familiar with the Bank Procurement procedure and therefore, needs to undergo Bank Procurement procedures training. Therefore, PMU will be responsible for overall coordination as well as review of procurement process of other departments. It was also noted during the assessment that Goa government is using e-procurement portal KEONICS. However, this system was not assessed by the Bank and cannot be used for Bank funded project until it has been assessed and cleared by the Bank. Until such assessment is completed and cleared, Goa government will use manual bidding for this Project. Therefore, transparency of tendering process could be of concern for the project. In view of this, procurement risk is rated as "substantial". However, after completing the mitigation measures, the residual risk would stand at "**moderate**".

42. ***Gujarat***: The State PIU will be housed within the Gujarat State Disaster Management Authority (GSDMA) and will be the nodal agency in-charge of implementation. Procurement would involve building cyclone risk mitigation infrastructure such as MPCS, access roads and bridges and underground cablings and it will be conducted through n-Code e-procurement portal. Procurement of goods and services will be done by SPIU, while procurement of works will be done by the line departments MPCS and access road by Roads & Building Department; underground cabling by Dakshin (South) Gujarat Vij Company Ltd. (DGVCL) and Paschim (West) Gujarat Vij Company Ltd. (PGVCL) under the overall guidance of GSDMA. State government in Gujarat is using e-procurement system called n-Code. The n-Code system was assessed by the Bank and it was cleared for its use for NCB. During the project preparation, capacity assessment was conducted using PRAMS questionnaire and the resultant risk rating for GSDMA is moderate. GSDMA and its line department has adequate staff in place including procurement officer, however, the staff are not familiar with Bank procurement procedures.

43. ***Karnataka***: The State PIU will be housed within the Revenue Department (Disaster Management) in Karnataka and will be the nodal agency in-charge of implementation in the Karnataka. Procurement in Karnataka involves construction of MPCS; rehabilitation of embankments; and construction and rehabilitant of roads and bridges in three districts. The procurement for construction of MPCS and roads and Bridges will be executed by PWD through their lines agencies while Embankments will be executed by Minor Irrigation (MI) Department.

44. Capacity assessment of the SPIU was carried out using PRAMS questionnaire, face to face discussion and desk review. The government of Karnataka is using PWD manual as a legal framework for public procurement. The PWD and MI Department had executed Bank funded project in the past and are familiar with the Bank Procurement procedures. The government of Karnataka is also using e-procurement portal for processing procurement in the State. A Project Director has been already designated and he is also the nodal officer for Procurement. As the investment amount is very small, the government is of the view that, all procurement will be completed in the first year itself. In consideration of these issues, the procurement risk has been rated as "**moderate**".

45. ***Kerala***: The State PIU will be housed within Department of Revenue and Disaster Management (R&DMD) and will be the nodal agency for implementation of NCRMP II in Kerala. The line agency (s) (District Nirmithi Kendra) in 9 districts shall prepare bid documents and submit to SPIU for review and bid processing. Bid for procurement of goods and civil works shall be done using Bank's model NCB document and shall be processed through NIC e-procurement portal. All NCB bids shall be opened virtually. The Procurement Officer at SPIU shall be one of the bid opening members. After opening the bids, respective line agencies shall carry out bid evaluation and the report shall be submitted to the SPIU with recommendation for the award of the Contract to the lowest evaluated bidder. The SPIU shall review and issue clearance for the bid evaluation report and draft Contract Agreement and may authorize respective District Nirmithi Kendra to sign a Contract on behalf of SPIU. The District Nirmithi Kendra shall take the responsibility of monitoring and supervision of the concluded Contract. In addition, the SPIU shall also engage third party TPQC to oversee overall quality assurance.

46. Capacity assessment of the SPIU was carried out using PRAMS questionnaire, face to face discussion and desk review. The government of Kerala is using State Purchase Manual. However, there are conflicting clauses such as price preferential treatment for local products, participation by government PSUs etc. The proposed project shall be implemented by SPIU through the support from District Nirmithi Kendra. The SPIU is yet to recruit procurement officer in SPIU and staffs from District Nirmithi Kendra while technically qualified, are not familiar with the Bank procurement procedure. Therefore, procurement risk has been rated as High. During the preparation visit, procurement arrangements were simplified, SPIU will recruit procurement, training on Bank procurement procedures shall be provided and handholding support shall be provided as and when required. After all these mitigation measures, the residual risk for the GoKe shall stand at "substantial".

47. ***Maharashtra***: The State PIU will be housed within the State Relief & Rehabilitation Department (SRRD) and will be the nodal agency in-charge of implementation in Maharashtra. Procurement would involve construction of MPCS; underground cabling and construction of

Saline embankment and bunds. The Coastal Engineer Public Works Department (PWD) will execute construction of MPCS; Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) for underground Cabling works; Project Director & Superintending Engineer Kharland Development Circle, Thane, Water Resources Department for Saline Embankment and bunds. All tendering will be processed at the Departmental level in close coordination with the SPIU using NIC e-procurement portal. The nodal officers for procurement in all agencies have been designated.

48. Government of Maharashtra is using "Manuals on Policies and Procedures for Purchase of Goods" which is a guiding principle for public procurement in the state. The Manual which has been prepared in conformity with applicable directives contained in GFR 2005 and covers general policies and procedures on public procurement for goods, works and services. The Manual provides preferential treatment to certain groups/items which are deviating from the Bank procurement procedures. However, the manual has a provision which states that donor funded projects shall follow procurement procedure of donor agencies as agreed in loan/financing agreement. Delegation of powers is as per the Chapter 6 of GFR 2005. The manual also has a procedure on dispute resolution.

49. The staffs handling procurement are generally well versed on the government procurement procedure. However, none of the department has handled external funded project in the past and following Bank procurement procedure would be a challenge. Therefore, the Bank team shall conduct 3 day training as well as handholding support wherever necessary. The overall risk rating for the Maharashtra is "substantial".

50. ***West Bengal***: The State PIU will be housed within the Department of Disaster Management (WBDDM) and will be the nodal agency in-charge of implementation. Procurement in West Bengal would involve construction of MPCS and underground cabling. The PMU through the line department such as PWD will execute construction of MPCS and underground cabling. They have already established SPIU with adequate staff including procurement officer. Four Engineers from PWD has been deputed to SPIU, strengthened the capacity of SPIU by recruiting staff from the market and have also initiated tendering of 150 MPCS While the staff are new to Bank Procurement procedures, the State Project Director is familiar with Bank Procurement procedures as he is also a nodal officer for ICZMP Project. West Bengal is the first state to migrate their procurement plan in SEPA system. In consideration of all these factors, the procurement risk for West Bengal is rated as "moderate".

51. Considering the capacity assessment results of multiple IAs across the country with different capacity levels, the overall risk for the Project has been rated as "**substantial**". Following mitigation measures are suggested in addressing the risk as tabled below.

Table 8: Procurement Risk and Mitigation Measures

Risk factor	Rating	Mitigation measures	Residual risk
Legal framework	Substantial	• All IAs shall use Bank SBDs and SRFP for procurement of goods, works and services. • Project Procurement manual was prepared to ensure consistency and adherence to the Bank procurement procedures.	Moderate

Institutional framework and staffing	High	• Setting up of State PIU with clear roles and responsibilities or line of control; • Recruitment of qualified staff. Staff not familiar with Bank procurement procedures will attend training in ASCI/NIFM, etc. • Provide hand holding support to all state IAs as and when required.	Substantial
Inconsistencies in procurement system	High	• Use of Bank approved Standard Bidding Documents; • Attending training/workshops etc.	Substantial
Lack of transparency, fairness and grievance mechanism system in procurement process	High	• Use of e-procurement system, MIS at NDMA, establishing grievance mechanism system etc.	Substantial
Multi-institutional implementation could lead to delay in procurement	High	• Strengthen capacity at NDMA so that there is proper coordination with all the IAs across the state; • Regular dialogues among the stakeholder at all times.	substantial
Overall residual risk			**Substantial**

52. Procurement risk and the progress on various mitigation measures will be re-assessed during the implementation phase and risk rating will be done accordingly. Further, Bank will conduct post review of those contracts falling under Bank's post review threshold level. Therefore, concerned IA is required to make all relevant documentation available to the Bank or its nominated auditors, as and when required.

Procurement arrangements under NCRMP II

53. The NCRMP II consists of four components: A) Early Warning Dissemination System; B) Cyclone Risk Mitigation Infrastructure; C) Technical Assistance for Multi-Hazard Risk Management; and D) Project Management and Implementation support. Components C and D will be implemented by NDMA while, components A, B and D will be implemented by respective SPIUs/line departments.

Procurement of Goods, Works and non-consulting services

54. For each contracts to be financed by the loan/credit, the different procurement methods or consultants selection methods, prior review threshold, timeframe etc. are agreed 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. All goods, works and services financed under the proposed project shall be procured using the Bank's Standard Bidding Documents (SBDs) and Standard Request for Proposals (SRFPs).

Procurement of Goods

55. At the state level, procurement of goods would involve cyclone shelter kits, office

equipment, furniture etc. Procurement shall be conducted using Bank's SBD as agreed with GOI Task Force (and as amended from time to time) for the National Competitive Bidding (NCB) with additional provisions mentioned below. Procurement of goods would also include supply and installation of early warning equipment and public address system for relaying the warning/advisories to the communication directly to the communities along the costal line 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 channels. The component also includes providing satellite phones/alternative technology to key officials to fail proof the EWDS and also expand a new radio based wireless communication technology in selected blocks in each state. The EWDS shall be installed along the costal lines in the state of Goa, Gujarat, Karnataka, Kerala, Maharashtra, and West Bengal.

Procurement of Works

56. Procurement of civil works under this project would include creation of physical infrastructure for cyclone risk mitigation under component B. this would include construction of Multipurpose Cyclone Shelter (MPCS) as safe place during cyclone, access roads and bridges to MPCS, embankments for protection against salinity ingress, drainage improvement measures and retrofitting of key installations. International Competitive Bidding (ICB) is unlikely to happen as most of the Contract packages fall below ICB threshold. Procurement of works in all states shall be done using National SBD as agreed with GoI Task Force (and as amended from time to time) and the following additional provisions shall apply:

- Only the model bidding documents for NCB agreed with the Government of India's Task Force (and as amended from time to time), shall be used for bidding.
- Invitations for bid shall be advertised in at least one widely circulated national daily newspaper (or on a widely used website or electronic portal with free national and international access along with an abridged version of the said advertisement published in a widely circulated national daily inter-alia giving the website/electronic portal details from which the details of the invitation to bid can be downloaded), 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 with the prior concurrence of the Bank, there shall be no negotiation of price with the bidders, even with the lowest evaluated bidder.
- Extension of bid validity shall not be allowed with reference to Contracts subject to Bank prior review without the prior concurrence of the Bank (i) for the first request for extension if it is longer than four weeks; and (ii) for all subsequent requests for extension irrespective of the period (such concurrence will be considered by Bank only in cases of Force Majeure and circumstances beyond the control of the Purchaser/ Employer).
- Re-bidding shall not be carried out with reference to Contracts subject to Bank prior review without the prior concurrence of the Bank

- The system of rejecting bids outside a pre-determined margin or "bracket" of prices shall not be used in the project
- Rate contracts entered into by Directorate General of Supplies and Disposals (DGS&D) will not be acceptable as a substitute for NCB procedures unless agreed with the Bank on case to case basis. Such contracts will be acceptable however for any procurement under the Shopping procedures.
- Two or three envelope system will not be used (except when using e-procurement system assessed and agreed by the Bank)

57. **Shopping:** Shopping method in accordance with paragraph 3.5 of the Procurement Guidelines shall be adopted for procuring readily available off-the-shelf goods of value less than US$100,000 or simple civil works of value less than US$200,000. For shopping procedure, list of vendors/contractors already registered with government departments may be used for inviting quotations. The procurement plan should determine the cost estimate of each contract, and the aggregate total amount. The borrower should solicit at least three price quotations for the purchase of goods, materials, or services (non-consulting), to formulate a cost comparison report.

58. **Direct Contracting:** Goods, works and non-consulting services which meets the requirement of para 3.6 of the Bank Procurement Guidelines may be procured following Direct Contracting method.

59. **Advance Procurement:** Retroactive financing up to an amount of 20% of the project amount will be available for financing expenditures incurred 12 months prior to Loan signing.

Selection of Consultants:

60. Procurement of Consultants by all the IAs will be conducted using Bank's Standard Request for Proposal (SRFP) for selection of consultants. Consultancies will be procured under Components C and D to undertake studies on multi-hazard risk modeling and assessment, to build institutional capacities of various stakeholders in strengthening emergency recoveries, enhancing capacities for disaster risk management and response in non-costal states, technical assistance to states for preparing high priority risk mitigation investments etc. The consultancies may also be procured for Project Management Consultants (PMCs), Third Party Quality Consultants (TPQC) for works, internal and external auditors and individual consultants for specific inputs. The following methods will be adopted depending upon size and complexity of assignments and as agreed in the Procurement Plan.

- Quality and Cost Based Selection (QCBS);
- Quality Based Selection (QBS);
- Selection under Fixed Budget (FBS);
- Least Cost Selection (LCS);
- Selection based on Consultant's Qualification (CQS);
- Single Source Selection (SSS); and
- Individuals.

61. Short list of consultants for services estimated to cost less than US$800,000 equivalent per

contract may be composed entirely of national consultants in accordance with the provision of paragraph 2.7 of the Consultants Guidelines.

62. **Method of Procurement:** The following methods of procurement shall be used for procurement under the project. It is to be noted that if a particular invitation for bid comprises of several packages, lots or slices, and invited in the same invitation for bid, then the aggregate value of the whole package determines the applicable threshold amount for procurement and also for the review by the Bank.

Table 9: Procurement Methods

Category	***Method of Procurement***	***Threshold (US$ Equivalent)***
Goods and Non-consulting services(including IT contracts)	*ICB*	*>3,000,000*
	LIB	*wherever agreed by Bank*
	NCB	*Up to 3,000,000 (with NCB conditions)*
	Shopping	*Up to 100,000*
	DC	*As per para 3.7 of Guidelines*
	Force Account	*As per para 3.9 of Guidelines*
	Framework Agreements	*As per para 3.6 of Guidelines*
Works	*ICB*	*>40,000,000*
	NCB	*Up to 40,000,000 (with NCB conditions)*
	Shopping	*Up to 200,000*
	DC	*As per para 3.7 of Guidelines*
	Force Account	*As per para 3.9 of Guidelines*
Consultants' Services	*CQS/LCS*	*Up to 300,000*
	SSS	*As per para 3.9-3.11 of Guidelines*
	Individuals	*As per Section V of Guidelines*
	QCBS/QBS/FBS	*for all other cases*
	(i) International shortlist *(ii) Shortlist may comprise national consultants only*	*>800,000* *Up to 800,000*

Prior Review by the World Bank

63. The Bank shall prior review the following contracts:

- Goods: All contracts more than US$ 1million equivalent;
- Services (Other than consultancy): All contracts more than US$ 1 million equivalent;
- Consultancy Services: Above US$ 500,000 equivalent for firms; and US$ 200,000 equivalent for individuals.

64. The Bank shall prior review the first contract package issued by each implementing line agency. In addition, the Bank will review the justifications for all contracts to be issued on LIB, single-source up to US$30,000 or direct contracting up to US$30,000. The Bank will provide handholding support all IAs on as and when required basis. These thresholds are for the initial 18 months period and it may be modified based on the procurement performance of the project.

65. **Supervision mission**: In addition to the prior review to be carried out by the Bank office,

procurement staff will participate in two formal review missions annually, along with the implementation support mission which will include Procurement Post Review (PPR). For the avoidance of doubts, the Bank shall be entitled to conduct, at any time, independent procurement reviews of all the contracts financed under the Credit. The IA shall prepare a list of contract and submit it to the Bank for conducting PPR. The PPR will be conducted on annual basis.

66. **Procurement Planning:** All IAs shall prepare Procurement Plan covering first 18 months of the project implementation. The prior review thresholds will also be indicated in the procurement plan. The Procurement Plan shall be agreed between the Borrower and the Bank before negotiation and shall be subsequently updated annually (or earlier/later, if required) and will reflect the changes in prior review thresholds, if any. All Procurement Plans, their updates or modifications shall be subject to Bank's prior review and no objection before implementation. In addition, the Bank will carry out an annual ex post procurement review of the procurement falling below the prior review threshold mentioned above.

67. **SEPA**: An online Procurement Plan Execution System (SEPA) shall be adopted to prepare Procurement Plan once the initial Procurement Plan has been agreed. It is a web-based tool owned by the Bank which helps in tracking dates of the different stages of a procurement activity that is planned or under implementation. The system establishes a new, easy to use, and more efficient way for Bank team and the clients to interact, while at the same time providing an audit trail of the process. The Bank will make arrangements to train the staff of IAs in operating SEPA.

68. **Complaint Handling Mechanism**: All IAs shall establish complaint handling mechanism to address complaints/grievances from contractors/suppliers more effectively. On receipt of complaints, immediate action will be initiated to acknowledge the complaint and redress within a reasonable timeframe. All complaints during bidding/award stage as well as complaints during the contract execution along with the analysis and response of the PMU/PIU shall invariably be submitted to the Bank for review.

Anti-Corruption Measures

69. **Disclosure Requirements**: The project shall comply with the disclosure requirements stipulated in the Banks' Procurement Guidelines and Consultant Guidelines, January 2011 updated July 2014. Accordingly following documents shall be disclosed on the project's website (NDMA for PMU and respective SPIUs): (a) Procurement Plan and all subsequent updates; (b) invitations for bids (IFB) for goods; (c) requests for expression of interest (REOI) for selection/hiring of consulting services; (d) short list of consultant; (e) contract awards; (f) lists of contracts following Direct Contracting (DC), Consultant Qualification Selection (CQS), or Single Source Selection (SSS) on a quarterly basis; and (g) action-taken reports on the complaints received on a quarterly basis.

70. The following details shall be published by PMU/SPIU through client connection or sent to the Bank for publishing on their behalf on the Bank's external website and UNDB *online*: (a) General Procurement Notice (GPN); (b) requests for expression of interest for consulting services estimated to cost more than US$300,000; and (c) contract award details of all consulting services, with estimated cost of more than US$300,000. The project shall also publish on its website any

information required under the provisions of disclosure, as specified by the Right to Information Act of India.

Environmental and Social (including safeguards)

Social

71. The follow up project NCRMP II, sequel to NCRMP I presents similar set of social aspects and issues in terms of scope and range as documented and addressed under NCRMP I. The assessments of NCRMP II in the Project States Goa, Gujarat, Karnataka, Kerala, Maharashtra and West Bengal reveal maximum benefits to project population with minimum safeguard risks. Assessment in Goa will have to be taken up after the sub-projects are identified during project implementation. The project components building/strengthening physical infrastructure cyclone shelters, bunds, habitation connectivity roads provide immediate relief and rehabilitation to the local communities during the periods of natural calamities. The expected social outcomes of the project are decreased vulnerability during calamities from: (i) strengthened physical capital shelter buildings, bunds and habitation connectivity; (ii) increased availability of social infrastructure for different community purposes during normal periods; and (iii) improved safety to the people and the assets; (iv) enhanced disaster resilience of coastal communities with secure public infrastructure and services in the worst affected areas.

72. *Impacts on people and land:* The inherent safeguard risks posed by the project are as follows: (i) obtaining land in few cases where suitable government land may not be available for building cyclone shelters, rural roads, embankment strengthening, etc; (ii) addressing implementation capacity issues at the state level; (iii) having to apply the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLA&RR 2013), which has come into force from January 1, 2014 for taking private land for project activities; (iv) ensuring community participation in the reconstruction process; (iv) addressing differential impacts of the affected vulnerable/ marginalized families and groups, specifically socially excluded families living in isolated habitations, women headed households, and differently abled persons.

73. Assessments and experience till date from NCRMP I indicates that no private land has ever been acquired for building physical infrastructure under the Project, except one case in Andhra Pradesh. The assessments made under NCRMP II for all sub projects in all the Project States till date also presents requirement of no land acquisition. All the multipurpose cyclone shelters are planned either in the existing school premises or on government lands. The embankments will use the existing alignments and are therefore unlikely to involve additional land requirement except for minor widening/upgradation where required by design. All the rural habitation connectivity roads are proposed are on the existing tracks in general, and restricted to the width as available in the Revenue Records. Consequently the land acquisition under the project is envisaged to be minimal. 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.

74. *Management of Social Risks:* The Project will provide physical infrastructure consisting

cyclone shelters, bunds/embankments, habitation connectivity roads. Almost all the works are planned to be taken up using government lands. Wherever small parcels of lands required shelters and for geometric improvements of roads, bunds, those land parcels preferably pursued through voluntary land donation or land purchase. Land will also be acquired through LA and R&R Act, 2013, but will be used sparingly as last resort largely to avoid time overruns. The Bank Operational Policy on Involuntary Resettlement (OP 4.12) has been triggered to deal with involuntary resettlement. OP 4.10 has not been triggered as there are no tribal habitations with unique socio-cultural identity vis-à-vis the mainstream population in the Project locations.

75. NDMA has prepared an Environment and Social Management Framework for the World Bank funded National Cyclone Risk Mitigation Project I (NCRMP I), wherein it was applied and implemented in the two participating states of Odisha and Andhra Pradesh. The same ESMF has now been revised/updated and will be used for the Project States proposed under National Cyclone Risk Mitigation Project II (NCRMP II). The revised document reflects the changes in regulatory requirements/ procedures that have come into effect post-2009 and takes into account the experiences/lessons learnt from the implementation of the first project. The revision/updating has also considered the baseline or existing environmental and social characteristics of the Project states proposed under NCRMP II. The use of this framework will be extended to any additional state/s that may be proposed for inclusion under NCRMP II, with modifications, as and if needed, in line with the nature/type of proposed mitigation works and/or the requirements related to baseline characteristics of the area proposed for coverage.

76. The Social Management Framework of ESMF provides (a) entitlement matrix for mitigating adverse impacts in line with National Acts and World Bank Policies; (b) measures to address the special needs of the vulnerable families, Scheduled Castes communities, single women headed and other vulnerable families; and (c) guidelines for free, prior, and informed consultation with the communities, ensuring community capacity building and participation, grievance redress, information disclosure and monitoring and evaluation. The salient features of the Framework include compensating and assisting the title and non-title holders at replacement cost and R&R assistance along with relocation support for the community/commonly owned properties.

77. Prior to the preparation of the DPRs the social impacts will be first identified using the screening checklist. If adverse impacts found, full scale SIA and preparation of RAP will be undertaken. All measures proposed in the RAP to mitigate adverse impacts will be completed before the start of works. Evaluation studies will be undertaken to assess the implementation effectiveness of the R&R measures and their outcomes on the people affected.

78. *Implementation Arrangements:* The Implementation of the ESMF provisions including the RAP is the responsibility of the SPMUs and will be monitored by the SDMA or the nodal department. The web based MIS will be used to monitor and track the implementation of the provisions of the ESMF. The SPIUs will have a nodal Social Development Officer. An orientation workshop on social and environment will be conducted for concern officers in all the Project States. Periodic training programs will be conducted for reorientation on the issues and also to orient the new staff joining the project later.

79. *Grievance Redress:* In the project all efforts will be made by so that the

compensation/assistance package for PAF's 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 in charge 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 PMU. 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 PMU will be responsible for maintaining a record of the proceedings and the final decisions.

Environment

80. The proposed investments under Component B of the project to create risk mitigation infrastructure include building of multi-purpose emergency shelters, upgrading of roads to provide connectivity to cyclone shelters, underground electric cabling, construction of bridges and strengthening of saline embankments/bunds. These activities are central to the approach and design for environment management and safeguards aspects of the project since they have a potential to create significant or irreversible impacts on natural and physical environment in a coastal area, if not managed appropriately. Activities under other components would focus on multi-hazard risk modeling and assessment, capacity building for Disaster Risk Management; implementation support and other such softer aspects. Any significant or irreversible adverse impact on environment is not envisaged from the implementation of such proposed interventions.

81. *Potential Issues/Impacts.* While the project is expected to benefit the coastal communities in the participating states by reducing their vulnerability to cyclone and other hydro-meteorological hazards through creation of cyclone risk mitigation infrastructure and early warning systems, the proposed investments may have some adverse environmental impacts Since works would be largely carried out in the coastal realms of states that are marked by various degrees of vulnerability and some sensitive environmental features, there are some risks or issues that need to be managed through appropriate planning and upfront care during the site selection process, particularly in case of sub-projects located close to the shoreline or high tide line influence area or in low lying area/s.

82. Potential adverse impacts on account of activities/works proposed under Component B of the project 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 (including endangered fauna); (iii) felling of trees and clearance of vegetation for sub-project construction; (iv) impacts on water resources used by the people; (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) concerns arising out of improper disposal of debris and other construction wastes.

83. In view of the potential impacts on the environment, Bank's OP 4.01 on Environmental Assessment, OP 4.04 on Natural Habitats and OP 4.11 on Physical Cultural Resources have been triggered, and the project is designated as Category A. On the whole, with proper planning and implementation of management measures, the project interventions are not likely to cause large scale, significant or irreversible damage to natural and/or physical environment.

84. *Overall Environment Management Process.* In order to ensure effective environmental management in a scenario where multiple sub-projects are proposed along different locations in the coastal areas of six participating states and their specific locations are not known at the time of over-all project design, an approach for preparation, application and implementation of an Environment and Social Management Framework (ESMF) has been adopted for the project.

85. The ESMF was originally prepared for NCRMP I, wherein it was applied and implemented in the two participating states of Odisha and Andhra Pradesh. The framework has now been revised/updated and is being used for NCRMP II. The revised document reflects the changes in regulatory requirements/ procedures that have come into effect post-2009 and takes into account the experiences/lessons learnt from the implementation of the first project. The revision/updating has also considered the baseline or existing environmental and social characteristics of the participating states (Goa, Gujarat, Karnataka, Kerala, Maharashtra and West Bengal) proposed to be covered under NCRMP II.

86. The ESMF will serve 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 concerns/issues are systematically identified and integrated into the project/sub-project cycle. It guides the integration of environment, health and safety 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 has been/is being carried out in parallel with the project identification/engineering feasibility studies for the sub-projects under consideration for inclusion in the project. Proposed investments have been/are being screened and sub-projects with no significant adverse environmental impact are being identified for implementation under 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. The results are being collated state-wise in the form of Screening Reports. The process and documentation structure for environment screening exercise was developed under NCRMP I (currently under implementation in Odisha and Andhra Pradesh) and was found to be quite effective in identifying issues early-on even in a scenario where a large number of sub-projects (400+ in each state) were being considered in a single state.

(ii) For sub-projects with a potential for significant adverse environment impacts (as identified from the screening results), an *Environment Assessment* (EA) and *sub-project specific Environment Management Plan* (EMP) will be prepared in accordance to 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 primarily expected to be limited to strengthening of saline embankments/bunds and underground electric cabling works.

(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 over-all guidance on avoidance, minimization and mitigation measures to be adopted during the planning/selection, design, implementation and operation stages of a sub-project and may be tweaked appropriately to suit the specific conditions in the field/state.

87. *Integration of Environmental Requirements in Bidding Documents.* The considerations/ requirements will be mainstreamed as part of the over-all decision making and execution process. For environment, health and safety requirements to be followed by the Contractor during construction, the requirements in form of conditions/specifications and Bills of Quantities (as required/relevant) will be integrated into the Bidding Documents.

88. Key Environmental *Parameters Considered.* 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; flooding and water logging/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 and cultural properties.

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

- 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/are being selected for investment in the first phase/year 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 about their possible inclusion.
- Use of GIS mapping and remote sensing technology to finalize the exact location of a sub-project – as has been done in both Odisha and Andhra Pradesh under NCRMP I, thereby avoiding significant 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 road and bridge works.
- The use of the cyclone shelter in normal (non emergency/disaster period) times, is being

decided in consultation with the community.

90. *Consultation.* Stakeholder involvement mechanisms are/will be central to the design and implementation of the project and provide opportunities for information sharing, consultation and collaboration measures. Guidance for this purpose has been laid out in the Environment and Social Management Framework to ensure proper consultation and involvement of key stakeholders during key stages of sub-project preparation and implementation. As part of the project preparation, extensive public consultation is being carried out to appraise people about over-all project objectives and inform sub-project selection.

91. In accordance with the applicable Bank policies, public consultations at the local level (in areas where specific investments will be made) have been carried out for investments/sub-projects identified so far. The consultation process for the project includes 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. The public consultation has been designed in a way that: (i) affected people are included in the decision making process; (ii) public awareness and information sharing on project alternatives and benefits are promoted; and (iii) views on designs and solutions from the communities are solicited.

92. Inputs/feedback on the ESMF and views of the stakeholders on the approach towards minimization/ mitigation of potential negative impacts on people and environmental resources has been sought. Expert opinion on specific issues related to the over-all design/components of the project and applicability of environmental regulations is also being sought during meetings/ workshops. Outputs from this process will be integrated into the project design, where technically feasible. Public involvement and participation process will continue through the project implementation stage as well.

93. *Disclosure:* The draft ESMF document (March 12, 2014 version) has been made public through the Project Authority's website and has also been disclosed at Bank's PIC/Infoshop. The final version was disclosed on October 7, 2014, with a further updated version prepared on February 18, 2015. Other relevant project documents such as screening reports (which also include documentation from the public consultation exercises), EAs and EMPs will be disclosed on the NDMA and the state websites in line with the requirements of Bank's Operational Policies.

94. *Staffing Arrangements for Environmental Management.* Staffing arrangements for environment management in the project are given below.

- At NDMA/PMU, an Environmental Specialist has been deployed to handle all matters pertaining to environmental management in the project (for both NCRMP I and II), including activities related to project planning and preparation, supervision, monitoring, evaluation, reporting and documentation. This role of this specialist also includes dealing 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/Independent Audit) and; co-ordination with the participating SDMAs on environmental activities in the project.

- At the state level, an Environment Officer (EO) will be appointed as part of the SDMA/Nodal Department's team, whose main responsibilities will include co-ordination with DoEF/other state agencies to obtain regulatory clearances in time 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 Environmental Officer shall also be responsible for data collation and documentation on environmental aspects of the sub-projects in the state. State level Environment Officers have already been designated in Kerala and Maharashtra.
- At the sub-project level, 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 concerned line department staff.
- During implementation, an 'Independent/Third Party Consultant' would audit/review the implementation of the works in accordance environmental, health and safety management provisions set out in the respective contracts.

95. *Capacity Building for Environmental Management.* A detailed training plan and modules will be prepared incorporating the short (project specific) and longer term capacity building needs of the SDMA/Nodal Department. The plan will consist of different training modules specific to the needs of various target groups. This will also cover sharing of implementation experience (good practices and lessons learnt) from NCRMP I, where similar works are currently under execution in Odisha and Andhra Pradesh.

96. *Monitoring 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 Nodal Department/SDMA's Environment Officer once in every six months covering all investment categories. A comprehensive report will be prepared by NDMA at mid-term and end-term and this will be shared with the Bank. 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; (c) regular participation in supervision missions (once in six months and interim missions, if and as required) and; (d) supporting training and capacity building activities.

Monitoring and Evaluation

97. **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 the implementation. Supervision will generally entail routine quality certification of the houses which are to be provided at various stages of construction, forming the basis of payment certification and other works. Monitoring will occur as a periodic function, and will include process reviews/audits, reporting of outputs, and maintaining progressive records. Broad thematic areas that will be supervised and monitored include the following:

I) Social and Environmental Monitoring
II) Regular Quality Supervision & Certification
III) Periodic Physical Progress Monitoring & Third Party Quality Consultants
IV) Monitoring and Evaluation (M&E)

98. A summary is provided below:

99. **Social and Environmental Monitoring -** This will comprise of the following sets of activities:

a) Monitoring compliance with environmental regulations,
b) Monitoring of ESMF requirements, including EA findings and EMP provisions,
c) Monitoring of social safeguards, including Social Assessment provisions
d) Overall State-Level Monitoring and Oversight of social and environmental issues at state/project levels.

100. **Regular Quality Supervision & Certification –** This will be carried out by the respective implementing departments, forming the basis of payment certification. Technical supervision staff shall be deployed by the implementing departments.

101. **Periodic Physical Progress Monitoring & Third Party Quality Consultants** –Physical progress monitoring will be carried out by the implementing departments on a monthly basis. The IAs will carry out monthly surveys in their respective domains (in Goa, Gujarat, Karnataka, Kerala Maharashtra and West Bengal) to record and report on progress of works. They will also, in coordination with the respective beneficiaries and contractors, identify any constraints and delaying factors. In addition, a third party will be deployed for quality monitoring of works and compliance on social and environmental aspects.

102. **Monitoring and Evaluation (M&E) -** Continuous monitoring of the project, and its achievements would be taken up by the PMU/ PIA. The PMU/PIA will also appoint special agencies to assist them.

Annex 4: Implementation Support Plan

INDIA: National Cyclone Risk Mitigation Project-II

Strategy and Approach for Implementation Support

1. The Implementation Support Plan (ISP) for National Cyclone Risk Mitigation Project –II (NCRMP II) developed based on the specific nature of the components, the planned implementation schedule, lessons learned from similar projects in the sector, and specific needs as identified by the respective assessments. The plan will be regularly reviewed and revised as required.

2. The ISP includes frequent review of implementation performance and progress, especially given the multi-state and multi-sectoral project. The Bank's team will monitor implementation through: (i) reporting of key performance indicators as defined in the Results Framework; (ii) State, district, and block level project implementation plans; (iii) independent verification of project activities through field visits and documentation review; (iv) proper fiduciary management of all activities carried out by the PMUs, and SPIUs; (v) reconciliation of payments with contracts; (vi) supervision of large numbers of District-level procurement activities; especially in relation to Component A: Early warning Dissemination Systems and Component B: Cyclone Risk Mitigation Infrastructure and (vii) regular communication with SPIUs Project Directors.

3. Information from various sources will be used to assess and monitor implementation progress. In addition to the data generated through the Project's MIS and M&E systems, the Bank will also review the findings and results of third party assessments and environmental and social audits. In addition, and as required, targeted support including short missions by subject matter experts will be carried out.

4. In addition to formal semi-annual implementation support missions and field visits to Goa, Gujarat, Karnataka, Kerala, Maharashtra and West Bengal and the project components target areas, in all project districts of the state, annual workshops with PMU, and SPIUs will be held to review progress against the implementation plan and take corrective actions as necessary. The semi-annual Implementation Status Reports will be produced to provide management with progress updates, tracking risk development and efficacy of mitigation measures. In addition, as required frequent 'Thematic' missions will be made to provide targeted support to address emerging issues.

5. The Bank's procurement, financial management, and environmental and social safeguards specialists will also provide timely and effective support to the Government of Goa (GoG), Gujarat (GoGu), Karnataka (GoKa), Kerala (GoKe), Maharashtra (GoM) and West Bengal (GoWB), and In addition to carrying out an annual ex-post review of procurement that falls below the prior review thresholds, the procurement specialist will lead procurement focused missions depending on the needs and as agreed to by the GoG, GoGu, GoKa, GoKe, GoM and GoWB. The financial management specialist will review all financial management reports and audits and take necessary follow-up actions as per the Bank procedures. These team members will also help identify capacity building needs to strengthen procurement and financial management capacity. Semiannual inputs from the environmental and social specialists will be required throughout the Project, and formal

supervision missions and field visits will monitor the implementation of the ESMF in accordance with the Bank safeguard policies, and suggest any corrective measures as necessary.

6. The following Implementation Support Plan reflects the preliminary estimates of the skill, timing, and resource requirements over the implementation period of the Project. Keeping in mind the need to maintain flexibility over project activities from year to year, the ISP will be reviewed from time to time to ensure that it continues to meet the implementation support needs of the Project.

7. In addition, the team will work in taking advantage of opportunities for cross-learning, combining external expertise, and carrying out joint missions with the ongoing NCRMP I, as well as with the other DRM projects being implemented in India.

Implementation Support Plan

8. The table below indicates the estimated level of inputs that will be needed from the Bank to provide implementation support for the proposed Project. Based on the average cost of missions in similar projects, an amount of US$45,000 per mission is presented. Whenever possible, missions will be combined.

Table 10: Implementation Support Plan

Time Year	Focus	Primary Skills Needed	Number of Trips	Resource Estimate	Partner Role	Comments
1	• Project launch • FM systems functioning effectively • Procurement practices following Bank norms • Safeguards systems functioning effectively.	• Team lead • FM, Procurement • Safeguards Specialist • Disaster Management Specialist • Communication Specialist • Urban Specialist	• Jun 2015	• 12 staff weeks	• Staff up PMUs/ PIUs/DIUs • Contract ODCH support firm	• Project will likely become effective in January 2015. • Task team to support smooth start-up following effectiveness
2	• Monitor implementation of project activities • FM, Procurement, Safeguards	• Team lead • FM, Procurement • Safeguards Specialist • Disaster Management Specialist • Urban Specialist	• Nov. 2015 • Feb 2016	• 12 staff weeks • 12 staff weeks	• Prepare comprehensive project progress report in advance of each mission • Prepare implementation and procurement plans for following year	• Review implementation, commitment and disbursement status • Ensure safeguards arrangements are built into implementation plans

Time Year	Focus	Primary Skills Needed	Number of Trips	Resource Estimate	Partner Role	Comments
					• Organize field visits	
3	• Monitor implementation of project activities • Mid-Term Review • FM, Procurement, Safeguards	• Team lead • FM, Procurement • Safeguards Specialist • Disaster Management Specialist • Urban Specialist • M&E Specialist	• Aug. 2016 • Feb 2017	• 12 staff weeks • 12 staff weeks	• Prepare comprehensive project progress report in advance of each mission • Prepare implementation and procurement plans for following year • Organize field visits • Mid-term review	• Support to monitor progress of activities, in-depth technical review of implementation, make adjustments to implementation plan if needed.
4	• Project withdrawal and closure • Scaling up of successful models with GoO	• Team lead • FM, Procurement • Safeguards Specialist • Disaster Management Specialist • Urban Specialist	• Aug. 2017 • Feb 2018	• 12 staff weeks • 12 staff weeks	• Prepare comprehensive project progress report in advance of each mission • Prepare implementation and procurement plans for following year • Organize field visits	• Support to monitor progress of activities, review implementation schedule to ensure timely completion of project activities.
5	• Project withdrawal and closure • Scaling up of successful models with GoO	• Team lead • FM, Procurement • Safeguards Specialist • Disaster Management Specialist • Communication Specialist	• Aug. 2018 • Feb 2019	• 12 staff weeks • 12 staff weeks	• Prepare comprehensive project progress report in advance of each mission • Prepare project closing, evaluation,	• Prepare closing arrangements • ICR Mission

Time Year	Focus	Primary Skills Needed	Number of Trips	Resource Estimate	Partner Role	Comments
		• Urban Specialist			and monitoring arrangements • Organize field visits	

Annex 5: Economic Analysis
INDIA: National Cyclone Risk Mitigation Project-II

1. Economic analysis was performed under the India National Cyclone Risk Mitigation Project-II to assess the rate of return of capital investments in the Cyclone Risk Mitigation Infrastructure in the states of Goa, Gujarat, Karnataka, Kerala, Maharashtra and West Bengal.

2. The main benefit of constructing new shelters and rehabilitating existing shelters is to save human lives at the time of cyclones. The connecting roads and bridges will allow for quicker evacuation to the shelters during cyclones including provision of immediate emergency and relief supplies. The roads will also provide improved access during the rest of the year.

3. The main benefit areas from the multipurpose cyclone shelters:
- Number of human lives saved by shelters
- Other ancillary benefits from non-emergency use of the shelters rest of the year

4. As for the construction of the roads and bridges connecting to the existing road network will have following benefits:
- Faster evacuation
- Provision of emergency food and other supplies to the shelter before disaster (preparedness)
- Faster relief delivery to the shelter after disaster
- Effective access to the market and other infrastructure during the rest of the year

5. For the purposed of this analysis we only consider the main benefit of the project, saving human lives.

6. Even though the shelters and the roads will have non-disaster related uses, we do not quantify these significant benefits. Thus, our estimates are conservative.

Costs calculations

7. For the purposes of the economic analysis, the total cost of building multipurpose cyclone shelters in the project is taken to be 177 million dollars. This consists of 60 percent of the total estimated project costs. The cost is to be disbursed in the amounts described in Table 11 over the five year period from 2016 to 2020. Following the end of the project the continued operating and maintenance costs of the project is considered to be between 1.0 percent of the overall costs.

Table 11: Distribution of project costs

	Project duration (Years)				
	2016	2017	2018	2019	2020
Costs (m$)	35	35	35	35	35

Counterfactual benefit calculations without the project

To understand the counterfactual of potential losses from the cyclones, we assume in the absence of the project no new shelters will be built. Thus, there will be no costs and benefits in the absence of the project.

Economic Analysis

8. The main benefit component of this project is saving human lives. Following Bhattacharya, Alberini, and Cropper (2007) we use the average value of statistical life (VoSL) to be $47,000 per individual[13]. The calculation of the VoSL is always contentious. We acknowledge that this value is rather low. This does not imply we value the lives any less. By choosing this value we show the economic viability of the project despite the conservative estimate of VoSL.

9. We calculate the project benefits based on the design capacity of the shelters. We acknowledge that under emergency conditions a shelter may provide refuge to many more than its design capacity. However, by using the design capacity of the shelters we underestimate the benefits.

10. The project benefits are based on the following assumption:

- The new shelters will each have the design capacity of 1,000 individuals.
- The shelters will be operated and maintained for the next 15 years after the end of the project. Even though the shelters may have a longer useful life, we only consider a total project life of 20 years.
- The discount rate is 12 percent.

11. Cyclone Aila in 2009 was considered to be a very severe cyclone that could return once in every five years.

Table 12: Cyclone types wind speed and probability of occurrences

Cyclone types	Speed KM/h	probability per year
Super cyclone	> 220	10%
Very severe cyclone	119-220	20%
Severe cyclone	90-119	30%

Source: Dasgupta et al (2014)

[13] The value of statistical life is often used to estimate the benefits of reducing the risk of death (EPA 2000, Viscusi 2003). The value of statistical life is an estimate of the financial value society places on reducing the average number of deaths by one. A related concept is the value of statistical life year, which estimates the value society places on reducing the risk of premature death, expressed in terms of saving a statistical life year. The value of statistical life is most appropriately measured by estimating how much society is willing to pay to reduce the risk of death. Note, Bhattacharya, Alberini, and Cropper (2007) calculated VoSL in current INR and PPP dollars in 2005 prices. We have updated the value to current USD.

Most conservative estimates

12. Based on the assumptions listed above we consider the hypothetical of a cyclone that would necessitate the utilization of all the shelters is one in 400 years. Under this scenario we only take the benefit of human lives saved and ignore additional benefits the year-round transport benefits from the roads and bridges.

13. We find the project to have the minimum internal rates of return (IRR) of 13.8 percent and net present value (NPV) of 19.6 million dollars, with the benefit costs ratio (BCR) of 1.1. Both the internal rates of return and net present value of costs and benefits of lives saved in case of a once in a 400 year cyclone show that the project is economically viable.

Sensitivity Analysis

14. Sensitivity analysis was conducted by changing key parameters of the probability of cyclones as described above. Given that base case IRR, NPV and BCR are calculated with very conservative assumptions, more realistic assumptions regarding the probability of more frequent cyclones highlight the possibility that the actual benefits may be much more substantial than anticipated in the most conservative case.

15. Table 13 shows the results of the sensitivity analysis for each state as well as the project as a whole. The three parts of the table show the IRR, the NPV, and the BCR respectively. In each part the first column shows 0.25 percent probability of cyclone show the smallest returns. Correspondingly, 5 percent probability of cyclones shows the highest returns from the project.

Table 13: Sensitivity analysis for probability of cyclone

States	Probability of Cyclone				
	0.25%	0.50%	1.00%	2.00%	5.00%
IRR					
Gujarat	15.9%	27.9%	42.9%	61.6%	92.0%
Maharashtra	15.2%	27.0%	41.8%	60.2%	90.3%
Kerala	10.8%	21.4%	34.8%	51.6%	79.5%
West Bengal	12.1%	23.1%	36.9%	54.2%	82.7%
Karnataka	28.1%	43.3%	62.0%	84.4%	120.3%
Goa	32.7%	49.0%	68.9%	92.6%	130.4%
Overall	13.8%	25.2%	39.5%	57.4%	86.8%
NPV					
Gujarat	13.8	72.5	189.7	424.1	1,127.4
Maharashtra	1.4	8.2	21.8	49.0	130.6
Kerala	-1.2	12.9	41.2	97.7	267.2
West Bengal	0.8	79.3	236.3	550.2	1,492.1
Karnataka	4.9	12.7	28.4	59.8	154.0
Goa	14.6	35.6	77.4	161.2	412.3
Overall	19.6	185.5	517.3	1,180.8	3,171.4
BCR					

Gujarat	1.3	2.6	5.2	10.5	26.2
Maharashtra	1.2	2.5	5.0	10.0	25.0
Kerala	0.9	1.8	3.7	7.4	18.4
West Bengal	1.0	2.0	4.0	8.1	20.2
Karnataka	2.7	5.3	10.7	21.4	53.4
Goa	3.3	6.7	13.3	26.6	66.5
Overall	1.1	2.3	4.5	9.1	22.7

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