Public Disclosure Authorized
Public Disclosure Authorized
Public Disclosure Authorized
Public Disclosure Authorized

102550

World Bank's INDIA Disaster Risk Management Program

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

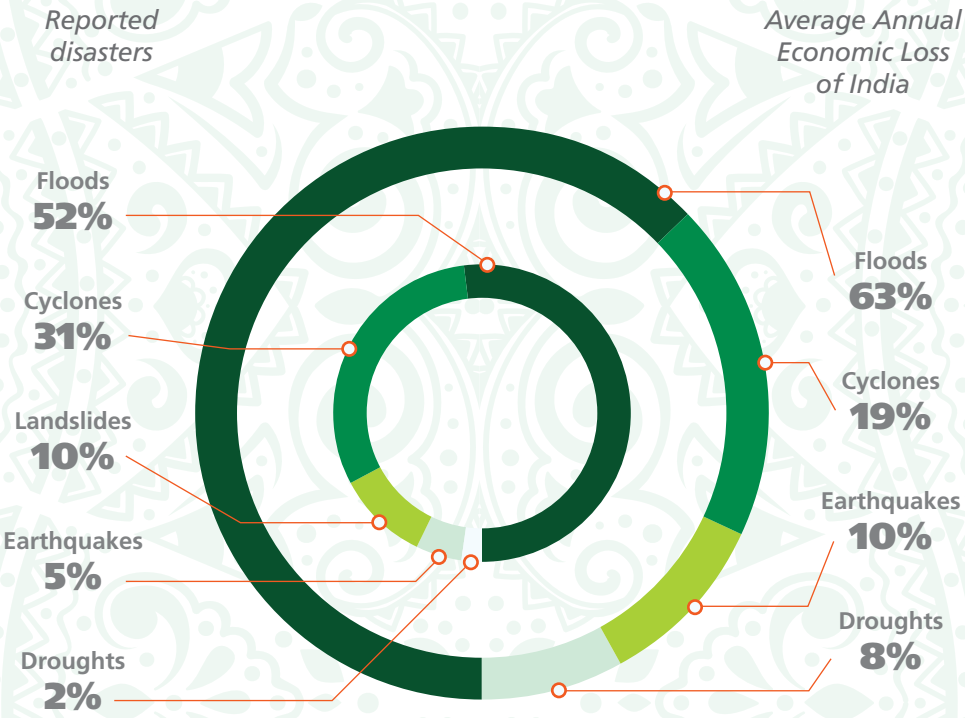
GFDRR

Introduction

Given its vast geographic and climatic diversity, India is prone to all major natural hazards and has experienced the highest number of disasters in South Asia, with an increasing trend in events and causalities over the past 40 years. It is particularly exposed to earthquakes (tsunamis), floods, droughts, cyclones and landslides. About 60 percent of the landmass is prone to earthquakes of varying intensities; over 8 percent is prone to floods; almost 5,700 kilometers of the 7,500 kilometer coastline is prone to cyclones and 68 percent of the area is susceptible to drought.

Percentage Distribution

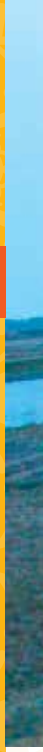
(1970 - 2014)



The Himalayan area, where the Indian Plate is moving against the Eurasian Plate, is seismically very active. Over the past 40 years, the Himalayan region has seen three big earthquakes: the 1988 Nepal-India, the 2005 Kashmir and the 2015 Nepal earthquakes. Many central parts of India are however also subject to earthquakes due to intraplate movements. They caused, for example, the 1993 Latur-Killari and the 2001 Gujarat earthquakes. Even though tsunami risk was estimated to be negligible, the 2004 Indian Ocean Tsunami heavily impacted the Andaman and Nicobar Islands, as well as the eastern coastline.

Floods occur in many areas, often more than once a year. The Southwest monsoon rains are the cause for flooding in the north, northeast and south of India. Extreme precipitations also cause flash floods, to devastating effect in urban areas, such as the 2005 Mumbai, 2014 Srinagar and the 2015 Chennai flooding and events, such as the 2013 Uttarakhand floods. Varying precipitation make India increasingly prone to frequent droughts, especially in Gujarat, Maharashtra, Rajasthan, Odisha, and Karnataka. The Inter tropical Convergence Zones in the Bay of Bengal and the Arabian Sea have formed cyclones that caused strong winds, heavy rains, and storm surges that had devastating impacts such as the 1970 Bhola, the 1999 05B, 2013 Phailin and 2014 Hudhud cyclones. Finally landslides are frequent in the Himalayan ranges.

Building Coastal Resilience to Future Climate and Disaster Shocks



The World Bank is supporting three coastal resilience projects to help mitigate the impacts of cyclones and related hydro-meteorological disasters in all the coastal states of mainland India. The projects are the National Cyclone Risk Mitigation Project (NCRMP), Phase I and II; and the Coastal Disaster Risk Reduction Project (CDRRP).

AP - Road to Habitation, Evacuation Route

National Cyclone Risk Mitigation Project

(Phase I including Additional Financing)

Project Size: $ 455 million
World Bank Funding: $ 359 million
Project Period: 7 years (2011- 2017)

The objective of the Project is to reduce the vulnerability of coastal communities in Andhra Pradesh and Odisha to cyclone and other hydro meteorological hazards. There are four components to the project: 1) Early Warning Dissemination System (EWDS) and capacity building for coastal communities to reduce the vulnerability of coastal communities by addressing the existing gap in dissemination of warning to the "last-mile" communities; 2) Cyclone risk mitigation infrastructure to build and strengthen risk mitigation infrastructure, namely multi-purpose cyclone shelters and saline embankments; and improve the access to emergency shelters, evacuation and protection against cyclone and other hydro meteorological hazards such as wind storms, flooding and storm surge in high risk areas; 3) Technical assistance for national and state level capacity building and knowledge creation to help understand risk and vulnerabilities better, and prepare the key institutions for addressing them effectively across all coastal states and Union Territories, consisting of studies, assessments, training and capacity building activities related to risk and damage assessments, development of training modules and action plans and implementing them through identified partner agencies; and 4) Project management and implementation support.

As a result of cyclone Phailin, which struck the coast of Odisha in October 2013, the Government of India decided to further increase disaster preparedness through additional financing for the Project, ever more conscious of the need for cyclone risk mitigation infrastructure in the vulnerable coastal states of Odisha and Andhra Pradesh.

National Cyclone Risk Mitigation Project

(Phase II)

Project Size: $ 387 million
World Bank Funding: $ 308.40 million
Project Period: 6 years (2015- 2021)

The objective of the Project is to reduce the vulnerability of coastal communities in West Bengal, Kerala, Karnataka, Goa, Maharashtra and Gujarat to cyclone and other hydro-meteorological hazards, expanding the geographical scope of the first phase. The main components of the project are in line with Phase I, additionally focusing on making coastal electrical connectivity more resilient by investing in underground electrical cabling in some pilot urban areas. The project is building further from Phase I and planning on expanding risk assessment and modeling to multi-hazards in coastal and non-coastal areas, strengthening emergency recovery capacity, enhancing the Capacity for Disaster Risk Management and response in non-coastal states, design of a National Seismic Risk Mitigation Program and develop hydro-meteorological resilience action plans for coastal states.

Coastal Disaster Risk Reduction Project

Project Size: $ 337.2 million
World Bank Funding: $ 236 million Project Period: 5 years (2013- 2018)

The objective of the Project is to increase the resilience of coastal communities in Tamil Nadu and Puducherry, to a range of hydro-meteorological and geophysical hazards. The project has five components: 1) Vulnerability reduction through infrastructure such as permanent houses, evacuation

Tamil Nadu, Vulnerable Housing Reconstruction

shelters and routes, and resilient electrical networks; 2) Sustainable fisheries to address gaps in the context of a long term vision for the fisheries sector by upgrading infrastructure, developing an approach for co-management of fisheries and addressing safety at sea; 3) Capacity building in disaster risk management to strengthen the capacity of government institutions, civil society, the school education system and coastal communities, including curriculum development on disaster risk reduction for schools and training institutions completing preparation of the Integrated Coastal Zone Management (ICZM) plan for Tamil Nadu, and completing erection of High Tide Line (HTL) pillars; and 4) Project implementation support. The Project also has a contingent emergency response component for both Tamil Nadu and Puducherry, which would make funds immediately available to respond to eligible crisis of emergencies should they occur during Project implementation.

Tamil Nadu, Early Warning System Broadasting Tower

Puducherry, Capacity Augmentation of Fire Services, Dhanvanthri Nagar Fire Station

Building Back Better - Early to Long-term Recovery from Disasters

In the past 3 years between2013 to 2015, India has witnessed five major disasters: the Uttarakhand floods, Cyclone Phailin, Cyclone Hudhud, flooding in Srinagar and the larger valley region, and the Chennai floods.

The World Bank has supported the Government of India in conducting rapid post-disaster damage and needs assessments in the first four listed disasters. The assessments provided clear guidance on the post-disaster recovery path that needed to be taken. Subsequently, emergency projects were prepared and are currently under implementation. All four projects focus on recovery and reconstruction as well as strengthening long-term resilience and emergency response capacity at the State level in the affected States.

Uttarakhand Disaster Recovery Project

Project Size: $ 250 million
World Bank Funding: $ 250 million Project Period: 4 years (2013- 2017)

The objective of the Project is to restore housing, rural connectivity and build resilience of communities in Uttarakhand. The project has the following components: 1) Resilient infrastructure reconstruction to focus on the immediate needs of reconstruction of damaged houses and public buildings to reduce the vulnerability of the affected population and restore access to the basic services of governance; 2) Rural road connectivity to restore the connectivity lost due to the disaster through the reconstruction of damaged roads and bridges including: village roads, Other District Roads (ODRs), bridle roads and bridle bridges; 3) Technical assistance and capacity building for disaster risk management to enhance the capabilities of government entities and others in risk mitigation and response; and 4) Financing disaster response expenses to support the financing of eligible expenses already incurred by the state during the immediate post-disaster response period.

Odisha Disaster Recovery Project

Project Size: $ 218.6 million
World Bank Funding: $ 153 million
Project Period: 5 years (2014- 2019)

The objective of the Project is to restore and improve housing and public services in targeted communities of Odisha. The project has the following components: 1) Resilient housing reconstruction and community infrastructure in the districts of Ganjam, Puri, and Khordha; 2) Urban infrastructure in Berhampur will finance investments to improve public services in Berhampur while at the same time reduce the vulnerability of its population, including improved drainage to reduce floods, and increasing the resilience of public service infrastructure; 3) Capacity building in disaster risk management to support Odisha State Disaster Management Authority (OSDMA) in strengthening their overall capacity towards better risk mitigation, preparedness, and disaster response, in line with global best practices; and 4) Project implementation support. The Project also has a contingent emergency response component which would make funds immediately available to respond to eligible crisis of emergencies should they occur during Project implementation.

Cyclone Hudhud

Andhra Pradesh Disaster Recovery Project

Project Size: $ 370 million
World Bank Funding: $ 250 million Project
Period: 5 years (2015- 2020)

The objective of the Project is to restore, improve, and enhance resilience of public services, environmental facilities, and livelihoods in targeted communities of Andhra Pradesh. The Project has the following components: 1) Resilient electrical network to reduce the vulnerability of the city's electrical network by laying the power distribution system underground and provision for high-speed data/voice transmission, in the city of Visakhapatnam; 2) Restoration of connectivity and shelter infrastructure which will finance investments to permanently restore, upgrade, and increase resilience towards future disasters of both rural roads as well as major district roads and existing cyclone shelters in the four affected districts: Visakhapatnam, Vizianagaram, Srikakulam and East Godavari; 3) Restoration and protection of beach front to help revitalize the public and private space along the beachfront of the city of Visakhapatnam; 4) Restoration of environmental services and facilities and livelihood support that will focus on the reconstruction of the severely damaged Indira Gandhi Zoological Park (IGZP) at Visakhapatnam and eco-tourism park at Kambalakonda Wildlife Sanctuary, as well as restoration/creation of shelterbelts/ windbreaks, support to farm forestry/ plantations through nursery support for poor/ vulnerable coastal families and regeneration of critical patches of mangroves along the coast to build disaster resilience and restore/ support livelihood opportunities in the affected areas; and 5) Capacity Building and technical support for disaster risk management will support investments to enhance the capabilities of Government of Andhra Pradesh entities and other stake holders in managing disaster risks, enhancing preparedness, and achieving resilient recovery.. The Project also has a contingent

Uttarakand Floods

emergency response component which would make funds immediately available to respond to eligible crisis of emergencies should they occur during Project implementation.

Jhelum and Tawi Flood Recovery Project

Project Size: $ 250 million
World Bank Funding: $ 250 million Project Period: 5 years (2015- 2020)

The objective of the Project is to support the recovery and increase disaster resilience in the affected areas. The project has the following components: 1) Reconstruction and strengthening of critical infrastructure to support the reconstruction/restoration of damaged public buildings, such as hospitals, schools, higher education buildings, fire stations, and selected block and district offices, and other important public buildings; 2) Reconstruction of roads and bridges to restore and improve the connectivity disrupted due to the disaster through the reconstruction of damaged roads and bridges, designed to withstand earthquake and flood forces as per the latest official design guidelines; 3) Restoration of urban flood management infrastructure to strengthen and reinforce existing weak and vulnerable flood control infrastructure in Srinagar municipal area, and assess urban flood management interventions in other areas; 4) Restoration and strengthening of livelihoods will finance the restoration of physical and productive assets in Srinagar as well as provide technical assistance for risk proofing non-farm livelihood; and 5) Strengthening disaster risk management capacity to enhance the capabilities of government entities in managing disaster risks, enhancing preparedness, and achieving resilient recovery. The Project also has a contingent emergency response component which would make funds immediately available to respond to eligible crisis of emergencies should they occur during Project implementation.

Building Disaster Resilience in Bihar

In August 2008, Bihar was devastated by floods when a section of the embankment on the river Kosi breached resulting in massive inundation in the districts of Supaul, Madhepura, Saharsa, Purnia and Araria. The World Bank supported long-term recovery and reconstruction efforts through the Bihar Kosi Flood Recovery project. This was followed up by a second project that focuses on building resilience to floods and supporting the overall development of communities in the Kosi Basin.

Bihar, Housing Reconstruction

Bihar Kosi Flood Recovery Project

Project Size: $ 205.7 million
World Bank Funding: $170 million Project
Period: 6 years (2010- 2016)

The objective of Project is to support flood recovery as well as future oriented risk reduction efforts of the Government of Bihar. Project components are: 1) Reconstruction of damaged houses and road infrastructure; 2) Strengthening the flood management capacity in Kosi basin; 3) Enhancing livelihood opportunities of the affected people; and 4) Improving the emergency response capacity for future disasters.

Bihar Kosi Basin Development Project

Project Size: $ 376.5 million
World Bank Funding: $250 million Project
Period: 7 years (2015- 2022)

The objective is to enhance resilience to floods and increase agricultural production and productivity in the targeted districts in the Kosi River Basin. The activities will be a continuation of the initiatives started under BKFRP. The project comprises the following five components: 1) Improving Flood Risk Management to increase the capacity of the Water Resources Department (WRD) to manage flood risk and to decrease vulnerability

Bihar, Reconstruction of Bridge

to floods in the Kosi River Basin by investing in flood management infrastructure to reduce vulnerability and by strengthening institutional capacity to better understand the functioning of the Kosi River system; 2) Enhancing agricultural productivity and competitiveness to work with organized farmers to increase agricultural production (which includes crops, horticulture, livestock and fisheries) and productivity by expanding their access to and adoption of innovative and climate-resilient farm technologies and practices (including irrigation) and extending their linkages to market infrastructure; and 3) Augmenting connectivity, focused to improve farmers' access to markets through the expansion of the local road network that connects rural roads to the main road network that will improve connectivity of habitations to the market centers. The Project also has a contingent emergency response component which would make funds immediately available to respond to eligible crisis of emergencies should they occur during Project implementation.

Bihar, Reconstruction of Roads

Knowledge Creation and Management

Coastal Hazard and Vulnerability Atlas / Portal

This tools is being developed under NCRMP I. Activities include: i) Micro-level risk assessment up to village level for the higher vulnerability States (Gujarat, West Bengal, Odisha, Andhra Pradesh and Tamil Nadu) and a macro level assessment up to taluka level for remaining 8 States/UTs; ii) To assess risks, nature of hazards, severity and frequency of occurrence of different disasters, the areas likely to be affected, and duration of impact; iii) To prepare state/district/mandal/taluka/ village level hazard zonation maps for cyclone and other hazards and classify settlements according to the risk perception. The final products and services to be delivered are: i) Risk assessment model on GIS; ii) Risk maps and risk atlas; iii) Scenario maps of disasters; iv) Inundation maps; v) Economic and developmental setback maps; vi) Threat maps for coastal ecosystems and natural resources; vii) Damage and loss maps for different attributes such as crops, housing, infrastructure, etc.; viii) Maps and data interpretation guide for decision makers; and ix) Training and capacity building of stakeholders. These tools and studies will contribute significantly to the understanding of risk in coastal India, and will serve as the basis for decision making on future risk reduction investments. In Phase II of NCRMP risk assessment tool will be enhanced to include scenario probabilistic modeling.

India-specific Post Disaster Damage and Needs Assessment Guide

The objective of this technical assistance is to develop a standardized methodology for

damage, loss and need assessment relevant to India based on an evaluation of existing Indian and international best practices, and to build the capacity of relevant stakeholders to use the methodology. Activities and products to be delivered include: i) In depth review of existing procedures; ii) Uniform standards for damage, loss and need assessments relevant in the Indian context; iii) Recommendations for integrating the new standards in existing procedures; iv) Creation of a panel of experts for damage, loss and need assessment and establish a database containing the updated procedures; and v) Development of modules and train panel of experts in application and procedures.

India DRM Institutional Capacity Strengthening Study

The objective of this technical assistance is to assess the capacity gaps of stakeholders in all the phases of the Disaster Management Cycle, develop short and long term capacity development strategies, conduct training need analysis and develop training designs and modules for all relevant stakeholders. The study area for the assignment was the States of Andhra Pradesh, Gujarat, Odisha, Tamil Nadu and West Bengal. Activities included the development of: i) Capacity gap assessment of stakeholders; ii) Capacity development strategy; iii) Training needs analysis; iv) Assessment of training infrastructure; v) Development of training designs and modules; vi) Awareness generation programs; v) Sensitization of decision makers; and vi) Strategy for implementation and quality assurance.

Urban Coastal Resilience for Vishakhapatnam

- A Study

The objective of this study is to carry out an analysis of vulnerabilities and prepare detailed designs for the beach and shore protection works in Vishakhapatnam. Activities include: carrying out necessary surveys and investigations, preparation of concept design, detailed engineering designs, good for construction drawings, bill of quantities, cost estimates including rate analysis, technical specifications and bid documents, support GVMC in procurement of works, and carry out the construction management of the works.

Urban Disaster Resilience for Bhubaneshwar, Cuttak and Puri

– A Study

Local resilience Action Plan (LRAP) is a planning document to help cities improve their resilience to the potential effects of climate change and disaster impacts. The city-level hazard risk assessment exercises were carried out to understand hazard risks and vulnerabilities in Bhubaneswar, Puri and Cuttack. All three cities are highly vulnerable to urban flooding, moderate earthquake and cyclone hazards. The risk assessment exercise has identified vulnerable hotspots within each city. Taking into consideration hazard risks, climate change impact, potential economic impacts in the future and the on-going project activities in the city, several structural and non-structural measures have been suggested to improve urban resilience.

Portfolio in Numbers

COMMUNITY MEMBERS SERVED THROUGH SLUM UPGRADATION

30,000

COASTAL & RIVER EMBANKMENT STRENGTHENING

230 km

MULTI-PURPOSE CYCLONE SHELTERS

1,012

RURAL ROADS

3,655 kilometers

COASTAL EARLY WARNING SYSTEM

50 million people

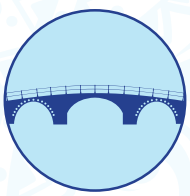
Icons from The Noun Project

Projects

10

SIZE OF PORTFOLIO
(World Bank funding)

US $ 2.2 Billion



CONNECTIVITY

128
bridges

RESILIENT UNDERGROUND
ELECTRICAL CABLING

2,900 km

COMMUNITY IRRIGATION PUMPS

17,000

MULTI-HAZARD
RESISTENT HOUSING

114,000

PUBLIC BUILDINGS
RECONSTRUCTED

30

COASTAL VILLAGES SERVED
BY FISHING INFRASTRUCTURE

150

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

GFDRR