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IMPLEMENTATION COMPLETION AND RESULTS REPORT

Credit No. 5378-IN

ON A

CREDIT

IN THE AMOUNT OF SDR 99.40 MILLION

(US\$153 MILLION EQUIVALENT)

TO

INDIA

FOR THE

ODISHA DISASTER RECOVERY PROJECT

January 15, 2021

Urban, Resilience And Land Global Practice
South Asia Region

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CURRENCY EQUIVALENTS

(Exchange rate effective June 30, 2020)

Currency Unit = Indian Rupees (INR)

INR 75.60 = US\$1

US\$1.38 = SDR 1

FISCAL YEAR

April 1 - March 31

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
BCR	Benefit-to-Cost Ratio
BeMC	Berhampur Municipal Corporation
CPF	Country Partnership Framework
CPS	Country Partnership Strategy
DDMA	District Disaster Management Authority
DEOC	District Emergency Operation Center
DPR	Detailed Project Report
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSS	Decision Support System
EFA	Economic and Financial Analysis
ESCS	Extremely Severe Cyclonic Storm
ESMF	Environmental and Social Management Framework
ETRP	Emergency Tsunami Reconstruction Project
EWDS	Early Warning Dissemination System
GHG	greenhouse gas
GIS	Geographic Information System
GoI	Government of India
GoO	Government of Odisha
GRM	Grievance Redressal Mechanism
GSDP	Gross State Domestic Product
H&UD	Department of Housing and Urban Development
HTL	High Tide Line
IRI	Intermediate Result Indicator
km	kilometer
M&E	Monitoring and Evaluation
MIS	Management Information System
MTR	Mid-Term Review
NCRMP	National Cyclone Risk Mitigation Project
NDMP	National Disaster Management Plan
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
ODCH	Owner Driven Construction of Houses
ODRAF	Odisha Disaster Rapid Action Force
ODRP	Odisha Disaster Recovery Project
PAD	Project Appraisal Document
PDO	Project Development Objective
PHEO	Public Health Engineering Organization
PIU	Project Implementation Unit
PMU	Project Management Unit
RDNA	Rapid Damage and Needs Assessment
RIMES	Regional Integrated Multi-Hazard Early Warning System
SC	Scheduled Caste
SEOC	State Emergency Operations Center
SHG	Self-Help Group
SIDM	State Institute of Disaster Management
ST	Scheduled Tribe

VSCS	Very Severe Cyclonic Storm
VWSC	Village Water and Sanitation Committee
WHO	World Health Organization

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P148868	Odisha Disaster Recovery Project
Country	Financing Instrument
India	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Republic of India	Odisha State Disaster Management Agency (OSDMA), Housing and Urban Development Department

Project Development Objective (PDO)

Original PDO

To restore and improve housing and public services in targeted communities of Odisha, and increase the capacity of the State entities to respond promptly and effectively to an eligible crisis or emergency.



FINANCING

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
World Bank Financing			
IDA-53780	153,000,000	99,335,149	84,605,043
Total	153,000,000	99,335,149	84,605,043
Non-World Bank Financing			
Borrower/Recipient	65,600,000	42,572,206	36,259,304
Total	65,600,000	42,572,206	36,259,304
Total Project Cost	218,600,000	141,907,355	120,864,347

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
20-Feb-2014	27-Aug-2014	10-Apr-2017	31-Mar-2019	30-Jun-2020

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
19-Mar-2019	73.41	Change in Results Framework Change in Components and Cost Change in Loan Closing Date(s) Cancellation of Financing Reallocation between Disbursement Categories Change in Implementation Schedule
31-Mar-2020	78.95	Change in Loan Closing Date(s)
30-Jun-2020	79.20	Change in Results Framework Change in Components and Cost Cancellation of Financing Reallocation between Disbursement Categories Change in Institutional Arrangements

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Unsatisfactory	Moderately Unsatisfactory	Modest



RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	25-Jun-2014	Satisfactory	Satisfactory	0
02	16-Jan-2015	Satisfactory	Satisfactory	0
03	25-Sep-2015	Satisfactory	Satisfactory	35.24
04	24-Jun-2016	Satisfactory	Satisfactory	40.13
05	14-Nov-2016	Satisfactory	Satisfactory	47.45
06	13-Jun-2017	Satisfactory	Satisfactory	58.07
07	27-Jun-2018	Satisfactory	Moderately Satisfactory	69.71
08	07-Jan-2019	Satisfactory	Moderately Unsatisfactory	73.26
09	23-Aug-2019	Moderately Satisfactory	Moderately Unsatisfactory	75.39
10	30-Jun-2020	Moderately Unsatisfactory	Moderately Unsatisfactory	79.20

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Public Administration	12
Sub-National Government	12
Energy and Extractives	1
Other Energy and Extractives	1
Transportation	6
Other Transportation	6



Water, Sanitation and Waste Management	6
Other Water Supply, Sanitation and Waste Management	6
Industry, Trade and Services	75
Housing Construction	75
Themes	
Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)
Finance	22
Finance for Development	22
Disaster Risk Finance	22
Public Sector Management	6
Public Administration	6
Administrative and Civil Service Reform	2
Municipal Institution Building	4
Social Development and Protection	2
Social Inclusion	2
Participation and Civic Engagement	2
Urban and Rural Development	73
Urban Development	5
Services and Housing for the Poor	5
Rural Development	2
Rural Infrastructure and service delivery	2
Disaster Risk Management	66
Disaster Response and Recovery	22
Disaster Risk Reduction	22
Disaster Preparedness	22



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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

- 1. At the time of appraisal in 2014, India's climate vulnerability and proneness to natural disasters was already well-recognized.** India was among the top five countries that were most frequently hit by natural disasters over 2004-14.¹ India was, and remains, highly vulnerable to a range of natural hazards, particularly earthquakes, floods, droughts, cyclones and landslides. With a coastline of 7,516 kilometer (km), of which 5,700 km is prone to cyclones of various degrees of intensity, approximately 40 percent of the total population living within 100 km of the coastline could potentially be affected.² With an estimated annual cost of US\$7 billion every year, floods remain, on average, the greatest source of losses from natural disasters in India.³ Vulnerable to multiple natural hazards, Odisha's coastline constitutes only about 17 percent (480 km long) of the Indian east coast, yet it had been affected by nearly 35 percent of all cyclonic and severe cyclonic storms that had crossed the east coast.
- 2. The Very Severe Cyclonic Storm (VSCS) 'Phailin' hit Odisha on October 12, 2013, with wind gusts up to 220 km/hour, heavy rains measuring up to 25 centimeters, and a storm surge of over 3 meters; the sea pushed in as much as 40 meters along parts of the coast, causing immense damage.** Phailin hit a densely populated area in coastal Odisha, placing 4.5 million people as well as a significant proportion of kutcha⁴ housing within the cyclone force wind path. Human casualties were relatively low at 44, as compared with the Super Cyclone 05B of October 1999 which killed more than 10,000. This was in part thanks to the National Cyclone Risk Mitigation Project (NCRMP-I, P092217, 2011-18) which enhanced resilience at national and state levels by installing Early Warning Dissemination Systems (EWDS), constructing and improving access to emergency shelters in high-risk areas, and strengthening the capacity of state and national governments to address natural disaster risks and vulnerabilities. However, the impact of the storm and subsequent floods on the lives of coastal residents was still massive, affecting 18 of the 30 districts in the state, particularly the districts of Ganjam, Puri and Khordha. In Ganjam district alone, about 90,000 houses were partially or fully damaged, many belonging to poor fishers, farmers and the landless. Crops on over 780,000 hectares of agricultural land were damaged as well. The devastation wrought by Phailin led to negative growth of 9.78 percent in the agriculture sector in 2013-14, a sharp decline from the positive growth rate of 12.3 percent in 2012-13; Odisha's Gross State Domestic Product (GSDP) was reduced by 1.72 percent.⁵ In Berhampur, the largest city in Ganjam district, urban infrastructure and services such as the water supply network, roads and drains were severely damaged, in part due to settlements being developed on vulnerable lands close to the High Tide Line (HTL), inadequate resilience of riverine embankments to protect coastal areas from saline water inundation, and roads with bituminous top and metal layer as opposed to concrete roads, which saw less

¹ Centre for Research on the Epidemiology of Disasters (2014). *Annual Disaster Statistical Review: The numbers and trends*.

² "Disaster Management in India" (2011). Ministry of Home Affairs. *Government of India*.

https://www.undp.org/content/dam/india/docs/disaster_management_in_india.pdf.

³ Climate Change Knowledge Portal. India: Vulnerability. <https://climateknowledgeportal.worldbank.org/country/india/vulnerability>.

⁴ Semi-permanent houses of wattle and daub construction with thatch or asbestos sheets for roofs.

⁵ Odisha Economic Survey (2014-15). Planning and Coordination Department. *Government of Odisha*.

https://pc.odisha.gov.in/sites/default/files/2020-03/Economic_Survey_2014-15.pdf.



damage than others. Many of the 261 slums in Berhampur were damaged while some were submerged for days due to flooding.⁶ The destruction wrought by Phailin also highlighted the need for sustainable recovery and further strengthening of the state's capacity to manage natural disasters in line with global best practices.

Government Strategies

- In October 2013, at the request of the Government of India (GoI), the Asian Development Bank (ADB) and the World Bank carried out a Rapid Damage Needs Assessment⁷ (RDNA) covering the districts of Ganjam, Khordha and Puri to inform the state government's recovery and reconstruction strategy and a comprehensive recovery framework in accordance with the National Policy on Disaster Management (2009).⁸** The report was intended to address immediate damages from Phailin as well as lay the groundwork for improving resilience and risk measures in the state going forward. The RDNA estimated that over 256,000 homes had been damaged by the storm and 13.2 million people had been affected in over 18,370 villages. The cost of reconstruction was estimated at about US\$1.45 billion, with the bulk required for housing (US\$480 million) and agriculture and livestock (US\$430 million). The RDNA highlighted: (i) the need for an appropriate housing reconstruction policy to identify criteria for eligibility, required relocation and an approach for reconstruction; (ii) the considerable social impact of Phailin, particularly on communities that relied on agriculture and fisheries for livelihood; and (iii) the need for access roads for informal settlements and an adequate storm water drainage system for evacuation and safety of these communities. Based on the findings, GoI, the Government of Odisha (GoO), ADB and the World Bank agreed on a framework of assistance in disaster recovery and future risk reduction. As per the framework, World Bank assistance was sought in rebuilding houses in the three districts, improving slums in Berhampur, expanding the risk mitigation infrastructure in Odisha, and enhancing livelihood activities of affected communities in coastal areas.⁹ The World Bank accordingly developed a package to support GoO's reconstruction and recovery efforts, with the Odisha Disaster Recovery Project (ODRP) designed as one of its key components.¹⁰

Rationale for Bank Involvement

- Beyond its involvement in the preparation of the RDNA, the World Bank had been a key partner of the GoI and GoO in disaster risk mitigation and management efforts.** Since 2010, the World Bank had been supporting the GoO in improving its capacity to manage hydrometeorological hazards through NCRMP-I, and it had also been engaged in similar projects in Andhra Pradesh, Bihar, Tamil Nadu, Uttarakhand and other states as well as at the national level.¹¹ Additionally, the World Bank was well positioned to

⁶ India: Cyclone Phailin in Odisha – Rapid Damage and Needs Assessment Report (2013). *Government of Odisha, Asian Development Bank, and World Bank*. <https://ncrmp.gov.in/wp-content/uploads/2014/03/Odisha-Phailin-report-Final.pdf>.

⁷ Ibid.

⁸ National Policy on Disaster Management (2009). *National Disaster Management Authority*. <https://ndma.gov.in/sites/default/files/PDF/national-dm-policy2009.pdf>.

⁹ Draft data from the RDNA suggested that the livelihoods of an estimated 46,781 households in the subsectors of fisheries, handloom and handicraft were severely affected, in addition to people working in 1,309 damaged micro, small and medium enterprises.

¹⁰ Complementary efforts were undertaken through Additional Financing to the NCRMP-I, which covered expansion of risk mitigation infrastructure in Odisha, and through activities under the Integrated Coastal Zone Management Project (P097985) and Odisha State Livelihood Project (P093478), which were expanded to support livelihood restoration and replacement of productive assets.

¹¹ In addition to NCRMP, other World Bank engagements related to disaster risk mitigation and management include Tamil Nadu and Puducherry Coastal Disaster Risk Reduction (P143382; 2013-20), Bihar Kosi Flood Recovery Project (P122096; 2011-18), India: Emergency Tsunami Reconstruction Project (P094513; 2005-11), Tsunami Disaster Recovery in India (P096087; 2006-11).



incorporate its global and regional experience in post-disaster projects, particularly in the design and implementation of owner-driven housing reconstruction in varying country and socioeconomic contexts.

5. **The project was structured assuming linkages with other relevant programs and Operation and Maintenance (O&M) by the client.** The broader package included additional financing for NCRMP-I (P092217, 2011-18) which supported capacity building, cyclone shelters and other protective infrastructure; expansion of activities under the Integrated Coastal Zone Management Project (P097985, 2010-20) which supported livelihood options for coastal communities and sustainable management of marine resources; and the Orissa Rural Livelihoods Project (TRIPTI, P093478, 2008-15) which sought to enhance the socioeconomic status of the poor. The GoO was to coordinate with other ongoing national and state-level schemes which sought to provide improved basic services such as water and sanitation facilities as well as electricity connections to the project beneficiaries. For reconstruction of damaged houses, an Owner Driven Construction of Houses (ODCH) approach¹² was to be used.

Higher-level Objectives to which the Project Contributed

6. **The project supported the World Bank Group Country Partnership Strategy (CPS) for India for FY2013-17.**¹³ The CPS noted India's high vulnerability to climate change due to high levels of poverty, high population density, heavy reliance on natural resources, and an environment already under stress. The project was anchored within the CPS' Strategic Engagement Area 3: Inclusion, which stated that the World Bank's investments in this area would help to build institutional capacity to prepare for and manage the impact of natural disasters, and help people protect themselves and recover quickly from natural disasters. It was also aligned with GoI's National Policy on Disaster Management (2009), which focused on "*a paradigm shift, from the erstwhile relief-centric response to a proactive prevention, mitigation and preparedness-driven approach for conserving developmental gains and to minimize loss of life, livelihood and property*".

Theory of Change (Results Chain)

7. **The project's theory of change is based on the Project Appraisal Document (PAD)**¹⁴, which described how project inputs and outputs were expected to lead to the desired medium-term outcome/Project Development Objective (PDO) of restoring and improving housing and public services in targeted communities of Odisha and increasing the capacity of state entities to respond promptly and effectively to an eligible crisis or emergency. The theory of change was not required to be prepared at the time of project appraisal.

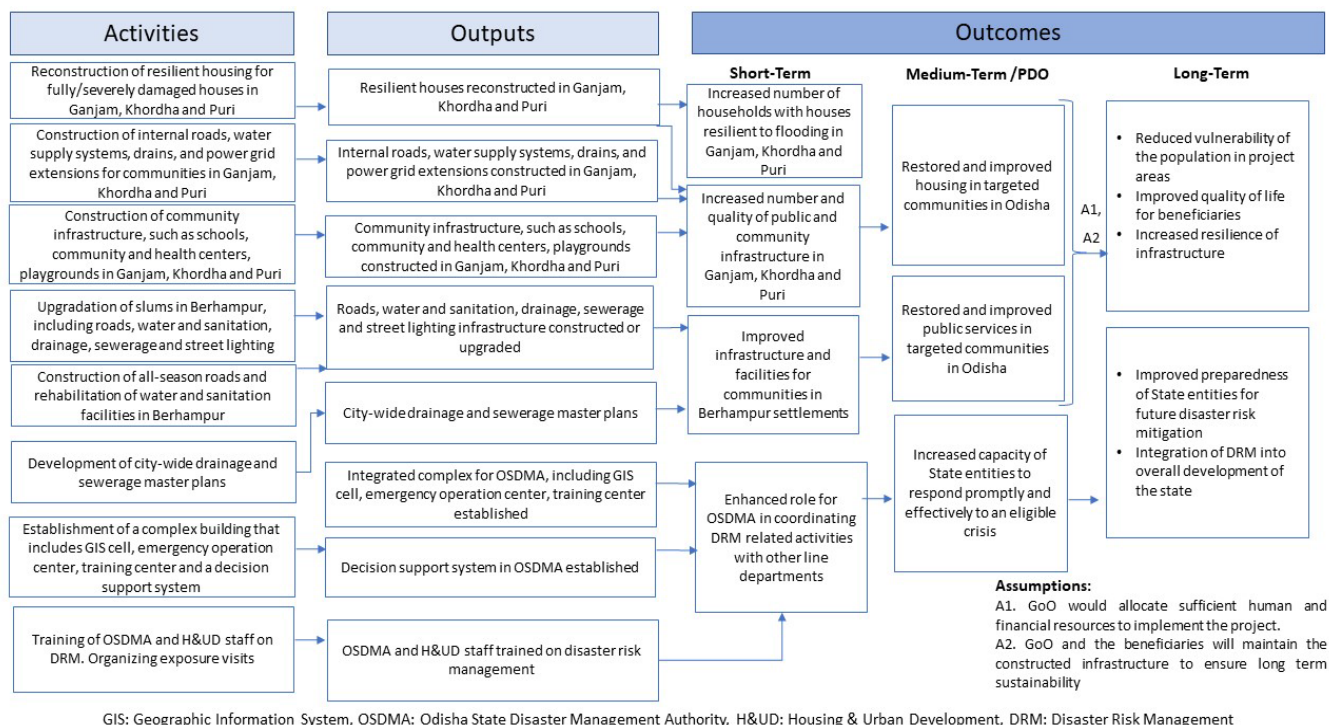
¹² Owners take responsibility for design and construction of their respective houses while the project provides funds in tranches based on agreed upon completed milestones.

¹³ Country Partnership Strategy for India for the period FY2013-17 (2013). *The World Bank Group*. Report No. 76176. <https://documents1.worldbank.org/curated/en/207621468268202774/pdf/7617600CASOREV0PUBLIC00R20130005004.pdf>.

¹⁴ Project Appraisal Document (February 2014). Report No. 83452-IN.



Figure 1: Theory of change



Project Development Objectives

- The PDO, as stated in the Financing Agreement, was to restore and improve housing and public services in targeted communities of Odisha and increase the capacity of the State entities to respond promptly and effectively to an eligible crisis or emergency.¹⁵

Key Expected Outcomes and Outcome Indicators

- The key expected outcomes and their measurement indicators were:

Table 1: Expected outcomes and PDO indicators

Expected Outcomes	PDO Indicator
Restored and improved housing in targeted communities of Odisha	PDO Indicator 1: Percentage of households with fully/severely damaged houses in project areas provided with resilient housing reconstructed under the project (percentage)

¹⁵ The *financing agreement* defines an “Eligible Crisis or Emergency” as an event that has caused, or is likely to imminently cause, a major adverse economic and/or social impact to the Project Implementing Entity, associated with a natural or manmade crisis or disaster. This PDO was also stated in the Project Appraisal Document.



Restored and improved public services in targeted communities of Odisha	PDO Indicator 2: Number of people with access to improved public services in Berhampur (number)
Increased capacity of state entities to respond promptly and effectively to an eligible crisis or emergency	PDO Indicator 3: State departments making use of OSDMA-generated information (number)

Components

10. **Component 1: Resilient Housing Reconstruction and Community Infrastructure (original cost:¹⁶ US\$167.3 million; actual cost: US\$108 million).** This component sought to reduce the vulnerability of coastal communities in the districts of Ganjam, Khordha and Puri by addressing their need for multi-hazard resilient housing and improved public infrastructure. This component had two subcomponents: (i) reconstruction of about 30,000 houses in the designated rural areas in the coastal belt 5 km from the HTL in the districts of Ganjam and Puri and 5 km from the Chilika Lake boundary as defined by the Survey of India in the district of Khordha; and (ii) public infrastructure improvements to complement the housing reconstruction such as roads, water supply, solid waste management, power grid extensions and community infrastructure such as schools, community and health centers, playgrounds, etc. Housing reconstruction was expected to be carried out either through ODCH,¹⁷ *in-situ* or as contractor-built houses in relocation sites. *In-situ* housing reconstruction was expected to be accompanied by the preparation of a Village Development Plan to support communities in the selection of community/public infrastructure investments within a fixed amount allocated to the village, based on population.

11. **Component 2: Urban Infrastructure in Berhampur (original cost: US\$28.7 million; actual cost: US\$6.17 million).** This component was designed to improve public services in Berhampur, the largest city in Ganjam district, and reduce the vulnerability of its population to natural disasters. It had four subcomponents: (i) upgrading of 80 slum settlements and internal streets with a total population of 30,000 in the city of Berhampur, including facilitating access to improved water and sanitation services, drainage, septic management and street lighting; (ii) construction of priority infrastructure at the city level to improve service delivery and living conditions of people in urban areas, including priority roads and trunk water supply infrastructure; (iii) facilitation of community participation in the planning of settlement-level infrastructure; and (iv) support to the Berhampur Municipal Corporation (BeMC) towards preparation of improved city-wide sectoral plans and priority Detailed Project Reports (DPRs),¹⁸ including for sewerage, street lighting and drainage.

¹⁶ Original and actual costs in this section reflect both IDA and Borrower costs. For more detailed information on costs, refer to Annex 3.

¹⁷ Funding for housing reconstruction at the same site was to be provided through direct credit to eligible beneficiaries' bank accounts in four tranches. Each stage of housing construction was to be certified by an engineer at the *Panchayat* (local government) level or a designated agency before the release of the following tranche. Beneficiaries were also able to choose to jointly carry out housing reconstruction by pooling their resources to procure materials, hire masons, etc.

¹⁸ DPRs refer to the outputs of the planning and design phase of a project. DPRs or physical plans were expected to be prepared at the sub-project/slum/settlement level, covering environmental and social dimensions as part of the planning process/criteria.



12. **Component 3: Capacity Building in Disaster Risk Management (original cost: US\$8 million; actual cost: US\$1.2 million).** This component was aimed at financing: (i) the establishment of a building complex to house the office of the OSDMA, the Emergency Operation Center, a Geographic Information System (GIS) cell equipped with a Decision Support System (DSS) to ensure coordination among various stakeholders and implementing departments, and a national-level training center on Disaster Risk Management (DRM) to augment OSDMA capacities; and (ii) need-based hiring of technical specialists to build capacity at OSDMA in the areas of DRM, hydro-met systems, risk assessment and financing, structural engineering, remote sensing, GIS, and others to provide timely support for various project activities; and (iii) community-based initiatives, such as vulnerability mapping and needs assessment, provision of common facilities for income-generating activities, and community-based DRM activities to enable affected marginalized communities to cope with survival risks posed by natural disasters.
13. **Component 4: Implementation Support (original cost: US\$14.7 million; actual cost: US\$6.02 million).** This component supported the incremental operating costs of Project Management Units (PMUs) in OSDMA and Department of Housing and Urban Development (H&UD) and Project Implementation Units (PIUs) in the three targeted districts and BeMC. In addition, the component also intended to finance consultancies required for the preparation and supervision of specific activities, training programs and exposure visits as well as knowledge exchange programs for PMU-OSDMA and PMU-H&UD.
14. **Component 5: Contingent Emergency Response (original cost: US\$0 million; actual cost: US\$0 million).** In the event of a major natural disaster, this component was designed to draw resources from an unallocated expenditure category and/or allow the GoO to request the World Bank to recategorize and reallocate financing from other project components to partially cover emergency response and recovery costs. It could also be used to channel additional funds should they become available because of an emergency.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

15. **The project underwent three Level II restructurings: in March 2019, March 2020 and June 2020.**¹⁹

Revised PDO, PDO Indicators and Outcome Targets

16. **No changes were made to the PDO.** The March 2019 restructuring **revised** the outcome target for PDO Indicator 1 (reconstructed houses) **from 75 percent of all damaged houses to 100 percent of all damaged houses.**

Revised Components

17. **The first restructuring of March 2019 extended the closing date by 12 months till March 2020 and US\$9.8 million credit was canceled.** This led to the cost of Component 1 (resilient housing reconstruction and community infrastructure) being revised from US\$167.3 million to US\$153.3 million, reducing the total project cost from US\$218.6 million to US\$204.7 million.²⁰ In March 2020, the project was restructured to extend the closing date by three months to June 30, 2020.

¹⁹ Report Nos. RES35941, RES37384, RES41902, respectively.

²⁰ Restructuring Paper on a Proposed Restructuring of Odisha Disaster Recovery Project (March 2019). Report No. RES35941



18. **The June 2020 restructuring canceled US\$40.13 million of credit, which resulted in changes to allocations across all components: resilient housing reconstruction and community infrastructure was revised from US\$136.18 million to US\$107.5 million, urban infrastructure in Berhampur from US\$12 million to US\$7.2 million, capacity building for DRM from US\$8 million to US\$5.6 million, and implementation support from US\$7 million to US\$4.2 million.** This included cancellation of two activities in Component 2, upgradation of 70 slum communities and roads of over 4 km in Berhampur, totaling US\$20.3 million as well as partial cancellation of two activities, all-season roads (road package I) and storm water drainage, leading to unused resources of US\$7.9 million. The contingent emergency response component was deleted.

Other Changes

19. **The March 2019 restructuring extended the project closing date from March 2019 to March 2020. The March 2020 restructuring further extended the closing date to June 2020.**

Rationale for Changes and Their Implication on the Original Theory of Change

20. **Based on detailed beneficiary consultation and identification by OSDMA, local government agencies and community-based organizations, the number of houses for reconstruction was revised from 30,000 (rough estimate as identified in the RDNA, based on limited data availability) to 19,604.** This led to savings of SDR7.1 million (equivalent of US\$9.8 million), resulting in partial credit cancellation of this amount in March 2019. In view of the reduced number of houses available for reconstruction, PDO indicator 1 was revised from 75 percent to 100 percent.
21. **The closing date was first extended from March 2019 to March 2020 to complete the delayed implementation of housing reconstruction in Puri for 3,046 beneficiaries, ongoing infrastructure works in Berhampur, and the establishment of the State Institute of Disaster Management (SIDM) integrated complex.** The closing date was further extended to June 30, 2020, to provide time to GoI to determine its priorities with respect to the use of undisbursed funds under the project in support of its response to the COVID-19 crisis.²¹
22. **The cancellation of two activities in Component 2 was undertaken as no successful bids for them were received.** Two activities were partially cancelled due to implementation delays arising from low capacity of BeMC and the contractors. The capacity building of OSDMA was achieved with support received by GoO from GoI, international agencies and private sector weather networks. Further, the SIDM complex building was not completed till project closing. These factors led to unspent credit, which was cancelled in June 2020.
23. Due to non-completion of 3,496 houses, mostly due to litigation²²-led delays in Puri district, of a total of 19,604 houses to be reconstructed in Component 1, partial or full cancellation of certain activities in Component 3 as well as on account of non-utilization of project funds towards capacity building under Component 3, a further credit of **US\$40.13 million was cancelled in June 2020.**

²¹ Restructuring Paper on a Proposed Restructuring of Odisha Disaster Recovery Project (March 2020). Report No. RES37384.

²² Housing reconstruction in Puri was delayed due to litigation in courts related to discrepancy in the beneficiary list. The matter was resolved in the later part of 2018. Referenced in restructuring paper (2019). Report No. RES35941.



24. The contingent emergency response component was deleted as it was no longer deemed necessary by Gol.
25. The original theory of change remained valid throughout the project period.

II. OUTCOME

A. RELEVANCE OF PDOs

Assessment of Relevance of PDOs and Rating

Rating: High

26. **The PDO remains highly relevant to the World Bank Group's Country Partnership Framework (CPF) for India for FY2018-22.**²³ Objective 1.5 of the CPF (improve disaster risk management and resilience to climate change) under Focus Area 1 (resource-efficient growth) seeks to create resilient infrastructure, build state and local-level DRM institutions, and build capacity for Disaster Risk Reduction (DRR) and emergency preparedness. The PDO is highly aligned to this CPF objective since it directly contributed to the creation of resilient housing and public service infrastructure, strengthened capacity of local and state DRM institutions, and helped Odisha provide more effective response to disasters.
27. **The PDO is also highly relevant to Gol's agenda for promoting DRR.** The Gol is strongly committed to addressing DRR as is evident in the National Disaster Management Plan²⁴ (NDMP) of 2019, whose objective is to make India disaster resilient and significantly reduce loss of lives and assets by providing a framework and direction to government agencies for all phases of the disaster management cycle. In line with NDMP 2019, the project focused on mainstreaming DRR into developmental planning, supported sustainability of development initiatives, and adopted an inclusive approach for building local capacity and infrastructure to cope with disasters. The relevance to government priorities is also evident in the Sendai Framework for Disaster Risk Reduction 2015-30, which was endorsed by the United Nations General Assembly in 2015. The Sendai Framework outlines seven global targets to be achieved by 2030, including substantial reductions in global disaster mortality, the number of affected people globally, the direct economic loss in relation to gross domestic product, and disaster damage to critical infrastructure and disruption of basic services; and substantial increases in the number of countries with national and local DRM strategies, international cooperation to developing countries, and the availability of and access to multi-hazard early warning systems. In line with these objectives, the project supported resilient infrastructure at the community level leading to disaster-related reductions in loss of lives and assets.

²³ India: Country Partnership Framework for the period FY18 22 (2018). *The World Bank*.

<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/277621537673420666/india-country-partnership-framework-for-the-period-fy18-fy22>.

²⁴ National Disaster Management Plan (2019). National Disaster Management Authority, Ministry of Home Affairs, *Government of India*. <https://ndma.gov.in/sites/default/files/PDF/ndmp-2019.pdf>.



B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

28. The PDO consists of three outcome statements: (a) restore and improve housing in targeted communities of Odisha; (b) restore and improve public services in targeted communities of Odisha; and (c) increase the capacity of the state entities to respond promptly and effectively to an eligible crisis or emergency. The evaluation of efficacy is structured around these three outcomes, discussing results as measured by the PDO-level Indicators and Intermediate Result Indicators (IRIs) and comparing them with original and revised targets as relevant. See further information on results in Annex 1.

Outcome 1: Restore and improve housing in targeted communities of Odisha

Rating: Substantial

29. This outcome was measured by the following indicators:

- PDO-level Indicator 1: Percentage of households with fully/severely damaged houses in project areas provided with resilient housing reconstructed under the project (original target: 75 percent, revised target: 100 percent²⁵);
- IRI 1: Number of resilient houses reconstructed (original target: 30,000, revised target: 19,604); and
- IRI 2: Number of Village Development Plans completed (target: 200).

30. The project mostly accomplished Outcome 1, having achieved 82 percent of PDO-level Indicator 1 as well as provided the requisite public services and community infrastructure to beneficiary households. It financed the construction of 16,108 multi-hazard resilient houses to replace houses fully/severely damaged by Cyclone Phailin, a notable achievement of the revised target (82 percent of IRI 1). The reconstruction embedded disaster-resilience, social and cultural elements into the design of the houses, their location, and the use of materials. The design (such as using a column beam structure), location and material used for construction provided protection against floods, cyclones and earthquakes. Social considerations that fed into the construction included flexibility of design for a house to be used for livelihood generation, if so desired, and its joint ownership by wife and husband beneficiaries. In addition, the reconstruction design enhanced natural ventilation and lighting to improve the health of the residents. The resilient design and construction of each house were verified by technical officers from OSDMA. Further, all houses were insured by the GoO against multi-hazard events, with a 10-year premium period. This is considered a remarkable achievement despite the many internal and external challenges (see the ‘Key factors during implementation’ section). Moreover, from June 2020 till June 2021, using its own resources, GoO constructed an additional 780 houses in Puri district, taking the total number of completed houses to 16,888 (86 percent of IRI 1). The partially constructed remaining 2,716 houses are being completed using GoO’s resources and are expected to be ready in early 2022; thus, the project is likely to fully achieve Outcome 1.

31.

Table 2: Total number of houses built in the three districts at completion²⁶

Name of the District	Ganjam	Khordha	Puri	Total
In-situ houses completed	3,343	230	117	3,690

²⁵ Note that the 75 percent target referred to the original 30,000 houses intermediate target, while the 100 percent target referred to the revised 19,604 houses intermediate target.

²⁶ As per Aide Memoire May 24-June 25, 2019, and email exchange with OSDMA, November 30, 2021.



Relocated houses completed	12,370	48	0	12,418
Total beneficiaries (in-situ + relocated, completed)	15,713	278	117	16,108

32. **The housing reconstruction program actively involved the community in the selection of beneficiaries as well as design and construction through a participatory approach.**²⁷ The project Grievance Redressal Mechanism (GRM) helped ensure transparency and resolve issues raised by beneficiaries. Beneficiaries were given an opportunity to customize the design of their houses according to their personal and livelihood needs. For example, some beneficiaries added housing extensions and exterior treatments to accommodate their needs, some chose to have a flat roof to dry fish on or the option to add floors as the family expands while others added a small shop to the house.²⁸ Relocated beneficiaries were provided with land titles and house ownership documents to ensure their social and economic stability; however, they also maintained ownership of the previously owned but damaged houses. A hired Non-Governmental Organization (NGO), Gram Vikas, conducted an awareness program (over 75 street theatre performances, movies, workshops)²⁹ to sensitize beneficiaries about hygiene, livelihood opportunities and formation of Village Water and Sanitation Committees (VWSCs).³⁰ The project facilitated formation of 106 VWSCs with broad and inclusive representation of different caste groups; the VWSCs managed water and sanitation services in the relocated houses. Mason training, including for women beneficiaries, was provided to help with the reconstruction of *in-situ* houses to save labor costs, address potential shortage of masons and enable efficient house construction as well as to apply this skill as a livelihood option. The project trained 2,340 masons, including 577 women, through 51 mason training programs conducted by Gram Vikas.
33. **As per the design of Component 3, the project sought to enhance the recovery and risk reduction needs of the socially vulnerable and marginalized groups in the project area.** Detailed surveys and consultations were carried out to identify the vulnerable individuals and households among the cyclone-affected communities. OSDMA identified key locations, inhabited by the Scheduled Caste (SC) households without secured tenure and regular incomes for the housing reconstruction component. The beneficiary identification process for housing reconstruction aimed to include households that subsisted below the poverty line, inhabited kutchha houses, were headed by women, belonged to the fishing communities or were not covered under other government schemes. The project provided land gratis to 12,418 such households; these were either landless families or those that did not possess adequate land for construction of resilient houses.
34. **In-situ housing reconstruction was not accompanied by the preparation of Village Development Plans to construct accompanying infrastructure as planned (IRI 2). Instead, the selection of community and public infrastructure investments was carried out through an intensive community consultation process.** Although this was not captured in the result indicator, it had very positive results, the same as those from achievement of IRI 2. The project financed paver block-laden internal village roads in project villages, which are resilient to floods and waterlogging (the first in India³¹) as well as resilient community infrastructure

²⁷Resilient Housing in Odisha (2020). *Global Facility for Disaster Reduction and Recovery*. The World Bank. p.40-43.

²⁸ Ibid. p35-36, 50.

²⁹ Aide Memoire (July 27-30, 2015).

³⁰ Resilient Housing in Odisha (2020). *Global Facility for Disaster Reduction and Recovery*. *The World Bank*.

³¹ Ibid. p.44.



including six primary schools, 123 roads with storm water drains, 11 healthcare and 48 childcare centers, 65 community buildings, 106 water supply systems, and 593 electricity supply substations in addition to street lighting, solid waste management systems, and marketplaces. These investments were complemented by several other government programs that provided essential public services to the housing component beneficiaries: the Biju Gram Jyoti Yojana program³² provided the households individual electricity connections; the Swachh Bharat Mission³³ supported the construction of toilets in the houses, including connections to fecal waste treatment systems; the Rural Water Supply Scheme,³⁴ part of the national Jal Jeevan Mission,³⁵ financed individual household water connections; and the Pradhan Mantri Ujjwala Yojana³⁶ financed cooking gas connections to the houses. GoO constructed new fishing jetties based on the location of reconstructed houses. The Mahatma Gandhi National Rural Employment Guarantee Scheme³⁷ financed metaled roads connecting relocated housing complexes to nearby main roads and to help the relocated beneficiaries access their original house sites and livelihoods. These houses and community infrastructure have since withstood the annual monsoon rains since construction over 2015-18 as well as subsequent multiple cyclones³⁸ of low and high intensity including VSCS Titli in October 2018, Extremely Severe Cyclonic Storm (ESCS) Fani in May 2019, and Super Cyclonic Storm Amphan in May 2020.

Outcome 2: Restore and improve public services in targeted communities of Odisha

Rating: Negligible

35. This outcome was measured by the following indicators:

- PDO-level Indicator 2: Number of people with access to improved public services in Berhampur (target: 30,000);
- IRI 3: People in urban areas provided with access to all-season roads within a 500-meter range under the project (target: 25,000);
- IRI 4: People in urban areas provided with access to “improved water sources” under the project (target: 25,000);
- IRI 5: People in urban areas provided with access to “improved sanitation facilities” under the project (target: 25,000); and
- IRI 6: City-wide drainage and sewerage master plans completed (original target: 2, revised target: 1).

36. The project restored and improved drinking water services in Berhampur, benefitting 350,000 city residents including nearly 120,000 slum residents³⁹ living in over 250 settlements—exceeding the set 25,000 target (IRI 4) and significantly contributing to PDO level Indicator 2. However, improvements in other public services were not supported as planned. The city’s water supply system (IRI 4) was restored by replacing 23.9 km of damaged water pipelines. Approximately 60 percent of the works on all-season

³² Scheme Monitoring Department. Energy Department. *Government of Odisha*. https://eicelectricityodisha.nic.in/SM/BGJ_SM_PB.aspx.

³³ Department of Drinking Water and Sanitation. *Government of India*. <https://sbm.gov.in/sbmReport/home.aspx>.

³⁴ Panchayati Raj and Drinking Water Department. *Government of Odisha*.

<https://odishapanchayat.gov.in/English/RuralWaterSupply.asp>.

³⁵ Jal Jeevan Mission (2020). *Government of India*. <https://ejalshakti.gov.in/WaterDashboard/HouseHoldConnection.aspx>.

³⁶ Pradhan Mantri Ujjwala Yojana. National Portal of India. *Government of India*. <https://www.india.gov.in/spotlight/pradhan-mantri-ujjwala-yojana#tab=tab-1>.

³⁷ Mahatma Gandhi National Rural Employment Guarantee Act. Ministry of Rural Development. *Government of India*. <https://nrega.nic.in/netnrega/home.aspx>.

³⁸ Resilient Housing in Odisha (2020). Global Facility for Disaster Reduction and Recovery. *The World Bank*.

³⁹ https://www.niua.org/sites/default/files/reserch_paper/RSS-118.pdf



roads (IRI 3) and just over 50 percent of the storm water drainage works (IRI 5) were completed by project closing, therefore not achieving results relevant to improved access to all-season roads and improved sanitation facilities as the sub-activities under these two IRIs remained incomplete. Accompanying facilities such as street lighting, pavements and utility ducts were also partially completed, improving quality of life for only some slum residents. Community consultations were carried out for designing infrastructure (roads, drains, water supply) as well as towards upgradation of slums (dropped by the project as no successful bid was obtained in time).

37. **The project financed the development of one city-wide drainage and sewerage master plan (below the original target of 2, and as per the revised target of 1 – IRI 6),** which serves as a planning tool for all related ongoing and future infrastructure planning, design and implementation. The master plan was developed by technical consultants based on community consultations, study of municipal records, assessment of disaster vulnerability, and incorporation of good DRM practices. As per the plan, a total of 380 km of drains would ensure faster drainage of rainwater and prevent waterlogging. It would also help plan future roads, slum development initiatives, and other city infrastructure while addressing the city's vulnerability to floods and waterlogging.⁴⁰ The project also financed the preparation of DPRs for the various infrastructure works as planned.

Outcome 3: Increase the capacity of the state entities to respond promptly and effectively to an eligible crisis or emergency

Rating: Negligible

38. **This outcome was measured by the following indicators:**

- PDO-level Indicator 3: State departments making use of OSDMA-generated information (target: 5);
- IRI 7: DSS established in OSDMA (target: 1);
- IRI 8: Integrated complex comprising of OSDMA, GIS cell, Emergency Operation Center and a training center established⁴¹ (target: 1); and
- IRI 9: Expert staff employed at OSDMA (target: 3).

39. **The project contributed to a multi-stakeholder discussion and identified specific government and nongovernment resources, tools and capacities towards strengthening the impact forecasting capacity at OSDMA as well as the use of modern tools such as GIS and remote sensing for disaster planning and response.** To achieve targets under IRIs 7 and 8, GoI and GoO took a decision to leverage existing financial and human resources as well as support from international and private agencies. Through a series of discussions between state experts and national DRM agencies, a plan was developed to enhance OSDMA capacity using existing national and state decision support tools, OSDMA's own resources, mobilization of OSDMA's existing memorandum of understanding with the Regional Integrated Multi-Hazard Early Warning System (RIMES) for Africa and Asia⁴² and ongoing engagement with the Indian Meteorological Department⁴³

⁴⁰ https://www.business-standard.com/article/pti-stories/drainage-master-plan-for-berhampur-116060700273_1.html.

⁴¹ 'Established' was defined as 'infrastructure in place, and staff making full use of it'.

⁴² RIMES is an international and intergovernmental institution, owned and managed by its Member States, for the generation and application of early warning information. Accessible at <https://www.rimes.int/>.

⁴³ National agency responsible for meteorological observations, weather forecasting and seismology under the Ministry of Earth Sciences, Government of India.



and support from other private weather networks in India.⁴⁴ A large number of DSS tools were deployed for sharing risk information with key stakeholders. These tools were integrated into the already operational State Emergency Operations Centre (SEOC) – IRI 8. The EWDS developed under NCRMP-1 Additional Financing (P148870) was integrated into the SEOC and utilized to relay public warnings of impending disasters and likely impacts. At closing, the PDO-level Indicator 3 was not met.

40. **The project supported the development of the integrated complex building (SIDM)⁴⁵ by financing training, research and its design and construction but did not achieve the set target.** Capacity building resources under this Component were not utilized as OSDMA received support for this from existing arrangements with national, intergovernmental and private weather agencies.⁴⁶ Thus, the project did not support the employment of new expert staff at OSDMA as planned (IRI 9). At closing, the project financed SIDM building was only partially (less than 50 percent) constructed. It is expected to be completed by March 2022 by the GoO which had already invested an additional INR 178 million (equivalent to US\$2.4 million) of its own resources till November 2021. Once completed and populated, the SIDM complex is expected to significantly enhance the DRM capacity of the state by enabling a faster, more effective and better coordinated response to disaster emergencies by state entities.
41. **In 2016, India adopted the first ever National Disaster Management Plan, a document based on the global blueprint for reducing disaster losses, the Sendai Framework for DRR (2015-30).**⁴⁷ Following this, the state prepared its first State Disaster Management Plan in 2017 which was further revised in June 2019.⁴⁸ The adoption of these plans at the national and state levels resulted in substantial allocation of resources towards DRM capacity, increasing from about US\$4 billion over five years to US\$4 billion annually.⁴⁹ India, including Odisha, also received support from international agencies, World Bank projects and the private sector in strengthening its DRM capacity and preparedness. Notably, Odisha installed a location-based alerting system for coastal communities through direct messages on their cellphones, disaster-resilient emergency communications systems for state and district officials, and near-universal access to emergency shelters. Combined with a “zero casualty” approach, Odisha suffered only two fatalities⁵⁰ during the Very Severe Cyclone Yaas in May 2021 compared to 45 fatalities from Cyclone Phailin in 2013 and nearly 10,000 fatalities from the cyclone in 1999. This dramatic reduction in loss of life highlights the extensive efforts made by Odisha in DRR and preparedness.⁵¹ However, it is difficult to estimate the exact attribution and contribution of an individual initiative, including that of this project, to the enhanced DRM capacity and preparedness in Odisha, given the multiple partnerships and integrated approach adopted by the state. Specific to this project, Component 3 has been given a Negligible rating owing to its underachievement on the physical construction of the SIDM integrated complex and the nonachievements PDO-level Indicator 3.

⁴⁴ Such as Skymet Weather Services.

⁴⁵ Odisha State Disaster Management Authority. *Government of Odisha*. <https://www.osdma.org/capacity-building/state-institute-of-disaster-management/#gsc.tab=0>.

⁴⁶ Like the support outlined above for establishing DSS.

⁴⁷ https://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf.

⁴⁸ <https://www.osdma.org/state-dm-plan/#gsc.tab=0>.

⁴⁹ <https://timesofindia.indiatimes.com/india/from-10000-in-1999-to-6-in-2021-how-india-cut-cyclone-deaths/articleshow/83022325.cms>.

⁵⁰ <https://www.indiatoday.in/india/story/odisha-cyclone-yaas-management-naveen-patnaik-1807834-2021-05-28>.

⁵¹ https://www.gfdrr.org/sites/default/files/publication/Understanding_Risk-Web_Version-rev_1.8.0.pdf.



Justification of Overall Efficacy Rating

Rating: Modest

42. **The project was able to partially (not to the extent intended) reduce the vulnerability of targeted rural and urban coastal communities in Odisha and had limited impact on enhancing the capacity of the state entities to respond promptly and effectively to an eligible crisis or emergency.** With the construction of 16,108 houses, the first outcome⁵² was mostly achieved in relation to the revised target of 19,604 houses and, with GoO efforts, the end target is likely to be achieved: an additional 780 houses were already constructed till June 2021 and 2,716 are expected to be ready in early 2022. The second outcome reached people with improved access to drinking water services at an exceeded number but with limited access to improved roads and sanitation facilities as compared to the project design. The third outcome was not achieved because, at the time of closing, designated state departments did not make use of OSDMA-generated information as planned. Capacity building of OSDMA was achieved, though with resources leveraged from other sources. The project achieved partial construction of the SIDM complex (see key achievements under borrower's comments in Annex 5).

C. EFFICIENCY

Assessment of Efficiency and Rating

Rating: Substantial

Economic Analysis

43. **At appraisal, the project Economic and Financial Analysis (EFA) focused on the key activities that were to be supported by the project – reconstruction of housing, improvements in urban infrastructure, primarily in Berhampur, and capacity building in DRM.** The EFA estimated the economic benefits of resilient housing and access to improved water and sanitation services to avoid illness, mortality and injuries caused by cyclones and other storms over a 10-year period. Costs were estimated from the RDNA that had been carried out in November-December 2013. In the base case for the analysis, the EFA used a 10 percent economic discount rate and estimated that storms such as Cyclone Phailin were 'once in 20-year' events. The EFA concluded that the housing reconstruction and community infrastructure efforts provided a nearly 2:1 Benefit-to-Cost Ratio (BCR) with a 10-year economic lifetime while the risk mitigation capacity-building efforts brought nearly a 32:1 BCR. Overall, the project was expected to generate significant economic benefits over a 10-year period, with smaller returns over the long term.
44. **No additional EFAs were carried out during the restructurings, which mainly consisted of cancellations of IDA proceeds and extensions of the loan's closing date.** The largest amounts cancelled were for urban infrastructure improvements in Berhampur, which were not expected to generate significant economic benefits on their own in the appraisal EFA, though the BCR was above parity on a 10-year scale at appraisal. Of note during the project period was depreciation in the value of the Indian rupee (INR) from about INR 62 per US\$1 at appraisal to an averaged-out figure of INR 64.44 per US\$1 at project closing, which affected the costs but not the benefits in the model.
45. **Rerunning the appraisal EFA with the main case parameters (10-year economic lifetime, 10 percent**

⁵² Split rating is not used for Outcome 1 as the difference between original target (75 percent of 30,000 houses) and revised target (100 percent of 19,604 houses) is just over 10 percent.



economic discount rate), adjusting for the change in exchange rate and project restructurings and scale-down shows that the project BCR was about 3.69:1 at closure. The project constructed 16,108 houses at an average cost of US\$6,705 per housing unit versus a forecast of US\$9,830. Unfortunately, at closing, there was no detailed breakdown of costs for housing units and these supporting costs; however, even adjusting for exchange depreciation shows the costs were approximated correctly.

46. **Due to the rush to respond to the Phailin disaster in a timely fashion, the appraisal EFA was limited in both sophistication and available data. A new model built as part of the ICR process that attempts to account for some of the benefits not included at appraisal (in particular, resilient housing replacing more vulnerable shelters and latrines replacing open defecation pits) shows a much more dramatic BCR of about 25.3:1 at closing.** See further information in Annex 4.

Implementation Efficiency

47. **Important results were achieved by project closing with financing of about 55 percent of the original IDA credit allocation, thanks to the leveraging of resources and partnerships** with state, national and international agencies as well as other ongoing programs and private firms under both Components 1 and 3. Not only did these partnerships reduce the costs of the components, they also enhanced the facilities available to reconstructed households and further strengthened the state's forecasting capacity. By mainstreaming livelihood interventions and provision of public services into ongoing government development initiatives, the project leveraged funds⁵³ from several government programs and secured improved water, sanitation and electricity services in addition to access to all-weather roads and improved fuels such as cooking gas for project beneficiaries in rural areas. Livelihood options for several of these households were strengthened by partnering with TRIPTI, the state livelihoods program.
48. **The cost of housing construction per unit was INR 300,000 or nearly twice the other prevailing government housing schemes in Odisha, which provide about INR 140,000 per house⁵⁴ comprising grant and labor subsidy.** The higher cost is attributed to the hazard-resilient design and quality of housing, higher minimum plinth area, cost of utilities and market-based estimation of material cost, among other factors. However, the social and economic benefits in terms of enhanced security, avoided asset and income losses, and potential loss of lives are expected to be many times higher than the extra cost vis-à-vis government housing schemes.
49. **Efficiency was affected by implementation delays** experienced under all the components, including delays in the reconstruction of housing in Puri district, infrastructure construction activities in Berhampur, and the construction of the SIDM complex. These delays resulted in the need to extend the project's closing date by a total of 15 months which, on the one hand, did not facilitate the achievement of all targets and, on the other, also did not lead to project management cost increases.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Moderately Unsatisfactory

⁵³ For example, each beneficiary household was provided an additional INR 12,000 by Swachh Bharat Mission to construct a toilet.

⁵⁴ Release of Loans under PMAY (2019). Ministry of Rural Development. *Government of India*. <https://rural.nic.in/press-release/release-loans-under-pmay>.



50. **The overall outcome is rated based on the project’s high relevance, modest efficacy and substantial efficiency.** Despite the significant achievement of results under Component 1 but negligible achievements of results under Components 2 and 3, the overall outcome has been rated as Moderately Unsatisfactory.

E. OTHER OUTCOMES AND IMPACTS

Gender

51. **The enhancement of overall DRM due to project interventions is expected to lead to social and economic benefits for women and girls.** Studies show that women and female children are more severely affected by natural disasters than men and boys.⁵⁵ Moreover, a key finding of an independent stock-taking study was that gender-caste inclusion was achieved in all stages of the project, including beneficiary identification, mason training programs, formation of VWSCs and economic transactions.⁵⁶ For the selection of housing reconstruction beneficiaries, priority was given to vulnerable groups such as women-headed families. As per GoO’s “Policy Guidelines for Post Cyclone Phailin Resilient Housing” issued on December 26, 2013, joint ownership was given to both wife and husband or to the sole surviving partner for all houses built on relocated land. In addition, 30 percent of the trainees in the mason training program were women to ensure promotion of women’s livelihood options.⁵⁷ The provision of smokeless cooking stoves and cleaner fuel such as cooking gas by partnering with other government schemes is expected to lead to direct health benefits for women and children who spend a substantial amount of time in kitchens and indoors.⁵⁸
52. **The project facilitated informal linkages with other government programs, enabling women community members to form Self-Help Groups (SHGs) and obtain grants and credits to undertake income-generating activities.** The project-financed NGO Gram Vikas assisted SHGs of 10-12 women each to leverage seed capital from the Odisha Livelihood Mission,⁵⁹ to the tune of INR 15,000 each and/or interest-free loans up to INR 200,000.⁶⁰ Gram Vikas helped beneficiaries to apply for these credit options during the reconstruction phase. The SHGs used the funds to undertake a variety of income-generating activities, including fishing, spice processing and packaging, and cultivation of mushrooms.

Institutional Strengthening

53. **The project contributed to institutional development of the Odisha Department of Revenue, H&UD, OSDMA, BeMC, officials in targeted districts, village governments and community level institutions.** It enabled the setting up of a knowledge- and process-driven strengthened system for housing construction in Odisha, particularly among the Revenue Department, OSDMA and the three target districts by developing a transparent, consultation-based and owner-driven housing reconstruction program. H&UD and BeMC strengthened their capacity towards managing urban disaster risk resilience through planning

⁵⁵ Vidili, M. (2018). “Why we must engage women and children in disaster risk management”. *The World Bank*. <https://blogs.worldbank.org/sustainablecities/why-engaging-women-and-children-disaster-risk-management-matters-and-how-it-makes-difference> AND <https://www.brinknews.com/gender-and-disasters/>

⁵⁶ Resilient Housing in Odisha (2020). Global Facility for Disaster Reduction and Recovery. *The World Bank*. p.74

⁵⁷ New life in safe homes (2016). *The World Bank*. <https://www.youtube.com/watch?v=14RFLNOUwh4>

⁵⁸ Household air pollution and health (2018). *World Health Organization*. <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>.

⁵⁹ Odisha Livelihoods Mission. Department of Mission Shakti. *Government of Odisha*. <http://olm.nic.in/>.

⁶⁰ Resilient Housing in Odisha (2020). Global Facility for Disaster Reduction and Recovery. *The World Bank*. p.28.



and implementation of the activities under Component 2. At the village level, the training and continuous engagement of local governments, Palli Sabhas and community leaders, as part of Component 1, led to the strengthening of their capacity and enhanced transparency in the selection of housing beneficiaries.

54. **The project enabled partnerships among state, national and international agencies to coordinate and enhance capacity for improved disaster forecasting.** A key outcome of the project was the building of bridges across multiple central and state government schemes by facilitating the integration of a large number of DSS tools into the SEOC for disseminating risk information to key stakeholders. The completion and subsequent utilization of the SIDM complex, whose design and partial construction the project financed, will substantially enhance the DRM capacity of the state, civil society organizations and community institutions.

Mobilizing Private Sector Financing

Not applicable

Poverty Reduction and Shared Prosperity

55. **The project enhanced the resilience of poor households in coastal Odisha to disasters such as cyclones, floods and storms, thus contributing to poverty reduction.** Studies have shown that disasters can induce and exacerbate poverty through the loss of lives; destruction of assets and incomes; disruption of economic activities and trade; and indirect impacts on health, mobility, gender equality and access to education.⁶¹ Further, there is evidence that reduced background risk and effective risk management allow poor households to build up savings, invest in productive assets and improve their livelihoods.⁶² More generally, increased resilience enables forward-looking planning, long-term capital investments and entrepreneurship – even if disasters do not occur for a long time.⁶³ Approximately 36 percent of the rural population in Odisha lives below the poverty line,⁶⁴ about 16.5 percent of the state’s population belongs to SC and about 22 percent to Scheduled Tribe (ST) communities, the poorest and socioeconomically disadvantaged groups.⁶⁵ The project reduced the exposure of poor coastal residents, including the SC and ST households, through hazard-resilient housing, improved public services and roads, and enhanced capacity of OSDMA to forecast disasters and improved post-disaster management. Moreover, the integration of livelihood-friendly designs in housing reconstruction and the provision of masonry training to community members are expected to enhance the income generation opportunities of housing reconstruction beneficiaries.
56. **Prior to reconstruction, villagers lived in hamlets segregated by caste.** In most relocation sites, the project was successful in creating mixed neighborhoods. The beneficiaries also were able to name their relocation sites thus providing them with a sense of ownership in their new sites. The provision of social infrastructure and public services helped improve the quality of life of the beneficiaries; such quality of infrastructure and public services were not available prior to reconstruction.

⁶¹ World Bank. 2017. *Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters*.

⁶² The Triple Dividend of Resilience (2015). *The World Bank*.

https://www.gfdrr.org/sites/default/files/publication/The_Triple_Dividend_of_Resilience.pdf.

⁶³ Ibid.

⁶⁴ Planning Commission (2013). *Press Note on Poverty Estimates, 2011-12*.

⁶⁵ Population Census (2011). *Government of India*.



Other Unintended Outcomes and Impacts

57. **The project likely reduced greenhouse gas (GHG) emissions and natural resource use during housing reconstruction activities.** Rather than supporting the extraction of environmentally precious clay or soil from the ground for housing reconstruction, environment friendly material (primarily fly ash bricks) was used. The process⁶⁶ of preparing such bricks bypassed the burning process used by brick kilns, thus reducing GHG emissions, which would have taken place while following conventional practices.

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

58. **The project was prepared on a short timeline in response to an emergency, necessitating some adjustments during implementation.** The entire project preparation from concept to approval took place in a period of about three months. As a result, several project activities saw revision in scope during implementation when more information became available and linkage with ongoing programs materialized.
59. **The project set the PDO at a right level of ambition and scope, given the knowledge at the time.** Based on the framework for assistance agreed to by GoI, ADB and the World Bank, the project focused on rebuilding houses in the three districts, improving slums in Berhampur and enhancing DRM capacity in Odisha. The intention of GoO was to fund activities of specific state and city agencies responsible for directly implementing the above-mentioned activities.
60. **The project selected appropriate stakeholders and beneficiaries with due consideration to impact, relevance and readiness for implementation.** While several districts in Odisha were affected by Cyclone Phailin, the project selected the three districts⁶⁷ that were most severely affected to concentrate its efforts and achieve maximum impact. With OSDMA already implementing another World Bank operation, NCRMP-I, it was considered the appropriate agency to lead the implementation of this project. H&UD along with BeMC was chosen as the implementing agency for interventions in Berhampur city. Aware of the limited experience and capacity of H&UD and BeMC, the project attempted to enhance their capacity through capacity building and hiring of technical consultants to assist BeMC.
61. **The project adopted a community-led implementation approach, reflecting lessons from completed and ongoing similar projects in India and elsewhere.** Evidence from the completed Emergency Tsunami Reconstruction Project (ETRP, P094513, 2005-11) in Tamil Nadu and Pondicherry, projects in Bangladesh⁶⁸ and global experience⁶⁹ clearly showed the benefit of involving the local community in disaster responses including determination of infrastructure locations and designs. Another applied lesson was to keep the

⁶⁶ Fly ash bricks are chemically bonded bricks made by compressing fly ash, sand, lime and water. This process saves energy, reduces air pollution and costs about 20 percent less than traditional clay bricks manufacturing.

⁶⁷ Ganjam, Khorda and Puri; Berhampur city is part of Ganjam district.

⁶⁸ Emergency 2007 Cyclone Recovery and Restoration Project (P111272, 2008-18); Livelihood Restoration in Cyclone Affected Area – Additional Financing-III SIPP (P110376, 2008-16).

⁶⁹ https://ieg.worldbankgroup.org/sites/default/files/Data/reports/eval_brief_nat_disaster_response.pdf.



project design simple with few subprojects and implementing agencies to avoid inordinately overburdening the implementation team, which was reflected in the project's implementation arrangements.⁷⁰ Learning from global experience⁷¹ on enhancing sustainability of post-disaster development interventions, the project sought to also focus on long-term risk reduction in addition to reconstruction. Experience from the ETRP and various government schemes in India had shown that regular third-party technical auditing of various construction activities of rural housing reconstruction had resulted in better quality of construction, which was replicated in this project.

62. **The project design placed due attention on gender equity and social inclusion.** A Gender Equity and Social Inclusion framework was developed by the project, focusing on the following key aspects: (i) giving priority to vulnerable families including women-headed families and socially-excluded families and those having disabled members in selecting housing beneficiaries; (ii) ensuring community engagement at all stages of the project; (iii) promoting owner-driven and group-based housing schemes with technical and social assistance; and (iv) supporting recovery and risk reduction needs of the socially vulnerable and marginalized groups through group-based initiatives.
63. **The assessment of risks was overall realistic; however, mitigation measures were partially effective.** At appraisal, the project had assessed overall operational risk as 'Substantial' on account of the large number of direct beneficiaries, management of social and environmental processes, and involvement of implementing agencies with varied capacities. Mitigation measures, such as capacity building of BeMC officials and hiring of a technical support agency for BeMC, were put in place to lower risks related to as the low capacity of H&UD and BeMC. Safeguards, financial management and procurement instruments were prepared on time and were of acceptable quality.

B. KEY FACTORS DURING IMPLEMENTATION

64. **Leveraging of existing projects and programs.** Given the rising importance that India attaches to DRR, as evidenced by its National Policy on Disaster Management 2009 and NDMP 2019, it has progressively devised multiple initiatives on capacity enhancement across the country. During implementation, the GoO increasingly leveraged other national and international programs to provide the reconstructed houses with needed public services and facilities and achieve more sophisticated forecasting capacity than originally planned. This, on the other hand, resulted in fewer results that could be attributed directly to the project.
65. **Lack of prior experience of BeMC and H&UD in implementing World Bank-funded projects.** The inexperience of H&UD and BeMC in World Bank procedures/policies for financial management and environmental and social safeguards impacted the pace of implementation of activities under Component 2. BeMC faced difficulties in managing issues such as rehabilitation of displaced community members, applying requisite environmental safeguards, and development of bid and contract documents.
66. **Beneficiary engagement difficulties in Puri.** The Puri district PIU faced considerable difficulties in

⁷⁰ World Bank. 2012. *ICR on Emergency Tsunami Reconstruction Project*. Report No: ICR00002215.

⁷¹ https://ieg.worldbankgroup.org/sites/default/files/Data/reports/eval_brief_nat_disaster_response.pdf.



implementing reconstruction activities, including litigation⁷² related to the identification of beneficiaries.⁷³ Consequently, it was able to finalize the beneficiary list only in 2019, leading to most houses in Puri remaining incomplete at project completion. The implementation was also adversely impacted by delayed application of appropriate social and environmental norms and the onset of COVID-19.

67. **Inexperience in use of a new procurement system.** As India had transitioned to an e-procurement system of the National Informatics Center in 2013, contractors and line departments were inexperienced in this system, which resulted in a halt on procurement of infrastructure activities for at least six months as project officials faced difficulties in preparing bid documents and seeking successful bids.
68. **Frequent natural disasters.** Odisha was hit by several natural disasters, including the VSCS Hudhud in October 2014 (two months after effectiveness), VSCS Titli in October 2018, ESCS Fani in May 2019, and Super Cyclonic Storm Amphan in May 2020. These storms diverted the attention of the PMUs and PIUs as they were engaged in emergency preparation, response and recovery works, resulting in general implementation delays. Notably, the reconstructed houses in Ganjam and Khordha reportedly fared well during these storms, demonstrating the success and benefits of the project's approach to DRM.⁷⁴
69. **At the onset of the COVID-19 pandemic, a nationwide lockdown was imposed across India beginning March 24, 2020.** Even though the project had been extended for three months in the March 2020 restructuring till June 2020, the extended period could not be effectively utilized to complete several activities such as 3,046 houses in Puri district, construction of the SIDM building, and multiple infrastructure activities in Berhampur. This led to underachievement of results under Components 1, 2 and 3.
70. **Limited effectiveness of project restructuring and Mid-Term Review (MTR).** The MTR mission in April 2017 was comprehensive and effective in analyzing the reasons for delays and social and environmental safeguards weaknesses and making appropriate suggestions as well as agreed-upon actions to overcome them. However, despite the timeliness and appropriateness of recommendations of the MTR and the extension of project closing by 15 months, the project failed to complete several activities.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

Rating: Modest

M&E Design

71. **M&E was to take place following a multi-tier Supervision, Reporting and Monitoring framework, developed during preparation.** Broad thematic areas that were to be supervised and monitored included the following: (i) social and environmental monitoring; (ii) regular quality supervision and certification forming the basis for payment; (iii) periodic physical progress monitoring of infrastructure activities and

⁷² Housing reconstruction in Puri was delayed due to litigation in courts related to discrepancy in the beneficiary list. The matter was resolved in the later part of 2018. Referenced in restructuring paper (2019). Report No. RES35941.

⁷³ Discrepancy in the housing beneficiary in Puri led to litigation by potential beneficiaries. The matter was finally resolved by the courts in 2019.

⁷⁴ Refer to Aide Memoire of May 24-June 25, 2019.



third-party quality audit of progress and quality of infrastructure being made; and (iv) M&E of progress toward PDO achievement using the results framework. The framework was adequate in monitoring of progress and achievement of PDO and outcomes of each project component. It was aligned as far as possible with government M&E systems for efficiency. Comprising three PDO level indicators and 10 intermediate result indicators, it comprehensively covered progress under each component and activities therein as well as overall outcomes and impacts of the project.

M&E Implementation

72. **The project monitoring arrangements were embedded mainly in the PMUs and PIUs through assigned specialists at OSDMA and BeMC; an online Management Information System (MIS) would have resulted in more accurate reporting of results.** They captured information on project/activity-based inputs, processes, outputs and outcomes. Beyond the collection and evaluation of results measured by the results framework, detailed surveys and consultations recorded the role of different existing schemes of the government aimed at the achievement of the housing reconstruction outcome; the consequent improvements in the quality of life of housing beneficiaries; the trade-offs between conserving the local natural resources and choice of location so as to not negatively impact the environment;⁷⁵ and the socioeconomic impacts of financial incentives for timely completion of housing construction.
73. **The project presented progress reports as well as a MTR and a completion report to the state-level Steering Committee to inform its advice to the project and to the World Bank team as required.** These progress reports were based on periodic reports from the PIUs on physical and financial progress as well as regular site visits carried out by the PMUs and PIUs. The data would get collected at the block level, aggregated at the district level, and then compiled at the state level. At each step, the data would undergo a scrutiny and audit. The numbers reported by the state displayed inconsistency, for instance, in the August 2018 mission, the Aide Memoire reports that 16,568 houses had been completed whereas, in August 2019, the mission reported that 15,604 houses were completed. This could potentially be attributed to the regular audits that were conducted at local, district and state levels, thus corrected for errors and misrepresentation but with a time lag. But this did make the overall reporting very complex. Notably, a digital, internet-accessible MIS would have enabled a more systematic and methodical collection and reporting of data by the beneficiaries constructing their own houses, civil works contractors, PIUs and PMUs. Similar systems have been adopted as a part of the Andhra Pradesh Disaster Recovery Project (P154847) and the Uttarakhand Disaster Recovery Project (P146653) which are both contemporaries to the project in Odisha.

M&E Utilization

74. **Progress reports submitted by the PMUs and PIUs and third-party quality audit reports served as key inputs for World Bank missions and ISRs, the MTR, this ICR and the restructurings.** The reports and regular audits enabled the project to identify risks to the achievement of the PDO in the ISRs and assess the need to adjust project costs, targets and timelines. The project Steering Committee utilized reports to monitor progress and provide directions towards more effective implementation to the OSDMA and district officials. Despite agreement between Gol and the World Bank team (as reflected in Aide Memoire

⁷⁵ For example, mitigation plans for some of the housing sites had to be prepared due to their proximity to the HTL.



of August 2018), the M&E framework was not revised in time to reflect the intended outcomes.

Justification of Overall Rating of Quality of M&E

75. **The M&E system was designed well but would have displayed more robustness and accuracy had it been digital and online.** During implementation while it was implemented well by dedicated M&E specialists to assess the achievement of the PDO, implementation progress and project outcomes beyond those measured by the results framework – it could have benefitted more from a timely revision or by introducing measures that made the reporting more consistent. The M&E findings formed the basis for the three restructurings and recommendations from the Steering Committee and World Bank missions.

B. ENVIRONMENTAL, SOCIAL AND FIDUCIARY COMPLIANCE

Environmental and Social

76. **The project was classified as Environmental Assessment (OP/BP 4.01) Category B and triggered three additional policies: Natural Habitats (OP/BP 4.04), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12).** The foreseen environmental impacts were largely associated with the construction of houses, roads, drains and community infrastructure. These included impacts on forests, human-elephant/wildlife conflict in select locations, vegetation, drainage, air quality, noise levels, and occupational health and safety. The foreseen social impacts included non-availability of potable water, inadequate solid waste management, risk of injury to commuters and nearby communities from unfinished work in Berhampur, relocation of 179 non-titled holders affected by road activities in Berhampur, and temporary livelihood disturbances associated with the reconstruction of houses in the three target districts and infrastructure works in Berhampur city. In January 2014, the project prepared an Environmental and Social Management Framework (ESMF)⁷⁶ as the instrument to address issues related to the above-mentioned triggered policies and social impacts. Any residual adverse impacts arising out of the housing or slum improvement subcomponent were to be assessed and mitigated by preparing and implementing resettlement action plans in line with the ESMF.

77. **The environmental and social risks and impacts were screened and assessed but were not mitigated in full compliance with the World Bank's safeguard policies.** In the years 2017-20, the World Bank noted cases of environment and social safeguards noncompliance. For example, in all three districts, issues such as inadequate solid and liquid waste management, incomplete rectification of loosely hanging electrical wires, insufficient adoption of solar power technologies, nonavailability of potable water in select villages, and human-animal conflict were not fully resolved. Infrastructure activities in Berhampur were carried out without due attention to labour laws and resettlement action plans. The work at the SIDM building site did not conform with the required environmental norms, including work-specific environmental and social screening not undertaken by OSDMA.

78. **A GRM was established based on the state's existing systems as specified in the ESMF.** The GRM was in place at the field level and aggregated in the MIS managed by the PMU. The grievances received were minor in nature and concentrated on non-inclusion in the beneficiary list, delay in payments for housing

⁷⁶ Report No. E4413, January 16, 2014.



reconstruction and deficiency in provision of potable water; they were mostly addressed at the field level. The exceptions were litigation that was initiated by potential but unincluded beneficiaries in Puri over the beneficiary list and in Berhampur over resettlement-related concerns. The former was resolved by the courts in 2019 but the latter was under litigation at project closing.

79. **Procurement.** The PMU and PIUs used GoO procurement procedures with some early delays and confusion among project officials and contractors regarding the new e-procurement system initiated by GoI in 2013 as noted. In addition, procurement staff of district PIUs at OSDMA and BeMC demonstrated low capacity as demonstrated by delays in procurement and contract management. The project's procurement plan was also not regularly updated in the Systematic Tracking of Exchanges in Procurement.
80. **Financial Management.** The client appointed financial management specialists in the PMU and PIUs as well as internal and external auditors to be responsible for financial management activities. The fund flow from state to district and local levels was quick, seamless and based on needs. Internal audits were prepared on time throughout implementation and made several key points, such as disbursement of sums (about US\$270,000) to 113 ineligible housing beneficiaries and making payment to housing beneficiaries in the absence of photographic evidence -- issues which were later resolved. Other key inadequacies were financial management staffing during the latter stages of the project, inadequate maintenance of books of accounts at BeMC, untimely addressal of some internal audit observations, and delays in Interim Unaudited Financial Report submission.
81. **Compliance with Legal Covenants:** The project complied with all the legal covenants, which were on maintaining a project steering committee and implementation units, hiring of a social mobilization agency and quality audit consultant, implementation consultant, BeMC consultant, ineligible expenditures, project documents, selection of beneficiaries, sub-grant agreements, eligibility of housing sub-grants, screening of activities – government permits/clearances and social and environment, contractors' safeguards obligations, safeguard instruments, government permits – compensation/relocation assistance, safeguard reporting and monitoring, internal auditors, suggestion and complaint mechanism, procurement disclosure, and procurement complaint mechanism.

C. BANK PERFORMANCE

Rating: Moderately Unsatisfactory

Quality at Entry

82. **The World Bank team employed due diligence in basing the project design on a comprehensive diagnostic foundation that reflected national and World Bank development priorities.** Despite the very short preparation timeframe, the team was able to draw on the World Bank's national and global experience and reflect lessons from other DRM/DRR projects in the design with the understanding that some modifications would be needed during implementation as more information was gathered. Close consultations with GoI, GoO, affected communities and other key stakeholders helped to clarify and refine the project design and institutional arrangements. Provisions for safeguards, including gender inclusion, were adequately assessed and reflected in the design, as were provisions for procurement and financial management. The project preparation team was composed of an appropriate technical and operational skill mix, including team members with experience of working in Odisha. Minor at-entry



weaknesses include the partial effectiveness of some risk mitigation measures as noted, and the carrying out of the EFA based on damage and rebuilding cost estimates instead of RDNA findings, resulting in underestimation by nearly 50 percent.

Quality of Supervision

83. **The World Bank provided timely and adequate support and guidance to the client at the national, state and community levels.** The completed supervision missions were conducted by a multidisciplinary team as well as additional support during missions of NCRMP-1 (P148870) to Odisha. Field visits and multi-stakeholder discussions were integral to supervision missions. Achievement of the PDO was at the center of the team's support efforts and the project restructurings as is evident in findings of all ISRs and MTR. The World Bank team prepared detailed Aide Memoires and ISRs listing achievements, challenges and actions required to achieve the planned outputs and outcomes, including direct support through training. The team assessed project progress and awarded ISR ratings properly. Decisions related to project implementation were made consultatively by the World Bank and OSDMA. However, it is observed that the supervision missions were not undertaken every six months as planned. Between January 2016 and project closure in June 2020, only five missions have been recorded. Additionally, at times, there was a considerable time lag between filing the Aide Memoires and the ISRs, for instance, the Aide Memoire for the mid-term mission was filed in April 2017 while the ISR was submitted in June 2017, which does not give a comprehensive, point-in-time understanding of the project. Further, the last Aide Memoire was filed in August 2019, encapsulating the findings from the June 2019 mission – a year before project closure. Thus, during the last year of implementation of the project, the team did not file an Aide Memoire. An improved frequency and timeliness of reporting may have influenced the implementation and improved the overall outcomes of the project. The team should have also been more proactive in dealing with the issues with the M&E system. The inconsistencies in reporting on the housing numbers or the non-achievements of targets in Berhampur could have been arrested by revising the results framework and by suspending works under the component, respectively.
84. **The team coordinated effectively with other parallel initiatives intended to address other aspects of Odisha's disaster recovery and readiness but failed to ensure timely and effective documentation.** ODRP was designed as part of a package of programs intended to increase Odisha's resilience to natural disasters. The World Bank team coordinated closely with project teams from other complementary initiatives to ensure avoidance of any duplication. For example, since NCRMP-II (P144726) supported impact forecasting of cyclone weather events through the Web-Dynamic Composite Risk Atlas, the resources allocated for capacity augmentation of OSDMA were not utilized; instead, the team decided to utilize existing decision support tools in the SEOC. Key setbacks included the third restructuring approved on the last day of the project in June 2020 and changing of two IRIs through ISRs rather than through restructurings.⁷⁷

Justification of Overall Rating of World Bank Performance

85. **The World Bank team designed the project in a very short time while ensuring an overall solid design**

⁷⁷ The target of 200 Village Development Plans was dropped from Component 1 in 2018. Under component 2, the target for the number of city-wide drainage and sewerage master plans was revised from 2 to 1 in 2016.



and provided adequate technical advice and support to facilitate project implementation. The design was relevant to GoI and World Bank priorities and reflected available data and lessons learned. The World Bank team demonstrated strong partnership with the OSDMA and state government in identifying and resolving implementation setbacks through ongoing communication and restructurings. Collaboration and coordination across World Bank and GoI projects and programs made sure that investments were complementary toward a shared objective. However, the World Bank performance has been impacted due to: (i) inadequate number of missions; (ii) failure to identify and implement adequate risk mitigation measures; and (iii) inconsistent reporting and documentation.

D. RISK TO DEVELOPMENT OUTCOME

86. **Sustainability of the housing and public services development outcomes is strong.** This is because **investments were selected based on a detailed assessment of real demand and the participation of the state agencies and communities in their planning and implementation.** Homeowners are maintaining their houses and public assets such as water supply pipeline, drainage works and community infrastructure are being operated and maintained by the relevant state agencies. For example, in Berhampur, the Public Health Engineering Organization⁷⁸ (PHEO), the state utility, is already operating and maintaining the municipal water supply system. Additional specific mechanisms under the project to support sustainability are the payment of multi-hazard insurance for the reconstructed houses and improved design standards of infrastructure, specially to withstand natural disasters.
87. **Sustainability of state entities' ongoing capacity enhancement outcome is also strong.** The GoO is committed to continue and improve its capacity to manage disaster risks as demonstrated in the ongoing preparation of a follow-up World Bank-funded Odisha State Capability and Resilient Growth Project⁷⁹ (P175811). The project is being prepared with the objective of enhancing the capability of GoO to expand coverage of evidence-based systems for social protection and post-disaster risk insurance for vulnerable communities within the state.
88. **The 2019 NDMP endorsed ODCH as a preferred approach for disaster-affected housing reconstruction, viewing disaster-resilient housing as a key approach to enhancing DRR and adopting an integrated recovery approach. Institutions such as NDMA and OSDMA drive the DRM agenda** at the national and state levels, respectively, **and the enabling institutional framework for DRR** is in place in Odisha. When completed in early 2022, the SIDM complex is expected to further enhance the state's DRM capacity.

V. LESSONS AND RECOMMENDATIONS

89. **Lesson 1: Enhancing local governments' capacity to respond to the needs of vulnerable communities is essential for magnifying outcomes in DRM projects.** The project directly involved local administrative agencies and village institutions, assisted by NGOs and technical support agencies, for the implementation and management of the project. This led to more effective and efficient selection of beneficiaries, resolution of most grievances at the local level, and community-friendly design of reconstructed houses. It also led to

⁷⁸ Public Health Engineering Organization. *Government of Odisha*. <https://pheedisha.gov.in/portal/16>.

⁷⁹ <https://projects.worldbank.org/en/projects-operations/project-detail/P175811>.



more effective linkages with other government schemes as most of those are implemented by local governments. **Recommendation 1: To reduce vulnerability and enhance sustainability of development initiatives, it is imperative to build capacity of local governments in DRM including designing, planning and implementing DRR interventions.**

90. **Lesson 2: It may be prudent and more effective to adopt a selective and focused approach regarding the design of multi-sectoral interventions in complex urban settings as was attempted in Berhampur.** The project attempted to support the BeMC in managing day-to-day implementation, contract management and other necessary administrative support for implementation by hiring a project management consultant, in addition to capacity building of BeMC officials. But these support measures for staffing and management proved inadequate. **Recommendation 2: When operating in complex urban settings, a development project would gain from studying lessons from similar initiatives in other Indian cities and by engaging greater support from state-level agencies.**
91. **Lesson 3: Representation of marginalized groups in reconstruction programs and ODCH leads to increased local participation in project implementation and facilitated incorporation of the communities' social and cultural preferences into design and use of houses.** Community-level expertise and labor as well as local resources, such as brick and sand, were used for construction. Field staff, local entrepreneurs and the community jointly took the initiative to set up precast building parts units at some large sites. At the behest of the beneficiaries, livelihood-friendly design in housing was introduced. Even in instances where a contractor was constructing houses, beneficiaries were able to influence the design and construction to better suit their needs. However, there could have been even greater involvement of the beneficiaries at all stages of the project. **Recommendation 3: A greater role of intermediary organizations focusing on community mobilization would have improved the involvement and influence of beneficiaries and led to greater resilience.**⁸⁰
92. **Lesson 4: Flexibility incorporated into the design and implementation of disaster recovery projects helps to meet the evolving needs of the community.** DRM is a very dynamic area of intervention and knowledge is still evolving in this field on most effective and efficient approaches that integrate sustainable development goals, DRR and climate resilience. The design of ODRP incorporated several flexible elements, which allowed it to deliver outputs in line with the evolving scenario such as leveraging non-project resources to build enhanced forecasting capacity among GoO agencies.⁸¹ Based on community consultations, the design of reconstructed houses was changed to reflect livelihood needs of the beneficiaries. Further, the beneficiaries enjoyed the freedom to make changes such as adding an additional floor, flat roofs for drying of fish, or construct a larger veranda (to accommodate tools and resources used in fishing). New jetties were also created based on the resettled location for the fishing boats. **Recommendation 4: To achieve need-based results, community-implemented initiatives must maintain adequate flexibility to incorporate felt needs and preferences of the beneficiaries at every stage of the project, from design and planning to implementation.**
93. **Lesson 5: In disaster-prone areas, construction of hazard-resilient houses leads to overall economic efficiency of the development interventions and enhanced socioeconomic benefits for the poor and vulnerable groups.** Even though these might cost more than double the traditional houses built under

⁸⁰ Resilient Housing in Odisha (2020). Global Facility for Disaster Reduction and Recovery. *The World Bank*.

⁸¹ Project Appraisal Document, p23.



current government housing schemes in India, they will prevent asset and income losses and aid in faster and more effective recovery in the aftermath of a disaster. World Bank estimates⁸² indicate that every dollar invested in resilient housing provides US\$4.20 in benefits over the economic lifetime of the housing.

Recommendation 5: In disaster-prone areas, it may be critical for the government to consider construction of such hazard-resilient housing under its own housing schemes.

94. **Lesson 6: Formal linkages and rules of engagement with other development programs/projects should be established in advance of implementation to achieve more effective development outcomes.** At the design stage, the project required the GoO to formally coordinate with other central- and state-sponsored schemes to strengthen the housing reconstruction component. The process of shifting by beneficiaries from GoO's housing scheme to that of the project caused significant implementation delays, especially in Puri district. At the same time, lack of formal linkages with TRIPTI may have led to limited access and lower impact of livelihood solutions for the project beneficiaries, especially the vulnerable communities. **Recommendation 6: Formal linkages with other government schemes would have resulted in higher participation of the beneficiaries in such schemes as well as holistic "build back better" results.**

⁸² Hallegatte, Stephane, Jun Rentschler, Julie Rozenberg. *Lifelines: The Resilient Infrastructure Opportunity*. Washington, DC: World Bank, 2019.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Restore and improve housing in targeted communities of Odisha

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percentage of households with fully / severely damaged houses in project areas provided with resilient housing reconstructed under the project.	Percentage	0.00 08-Jan-2014	75.00 31-Mar-2019	100.00 19-Mar-2019	82.20 30-Jun-2020

Comments (achievements against targets):

Target substantially achieved (82 percent achievement compared to the revised target: 16,108 compared to 19,604 reconstructed houses). As per the Odisha Phalin RDNA exercise, fully/severely damaged structures are defined as those structures where both the walls and roofs are damaged and are not habitable. Houses were reconstructed in Ganjam district (15,713), followed by Khordha (278) and Puri (117). The project financed (i) reconstruction of houses in the designated rural areas in the coastal belt 5 km from the High Tide Line in the districts of Ganjam and Puri, and 5 km from the Chilika Lake boundary as defined by the Survey of India in the district of Khordha; and (ii) public infrastructure improvements to complement the housing reconstruction, such as roads, water supply, solid waste management, power grid extensions, and community infrastructure, such as schools, community and health centers, playgrounds, etc.



Since the completion of the project, the state has finished construction of another 780 housing units and has expressed its commitment to complete all the houses by early 2022.

Information source: Aide Memoire for May 24-June 25, 2019, Project Appraisal Document and Borrower comments

Objective/Outcome: Restore and improve public services in targeted communities in Odisha

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of people with access to improved public services in Berhampur	Number	0.00	30000.00	30,000.00	350,000.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	10-Jun-2019

Comments (achievements against targets):

Target exceeded in number but partially achieved in terms of scope of public services. Improved public services were to include improved water and sanitation and all-season roads. At closing, the water pipelines that were financed under the project benefited the 350,000 city residents including nearly 120,000 slum residents living in over 250 settlements– exceeding the set target. However, not all services were supported as planned in Berhampur and the city did not benefit from the interventions on improved sanitation services and all-access roads.

The project financed the development of:

- All-season roads
- Water supply pipelines to allow access to “improved water sources”
- Sewerage and sanitation facilities to allow access to “improved sanitation facilities”
- City-wide drainage and sewerage master plans completed

Information source: Aide Memoires, Project Appraisal Document



Objective/Outcome: Increase capacity of State entities to respond promptly & effectively to eligible crisis or emergency

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
State departments making use of OSDMA generated information.	Number	0.00	5.00	5.00	0.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	20-Mar-2020

Comments (achievements against targets):

Target not achieved. At closing, none of the state departments were making use of the OSDMA generated information. The project conceptualized the pathway for strengthening the impact forecasting capacity of OSDMA as well as use of modern tools such as GIS and remote sensing for disaster planning and response. Through a series of discussions between state experts and national DRM agencies, a plan was developed to enhance OSDMA capacity using existing national and state decision support tools, OSDMA’s own resources, mobilization of OSDMA’s existing Memorandum of Understanding (MoU) with the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) and ongoing engagement with the Indian Meteorological Department, and support from other private weather networks in India. The project also initiated the development of the integrated complex building (a State Institute of Disaster Management [SIDM]) by financing training, research, and the facilities’ design and construction. However, this activity could not be completed within the implementation period.

The project could not complete the activities related to the (i) hiring of technical specialists to build capacity at OSDMA in the areas of disaster risk management, hydro-met systems, risk assessment and financing, structural engineering, remote sensing, GIS, and others to provide timely support for various project activities; and (iii) community-based initiatives, such as vulnerability mapping and needs assessment, provision of common facilities for income generating activities, and community-based DRM activities to enable affected marginalized communities to cope with survival risks posed by natural disasters.

**A.2 Intermediate Results Indicators****Component:** Restore and improve housing in targeted communities of Odisha

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of Village Development Plans completed	Number	0.00 08-Jan-2014	200.00 31-Mar-2019		0.00 10-Jun-2019

Comments (achievements against targets):

Target not achieved. No Village Development Plans were completed at closing. The Village Development Plans were to guide the selection of community infrastructure investment in the in-situ housing reconstruction sites.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of resilient houses reconstructed	Number	0.00 08-Jan-2014	30000.00 31-Mar-2019	19,604.00 30-Jun-2020	16,108.00 20-Mar-2020

Comments (achievements against targets):

Substantial achievement of the target (82 percent) given the context - where the state was affected by multiple cyclones and the pandemic during implementation.

Houses were reconstructed in Ganjam (15,713), Khordha (278) and Puri (117) through in-situ reconstruction (3,690) and relocation (12,418). In addition, the project was able to leverage efforts and resources from other government programs.



Component: Restore and improve public services in targeted communities in Odisha

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
People in urban areas provided with access to all-season roads within a 500 meter range under the project	Number	0.00	25000.00	25,000.00	0.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	20-Mar-2020

Comments (achievements against targets):

Target not achieved. At closing, approximately 60 percent of the work on all-season roads (road package I) were completed, therefore not providing the expected access benefit.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
People in urban areas provided with access to "improved water sources" under the project	Number	0.00	25000.00	25,000.00	350,000.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	20-Mar-2020

Comments (achievements against targets):



Target exceeded. 350,000 beneficiaries were provided access to improved water sources as compared to the original target of 25,000. The water supply system of the city was restored by replacing 23.9 km of damaged water pipelines benefiting the entire population of the city - about 350,000 city residents. The state utility, the Public Health Engineering Organization (PHEO), operates and maintains the system.

Information Source: PAD, Aide Memoires and Population number from Government of India data

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
People in urban areas provided with access to "improved sanitation facilities" under the project	Number	0.00	25000.00	25,000.00	0.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	20-Mar-2020

Comments (achievements against targets):

Target not achieved. At closing, just over 50 percent of the storm water drainage work was achieved, therefore not providing the expected access benefit.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
City-wide drainage and sewerage master plans completed	Number	0.00	2.00	1.00	1.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	20-Mar-2020

Comments (achievements against targets):



Target achieved. The project completed one city-wide drainage and sewerage master plan, which serves as a planning tool for ongoing and future infrastructure development. The master plan serves as a planning tool for all related ongoing and future infrastructure planning, design, and implementation. The project financed the preparation of DPRs for the various infrastructure works as planned.

Information source: Aide Memoires, Project Appraisal Document

Component: Increase capacity of State entities to respond promptly &effectively to eligible crisis or emergency

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Decision Support System established in OSDMA	Number	0.00	1.00	1.00	1.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	20-Mar-2020

Comments (achievements against targets):

This target was achieved but not through the direct support of the project. Using its own resources, the OSDMA developed a Decision Support System (DSS) for automated assessment of risks, dissemination of warnings, and advisory for resources management.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Integrated complex comprising of OSDMA, GIS cell, Emergency Operation Center and a training established.	Number	0.00	1.00	1.00	0.00
		08-Jan-2014	31-Mar-2019	30-Jun-2020	20-Mar-2020



Comments (achievements against targets):

At closing, the complex was not established as planned. The GoO is presently completing the construction using its own resources and the complex is expected to become available in early 2022.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Expert staff employed at OSDMA	Number	0.00 08-Jan-2014	3.00 31-Mar-2019	3.00 30-Jun-2021	0.00 20-Mar-2020

Comments (achievements against targets):

Target not achieved.

Component: Contingent Emergency Response

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Funds immediately available to respond to a major disaster	Amount(USD)	0.00 08-Jan-2014	0.00 31-Mar-2019	0.00 30-Jun-2020	0.00 20-Mar-2020

Comments (achievements against targets):



The CERC was not activated.



B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1: Restore and improve housing in targeted communities of Odisha	
Outcome Indicators	1. Percentage of households with fully / severely damaged houses in project areas provided with resilient housing reconstructed under the project.
Intermediate Results Indicators	1. Number of resilient houses reconstructed 2. Number of Village Development Plans completed
Key Outputs by Component	<u>Component 1</u> 82 percent of the fully/severely damaged households were reconstructed either in-situ or by relocating the beneficiaries. Wherever necessary, other public infrastructures such as roads, toilets, <i>aaganwadis</i> , shopping complexes etc. were also built as a part of this component. At the end of the implementation, 16,108 houses had been reconstructed in Ganjam (15,713), Khordha (278) and Puri (117).
Objective/Outcome 2: Restore and improve public services in targeted communities in Odisha	
Outcome Indicators	Number of people with access to improved public services in Berhampur.
Intermediate Results Indicators	1. People in urban areas provided with access to all-season roads within a 500-meter range under the project 2. People in urban areas provided with access to "improved water sources" under the project 3. People in urban areas provided with access to "improved sanitation facilities" under the project 4. City-wide drainage and sewerage master plans completed



Key Outputs by Component	<u>Component 2</u> Construction of a road, laying of a storm water drain and a water supply pipeline. Of the three, the road construction and storm water drain could not be completed while the 23.9 km water supply pipeline was completed benefiting all the 350,000 residents of the city.
Objective/Outcome 3: Increase capacity of State entities to respond promptly & effectively to eligible crisis or emergency	
Outcome Indicators	State departments making use of OSDMA generated information.
Intermediate Results Indicators	<ol style="list-style-type: none">1. Decision Support System established in OSDMA2. Integrated complex comprising of OSDMA, GIS cell, Emergency Operation Center and a training established.3. Expert staff employed at OSDMA
Key Outputs by Component	<ul style="list-style-type: none">- Project conceptualized the pathway for strengthening impact forecasting capacity at OSDMA- Facilitated discussions and developed a plan to enhance the capacity of OSDMA- Completed the design and initiated work on the SIDM



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Deepak Singh	Task Team Leader
Saurabh Suresh Dani	Co-Task Team Leader
Martin Serrano	Legal
Juan Carlos Alvarez	Legal
Sita Ramakrishna Addepalli	Senior Environmental Specialist
Vinayak N. Ghatate	Senior Rural Development Specialist
Neha Pravash Kumar Mishra	Senior Environmental Specialist
Ignacio M. Urrutia	Disaster Risk Management
Satya N. Mishra	Social Development Specialist
Barjor E. Mehta	Urban Specialist
Vasudha Thawakar	Urban Specialist
Hemang D. Karelia	Operations Officer
Navid Rahimi	Disaster Risk Management
Tripti Chopra	Financial Management Specialist
Alok Narayan Pattanaik	Disaster Risk Management
Khabilongtshup Khumujam	Environment
Dechen Tshering	Disaster Risk Management Specialist
Raja Rehan Arshad	Peer Reviewer



Abebaw Alemayehu	Peer Reviewer
Elif Ayhan	Peer Reviewer
Jurminla Jurminla	Procurement Specialist
Vidya Mahesh	Program Assistant
Lilian MacArthur	Program Assistant
Peeyush Ramawtar Sekhsaria	Operations Support Consultant
Malini Nambiar	Disaster Risk Management Consultant
Satyanarayana Pallagani	Operations Support Consultant
Bokepalli Kanaka Durga Raja	Safeguard Management Consultant
Vidyadhar K. Phatak	Operations Support Consultant
Supervision/ICR	
Anup Karanth, Deepak Singh, Peeyush Ramawtar Sekhsaria	Task Team Leader(s)
Priti Jain	Procurement Specialist(s)
Supriti Dua	Financial Management Specialist
Sumit Gulati	Program Assistant
Sheena Arora	Operations Consultant – DRM and Housing
Hyunjee Oh	Operations Specialist
Harjot Kaur	Social Specialist
Sandhya Srinivasan	Contributing Author, ICR
Keiko Sakoda	Housing Expert
Sivaramakrishnan Kumar	Procurement Team
Jared Phillip Mercadante	DRM Specialist
Deepak Malik	Operations Consultant - DRM
Charu Jain	Environmental Specialist
Keisuke Iyadomi	Operations
Varun Ravi Nangia	ICR Economic Analysis Author



Ignacio M. Urrutia Duarte	Operations and DRM Specialist
Sanjay Gupta	ICR Efficacy Analysis & Strategic Communications
Radha Narayan	Procurement Specialist

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY14	28.541	63,137.30
FY15	13.130	13,527.49
FY16	0	0.00
FY20	0	10,595.69
Total	41.67	87,260.48
Supervision/ICR		
FY14	4.800	15,125.48
FY15	22.027	78,126.93
FY16	43.982	202,684.05
FY17	23.763	113,881.48
FY18	23.814	133,445.06
FY19	36.198	172,429.34
FY20	42.161	351,728.93
Total	196.75	1,067,421.27



ANNEX 3. PROJECT COST BY COMPONENT

Components	Amount at Approval (US\$M)		Revised Amount (March 2019) (US\$M)		Revised Amount (June 2020) (US\$M)		Actual at Project Closing (US\$M)		Percentage of Approval (US\$M)	
	IDA	Borrower	IDA	Borrower	IDA	Borrower	IDA	Borrower	IDA	Borrower
Resilient Housing Reconstruction and Community Infrastructure	117	50.20	107.30	46.00	75.23	32.25	75.60	32.40	64.6	64.6
Urban Infrastructure in Berhampur	20.10	8.60	20.10	8.60	5.04	2.16	4.32	1.85	21.5	21.5
Capacity Building for Disaster Risk Management	5.60	2.40	5.60	2.40	3.92	1.68	0.84	0.36	15.0	15.0
Implementation Support	10.30	4.40	10.30	4.40	2.94	1.26	4.21	1.80	40.8	40.8
Contingent Emergency Response	0	0	0	0	0	0	0	0	-	-
Total	153.00	65.60	143.30	61.40	87.12	37.36	84.98	36.42	55.5%	55.5%



ANNEX 4. EFFICIENCY ANALYSIS

1. Tropical cyclones have increased both in number and strength globally as oceans have warmed in recent decades. In the 30 years prior to Cyclone Phailin's landfall along the coast of Odisha, tropical cyclones accounted for nine of the 10 most costly natural disasters, adjusted for inflation.⁸³ At the Seventh International Workshop on Tropical Cyclones in 2012 in La Reunion,⁸⁴ the participants found that, for every dollar invested in DRM, nearly US\$41 of benefits accrue over a 10-year period.
2. The coast of Odisha is an exceptionally high-risk area, with approximately four million people at risk of a once-in-50-year cyclone, and 5.6 million at risk of a once-in-a-century cyclone. The annual exceedance probability, the probability of an event occurring in any single year, for an ESCS was estimated in the Composite Risk Atlas developed by the India National Cyclone Risk Mitigation Project in 2019 as between 6 percent and 9 percent. The past decade has borne out this analysis: since the Extremely Severe Cyclone Phailin in 2013, Odisha has been struck by Extremely Severe Cyclone Hudhud (2014), Very Severe Cyclone Titli (2018), Extremely Severe Cyclone Fani (2019), and Very Severe Cyclone Yaas (2021) as well as been affected by Super Cyclone Amphan (2020). One estimate found that as many as 96 cyclonic storms have made landfall in Odisha over the past 130 years.⁸⁵
3. Consequently, post-disaster recovery activities include efforts to reduce the vulnerability of populations in project areas and increase the resilience of housing and community infrastructure against future disaster events, including more frequent and intensive storms. While a complete theory of change was not necessary at project appraisal, the overarching goals of the project were to reduced vulnerability of the population in project areas, build the institutional capacity of select state entities, and improve the quality of life for beneficiaries and increase the resilience of infrastructure to future disaster events.
4. At appraisal, the project's EFA focused on sectors that were under the purview of the World Bank's efforts – reconstruction of housing and community infrastructure, improvements in urban infrastructure in Berhampur city, and capacity building for DRM. The first component financed resilient housing, either *in-situ* construction of houses damaged by Cyclone Phailin that could be rebuilt as per safety norms in their present location or relocated houses in safer locations to replace damaged houses that were in vulnerable locations. The second component financed improved infrastructure, including water as well as drainage and sewerage facilities in Berhampur, to replace those that were damaged during the Cyclone. The third component was a risk mitigation component to build the capacity of state entities to respond promptly and effectively to future disasters in Odisha. The largest portion of the project at appraisal, approximately US\$167.3 million, was allocated to the resilient housing component. Another US\$28.7 million was allocated for the urban infrastructure investments in Berhampur, and US\$8 million for capacity-building efforts. The EFA used a 10-year time horizon, a 10 percent economic discount rate, and assumed that storms such as Cyclone Phailin were once-in-20-year events for the main case. Additional sensitivity analyses looked at the impact of a 5

⁸³ Swiss Reinsurance Company. 2010. "Natural Catastrophes and Man-made Disasters in 2009: Catastrophes Claim Fewer Victims, Insured Losses Fall." *Sigma No 1/2010*

⁸⁴ World Meteorological Organization. 2011. "7th International Workshop on Tropical Cyclones (IWTC-VII)." https://library.wmo.int/doc_num.php?explnum_id=9786

⁸⁵ Mohanty, Hrusikesh. *Yaas fifth severe cyclone to hit Balasore in 130 years: Study*. In *Times of India*, 27 May 2021. <https://timesofindia.indiatimes.com/city/bhubaneswar/yaas-fifth-severe-cyclone-to-hit-balasore-in-130-years-study/articleshow/82998523.cms>



and 12 percent discount rate, as well as storms occurring more or less frequently (once in five-, 10- and 50-year events).

5. A key challenge for the appraisal EFA was the extremely short preparation time of the project. The project preparation was carried out in parallel with RDNA (completed in December 2013) and was completed by February 2014. Consequently, for resilient housing activities under Component 1, the economic analysis took very early estimates from RDNA of reconstruction cost of housing (excluding cost of land acquisition, if any) and accompanying basic services to be approximately INR 14 billion⁸⁶ – at the time, US\$229.3 million – across the districts of Ganjam, Khordha and Puri. The appraisal EFA showed thus that, at a 10 percent discount rate and a 10-year economic lifetime for the housing, the project benefits totaled approximately US\$315 million or a return of US\$1.89 for every dollar committed. If the cost of land acquisition for new houses were to be incorporated, the overall reconstruction cost as per the RDNA was approximately INR 29.6 billion⁸⁷ or US\$480 million, with 30,000 homes needing to be reconstructed. Using the same methodology and parameters as those used in the appraisal EFA, benefits of US\$661 million or a benefit of US\$3.95 for every dollar committed would have emerged.

6. For Component 2, which financed water and sanitation improvements in Berhampur, the appraisal EFA estimated the benefits only from avoided illnesses from improvements to the water, drainage and sewerage systems. Using the World Health Organization's (WHO's) estimate of approximately US\$1 per household per month, the 70,000 households of Berhampur were expected to accrue approximately US\$5 million in total benefits over a 10-year period using a 10 percent discount rate, or a benefit of about US\$0.18 for every dollar invested. The RDNA, by contrast, concluded the reconstruction cost would total about INR 725 million⁸⁸ or US\$11.7 million for the water supply and drainage system in Berhampur. Including the restoration of water and sewerage services to the same level in the appraisal EFA would have resulted in benefits of US\$7.12 for every dollar invested.

7. Finally, for capacity-building activities under Component 3, the appraisal EFA estimated the benefits from the reduction in lives lost during Cyclone Phailin (45 deaths) by comparing the outcomes from the 1999 Super Cyclone, which killed over 11,000 people. The appraisal EFA then estimated the benefits as the sum of the value of a statistical life, taken as about US\$240,000, multiplied by the probability of mortality during a disaster. Using the same 10-year, 10 percent discount rate, the appraisal EFA concluded that the project would result in US\$6.4 in benefits for every dollar committed.

8. During implementation, a detailed field-based beneficiary identification process led to reducing the target number of houses to be built from 30,000 to 19,604 or 65 percent of the original target. The total costs for the component came to US\$108 million (versus US\$167.20 million planned). Table A4.1 shows the effect of running the appraisal EFA as it was run in the main case (10-year economic lifetime, 10 percent economic depreciation), if it was run with the benefit of the data included in the RDNA, and again at completion, adjusting the costs to account for the depreciation of the Indian rupee from about INR 62 per US\$1 at appraisal to an averaged cost of INR 64.44 per US\$1 at closing.

⁸⁶ India: Cyclone Phailin in Odisha – Rapid Damage and Needs Assessment Report (2013). *Government of Odisha, Asian Development Bank, and World Bank*. <https://ncrmp.gov.in/wp-content/uploads/2014/03/Odisha-Phailin-report-Final.pdf>; p10.

⁸⁷ *Ibid.*

⁸⁸ *Ibid.* p18.



Table A4.1: Benefits and costs using original EFA at appraisal, after RDNA and closing

Description	Appraisal	RDNA	Closing**
Number of houses damaged (#)	not estimated	30,000	16,108
Estimated direct damages (NPV, US\$ mil)	140.89	294.94	185.52
Estimated indirect damages (NPV, US\$ mil)	174.71	365.72	230.05
Estimated total damages (NPV, US\$ mil)	315.6	660.66	415.57
Commitment (Planned, US\$ mil)	167.2	167.2	
Disbursements (Actual, US\$ mil)			108
Implied cost of house (US\$)	4,696.50	9,831.31*	6,704.74
Depreciation adjusted cost of house (US\$)	4,881.33		6,968.87
Benefit-cost ratio (#)	1.89	3.95	3.85

* In addition to housing, this includes the cost of the accompanying community infrastructure for provision of basic services.

** As costs at closing were only estimated in terms of housing units replaced rather than dollar estimates, the closing run of the appraisal EFA estimates dollar damages by scaling the RDNA dollar estimates by the number of houses that were replaced with the financing of the project and then adjusting for the depreciation of the Indian rupee.

9. Using the same model and parameters as in the appraisal EFA, the overall BCR for the project was 3.85 versus 1.89 at appraisal, which is significantly higher than expected at appraisal. World Bank estimates⁸⁹ indicate that every dollar invested in resilient housing provides US\$4.20 in benefits over the economic lifetime of the housing. If every housing unit financed by the project replaced a non-resilient house, over the 10-year expected lifetime of a resilient house, it would return nearly US\$2.8 billion in benefits – or over a 26:1 BCR.

10. At appraisal, costs were estimated at approximately US\$4,697 per house, with the remaining costs including community infrastructure (community meeting halls, marketplaces, water supply, medical centers, solid waste management, childcare centers, internal roads, etc.) as well as housing insurance, relocation payments, temporary rental payments and incentives for accelerated construction. In contrast, with total disbursements at US\$108 million and 16,108 houses constructed, the average house costs about US\$6,705 in fact. Unfortunately, due to a lack of data because of the COVID-19 pandemic, it is not clear how much of the US\$6,705 went towards actual housing construction versus supporting infrastructure and other payments. Adjusting for depreciation in the value of the Indian rupee to the US dollar would still imply that the per house cost at 2013 exchange rates would be US\$4,881, about half of the estimated cost at the RDNA stage. While the appraisal EFA did not include information on how many houses were needed, if the assumption was 30,000, as in the RDNA and the project results framework, the cost per house would have been about US\$4,700 at 2013 exchange rates. At 2020 exchange rates, the estimate would be US\$4,881, about 73 percent of the actual cost per house based on the number of houses constructed and amount disbursed. The remaining 27 percent may be assumed to be spent on provision of community infrastructure.

⁸⁹ Hallegatte, Stephane, Jun Rentschler, Julie Rozenberg. *Lifelines: The Resilient Infrastructure Opportunity*. Washington, DC: World Bank, 2019.



11. There were other benefits to the housing activities that were not assessed at appraisal, most notably the benefits of building dedicated latrines where earlier open defecation was the norm. A 2012 WHO study⁹⁰ estimated that for every dollar invested in sanitation, there was a return of US\$5.50 in lower health costs, higher productivity and fewer premature deaths. While the final stock-taking for housing does not estimate these costs, the Swachh Bharat Mission which built millions of latrines across India, including in Odisha, found that the average latrine building cost was about US\$396. If just 10 percent of the 16,108 households shifted away from open defecation due to project-provided toilets, the estimated benefit would be about US\$21.6 million over a decade. Electrification is also estimated⁹¹ to provide a benefit of between US\$1.93 to US\$9.00 per dollar invested but no reliable figures were available to estimate the number or costs of connections. It may, however, be noted that while the project facilitated the provision of toilets and electricity supply, it was funded by other government schemes.

12. A few activities in Component 2 were either scaled down or cancelled due to reasons explained in the ICR. The appraisal EFA estimate of 350,000 people (or about 70,000 households) benefitting from the project holds, but the total disbursements of Component 2 were only US\$6.17 million versus a commitment of US\$28.7 million. The BCR is therefore estimated at 0.88:1 using the appraisal EFA methodology and parameters.

13. Using a different methodology based on the same 2012 WHO analysis⁹² which estimates US\$2 in return for every dollar invested in water supply, the expected return over a 10-year economic lifetime with a 10 percent discount rate would be US\$89.7 million. In this case, the BCR would be nearly 14.5:1.

14. Allocated funds in Component 3 were not spent fully as the SIDM building was only partially completed while capacity building activities, though achieved the set target, were funded from other national and international sources. The appraisal EFA estimated benefits from this component as eliminating mortality from tropical cyclones and found a BCR of 31.8:1 over a 10-year period using a 10 percent discount rate. However, while the specific activities included under the component could have reduced mortality, it was not clear that they could have eliminated all deaths from tropical storms in Odisha. Finally, the methodology used by the appraisal EFA was not sound and used the estimates of deaths from the 1999 Orissa cyclone BOB 06, when approximately 11,000 people were killed; the benefits of these reductions were ascribed by the World Bank to other projects between 1999 and 2013 and should not have been included as a benefit of only this project. Due to non-completion of SIDM building and no funds disbursed for capacity building, a BCR of 0:1 is assumed but this does not affect the closing EFA.

Table A4.2: Benefits and costs under appraisal and closing methodologies

Component	Description	Appraisal EFA Methodology*	Additional Benefits
Component 1	Benefits (NPV, US\$ mil)	415.59	2,800.06

⁹⁰ Hutton, Guy. *Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage*. Geneva: World Health Organization, 2012.

⁹¹ SEforAll. *The Recover Better with Sustainable Energy Guide for African Countries*. Washington, DC: SEforAll, 2021.

⁹² Hutton, Guy. *Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage*. Geneva: World Health Organization, 2012.



	Disbursements (Actual, US\$ mil)	108	
	Benefit-cost ratio (#)	3.85	25.93
Component 2	Benefits (NPV, US\$ mil)	5.46	89.71
	Disbursements (Actual, US\$ mil)	6.17	
	Benefit-cost ratio (#)	0.88	14.54
Overall	Benefit-cost ratio (#)	3.69	25.31

* Adjusted for exchange rate depreciation.

15. A paucity of data made it difficult to fully establish the benefits and costs at both appraisal and at closure. However, even using the relatively limited data, the project showed a 3.69:1 BCR using the same EFA methodology and parameters as at appraisal. It is worth noting that this is despite a significant depreciation in the value of the Indian rupee, which is the currency in which all costs were denominated in the model. Using a different model that uses international standard values for a handful of benefits (resilient housing, toilets, electrification for the first component and water supply for the second) shows that, potentially, the project’s BCR was as high as 25.31. Housing costs were lower than the forecast of the RDNA, at about US\$6,705 versus US\$9,830 anticipated. This could be due to the leveraging of funds from different government schemes to provide services such as water supply, sanitation, and electric connections. Consequently, though the project was scaled down, it was reasonably efficient, and the outcomes were commensurate with the disbursements.



ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

In appreciation to the World Bank team for putting together a comprehensive completion report for the ODRP, though OSDMA agrees with most of the analysis shared as a part of this report, it requests the ICR team to reconsider the outcome rating that have been suggested as a part of the analysis. The project has currently been rated **Moderately Unsatisfactory** by the ICR team, which is not in line with the achievements of the project. Sharing below some of the key achievements of the project that highlight why the project should be rated as **Moderately Satisfactory**.

Component 1: Restore and improve housing in targeted communities of Odisha

Under this component the project had a target of completing 19,614 houses which were either to be constructed in-situ or beneficiaries needed to be relocated to new locations. Of these, 16,108 houses (82 percent) were completed within the project period (June 30, 2020) and, in the subsequent year, after project closure, the state with its resources has been able to complete another 780 houses, taking the tally of completed households to 16,888. More details on the housing numbers and costs are shared below.

It is important to acknowledge that, during the implementation of this project and the last year, the state has been ravaged by at least five cyclones (Hudhud, Titli, Fani, Amphan, Yaas). For some of these cyclones, the state was in the path of the eye of the storm while in others the impacts were limited. Coupled with this, the state has suffered immensely since March 2020 owing to the COVID-19 pandemic. These events had a significant impact on the state's ability to complete the construction of the houses. Furthermore, the state faced some legal troubles in initiating work in the district of Puri; this too, delayed the implementation.

Given these headwinds, which were not in control of the implementing agency, the achievement of 82 percent of the target is a highly satisfactory outcome. A longer-term outcome is that the project has allowed the state to test out different models of housing construction – learnings from this experience may be used in housing schemes that the government embarks upon in the future. In fact, this was the first time Odisha embarked upon an ODHR program at scale. Another important point to consider is that of the approximately US\$121 million that was disbursed as a part of this project, US\$108 million was used towards Component 1; hence, the success of this component should have a greater influence on the overall rating of the project. Lastly, the state government continues to be committed to the objective of providing resilient housing to its citizens and will provide adequate resources to complete the remainder of the construction.

Component 3: Increase capacity of state entities to respond promptly and effectively to eligible crisis or emergency

OSDMA was set up by the GoO as an autonomous organization in the intermediate aftermath of the super cyclone in 1999. The Department of Revenue and Disaster Management is the administrative department of OSDMA. The OSDMA has established a dedicated GIS cell, formulated 30 departmental



disaster management plans, established a drought monitoring cell, integrated DSS (System for Accessing, Tracking and Alerting disaster Risk information based on dynamic Risk Knowledge web and mobile app), total lightning detection system, trained community taskforces linked to cyclone and flood shelters in 25 districts and also established a unit to manage the performance of all the District Disaster Management Authorities (DDMAs). The SEOC functions round the clock throughout the year. The organization is headed by the Special Relief Commissioner. To implement its mandate, it has an EWDS with five layers of communication technology, relief code, norms of assistance under the State Disaster Response Force and National Disaster Response Force and District Emergency Operation Centers (DEOCs) in each of the 30 districts. The office is also responsible for requisitions and coordinating deployment of emergency management services (national, state and local). Similarly, the DEOC functions within the DDMA and is chaired by the District Collector. In the post-1999 Super Cyclone reconstruction and preparedness phase, the GoO constituted the Odisha Disaster Rapid Action Force (ODRAF) which was conceived as a force that is professionally trained and equipped with state-of-the-art emergency equipment to assist the civil administration in search and rescue as well as relief operations for effective management of disasters. There are 20 ODRAF units strategically located throughout Odisha. It is important to mention that the World Bank, through the National Cyclone Risk Mitigation Project and the ODRP, has been an important partner in this institutional journey that the state embarked upon a little over two decades back.

Hence, while the achievements under this component may seem inadequate, when viewed in context of the institutional journey of the state, it becomes clear that the creation of the SIDM is a transformative change that will allow the state to further streamline the disaster management operations. Furthermore, while it may not have been possible to set up a formal information exchange mechanism through the life cycle of the project, the project did introduce systems that have facilitated this exchange. The drastic reduction in the loss of lives during Cyclone Fani is a testament to the success of these processes that allowed different state departments to exchange information effectively and efficiently.

Given the state's vulnerability to disaster events and its aspirations to become a global leader in the field of disaster management, the state remains committed to the objective of completing all the activities that were a part of Component 3 of this project. It is estimated that the state would be able to complete the construction of the SIDM and put in place all the necessary systems for its operationalization by the end of March 2022.

More details (photographs and achievements) can be found in the detailed component description shared below.

**Key Achievements**

For augmenting disaster-resilient houses, the World Bank supported ODRP has been taken up by GoO in the Phailin affected areas of Ganjam, Khordha and Puri districts from March 2014. A total of 19,614 disaster resilient houses within 5 km from the HTL have been constructed. Each beneficiary under the project was provided and supported in the construction of a 294 square foot house having a toilet, and electricity and water supply facilities. About 13,000 beneficiaries have been relocated to 141 relocation sites which have been developed into model habitations with all basic amenities such as piped water supply, electricity, internal roads and drains, waste management and community infrastructure. The house construction and infrastructure development in relocation sites have been completed in all respect and approximately 16,000 houses have been occupied under the project (Table A5.1).

Table A5.1: Details of completed houses

District	Particulars	Relocation Houses	In-situ Houses	Relocation Houses
Ganjam	Total houses	12,947	3,343	16,290
	Completed by June 2020	12,370	3,343	15,713
	Completed by June 2021	12,370	3,343	15,713
Khordha	Total houses	48	230	278
	Completed by June 2020	48	230	278
	Completed by June 2021	48	230	278
Puri	Total houses	0	3,046	3,046
	Completed by June 2020	0	117	117
	Completed by June 2021	0	897	897
Total	Total houses	12,995	6,619	19,614
	Completed by June 2020	12,418	3,690	16,108
	Completed by June 2021	12,418	4,470	16,888

Component 3: State Institute of Disaster Management

The construction of the SIDM building is expected to be completed by March 2022. The progress so far:

- **Hostel Building: 80 percent completed**
- **Institution Building: 90 percent completed**
- **Auditorium: 50 percent completed**
- **Workshop: 50 percent completed**
- **Training Tower: 60 percent completed**



Hostel Building



Workshop



Institution Building



Training Tower

Selected Community Infrastructure Development

- Disaster recovery being the main objective, ODRP emphasized the enhancement of all-round capacity of the community to face, respond to and recover from emergency situations with the introduction of following disaster resilient infrastructure:
 - 106 overhead tanks to supply safe drinking water were created to ensure better health
 - Approximately 84 km of permeable internal road and drain was developed to ensure enhanced water table recharge
 - Internal and peripheral plantation-led green corridors were laid ensuring adaptable climate and healthy atmosphere in the habitations
 - Electricity was made available to all houses under ODRP
 - 134 community structures, e.g., primary schools, childcare (Anganwadi) and healthcare (ANM) centers, community buildings, etc., were created in the relocation sites as per requirements and necessity



 <p data-bbox="400 689 624 719">Pipe Water Supply</p>	 <p data-bbox="1007 689 1174 719">Electrification</p>
 <p data-bbox="427 1122 596 1151">Internal Road</p>	 <p data-bbox="978 1122 1203 1151">Anganwadi Center</p>

Fund flow Mechanism after closure of ODRP

ODRP was officially closed on June 30, 2020. However, house construction in Puri, infrastructure development in few relocation sites of Ganjam and setting up of SIDM was under progress. Since closure of ODRP, an amount to the tune of INR 425.6 million has been met from the state exchequer towards housing reconstruction, infrastructure development and SIDM building. The detailed progress report is given in Table A5.2.



Table A5.2: Detailed project costs and achievements

										<i>Amount (in INR Millions)</i>		
S. No.	Component	Units created (Till June 2020)				Units created (Till June 2021)				Expenditure incurred (Till June 2020)	Expenditure incurred (From July 2020 to June 2021)	Expenditure incurred (From July 2021 to Nov 2021)
		Ganjam	Puri	Khordha	Total	Ganjam	Puri	Khordha	Total			
1	Housing Reconstruction	15,713	117	278	16,108	15713	897	278	16,888	5,440.18	139.27	153.88
2	Selected Community Infrastructure				0				0	1,617.56	55.54	0
a	Road & Drain	123	0	0	123	129	0	0	127			
b	Childcare Centers	48	0	0	48	48	0	0	48			
c	Health Centers	11	0	0	11	11	0	0	11			
d	Primary Schools	6	0	0	6	6	0	0	6			
e	Community Building	65	0	0	65	73	0	0	71			
f	Pipe Water Supply	106	0	0	106	106	0	0	106			
g	Electrical Sub stations	593	0	0	593	593	0	0	593			
3	Capacity Building in DRM (State Institute of Disaster Management)									82.45	53.45	124.56
4	Implementation Support									288.35	1.52	0
	TOTAL									7,428.54	249.78	278.44

** Two sites for road and drain and two sites for community buildings are under dispute.



ANNEX 6. SUPPORTING DOCUMENTS

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