



Completion Report

PUBLIC

Project Numbers: 40156-013 and 40156-033
MFF Number: 0049
Loan Number: 3549
December 2022

India: Sustainable Coastal Protection and Management Investment Program (Tranche 2 and Multitranches Financing Facility)

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Asian Development Bank

CURRENCY EQUIVALENTS

Currency unit – Indian rupee/s (₹)

		At Approval	At Project Completion
		27 August 2010	28 September 2020
₹1.00	=	\$0.02134	\$0.01364
\$1.00	=	₹46.85	₹73.32

ABBREVIATIONS

ADB	–	Asian Development Bank
CIMU	–	coastal information management unit
CMIS	–	coastal management information system
COVID-19	–	coronavirus disease
CPS	–	country partnership strategy
DMF	–	design and monitoring framework
EIRR	–	economic internal rate of return
ha	–	hectare
IEE	–	initial environmental examination
km	–	kilometer
m ³	–	cubic meter
MFF	–	multitranches financing facility
O&M	–	operation and maintenance
P&IWTD	–	Ports and Inland Water Transport Department
PIU	–	project implementing unit
PMU	–	project management unit
PWPIWTD	–	Public Works, Ports and Inland Water Transport Department
SCPMIP	–	Sustainable Coastal Protection and Management Investment Program
SEA	–	state executing agency
SEMU	–	social and environment management unit
SMO	–	shoreline management organization
SMP	–	shoreline management plan

NOTES

- (i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2022 ends on 31 March 2022.
- (ii) In this report, “\$” refers to United States dollars.

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CONTENTS

	Page
BASIC DATA	i
I. PROJECT DESIGN AND IMPLEMENTATION	1
A. Rationale	1
B. Facility and Project 2 Impact, Outcome, and Output	2
C. Project Costs and Financing	6
D. Disbursements	6
E. Project Schedule	7
F. Implementation Arrangements	7
G. Procurement	8
H. Poverty, Social, and Gender Equity	8
I. Safeguards	8
J. Monitoring and Reporting	10
II. EVALUATION OF PERFORMANCE	10
A. Relevance	10
B. Effectiveness	12
C. Efficiency	13
D. Sustainability	13
E. Development Impact	14
F. Performance of the Borrower and the Executing Agency	15
G. Performance of the Asian Development Bank	16
H. Overall Assessment	16
III. ISSUES, LESSONS, AND RECOMMENDATIONS	17
A. Issues and Lessons	17
B. Recommendations	18
APPENDIXES	
1. Design and Monitoring Framework for the Multitranche Financing Facility and Tranche 2	19
2. Multitranche Financing Facility and Tranche 2 Cost at Appraisal and Actual	28
3. Multitranche Financing Facility and Tranche 2 Cost by Financier	29
4. Disbursement of ADB Loan Proceeds – Tranche 2	30
5. Contract Awards of ADB Loan Proceeds – Tranche 2	31
6. Project Implementation Schedule	32
7. Summary of Contracts	33
8. Sector Road Map Achievement Matrix	34
9. Safeguards Reassessment	37
10. Status of Compliance with Loan Covenants	41
11. Economic and Financial Reevaluation	52
12. Contribution to Strategy 2030 Operational Priorities	64

BASIC DATA

I. MULTITRANCHE FINANCING FACILITY

A. Facility Identification

- | | | |
|----|------------------------------------|-----------------------------------------------------------------------------------------------------|
| 1. | Facility number and facility title | 40156-013 Sustainable Coastal Protection and Management Investment Program |
| 2. | Mode of financial assistance | Multitranche Financing Facility |
| 3. | Country | India |
| 4. | Borrower | India |
| 5. | Executing agencies | Karnataka Public Works, Ports and Inland Water Transport Department, and Maharashtra Maritime Board |
| 6. | Products | |

Item	Approval Number	Financing Amount (\$ million)	Financing Source	Product Modality and Nature of Activities
Loan	0049	250.0	Ordinary capital resources	Multitranche financing facility
Technical assistance	4865	1.3	Japan Special Fund	Project preparation technical assistance
State governments		119.8		
Other sources, including private sector		34.8		
Project Total		405.9		

B. Milestone Dates of Facility

Item	Loan
Approval of concept clearance	
– Date started	March 2007
– Date completed	September 2010
Fact-finding mission	
– Date started	27 September 2009
– Date completed	14 October 2009
Loan negotiations	
– Date started	30 August 2010
– Date completed	1 September 2010
Date of Board approval	29 September 2010
Date of loan agreement	17 August 2011
Date of loan effectiveness	
– In loan agreement	14 November 2011
– Actual	28 November 2011
– Number of extensions	0
Loan closing date	
– In loan agreement at approval	31 December 2019
– Latest revised	28 September 2020
– Number of extensions	1
Financial closing date	22 February 2021

C. Facility Cost and Financing

1. Facility cost (\$ million)

Cost	Estimate at Approval	Actual
Foreign exchange cost	250.0	50.6
Local currency cost	154.6	65.1
Total	404.6	115.7

2. Cost breakdown by project component (\$ million)

Component	Estimate at Approval	Actual
A. Base Cost		
1. Planning and design	19.8	2.9
2. Coastal erosion and instability reduction	309.3	94.4
3. Capacity development	19.7	15.9
Subtotal	348.8	113.2
B. Contingencies	41.9	0.0
C. Financing Charges during Implementation	13.9	2.5
Total	404.6	115.7

3. Financing plan and actual (\$ million)

Cost	Estimate at Approval	Actual
Implementation cost		
Borrower-financed	119.8	33.0
Asian Development Bank-financed	250.0	82.7
Other external financing	34.8	0.0
Total implementation cost	404.6	115.7
Interest during construction costs	0.0	0.0
Borrower-financed	13.9	0.1
Asian Development Bank-financed	0.0	0.0
Other external financing	0.0	0.0
Total interest during construction cost	13.9	0.1

4. Disbursements

a. Disbursement dates by product

	First Disbursement	Final Disbursement
Tranche 1	16 December 2011	20 December 2018
Tranche 2	23 April 2018	22 February 2021

b. Amount (\$ million)

Category	Original Allocation (1)	Canceled during Implementation (2)	Last Revised Allocation (3=1-2)	Amount Disbursed (4)	Undisbursed Balance (5=2-4)
Tranche 1	51.56	15.08	36.48	36.48	0.00
Tranche 2	65.50	19.25	46.25	46.25	0.00
Total	117.06	34.33	82.73	82.73	0.00

5. Terms of loan by product

– Interest rate	London interbank offered rate plus 0.60%
– Maturity	25 years
– Grace period	5 years

II. TRANCHE 2

A. Project Identification

1.	Project number and project title	40156-033—Sustainable Coastal Protection and Management Investment Program – Tranche 2
2.	Mode of financial assistance	Project loan
3.	Country	India
4.	Borrower	India
5.	Executing agency	Public Works, Ports and Inland Water Transport Department, Government of Karnataka ¹
6.	Products	

Item	Approval Number	Financing Amount (\$ million)	Financing Source	Product Modality and Nature of Activities
Loan	3549	65.50	Ordinary capital resources	Multitranchise financing facility tranche
State Government		28.04		
Project Total		93.54		

B. Milestone Dates

Item	Loan
Fact-finding mission	
– Date started	June 2016
– Date completed	July 2017
Loan negotiations	
– Date started	12 May 2020
– Date completed	July 2017
Date of Board approval	6 October 2017
Date of loan agreement	26 October 2017
Date of loan effectiveness	
– In loan agreement	24 January 2018
– Actual	15 December 2017
– Number of extensions	1
Project completion date	
– At approval	31 March 2020
– Actual	28 September 2020
Loan closing date	
– In loan agreement at approval	28 September 2020
– Latest revised	28 September 2020
– Number of extensions	0
Financial closing date	28 January 2021

¹ In 2020, the executing agency's name changed from Public Works, Ports and Inland Water Transport Department (PWPIWTD) to Ports and Inland Water Transport Department (P&IWTD).

C. Project Cost and Financing

1. Project cost (\$ million)

Cost	Estimate at Approval	Actual
Foreign exchange cost	65.50	46.25
Local currency cost	28.04	19.24
Total	93.54	65.49

2. Cost breakdown by project component (\$ million)

Component^a	Estimate at Approval	Actual
A. Coastal Erosion and Instability Managed and Reduced		
1. Civil works	69.97	53.78
2. Equipment and supplies	0.00	0.00
3. Studies and surveys	0.07	0.00
4. Consulting services	2.86	0.00
5. PMU staff and expenses	0.00	0.00
Subtotal (A)	72.90	53.78
B. Enhanced Capacity for Shoreline Management and Development		
1. Civil works	0.00	0.00
2. Equipment and supplies	0.63	4.21
3. Studies and surveys	0.26	0.01
4. Consulting services	3.91	6.44
5. Project management unit staff and expenses	5.07	0.96
Subtotal (B)	9.86	11.62
C. Recurrent Costs		
1. Operation and maintenance of civil works	0.70	0.00
Subtotal (C)	0.70	0.00
Total Baseline Costs (A+B+C)	83.46	65.39
D. Contingencies		
1. Physical contingencies	5.39	0.00
2. Price contingencies	2.42	0.00
Subtotal (D)	7.81	0.00
Total Project Costs (A+B+C+D)	91.27	65.39
E. Financing Charges during Implementation		
1. Interest during construction	2.05	0.10
2. Commitment charges	0.22	0.00
Subtotal (E)	2.27	0.10
Total (A+B+C+D+E)	93.54	65.49

3. Financing plan and actual (\$ million)

Cost	Estimate at Approval	Actual
Implementation cost		
Borrower-financed	25.77	19.24
Asian Development Bank-financed	65.50	46.25
Total implementation cost	91.27	65.49
Interest during construction costs	0.00	0.00
Borrower-financed	2.27	0.10
Asian Development Bank-financed	0.00	0.00
Total interest during construction cost	2.27	0.00

4. Disbursements
 a. Disbursement dates by product

	First Disbursement	Final Disbursement
Loan	23 April 2018	22 February 2021

- b. Loan disbursed amount (\$) million

Category	Original Allocation (1)	Canceled during Implementation (2)	Last Revised Allocation (4=1-3)	Amount Disbursed (4)	Undisbursed Balance (5=3-4)
Civil works	54.30	12.57	41.70	41.70	0.00
Equipment and supplies	0.44	0.44	0.04	0.00	0.00
Studies and surveys	0.05	0.05	0.00	0.00	0.00
Consulting services	4.74	0.23	4.51	4.51	0.00
Contingencies	5.97	4.04	0.00	0.00	0.00
Total	65.50	19.25	46.25	46.25	0.00

5. Terms of loan by product
 – Interest rate LIBOR plus 0.60%
 – Maturity 20 years
 – Grace period 5 years

D. Project Implementation

1. Project Schedule

Items	Estimate at Approval	Actual
Date of contract with consultants	30 January 2017	30 January 2017
Completion of engineering designs	17 December 2017	2 January 2019
Civil works contracts		
<i>Maravanthe: Groynes and sand redistribution</i>		
Contract award	9 December 2016	9 December 2016
Completion of construction	3 December 2018	29 June 2019
<i>Udayavara: Rock groynes and beach nourishment</i>		
Contract award	20 February 2017	20 February 2017
Completion of construction	23 December 2018	25 September 2020
<i>Kodi Bengre: Rock revetment</i>		
Contract award	28 September 2017	28 September 2017
Completion of construction	19 August 2019	6 June 2019
<i>Murudeshwara: Construction of offshore reef, sand nourishment and dune stabilization for shoreline protection and management</i>		
Contract award	19 April 2017	19 April 2017
Completion of construction	19 December 2018	Dropped
<i>Someshwara – 01: Geotextile revetment for shoreline protection and management</i>		
Contract award	5 July 2017	5 July 2017
Completion of construction	6 August 2020	25 September 2020

Items	Estimate at Approval	Actual
<i>Kodi Kanyana: Plantation work and community awareness and training on maintenance of plantation and nurseries</i>		
Contract award	3 November 2018	3 November 2018
Completion of construction	31 July 2020	31 December 2019
<i>Someshwara – 02: 2 offshore reefs and beach nourishment</i>		
Contract award	11 July 2019	11 July 2019
Completion of construction	21 October 2020	31 March 2021
<i>Yermal Thenka: Rock revetment for shoreline protection management</i>		
Contract award	11 July 2019	11 July 2019
Completion of construction	21 October 2020	8 February 2021
<i>Mukkachery: Rehabilitation of existing seawall</i>		
Contract award	24 July 2019	24 July 2019
Completion of construction	25 June 2020	25 September 2020
<i>Community subproject – 01: Plantation work</i>		
Contract award	7 November 2019	7 November 2019
Completion of Construction	25 June 2020	March 2021 ^a
<i>Community subproject – 02: Plantation work</i>		
Contract award	7 July 2019	7 November 2019
Completion of construction	6 November 2020	March 2021 ^a

^a Minor works under the community subprojects are currently being undertaken with state funding.

2. Project Implementation Indicators

Project Indicator	Description
Project readiness	Design-ready
Concept approval (PFR) to first disbursement (days)	263
Signing to first disbursement (days)	179
Loan closing to financial closing (days)	122

PFR = periodic financing request.

3. Project Performance Ratings

Year		Overall	Contract Awards (%)	Disbursement (%)	Financial Management	Technical/ Output	Safeguards
2017	Q4	On track	100.00	100.00	Yes	Yes	Satisfactory
2018	Q1	Potential problem	100.00	0.00	Yes	Yes	Satisfactory
	Q2	On track	90.69	83.91	Yes	Yes	Satisfactory
	Q3	Potential problem	84.77	63.81	Yes	Yes	Satisfactory
	Q4	Potential problem	87.15	73.87	Yes	Yes	Satisfactory
2019	Q1	Actual problem	68.60	62.74	Yes	No	Satisfactory
	Q2	Actual problem	61.61	72.24	Yes	Yes	Satisfactory
	Q3	Actual problem	90.91	71.98	Yes	No	Satisfactory
	Q4	On track	100.00	99.57	Yes	Yes	Satisfactory
2020	Q1	On track	100.00	100.00	On track	On track	For attention
	Q2	On track	100.00	100.00	On track	On track	For attention
	Q3	For attention	100.00	100.00	On track	On track	At risk
	Q4	On track	98.36	100.00	On track	On track	For attention
2021	Q1	On track	100.00	100.00	On track	On track	For attention

4. Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members	Virtual Mission (Yes/No)
Consultation	24 Nov–1 Dec 2015	3	20	d,b	No
Consultation	26 Jun–3 Jul 2015	4	16	d,b	No
Loan review	28–30 Jan 2016	2	6	c,e	No
Consultation	23–25 Jun 2016	3	9	d,b	No
Review	28 Jul–4 Aug 2017	2	16	a,e	No
Inception	7–12 Feb 2018	5	30	a,c,e,b,f	No
Review	2–4 May 2018	3	9	a,c,b	No
Review	14–17, 28 Nov 2018	3	15	a,c,b	No
Special project administration	11–13 Mar 2019	4	12	a,c,e,b	No
Midterm review	20–26 Aug 2019	4	28	a,c,e,g	No
Project completion	10–13 May 2022	3	12	a,b,e	No

a = senior project officer (natural resources and agriculture), b = project analyst, c = senior environmental specialist, d = climate change specialist, e = social safeguards officer, f = associate project officer (infrastructure), g = associate social safeguards officer.

Source: Asian Development Bank

I. PROJECT DESIGN AND IMPLEMENTATION

A. Rationale

1. India has a coastline of 7,525 kilometers (km), consisting of 5,425 km along the nine national coastal states of the mainland and 2,100 km in the union territories. Of the country's population, 20%–25% lives along a total of 50 km of the coastline, with 70% of them residing in rural areas. Coastline erosion has intensified on the west coast, threatening communities and the economic development in the coastal zone within the states of Goa, Karnataka, and Maharashtra. Due to human-induced activities and the relative sea-level rise, pressure on the coastal zone has continued to intensify and there is an urgent need to find sustainable solutions for coastal protection. In India, its coastal protection strategy has been subsumed under the objectives of protecting the land and achieving overall economic growth. Across the world, the continuing coastal erosion has led to the development and installation of innovative techniques for effective and unobtrusive shoreline and nearshore control. Hence, there is an urgent need to shift coastal erosion management—from traditional approaches to more comprehensive and proactive ones based on planning, good practice, and accountability.

2. India's national development plans reflect the critical need for sustainable coastal protection measures with a focus on enhanced capacity of state authorities to ensure coastal protection and management. At appraisal, a key theme of the government's 11th five-year plan, 2007–2012¹ was the integration of environmental concerns into policy, planning, and development activities. This underscored the need to address the impacts of sea-level rise (particularly for coastal agriculture), and to manage seawater ingress into the coastal areas. To help address the issues of coastal protection and management, the Asian Development Bank (ADB) financed the Sustainable Coastal Protection and Management Investment Program (SCPMIP) under a multitranche financing facility (MFF).² The program is aligned with ADB's Strategy 2030 operational priorities, particularly on (i) accelerating progress in gender equality, (ii) tackling climate change, (iii) building climate and disaster resilience, (iv) enhancing environmental sustainability, and (v) strengthening governance and institutional capacity.³ It is also consistent with the ADB country partnership strategy (CPS) for India, 2018–2022, which includes support for coastal erosion management to help the transition from traditional hard protection toward more environmentally appropriate and sustainable solutions.⁴

3. The MFF modality was appropriate given the need for a long-term support for coastal management planning and implementation, and to develop the capacity of state executing agencies (SEAs) and various stakeholders. Until project 2, ADB was able to design interventions based on the needs of individual SEAs, such as protecting the land and beaches, addressing the causes of erosion, and providing natural protection measures.

4. On 29 September 2010, ADB approved the MFF with four tranches, planned to be implemented over a period of 9 years.⁵ This was later revised to two tranches due to the slow progress made under tranche 1. Tranche 3 was incorporated into tranche 2 to enable project

¹ Planning Commission, Government of India. 2007. *Eleventh Five Year Plan, 2007–2012*. New Delhi.

² ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility to India for the Sustainable Coastal Protection and Management Investment Program*. Manila.

³ ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

⁴ ADB. 2017. *India: Country Partnership Strategy (2018–2022)—Accelerating Inclusive Economic Transformation*. Manila.

⁵ See para. 33 of footnote 2.

completion within the agreed facility duration.⁶ At completion, the facility comprised two tranches: (i) tranche 1, which was approved on 6 October 2010, became effective on 11 November 2011, and closed on 30 June 2018 after two extensions; and (ii) tranche 2, which was approved on 28 July 2017, became effective on 15 December 2017, and closed on 28 September 2020.

B. Facility and Project 2 Impact, Outcome, and Output

1. Multitranche Financing Facility

5. The envisaged impact of the MFF was improved incomes and reduced poverty levels of the coastal communities in the subproject areas of Goa, Karnataka, and Maharashtra states.⁷ The MFF's expected outcome was to have the shorelines protected and managed in the three states while meeting the needs of stakeholders and protecting the environment. The state of Goa, however, requested to be excluded during the loan negotiation of project 1. The key performance targets included (i) protecting and managing 150 km of coastline using soft technologies, (ii) community and private sector participation in coastal protection and management, (iii) increasing the number of businesses at intervention beaches, and (iv) increasing coastal shipping and fish landings at intervention districts. The outcome was to be achieved through the following outputs: (i) sustainable plans and management for shorelines developed, (ii) coastal erosion and instability managed and reduced, and (iii) capacity for shoreline planning and development enhanced. Project 1 covered Karnataka and Maharashtra, and project 2 focused on Karnataka. Subprojects under project 1 were based on a vulnerability assessment that was supported by an ADB technical assistance.⁸ Subprojects under project 2 were identified in areas different from those under project 1. These were based on the required structural interventions envisaged under the shoreline management plans (SMPs) to prevent the coastal areas from further erosions. Shoreline management organizations (SMOs), which were registered as per government procedures in the subproject areas, were expected to undertake community initiatives. Both projects 1 and 2 assisted the local governments and SMOs in preparing and implementing the shoreline management and maintenance activities.

6. The three impact targets of the MFF were envisioned to be met by 2024 and these are *likely to be achieved*. On the outcome, two targets were achieved, one was substantially achieved, and one was partially achieved. Of the 22 output targets, 17 were achieved, 2 were exceeded, 2 were substantially achieved, and 1 was not achieved. The design and monitoring framework (DMF) in Appendix 1 shows these achievements against the targets.

7. **Output 1: Sustainable plans and management for shorelines developed.** All of the eight output targets were achieved. This output was to assist in the (i) establishment of participatory and integrated SMPs to ensure the sustainable management and protection of the shorelines, and (ii) establishment of a coastal management information system (CMIS) at the SEAs as an effective mechanism for information sharing and to support the management and supervision of subprojects. The sub-outputs include (i) participatory SMPs prepared and endorsed to meet the long-term needs of shoreline management in the three states, (ii) CMIS established

⁶ ADB. 2021. *Validation Report: India: Sustainable Coastal Protection and Management Investment Program—Tranche 1*. Manila.

⁷ Three states were selected after consulting with them and the central government and considering their coastal erosion and instability status. At approval, tranche 1 was to finance the outputs for Karnataka and Maharashtra, while tranche 2 was to finance the outputs for Karnataka.

⁸ ADB. 2007. *Technical Assistance to India for Preparing the Sustainable Coastal Protection and Management Project*. Manila.

to support planning and management, and (iii) project management system established and operational, and also the subprojects, for future tranches to be planned and designed.

8. Karnataka and Maharashtra have completed all district and state SMPs, established a fully functional CMIS with linkages to central agencies, and have set up their project management units (PMUs). These PMUs trained staff, engaged consultants, and prepared project manuals for inshore berms and offshore reef that were used by the two SEAs. Project designs for future tranches were prepared for the two states and endorsed by the technical review panel from central agencies. The indicator was achieved despite the delayed readiness of the Maharashtra subprojects due to consultancy issues.⁹ The SEA, nevertheless, completed these subprojects as designed, from its own resources. The PMU used state funds to engage a design and supervision consultant to complete the work required under the original terms of reference for project management and design consultants.

9. **Output 2: Coastal erosion and instability reduced.** This comprises (i) reducing coastal erosion and instability, and (ii) engaging the community and private sector in reducing coastal erosion and instability. Two targets were achieved, one substantially achieved, and one not achieved. In Karnataka and Maharashtra, the coastline subject to erosion was reduced to 248 km—exceeding the target of 380 km—compared to 530 km coastline subject to erosion at baseline. The creation of active SMOs achieved the target of community and local government engagement and participation in coastal erosion and instability reduction, shoreline management, and the maintenance of projects.

10. At approval, the private sector was envisaged to invest in coastal protection and management in the communities while supporting up to 30% women beneficiaries at each intervention district. In Maharashtra, the target of reducing coastline erosion was achieved.¹⁰ Thirteen SMOs were organized in projects 1 and 2, with the active participation of communities.¹¹ Shoreline management maintenance plans were developed and maintained by the local governments and SMOs. Enhanced community involvement was also achieved in both states with representatives participating in project activities exceeding well over the target of 50 communities. For the MFF, the target of private sector engagement in coastal erosion and instability reduction was not achieved. Private sector investment in both states was negligible. There was no incentive for the private sector to invest because these investments were perceived as a public good.¹² Women's participation in the process of shoreline management did not meet the targeted level. Consistent with general social norms in the area, the collaborative participation of women was limited and men dominated such local bodies and roles. In Karnataka, for instance, the requirement for 30% participation of women in the SMOs could not be met due to the local socioeconomic and political environment. In Maharashtra, women's participation in some of the

⁹ The resignation of the project management and design consulting firm caused delays in Maharashtra's design tranche, hence, it was not finalized in time for its inclusion in project 2. The designs were delivered (despite delays), endorsed, and implemented.

¹⁰ A remeasurement of the actual length of the coastline to be protected in 2015 showed that it is only 8.3 km compared to the 10 km target given in the DMF. Hence, it is considered that the full length was achieved. However, the DMF target for project 1 was not updated.

¹¹ There are two SMOs in Karnataka and seven in Maharashtra for a total of nine in project 1. In project 2, there are four SMOs in Karnataka. SMOs were registered under the Society's Registration Act, 1960. In Maharashtra, even the *gram panchayats* (government's local bodies for governance) at village level were given the mandate of SMOs, in addition to the registered SMOs. The Maharashtra Maritime Board initiated a program "*Nirmal Sager Tat Abhiyan*," which aimed to establish SMOs in all coastal *gram panchayats* of the state. At the village level, 77 SMOs were formed, each comprising 15–21 members. ADB agreed to involve *gram panchayats* in the expanded mandate.

¹² Business endeavors aim to ensure attractive returns, but coastal protection subprojects are not revenue-generating. Green incentives could be offered to private investors through preferential and incentive mechanisms.

community organizations was likewise less than 30%. It is only in Mirya Bay SMO where the required 30% of women members were achieved.

11. Output 3: Enhanced capacity for integrated shoreline planning and development. These include (i) an enhanced capacity of districts and states to plan, design, and implement shoreline protection and management projects; (ii) enhanced capacity of state and district agencies, local experts and agencies, local bodies, and stakeholders to provide specialist support for the planning, modeling, designing, checking, and reviewing of coastal protection and management; (iii) having beaches managed and maintained by the communities and stakeholders; and (iv) having SEAs formally mandated to coordinate all coastal protection and management programs. Of the 10 performance targets, one was exceeded, eight were achieved, and one was substantially achieved in projects 1 and 2. In 2012, adequate numbers of officers and staff at state and district agencies, local bodies, and stakeholders were trained in planning, design, and in the implementation of shoreline protection and management projects. Coastal information management units (CIMUs) were also established in the two states in 2015. SMPs were updated in the two SEAs. From the two states, 18 staff were also trained on climate-resilient coastal protection using nature-based coastal protection technologies. Shoreline management was formally mandated in the maritime boards of the two states. One indicator that was exceeded is the training of 116 staff—from the Central Water Commission, Central Water and Power Research Station, the local governments, and other stakeholders—who took up lessons in planning, modeling, design, checking, and review of coastal protection and management.¹³ The target of shoreline management through local bodies was substantially achieved through the establishment of 13 SMOs (six in Karnataka and seven in Maharashtra), but with women's representation less than the required 30% in two SMOs. The number of SMOs was expanded to 77 in Maharashtra, where ADB support was provided to involve gram panchayats in the expanded mandate for communities along the shoreline. In these 77 SMOs, the condition to meet 30% representation by women was adhered to.

2. Tranche 2 (Project 2)

12. Consistent with the MFF, the envisaged outcome of project 2 was the protection and management of shorelines in Karnataka. Project 2 had three outcome and six output performance targets. During the midterm review mission in August 2019, the outcome and output targets were revised to reflect the reduced length of the eroding coastline, and to adjust other parameters.¹⁴ Two of the three outcome targets were partially achieved, and one was substantially achieved. At completion, 28.4 km of shoreline were protected and managed against erosion and saline inundation versus the target of 43 km in the state of Karnataka. The outcome target for farmlands was partially achieved. Only 73 hectares (ha) out of the revised target of 105 ha were protected and managed. The revised outcome target of 1,692 households and 26 km of village roads protected from erosion was substantially achieved—with 1,550 households and 27.3 km of village roads protected. The DMF achievements for project 2 are shown in Appendix 1.

13. Output 1. Coastal erosion and instability mitigation structures constructed or upgraded. At appraisal, this comprised one performance indicator: 9 km of rock revetment, 50 groynes, 9 T-groynes and 1 offshore reef, 180 ha of dune planting, 30,000 cubic meters (m³) of sand-filled geotextile-bag protection, and 1.8 million m³ of beach nourishment completed. This was revised at midterm to 7.95 km of rock revetment, 60 groynes, 9 T-groynes and 2 offshore

¹³ The participants were from the Ports Department, District Planning Committee, district disaster committees, PMUs, CIMUs, SMOs, and nongovernment entities.

¹⁴ ADB. 2019. Memorandum for Minor Change in Scope. Loan 3549-IND: Sustainable Coastal Protection and Management Investment Program—Project 2—Request for Minor Change in Scope of the Project. 1 October. Manila.

reefs, 43.15 ha of dune planting, 14,425 m³ of sand-filled geotextile-bag protection, and 1.31 million m³ of beach nourishment completed.

14. At approval, the output included nine subprojects consisting of six coastal protection subprojects designed to address the medium-to-severe coastal erosion, and three community subprojects for areas of low erosion for the protection of a revised target of 43 km of coastline in Karnataka. The subprojects were undertaken in the following six locations: (i) Kodi Bengre, (ii) Maravanthe, (iii) Murudeshwara, (iv) Someshwara, (v) Udyavara, and (vi) Yermal Thenka.

15. The community protection subprojects (Kodi Kanyana, Pavinakurve, and community subproject 3) aimed to address lower levels of erosion through the piloting of soft technologies. These included dune construction with sand nourishment supported by modelling and planting of vegetation to help stabilize the dunes, including minor infrastructure. Of the nine subprojects, two (Murudeshwara and Pavinakurve) were dropped during implementation for technical reasons.¹⁵ In addition, due to the urgent need for coastal protection, the project management and design consultants designed two new subprojects—Someshwara Phase 2, and Mukkachery—and two more community subprojects—the Bailur-Thumbebeela-Manki and Dhareswara-Kadlebirkodi-Gangekolli coastal protection projects. A total of 10 subprojects were implemented.

16. The design of the Someshwara original subproject was changed after the awarded contract was revised due to the ongoing erosion, sediment deficiency, changes in the beach profile, and nearshore bathymetry.¹⁶ After a detailed scientific assessment, the earlier technical solution of protecting through a shore parallel revetment using sand-filled geotextile bags was changed to 10 inshore berms and two offshore reefs, along with sand nourishment.

17. At completion, the revised targets for this output were achieved. These included the reconstruction of 8.91 km of rock revetment, 60 groynes, 9 T-groynes, 2 offshore reefs, 15 ha of dune planting, 8,000 m³ of sand-filled geotextile-bag protection, and 600,000 m³ of beach nourishment. Although 1.31 million m³ of beach nourishment through sand redistribution was planned to enhance the beach width at critical sections, the sand requirement turned out to be less due to sand replenishment resulting from project interventions and the planned maintenance dredging, which provided additional sand.

18. **Output 2. Capacity for integrated shoreline planning and development enhanced.** All five targets under this output were achieved. The first performance indicator was to transfer the CIMU to the Public Works, Ports, and Inland Water Transport Department (PWPIWTD). This was achieved at project completion when the CIMU was transferred to the Ports and Inland Water Transport Department (P&IWTD) effective 7 July 2020. The second performance indicator—to transfer the CMIS to PWPIWTD and use it in planning and monitoring—was achieved at project completion.

19. The third performance indicator—to train CIMU and SMO staff in preparing two subprojects—was achieved. This was done by training the executing agency staff, district-level organizations, district collectors, district planning committees, the district development council

¹⁵ At Murudeshwara, the construction of offshore reef, sand nourishment, and dune stabilization package was dropped due to stable shoreline. The Pavinakurve community protection package was dropped due to a change in the government's plan for the region.

¹⁶ Design changes included revision from the earlier shore parallel geotextile revetment to 10 groynes in the first package and construction of two offshore reefs with sand nourishment in the second package (Someshwara II). The inshore berms were executed through a variation under the package already awarded. Someshwara II was awarded for the offshore reefs and sand nourishment.

(*Zilla Panchayats*), urban local bodies, and *gram panchayats* in 2018. The performance indicator to train 30 PWPIWTD staff on project management was also achieved.

20. The last indicator—to develop and maintain shoreline management maintenance plans by the local governments—was achieved. At completion, SMPs were developed for all the three coastal districts and for the state. Although there were some delays in the preparation and approval, these were prepared and endorsed by the state government. A CMIS to support planning and management, which was established in 2018 under project 1, was further strengthened during project 2 implementation. A project performance management system established in 2012 provided the necessary project information for project 2.

C. Project Costs and Financing

21. At approval, the cost of the facility was \$404.60 million, comprising the ADB loan of \$250.00 million (61.8%) and the state governments' contribution of \$154.60 million (38.2%). At completion, the actual cost of the MFF was \$115.73 million, comprising the ADB loan of \$82.73 million and the state governments' contribution of \$33.00 million. The first periodic financing request for tranche 1 was approved for a net loan of \$51.56 million (\$41.03 million for Karnataka and \$10.53 for Maharashtra). The second and final periodic financing request was approved for \$65.50 million for Karnataka. At completion, the actual cost of project 1 was \$50.25 million, comprising the ADB loan of \$36.48 million and the state governments' contribution of \$13.77 million. The actual cost of project 2 was \$65.49 million, comprising the ADB loan of \$46.25 million and the state governments' contribution of \$19.24 million. The remaining \$167.27 million of the ADB-approved loan was unutilized within the remaining MFF period. At completion, \$82.73 million in ADB funds had been disbursed. State governments contributed the balance of \$33.00 million for a total actual cost of \$115.73 million. ADB's contribution increased from 61.8% at approval to 71.5% at completion.

22. At approval, the cost of tranche 2 was estimated at \$93.54 million, of which \$28.04 million (30%) was to be provided by the Government of Karnataka and \$65.50 million (70%) by the ADB loan. The net loan was reduced to \$46.25 million after the project partially cancelled \$19.25 million on various dates at the borrower's request. At completion, the actual expenditures totaled \$65.49 million, with \$19.24 million (29.4%) as government contribution and \$46.25 million (70.6%) from the ADB loan. The civil works expenditure of \$53.78 million was lower than the \$69.97 million estimated at approval due to the higher currency exchange rates and savings from the cancelled beach nourishment, dune stabilization, and community protection works. Appendix 2 compares the estimated and actual MFF and tranche 2 costs. Appendix 3 compares the estimated and actual MFF and tranche 2 costs by financier.

D. Disbursements

23. For tranche 2, a total of \$46.25 million (70.6% of the \$65.50 million loan amount) was disbursed. Loan disbursements were on track—from the first disbursement on 23 April 2018, it totaled 28.7% in the second year, 31.1% in the third year, and 38.5% in the succeeding year, then decreasing to 1.7% in the final year. The SEA was satisfied with ADB's disbursement procedures and encountered no problems in processing reimbursement claims. Annual and cumulative disbursements of loan proceeds are shown in Appendix 4, and contract awards are presented in Appendix 5. Of the \$117.05 million in loans approved under the MFF and its two tranches,¹⁷ \$82.73 million (33.1% of the loan amount of \$250.00) was utilized—\$36.48 million under tranche

¹⁷ The stated amounts at approval are based on the Facility Administration Manual for tranches 1 and 2.

1 and \$46.25 million under tranche 2. Disbursements were made as per ADB's *Loan Disbursement Handbook* (2007, as amended from time to time) and no imprest advance was used. Both statement of expenditure and reimbursement procedures were used for the withdrawal of funds. The statement of expenditures procedure was used to reimburse or liquidate eligible expenditures.

E. Project Schedule

24. Project 2 was designed to be implemented over 34 months. The loan was signed on 26 October 2017, became effective on 15 December 2017, and was expected to be completed by 31 March 2020. Project 2 was closed on 28 September 2020 as scheduled. There were delays during the critical period of the works due to design and scope changes, lack of suitable suppliers, and contractors' labor shortages.¹⁸ The coronavirus disease (COVID-19) pandemic further exacerbated the delays during implementation. Despite these challenges, the contractors mobilized additional resources while utilizing the monsoon period for procurement and good progress was achieved before loan closure. In parallel with the MFF, a capacity development technical assistance was implemented from 2014 to 2019—to support the institutional capacity strengthening of state authorities in planning, implementing, financing, and monitoring coastal protection and management measures.¹⁹ The project implementation schedule is provided in Appendix 6.

25. At appraisal, the MFF-supported projects were scheduled for completion by 31 December 2019. The projects were completed by 28 September 2020.²⁰ Project 1 became effective on 28 November 2011 and was expected to close on 30 June 2014. ADB extended the loan closing date twice (by 48 months) until 30 June 2018 to allow the SEAs time to complete the ADB loan-funded contracts. The extensions were mainly due to the design revisions of the major civil works and the construction of the offshore reef.

26. The MFF's availability was extended once—from 9 years to 10 years—due to delays in completing the portions of the ADB-funded contracts under project 1.²¹

F. Implementation Arrangements

27. The implementation arrangements for the MFF and the two projects were consistent with the design at appraisal and were appropriate in achieving the envisaged outputs. Each state had a different SEA that is responsible for the overall project management and implementation. Each state established a program steering committee, chaired by the SEA departmental secretary. A PMU headed by a full-time project director was established in each state. The PMUs

¹⁸ Design changes were required due to the situation on the ground, which was different from what was indicated in the periodic financing request. Some subproject sites lacked suitable sources of sand for beach nourishment. The lack of a suitable local supplier for geotextile bags also necessitated a design change. These issues led to the reduction in scope for some subprojects.

¹⁹ ADB. 2022. *TA 8652-IND: Climate Resilient Coastal Protection and Management Project. Completion Report*. Manila. The successfully implemented technical assistance had the following outputs: (i) development of a reference manual on climate change adaptation guidelines for the protection and management of the Indian coast; (ii) support climate-resilient shoreline management; (iii) coastal investments in the focal states incorporate climate resilience; and (iv) institutional capacity building through training and implementation of community protection pilot projects.

²⁰ Tranche 1 was completed on 30 June 2018 after one extension and tranche 2 was completed on 28 September 2020 as originally scheduled.

²¹ Delays in tranche 1 were due to the (i) major modifications in the reef design, (ii) PMU understaffing, (iii) prior approval from higher-level advisory committees, (iv) a temporary ban on sand extraction, and (v) the withdrawal of the project management and design consultants.

were responsible for processing and implementing the MFF outputs and were assisted by project management and design consultants.

G. Procurement

28. As envisaged, the project design provided for consultancy services in the form of project management and design consultants engaged by PMUs of the SEAs. Consultant selection was done as per ADB's *Guidelines on the Use of Consultants* (2013, as amended from time to time).

29. ADB ensured effective cooperation with the SEAs by timely approving procurement documents. The SEAs procured ADB-financed contract packages as per ADB's *Procurement Guidelines* (2007, as amended from time to time). For project 1, the SEAs awarded the first contracts in November 2011. By 17 November 2014, the SEAs had awarded 18 contracts. For project 2, the SEA awarded the first contracts on 9 December 2016 and by 7 November 2019, it had awarded all contracts comprising 14 packages. One package for a Murudeshwara subproject was cancelled during implementation. The SEAs reported that all goods and services procured for the MFF complied with the specifications and performance standards specified in bidding documents. Appendix 7 presents the summary of contracts.

H. Poverty, Social, and Gender Equity

30. The facility was categorized as having *some gender elements* (SGE). The DMF of project 1 included two output-level gender indicators for enhancing the participation of women in community-based activities for shoreline management. Thirteen SMOs were formed and registered with the participation of the local communities, including six SMOs in Karnataka²² and seven SMOs in Maharashtra.²³ In Maharashtra, the number of SMOs was expanded to 77 (footnote 11). In both SEAs, SMOs were formed through a series of community consultation meetings and community development activities. While the primary focus of the MFF was to address coastal erosion and coastal management, a significant number of the poor population and women benefited from the subprojects—as a result of being protected from losses and damages to their lands and houses and the restoration of their livelihood and incomes.

31. For project 2, community development and shoreline economic development initiatives were implemented to ensure gender equality and participation in the project activities. In the SMOs, 30% of the management committee members were women. Women's participation in the SMOs and community consultations comprised 30%. Gender representation in SMOs was adhered to and women's participation in all training and awareness programs was implemented. The community activities in the two states were implemented by the PMU and the project management and design consultants.

I. Safeguards

32. **Environmental safeguards.** Project 2 was classified as environmental category B, as per ADB's *Safeguard Policy Statement* (2009). The state government developed detailed environmental planning documents during project preparation. These included an initial environmental examination (IEE) report, an environmental management and monitoring plan, and an environmental assessment and review framework. These documents were prepared according

²² Government of Karnataka, PWPIWTD. *Sustainable Coastal Protection and Management Investment Programme. Quarterly Progress Report*, January–March 2017. Delhi.

²³ Maharashtra Maritime Board. *Sustainable Coastal Protection and Management Investment Program (SCPMIP)–Tranche 1. Fourth Quarterly Progress Report 2016 (Oct–Dec)*. Delhi.

to the Government of India's environmental regulatory framework then prevailing and based on ADB's Safeguard Policy Statement. The IEE report identified site-specific environmental impacts associated with proposed works during preconstruction, construction, and operation and maintenance (O&M) phases. It also reflected consultations done with the local communities and other stakeholders; and the proposed detailed environmental mitigation measures and monitoring plans, including the testing of parameters for ambient air quality, ambient noise levels, and water qualities. The IEE report and the environmental assessment and review framework were disclosed on ADB's website in May 2016 as per ADB's disclosure requirement. The executing agency—the PWPIWTD—obtained the requisite statutory approvals, permissions, and clearances. It subsequently renewed these prior to commencing with the relevant works as required under then-prevailing environmental and labor regulations. No instances of qualifications raised by the regulatory agencies were reported during inspections. The PWPIWTD ensured that all requisite statutory permissions stipulated at national, state, and local levels were obtained.

33. The PWPIWTD established a social and environment management unit (SEMU) within its PMU to supervise, monitor, guide, and report the implementation of safeguards-related requirements. It engaged academically trained and professionally experienced environment practitioners to manage environmental safeguards-related requirements. It designated its existing engineering staff from the project implementing units (PIUs) to further support the SEMU staff. The civil works contractors either designated their existing engineering staff or engaged qualified environment, health, and safety officers to implement provisions outlined in the ADB-cleared environmental management plans. The SEMU and other PWPIWTD officials attended ADB-organized capacity building programs on safeguards during implementation. ADB also provided hand-holding support to the project staff through virtual meetings, which facilitated the resolution of implementation issues. The SEMU, supervision consultant, and PIU staff coordinated with the civil works contractors on implementing environmental management measures and monitoring plans. The PWPIWTD submitted environmental monitoring reports to ADB. It also established a grievance redressal mechanism as outlined in the safeguards planning documents, and this was functional until the closure of project 2.

34. **Social safeguards.** At appraisal, the project was classified under category C for involuntary resettlement for nine approved subprojects that caused no land acquisition or livelihood impacts (either temporary or permanent) on any titled or non-titled persons. This was upgraded to category B in December 2019 to reflect the resettlement impacts in one subproject (Mukkachery—additional scope of work). The subprojects involved no land acquisition and works were carried out within the available land belonging to the state government. Nevertheless, the subproject envisaged impacts on 3 septic tanks, 4 coconut trees, and 30 drainpipes. A resettlement plan was advised to be prepared, as per ADB's Safeguard Policy Statement, in line with the entitlement matrix of the agreed resettlement framework for the loan. This plan was developed, reflected the envisaged impacts, and was disclosed on ADB website in March 2020. Project 2 was classified as category C for indigenous peoples at appraisal and implementation. Detailed consultations were held with the *gram panchayat* and the local communities during the detailed design and construction stage to avoid resettlement impacts. To confirm that there will be no impacts on the remaining additional subprojects, due diligence reports for five subprojects were undertaken, confirming no social safeguards impacts were prepared, and this was cleared by ADB. The implementation of social safeguards for project 2 is assessed to have complied with the Safeguard Policy Statement. A reassessment of social safeguards is provided in Appendix 9.

J. Monitoring and Reporting

35. MFF assurances and the project 2 covenants, including safeguards, were complied with. No covenant was modified, suspended, or waived during implementation. All covenants were reasonable and relevant for the sector and for the borrower's operations. The SEAs generally complied with all loan covenants. Program monitoring reports were irregular and delayed for the first few implementation years under project 1, and submission of the audited project financial statements was sometimes delayed.²⁴ Compliance was regularly monitored through the ADB review mission reports. All of the 68 covenants in project 2 were complied with. The SEAs complied with the institutional development and policy actions specified in the sector road map as provided in the MFF's framework financing agreement. The MFF generally met the monitoring and reporting requirements, including the regular submission of quarterly progress reports, audited project financial statements, and with the auditor's opinion and compliance on the use of loan proceeds. The SEA's financial management was deemed adequate and complied with statutory requirements. Appendix 10 provides the status of compliance with the loan covenants. After the financial closure of the loan, ADB received two complaints—in May and June 2021—which were taken up with the executing agency. Appendix 9 provides the details of these complaints. To address these, the executing agency consulted with the complainants and is working on cost-effective and longer-term local solutions.

II. EVALUATION OF PERFORMANCE

A. Relevance

36. At approval and upon completion, the MFF and project 2 were *relevant* to the government's development objectives and to ADB's country and sector strategies (Appendix 12). The MFF's objective was aligned with the government's Eleventh Five Year Plan, 2007–2012 (footnote 1), which called for the country to integrate environmental concerns into policy, planning, and development, thus, underscoring the need to address the impacts of sea-level rise (particularly for coastal agriculture) and the management of seawater ingress into coastal areas. The MFF was tied to the sector road map, which comprised policy and institutional development actions supporting the states to move toward integrated, sustainable coastal protection.²⁵ The sector road map achievements are presented in Appendix 8.

37. The MFF, including project 2, helped to introduce new technologies for building coastal resilience. This has led to solutions that protect the coastline from erosion and flooding and effectively enhanced income-generating opportunities for communities living near the project areas. It piloted a new approach involving dune construction, restoration, and the use of submerged breakwaters and reefs, thus, moderating the circulation of water currents. In opting for innovative hybrid technology (e.g., offshore reefs) and nature-based solutions over conventional gray infrastructure, the project played a demonstrative role in promoting replication in similar coastal settings.²⁶ Innovative technologies in designing offshore reefs, groynes, and

²⁴ For tranche 2, the submission of the audited project financial statements were delayed three times—by 6.9, 2.4, and 1 month. One was delivered on time.

²⁵ ADB. 2010. *Framework Financing Agreement. Sustainable Coastal Protection and Management Investment Program*. Manila. Except for the action on increased public–private partnership in coastal protection, all listed items have been complied with and achieved.

²⁶ The Global Environment Facility (GEF) technical assistance created national guidelines for climate change adaptation for coastal protection and management in India. The subproject designs were reviewed for the incorporation of climate adaption measures into the design of tranche 2 subprojects.

breakwaters were combined with sand-nourishing measures to arrest erosion and protect the coastal communities along the shoreline.

38. Due diligence was adequate during the MFF and tranche 2 preparations. The executing and implementing agencies, and the central and local government agencies, actively participated in the process-oriented SMPs through the project-established systems and institutions (i.e., CIMU, CMIS, and SMOs). The central agencies oversaw the approval processes for the subproject's detailed reports, and they institutionalized the technical, innovative, and nature-based hybrid solutions. Beneficiaries' involvement in SMOs was participatory and enabled small-scale business opportunities, as well as low-cost, sustainable O&M by the SMOs. The MFF demonstrated transformative interventions through capacity development.

39. The MFF was consistent with the ADB's country strategy for India, 2009–2012, which emphasized sustainable measures for coastal protection and a focus on enhanced capacity of state authorities to design, implement, monitor, and finance coastal protection and management.²⁷ The CPS 2009–2012 supported the use of advanced technologies and innovative business and financing options. At completion, the MFF and project 2 remained relevant to ADB's policy focus on India in areas of inclusive growth, infrastructure, and environmental sustainability.²⁸ The MFF was also consistent with ADB's Strategy 2030 (Appendix 12) and the CPS for India 2018–2022, which aimed to provide support in tackling climate change, building climate and disaster resilience, enhancing environmental sustainability, and promoting sustainable natural resource use in the project design. The SCPMIP is strongly allied to this objective. The MFF design focused on supporting SEAs' long-term investment needs to address coastal management and infrastructure investment. Prior to this program, there had been only limited external assistance for coastal protection and management in India.

40. The MFF lending modality was deemed appropriate (para. 3) given the investment program's long implementation period and funding requirements for various works that were sequenced for implementation. The approach allowed detailed designs to be developed through project implementation and fostered stronger support for the capacity building of the SEAs. ADB's assistance is also based on the sector road map developed by the government (para. 35). Given the nature of the investment program and the government's sector road map, the DMF is appropriate.²⁹ The DMF for the MFF was used for project 1 since the tranche was to finance the three outputs as originally intended. The DMF for project 2 was revised at midterm (October 2019) to reflect the updated target indicators based on detailed surveys and estimates.

41. The risks associated with the implementation delays, however, were not adequately assessed at appraisal. This resulted in (i) non-participation of Maharashtra in project 2, (ii) time and cost overruns, and (iii) design changes under projects 1 and 2 (Appendix 1, DMF of the facility). The SEAs acted in a timely manner to address the issues and reassessed subprojects for implementation during the life of the facility. To maintain the MFF's relevance, the original design was also adjusted based on the readiness of the interventions (para. 4).

²⁷ ADB. 2009. *Country Partnership Strategy: India, 2009–2012*. Manila.

²⁸ ADB. 2018. *Country Operations Business Plan: India, 2018–2020*. Manila.

²⁹ The quality of the DMF indicators was appropriate at the time of appraisal and periodic financing requests for tranches 1 and 2. Being long term in nature, the MFF provides an indicative framework. Projects 1 and 2, thus, prepared the DMF based on actual needs assessments at the time of their preparation.

B. Effectiveness

42. The MFF is rated *less than effective*. Of the four outcome performance indicators, two were achieved, one was substantially achieved, and one was partially achieved (as the private sector's role in the program was limited). The MFF provided a key step for India to develop coastal management systems that will help stabilize coastal erosion in the face of climate change challenges. However, the MFF partially achieved the outcome target of protecting and managing the coastline in the states of Karnataka and Maharashtra using hybrid and soft technologies. While the eroding coastlines were reduced based on an updated coastline survey, the facility's targets were not revised.³⁰ Nevertheless, early monitoring data confirm the effectiveness of the solutions adopted for the coastal erosion problems.³¹ The MFF interventions achieved the outcome target of increased businesses at the beaches and improved coastal shipping and fish landings in the program districts. The implementation of community participation and public-private partnership in coastal management was also substantially achieved. At completion, the SMOs' active participation and involvement in community development have been notably sustained during and after the MFF's completion. Despite its minimized role, the private sector was indirectly spurred by the commercial aspects of tourism, as indicated by increased investments in the program areas. The performance target of 30% women participation in SMOs was substantially achieved, as was their participation in community interventions in Maharashtra³² and Karnataka.³³ The community engagement activities in the two states generated benefits for the coastal communities, including women. Of the 22 output targets, the MFF achieved 17 targets, substantially achieved 2 targets, exceeded 2 targets, and 1 target was not achieved (Appendix 1, Table A1.1).

43. Project 2 is rated *less than effective*. One outcome target was substantially achieved, and two were partially achieved, while all six output targets were achieved (Appendix 1, Table A1.2). Project 2's output target of constructing environmentally and socially appropriate solutions helped address the immediate coastal protection needs and coastal instability in Karnataka. The development of SMPs for such a large portion of the state's coastline helped to strengthen 28.4 km of coastline protection, thus, considerably minimizing soil erosion and flooding. Also protected from erosion were 73 ha of farmland and 1,550 households.

44. As agreed during appraisal, the SEAs prepared environmental management and monitoring plans and resettlement plans with the approval of ADB. The implementation of these

³⁰ Based on an updated 2016 India survey, the eroding coastline was reduced from 380 km to 265 km for the three original MFF-supported states. The substantial reduction may be attributed to actual surveys undertaken with more advanced survey technologies (standard, repeatable methods). Source: R. Murthy, et al. 2018. *National Assessment of Shoreline Changes Along Indian Coast. Status Report for 26 Years, 1990–2016*. Delhi: National Center for Coastal Research, Chennai, Ministry of Earth Science.

³¹ Black, K.P. et al. 2020. Salient Evolution and Coastal Protection Effectiveness of Two Large Artificial Reefs. *Journal of Coastal Research*. 36(4), pp. 709–719.

³² At completion, 11 of the 13 SMOs established under the MFF included at least 30% women. Sources: Maharashtra Maritime Board. (i) *Sustainable Coastal Protection and Management Investment Program (SCPMIP)–Tranche 1*; (ii) *Quarterly Progress Report, 2016 and 2017 (October–December)*; and (iii) *Quarterly Progress Report, 2018 (January–March)*. New Delhi.

³³ In Karnataka (project 1), the required 30% women participation of women in the SMOs could not be met due to the local socioeconomic and political environment. In Namma Bengre SMO, women representation was 15% (2 out of 13). In Ullal, women's representation was zero (0 out of 7). The SMOs formed under the project held community awareness initiatives in collaboration with nongovernment entities (e.g., installing solar high mast lights, streetlights, operationalizing community toilet units, organizing health camps, holding beach festivals) and held community awareness meetings. Source: PWPIWTD. 2018. *Sustainable Coastal Protection and Management Investment Program (SCPMIP), Karnataka–Tranche 1. Project Completion Report*. Delhi. In project 2, women's 30% participation in all four SMOs was achieved.

plans had been satisfactory. The program intervention did not result in environmental degradation. Safeguards monitoring was adequate. The compensation paid by SEAs was adequate and it is expected that the social infrastructure implemented will contribute to the welfare of communities.

C. Efficiency

45. Project 2 is rated *efficient* in achieving its intended outcome and output. The economic analysis at appraisal was consistent with the economic reevaluation at completion and covered the 10 completed subprojects of project 2. Benefits accrued principally from protecting the land, buildings, and infrastructure from erosion and damage and from avoiding other associated costs and loss of productivity and/or income from agriculture and fishing. The economic internal rate of return (EIRR) for project 2 is estimated at 17.7%, which exceeds the hurdle rate of 12.0%. Funds were effectively disbursed. Project 2 was implemented within the original time period and budget. Sensitivity analysis confirms the economic viability of project 2.

46. Overall, the MFF is rated *efficient* in achieving outcome and outputs despite the implementation delays in project 1. The EIRR at appraisal was estimated at 15.2%–18.9% based on the proposed investment plan for project 1. The MFF's EIRR at completion, however, was calculated for tranches 1 and 2. The MFF's consolidated EIRR at completion was calculated at 20.3%, which is also above the 12.0% hurdle rate. Sensitivity analysis of the main risks indicates that the MFF remains economically viable. Appendix 11 presents the methodology and assumptions underlying the EIRR reevaluation of project 2 and the MFF.

47. The MFF had significant issues in process efficiency due to procurement, staff capacity, the slow mobilization of experts, and design changes. These delayed the program's completion, even with the reduced number of tranches. The MFF supported community participation through the SMOs. This was effectively undertaken particularly during project 2 implementation. Considering the large benefits of coastal protection, the program can be regarded as having achieved the expected efficiency.

D. Sustainability

48. Both the MFF and project 2 are rated *likely sustainable*. The design and technology adopted in the coastal erosion subprojects are innovative and appropriate given (i) the huge advantages of hybrid, nature-based solutions, and technology, which has addressed coastal erosion and built resilience; and (ii) the involvement of coastal communities in shoreline management while providing local communities with enhanced opportunities for fishing and tourism. The SEAs have sufficient funds to absorb O&M costs. As a nonrevenue-generating project, the financial internal rate of return was not calculated. This is consistent with the MFF and project 2 financial analyses at approval. The overall O&M cost requirements of P&IWTD (e.g., for ports and lighthouses) for unconstrained asset network (inclusive of project assets) versus the entity's financial capacity was considered in the fiscal impact analysis for project 2. The government's annual budget requirement to cover the total unconstrained network of assets managed by the P&IWTD after completion of project 2 is deemed minimal.³⁴ The projected

³⁴ These costs are defined as those that are required, based on technical or normative requirements related to the network, to operate and maintain the network for optimum service delivery over its economic life. The incremental costs of project 1 and 2 investments are deemed minimal. The Karnataka Maritime Board, which is currently in transition from P&IWTD, now reports to the Infrastructure Development Department. As such, the entity's mandate will enable it to gradually become autonomous, allowing the entity to generate revenues. During FY2021–FY2023, ports and lighthouses were allocated incremental budgetary expenditure, including capital outlays, and this trend is expected to continue.

recurrent expenditures from FY2022 to FY2030 indicate that P&IWTD (now the Karnataka Maritime Board) will have adequate capacity to finance these incremental, recurrent O&M costs. For project 1, the agency has reported having sufficient budget to meet the project's O&M requirements.³⁵ Project 1's assets continued to perform as expected. SMO involvement in maintaining the projects' community infrastructure has ensured the sustainable operations of the coastal protection facilities. The fiscal impact analysis also shows that the government has adequate financial resources to fulfill all its financial obligations under project 2. Hence, the project is deemed financially sustainable (Appendix 11).

49. The technical standards, quality of systems adopted, and the material and equipment procured and installed were of the latest technology. Institutionally, the SEAs have developed in-house capacity to operate and maintain the coastal subprojects effectively and efficiently and can, therefore, ensure that the projects meet all regulatory standards. At completion, 85 SMOs have also been formed and registered. Moreover, their capacity has been strengthened to capably manage and maintain the subproject areas. The capacity building of SEA officials and the formal training and involvement of coastal community members in soft coastal protection activities were comprehensively undertaken. The soft approach—such as developing the O&M manuals as technical solutions—is being used after project completion for the subprojects' maintenance. The benefits and impacts of the facility are deemed likely sustainable. New approaches and demonstrated benefits of appropriate shoreline management, community involvement in decision making, and investments along the coastline were exhibited under the facility. A positive feature was the broad agreement with the technical solutions adopted by the program. This suggests that such approaches to coastal and shoreline management will continue to be pursued in the country.

50. The MFF, including project 2, is assessed environmentally sustainable. It contributes to coastal zone resource conservation and, thus, to improving the quality of life and the environment. The MFF's outputs have operational life spans exceeding 30 years and with no adverse environmental impacts. In addition to the technologies associated with this MFF, several more coastal projects are under various stages of construction in the coastal region.

E. Development Impact

51. While improvements in the impact indicators are expected to be achieved by 2024, emerging benefits from improved business opportunities and increased fisheries, tourism, and other economic activities within the coastal communities are already observed in the states of Karnataka and Maharashtra after project completion. Since the impact targets are likely to be achieved in the next few years, the contributions of the MFF and project 2 to development impacts are rated *satisfactory*. The MFF's outputs have contributed to addressing the immediate coastal protection needs and coastal instability—using solutions that are environmentally and socially appropriate for the rural communities in India's coastal areas. The development of beaches at subproject sites has exhibited favorable impact. In Karnataka, for instance, businesses at intervention beaches have increased by at least 100%.³⁶ In Maharashtra, the net positive impact has occurred as new businesses have been established due to increased footfall for tourism and related economic activities.³⁷

³⁵ The maritime boards, CIMUs, and SMOs have had extensive training on using and implementing the O&M manuals.

³⁶ For example, tourism as a percent of gross domestic product in the state increased from 0.001% in 2012 to 14.8% in 2019 (Appendix 1).

³⁷ ADB. 2020. Restoring Beaches through Sustainable Coastal Protection and Management. Manila. <https://www.adb.org/news/videos/restoring-beaches-through-sustainable-coastal-protection-and-management>.

52. The project efforts resulted in recovering lost beaches and has spurred small businesses on the beach catering to the rising tourist arrivals. It is also encouraging that the protection infrastructure has stood firm during extreme weather events, confirming the efficacy of these measures. The community participation interventions are likely to have demonstrative impacts in the sector, as other states can also use the innovative and sustainable soft protection measures employed in this project. Such approaches entail long-term remedial measures rather than mere stopgap measures of building infrastructure to halt the ingress of seawater.

53. By adopting integrated planning approaches and institutionalizing the SMPs, CMIS, CIMU, and SMOs, the MFF has enabled the participating SEAs to meet their long-term needs for sustainable and inclusive coastal protection and management. The integrated approach was appropriate given the multiple layers of government agencies and sector agencies involved in coastal management. Nature-based solutions were considered part of the SEAs' integrated plans via the SMPs. These entailed combining gray and green solutions and soft measures, such as awareness raising, policy making, and land use planning that utilized geographic information systems, among others. The project supported initiatives to increase private sector and community participation. Likewise, it helped strengthen the capacities of the SEAs, PMUs, and stakeholders in design, engineering, procurement, project execution, safeguards, and overall coastal management. The technologies and solutions employed by the project significantly minimized associated negative environmental and social impacts. The environmental impacts of the MFF and project 2 are assessed in para. 32. The MFF also contributed to the operational priorities of ADB Strategy 2030 on accelerating progress in gender equality, tackling climate change, building climate and disaster resilience and environmental sustainability, and strengthening governance and institutional capacity (Appendix 12).

F. Performance of the Borrower and the Executing Agency

54. The Public Works, Ports, and Inland Water Transport Department (PWPIWTD) was the SEA for project 2. The overall performance of the SEAs is rated generally *satisfactory*.³⁸ The related government agencies, including the Department of Economic Affairs, actively coordinated and monitored project formulation and implementation. The SEA established a PMU that was staffed by qualified and experienced personnel to coordinate project preparation, conduct procurement, implement the safeguard requirements, implement project activities, comply with the covenants, and the rest of the activities. Capacity was built up throughout projects 1 and 2 among the implementing agencies and project units, the same way that institutional linkages and cooperation were strengthened with central agencies. The SEAs complied with the conditions of the loan covenants, including the safeguard and fiduciary requirements. The SEAs effectively executed the required tasks to meet the extended facility and completion dates. The completed subprojects have been operating successfully and positively impacted the subproject areas.

55. No adverse issues arose through the borrower's actions. The Ministry of Jal Shakti and its constituent agencies, the Central Water Commission and the Central Water and Power Research Station, provided considerable support during project implementation and significantly contributed to the project's overall success.

56. The PMU provided strong support and guidance to overcome many challenges during implementation, such as managing the design changes and conducting additional site investigations (within the constraints of its own procedures for clearing design changes and managing procurement processes). Loan covenant's non compliance was a minor issue, and the

³⁸ The Maharashtra Maritime Board's performance, however, was rated *less than satisfactory* in project 1.

SEA made efforts to achieve compliance. A robust internal financial reporting system currently existing in the Karnataka government supported the financial management of the project.

G. Performance of the Asian Development Bank

57. During project implementation, ADB fielded one inception mission, one midterm review mission, three consultation missions, four loan review missions, and one special administration mission. These missions provided strong support and clear direction for project implementation as ADB staff had in-depth technical knowledge and strong country experience. The staff members' suggestions enabled the PMUs to fast-track project implementation. The mission members helped flag potentially troublesome issues and resolved internal and external bottlenecks. The collaboration between the executing agency and ADB resulted in an improved performance of the PMU. The overall performance of ADB was assessed *satisfactory*.

H. Overall Assessment

58. Overall, the MFF and project 2 were rated *successful*. This pioneering program effectively implemented environmentally appropriate hybrid solutions by combining engineered and nature-based solutions that are appropriate for India's coastal protection and management thereby enhancing climate change resilience and environment conservation. The participation of coastal communities in shoreline management was an important part of the project's approach. The project helped to stabilize the shoreline and recover the beaches and supported the local communities through enhanced economic opportunities.

59. The MFF, including project 2, was *relevant* to the government's overall development objectives and ADB's policies at appraisal, and continued to remain so upon completion. Project 2 was rated *less than effective* as one outcome indicator was substantially achieved and two were partially achieved, and output indicators were all achieved. The MFF was rated *less than effective* as the outcome and output indicators had a mixed achievement (two were achieved, 1 was substantially achieved, and one was partially achieved) in delivering an environmentally sustainable and effective protection of the coastal areas. Project 2 and the MFF were rated *efficient* as both EIRRs were above the 12% threshold. The two projects are rated *likely sustainable*, and the development impacts and performance of ADB and the borrower and executing agency are rated *satisfactory*. The broad agreement with the technical solutions and institutional development approaches adopted by the program indicates that such approaches to coastal and shoreline management will continue to be pursued in the country. These are summarized in the table that follows.

Multitranche Financing Facility and Project Overall Ratings

Criterion	Project 1 (Tranche 1)	Project 2 (Tranche 2)	Multitranche Financing Facility
Relevance	Relevant	Relevant	Relevant
Effectiveness	Effective	Less than effective	Less than effective
Efficiency	Efficient	Efficient	Efficient
Sustainability	Likely sustainable	Likely sustainable	Likely sustainable
Overall assessment	Successful	Successful	Successful
Development impact	Satisfactory	Satisfactory	Satisfactory
Borrower and executing agency	Satisfactory	Satisfactory	Satisfactory
Performance of ADB	Satisfactory	Satisfactory	Satisfactory

ADB = Asian Development Bank.

Source: Asian Development Bank.

III. ISSUES, LESSONS, AND RECOMMENDATIONS

A. Issues and Lessons

60. The program introduced pioneering, transformative technologies, and new planning approaches. The emphasis on softer, hybrid, and sustainable coastal protection solutions and the involvement of local communities in the shoreline management are keys to a climate-resilient infrastructure that are appropriate for India's coastal protection and management. The program can be an example for possible replication in other parts of India and in other Asia-Pacific countries.

61. For environmental projects, the program demonstrated that it is critical to analyze the multisector issues and to integrate conservation, livability, protection, and conservation into the design.

62. Throughout project implementation, the program showed that a sustained capacity building and multi-stakeholder participation could strengthen the knowledge and awareness of CMIS, SMPs, and SMOs on their roles in coastal protection and in prioritizing the investments.

63. Project readiness—through procurement and safeguard readiness—should have been undertaken more effectively, with detailed project preparation and feasibility studies carried out and included in the periodic financing request. Another lesson is to have the comprehensive field investigations and site assessments conducted during the detailed project reporting stage. Monsoon and weather conditions and project readiness for physical works should be considered in drawing up implementation schedules—for both onshore and offshore projects.

64. Design changes were required because the actual situation differed from what was indicated at appraisal. Thus, the revised procurement of materials and technical approaches necessitated design changes. These issues required lengthy approval processes, resulting in reduced scope and cancellation of some subprojects. Replacement subprojects likewise caused delays and even ended Maharashtra's participation in project 2. To achieve project readiness, extensive consultations with relevant, higher-level agencies (e.g., the Central Water Commission, Central Water and Power Research Station, Coastal Regulation Zone), local governments, and civil society organizations needed to be undertaken, and this is one of the important lessons derived from this program.

65. Community involvement in project implementation was minimal due to the lengthy SMO registration procedures. The capacity of the stakeholders to understand the complex coastal process and the coast's dynamic nature could have been more closely considered when planning community roles. One lesson is to consider alternative and locally appropriate strategies for community involvement. The planned roles for community members in SMOs should be tailored to community members' capacity and experience. Cultural norms regarding women's roles in the society and community should be more carefully addressed. Community involvement in implementation—especially women's engagement—could have been further enhanced through (i) continuous engagement with the shoreline communities, (ii) targeted interventions and mobilization of specialized resources in the PMU, and (iii) consultant team guidance. In this program, the documentation of the communities' engagement activities was weak; a better mechanism employed to report women's participation in project activities would have been more productive.

B. Recommendations

66. Since the MFF is a long-term modality, a midterm review process is essential to ensure adherence to the framework as designed, and so that the tranches could fully contribute to the overall achievement.

67. The exclusion of one state at an advanced stage of the MFF should have been mitigated through firm commitment with the SEA and the Ministry of Finance prior to loan approval.

68. The DMF for a facility and its projects should be updated at midterm to reflect implementation status, information, surveys, design changes, and adequacy of resource mobilization, among other matters. Changes such as the SEA involvement, cancellation of subprojects, and implementation delays should be anticipated to the extent possible during project design and formulation. Target performance indicators should be clearly identified and quantified. The impact of the Goa state's departure from the program should have been assessed earlier and the DMF should have been updated accordingly.

69. During project 1, the envisaged work contracts were delayed. It is recommended that the PMU's capacity for contract administration be assessed and strengthened wherever necessary.

70. The handing over of assets from the PMU to the Ports Department was undertaken at the ending period of the MFF. Since only a few port department officials were part of the PMU, and only for a limited period, it is recommended that the port department officials be actively involved in project implementation to mainstream the new approaches for coastal erosion protection.

71. The project witnessed frequent changes in PMU staffing, specifically of project directors, and resulted in delayed decision-making. Longer tenure for project directors is recommended to avoid such delays.

72. **Future monitoring.** Continued monitoring of the projects' performance after implementation will be needed for Maharashtra and Karnataka and projects 1 and 2. Collecting information and monitoring through the CMIS is essential to assess the delivery of the program's impact. The institutionalization and effective functioning of the CMIS, SMPs, and SMOs should likewise be ensured through monitoring. Close monitoring by the SEAs is essential to ensure the effectiveness of the following interventions: (i) the installation of offshore reefs, revetments, dune management, and sand nourishment at target areas; and (ii) the implementation of the innovative and institutional mechanisms adopted and tested under the program.

73. **Further action or follow-up.** The SEAs should provide increased budget for the innovative coastal protection solutions and O&M provisions for assets developed under the program. The SEAs should continue to provide capacity-building opportunities to districts in coastal areas, including nurturing the involvement of CIMUs, SMOs, and the communities. Knowledge products developed under the project (e.g., O&M manuals, best-practice videos, and the like) should continually be disseminated. Further actions should continue to reform the environment to pave the way for private sector participation. The SEAs have expressed their intent to expand these activities in vulnerable coastal communities. Action is needed by ADB to support local governments to further address coastal erosion.

74. **Timing of the project performance evaluation report.** The project performance evaluation report should be prepared 3 years after the completion of the program's project 2.

Results Chain	Performance Indicators	Project Achievements
	b. Community and private sector participate in coastal protection and management. (OP 3.3.4)	b. Substantially achieved. Communities are more actively participating in coastal protection. Thirteen SMOs (2 in Karnataka and 7 in Maharashtra) were organized in project 1 and four SMOs in project 2, with active participation of communities. Community participation was further expanded to 77 village SMOs in all coastal gram panchayats. The SMOs were actively involved in preparing implementation plans for community development through stakeholder consultations, undertook community development and livelihood promotion activities, and maintained the investments of the program. Private sector involvement in coastal protection was, however, limited despite efforts to encourage involvement, as there have been no feasible private sector investment and perceived incentive for involvement as these investments were deemed public goods. In the project areas, private sector involvement had been observed through investments in hotels, recreational facilities, and other tourism and income-generating activities.
	c. Number of businesses at intervention beaches increased by 15%. (OP 3.3) d. 10% increase in coastal shipping and fish landings at intervention districts. (OP 3.3)	c. Achieved. In Karnataka, businesses at intervention beaches have increased by at least 100%. At appraisal, there were no business activities in the beaches; at completion, 20 to 30 families are gainfully employed in beach tourism during weekends, with enhanced income of ₹6,000 to ₹10,000 per month and 10 to 15 new vendors and micro retailers use peripatetic stalls to earn their livelihood with earning of ₹2,000 to ₹3,000 per day during weekends. (Source: SMO) In Maharashtra, new businesses were established due to increased footfall for tourism and related economic activities for a net positive impact. Without the project, there was little, or no business and tourism activities observed. No specific program baseline data for measuring business activities was provided at appraisal. d. Achieved. In Karnataka, 100% increase in enriched population of “clam mussels” in the Ullal reef allows gainful employment to 15 families operating in five groups, between October and April. Catch potential up to 150 to 200 kg per group per trip, fetching around ₹100 to ₹120 per kg. (Source: Discussion with group members and SMO) ^b In Maharashtra, the purses seiners operating along the Ratnagiri coast (Marine Fisheries Census, 2010) increased by 18% from 142 in 2010 to 167 in 2016. The combined average

Results Chain	Performance Indicators	Project Achievements
		landing of Indian mackerel and oil sardines in Maharashtra grew from 9% to 23% after the introduction of purse seine ⁱ .
<p>Outputs</p> <p>1. Sustainable plans and management for shorelines developed</p> <p>1.1 Participatory shoreline management plans to meet the long-term needs for shoreline management for 3 state coastlines prepared and endorsed</p> <p>1.2 Coastal management information system to support planning and management established</p> <p>1.3 Project management system established and operational, and subprojects for future tranches planned and designed</p>	<p>1.1.1. All plans are completed and endorsed by local bodies as stakeholders, and relevant planning authorities by 2017. (OP 3.2.4, OP 6.1.1)</p> <p>1.2.1. Coastal management information system (CMIS) is functional in each state with linkages to central agencies. (OP 6.1)</p> <p>1.2.2. Staff are trained to manage and maintain the system. (OP 6.1.1)</p> <p>1.3.1. PMUs established and staffed. (2010)</p> <p>1.3.2. PMU staff trained (2011). (OP 6.1.1)</p> <p>1.3.3. Project manuals prepared and fully operational. (2011)</p> <p>1.3.4. Consultants engaged and provide support. (2011)</p> <p>1.3.5. Designs for future tranches are approved by qualified professional technical review panel and endorsed by communities and stakeholders.</p>	<p>1.1.1 Achieved. By 2017, three district Shoreline Management Plans (SMP) and one state SMP in Karnataka were completed in 2017 For Maharashtra, five districts and one State SMPs (project 1) were approved on 19 July 2017.</p> <p>1.2.1. Achieved. Coastal management information system is functional in the 2 states with linkages to central agencies.</p> <p>1.2.2. Achieved. 28 staff trained in the use, management and maintenance of CMIS in the 2 states.</p> <p>1.3.1. Achieved. PMUs were established and staffed in 2 states in 2010.</p> <p>1.3.2. Achieved. A total of 228 officers and staff trained for project 1 (28 on CMIS, 66 on project management, 116 on coastal protection management, 18 on climate resilient/soft technologies.</p> <p>1.3.3. Achieved. Project manuals prepared for inshore berms (Feb. 2019), offshore reef (Jan. 2019) and are being used by 2 SEAs since 2019.</p> <p>1.3.4. Achieved. Consultants engaged in 2011 and 2012 for 2 projects comprised of 2 project management and design consulting firms and an individual consultant who provided support until project completion.^j</p> <p>1.3.5. Achieved. Designs for future tranches were prepared by the 2 states, undertaken by the project management and design consultants, and approved and endorsed by technical panel from central agencies (CWC, CWPRS, PMUs of the 2 states); however, delays were encountered in Maharashtra due to the resignation of the project management and design consultants; and the project readiness was not achieved on time. These subproject designs were approved, and fully implemented under government resources.</p>

Results Chain	Performance Indicators	Project Achievements
<p>2. Coastal Erosion and Instability Reduced</p> <p>2.1 Coastal erosion and instability reduced</p>	<p>2.1.1. Coastline subject to erosion is reduced to 380 km from the present level of 530 km.^h (OP 3.2.1, OP 3.3.3)</p> <p>2.1.2. Community/local government resolution for purposes of maintenance of completed projects.</p>	<p>2.1.1. Exceeded. The coastline subject to erosion was reduced to 248 kms for 2 projects.</p> <p>2.1.2. Achieved. Management and maintenance are being handled by local government agencies, through the created SMOs established under Societies Registration Act, 1960. SMO's maintenance responsibilities were established through local Gram Panchayat offices. SMOs were registered under the society's registration Act. In Maharashtra, even the Gram Panchayats (Government's local body for governance) at Village level were given the mandate of SMOs, in addition to the registered SMOs.</p>
<p>2.2 Community and private sector engaged in coastal erosion and instability reduction</p>	<p>2.2.1 50 communities with up to 30% women beneficiaries at each intervention district supported. (OP 2.5)</p>	<p>2.2.1 Substantially Achieved. While the community development and livelihood support interventions benefitted both men and women, the target number for communities to be engaged could not be fully achieved. Communities had been fully supported, but participation of women in some of the organizations was less than the 30% target.</p> <p>In Karnataka (project 1), SMOs were formed in the project areas of Ullal and Bengre. Community awareness meetings on coastal protection assets created under the project were organized by the SMOs. Coastal communities active in coastline management activities have been supported. Representatives of 600 communities attended training events.^k Participation of women in these community organizations was less than the 30% target due to the socioeconomic and political environment.^l Continued investment supported increased participation of women. Community activities have benefitted both men and women community members in these areas.</p> <p>In Maharashtra (project 1), coastal communities are active in coastline management activities and have been supported through 7 SMOs. Representatives of 53 communities represented within the SMO committees. These SMO organizations are the local Gram Panchayats, having sufficient means to assure sustainability and have excellent community links. Participation of women in some of these community organizations is currently less than 30%. In Mirya, SMO has 30% women representation. The SMO has undertaken community development activities for the local</p>

Results Chain	Performance Indicators	Project Achievements
	2.2.2. Private sector investments in coastal protection and management up to 7% of total cost.	community and conducted livelihood training for the community. These activities have benefitted both men and women in the Mirya community. ^m 2.2.2. Not Achieved. Private sector investment in both states is negligible, as there is no perceived incentive for involvement within the private sector.
<p>3. Enhanced capacity for integrated shoreline planning and development</p> <p>3.1 Enhanced capacity for districts and states to plan, design, and implement shoreline protection and management projects</p> <p>3.2 Enhanced capacity for state/ districts agencies, local experts/ agencies, local bodies and stakeholders to provide specialist support for planning, modeling, design, checking and review for coastal protection and management</p> <p>3.3 Beaches are managed and maintained by the communities and stakeholders</p>	<p>3.1.1. Training provided to state and/or districts agencies, local experts and/or agencies, local bodies and stakeholders. (2012) (OP 3.2, OP 6.1.1)</p> <p>3.1.2. CIMU operational by 2012.</p> <p>3.1.3. Shoreline management plans are updated at five yearly intervals.</p> <p>3.2.1. Adequate numbers of state/ districts agencies, local experts/agencies, local bodies and stakeholders trained in the application of new technologies. (OP 6.1.1)</p> <p>3.2.2. 50 staff at CWC, CWPRS, and other central agencies trained. (OP 6.1.1)</p> <p>3.3.1. Shoreline management involving local bodies as stakeholders with at least 30% representatives from women functional.</p>	<p>3.1.1. Achieved. Training programs on coastal protection and management, shoreline planning and design, financial management, CMIS, project management, and environment, among others, were provided starting 2012.</p> <p>3.1.2. Achieved. CIMU was established in the 2 states in 2015.</p> <p>3.1.3. Achieved. SMPs have been updated in the 2 SEAs. In Karnataka, the SMPs were updated in 2017, and in Maharashtra, the SMP updating is due in 2023.</p> <p>3.2.1. Achieved. A total of 18 staff trained from the 2 states on climate resilient coastal protection using softer technologies such as use of offshore reefs and coastal dunes.</p> <p>3.2.2. Exceeded. A total of 116 staff trained from CWC, CWPRS, local government, Ports Department, District Planning Committee, District Disaster Committees, PMUs, CIMUs, SMOs, NGOs.ⁿ</p> <p>3.3.1. Substantially Achieved. 13 SMOs have been established (6 in Karnataka and 7 in Maharashtra) and women representation is below 30% in only two SMOs. The numbers of SMOs were expanded to 77 in Maharashtra, where ADB support was provided to involve Gram panchayats for the expanded mandate along the communities in the shoreline. In these 77 SMOs, 30% women representation was adhered to.</p> <p>In Karnataka, 2 SMOs have been registered in project 1 (in Bengre and Ullal). There were 15% women representation in Bengre SMO (13 members, 2 female) and no female representation in Ullal SMO (7 members). In project 2, the 4 SMOs which were established achieved 30% women representation in each of the SMOs. SMOs were operational during the project period and have undertaken community development and livelihood promotion activities.^o</p>

Results Chain	Performance Indicators	Project Achievements
3.4 SEAs formally mandated to coordinate all coastal protection and management programs	<p>3.3.2. Shoreline management active at each subproject site. (OP 3.3.4)</p> <p>3.4.1. Approved formal mandate as part of proposed shoreline planning and management policy. (OP 6.1)</p> <p>3.4.2. Approved Shoreline Planning and Management Policy.</p> <p>3.4.3. Appropriate notification by the states as required.</p>	<p>In Maharashtra, 7 SMOs were established. And in all coastal villages of the state with at least 30% women representation (project 1). The women participation in all the SMOs were adhered to. The SMOs were operational during the project duration and have initiated community development activities.</p> <p>3.3.2. Achieved. Shoreline management is a formal mandate of the maritime board in the 2 states and covers all subproject sites.</p> <p>3.4.1. Achieved. Shoreline management is a formal mandate of the maritime board in the 2 states since 2018. The maritime boards regularly conduct shoreline management activities in all the project sites.</p> <p>3.4.2. Achieved. Shoreline Management Plans approved in 2017. In Karnataka, the SMP for the State was approved by the Government on 30 November 2017. In Maharashtra, the SMP for the State was approved by the Government on 19 July 2017.</p> <p>3.4.3. Achieved. Notification on shoreline management as a formal mandate of the maritime board was issued by the State of Karnataka in 2015 and State of Maharashtra in 1996.</p>

ADB = Asian Development Bank, CIMU = coastal information management unit, CMIS = coastal management information system, CWC = Central Water Commission, CWPRS = Central Water and Power Research Station, DMF = design and monitoring framework, GDP = gross domestic product, KMB = Karnataka Maritime Board, MMB = Maharashtra Maritime Board, NGO = non-governmental organization, OP = operational priority, PCR = project completion report, P&IWTD = Ports and Inland Water Transport Department, PMU = project management unit, SEA = state executing agency, SMO = shoreline management organization, SMP = shoreline management plans.

^a [India GDP Per Capita Income | State Highest 2022 – Indian Companies, Economic Survey 2021: First time in 10 years, Maharashtra's per capita state income falls \(freepressjournal.in\)](#)

^b Shoreline Management Organization (SMO)

^c ADB. 2021. *India: Sustainable Coastal Protection and Management Investment Program – Tranche 1*. Manila.

^d National Council of Applied Economic Research January, 2019. District-Driven Growth A Pilot Study for Making India A \$5 Trillion Economy. Report for Ratnagiri District; ADB (India Resident Mission). 2022. Project Completion Mission. Memorandum. 14 May 2022 (internal).

^e ADB review missions; Karnataka Maritime Board, local government, and SMO discussions

^f Government of Karnataka. 2022. Economic Survey of Karnataka 2021–22.; [NCAER \(tsa-ncaer.org\)](#).

^g [Poverty Rate in India Statistics 2022 | Poorest State in India – The Global Statistics – The Data Experts | Statistical Data Reports.](#)

^h No baseline data on businesses at intervention beaches to quantify actual increase in activity.

ⁱ Marine Fisheries Census 2010, Maharashtra <http://www.cmfri.org.in/> and other published article in J.Exp. Zool.India Vol 20, No.1, pp.431-434, 2017 ISSN 0972-0030)

^j In Maharashtra, due to consultants' self-termination of their contract in project 1, the state engaged consultants funded from its own resources to complete the project implementation.

^k Orientation training was conducted for all district administration and local bodies (GPs and municipalities) in three districts, covering about 600 participants. Repeat training also conducted in 2014 and 2015. In addition to local bodies training, 8 further training events attended by PMU staff in a variety of subjects (SMP and SMO, coastal management/engineering, project management, safeguard, PPMS, finance, CIMU, CMIS, etc.)

^l In Karnataka (project 1), the requirement for participation of women in the SMOs could not be met. In Namma Bengre SMO, women representation was 15% (2 out of 13), in Ullal women representation was zero out of 7. Sources: PWPIWTD. 2018.

- Sustainable Coastal Protection and Management Investment Program (SCPMIP), Karnataka – Tranche 1. Project Completion Report.* In project 2, women participation in all 4 SMOs were achieved.
- ^m Maharashtra Maritime Board. Sustainable Coastal Protection and Management Investment Program -Maharashtra – Tranche 1, Project Completion Report, First Draft (09-01-2019).
- ⁿ Panchayats, Gran Panchayats, municipalities, standing committees.
- ^o Government. of Karnataka, PWPIWTD. Sustainable Coastal protection and Management Investment Programme. Quarterly Progress Report, January-March 2017.

Table A1.2: Design and Monitoring Framework for Tranche 2

Impact the Project is aligned with: Income and poverty status of coastal communities in the subproject areas of Karnataka improved (Defined by Investment Program).

Results Chain	Performance Indicators	Revised DMF Indicators	Project Achievements
<p>Outcome Shorelines in Karnataka protected and managed</p>	<p>By 2021: a. 54 km of shoreline in the State of Karnataka protected and managed from erosion and saline inundation (21 km fully protected with no erosion and 33 km partially protected with erosion reduced to 0.4m/year) using soft technologies (2015 baseline: average erosion estimated at 1.0m/year)</p> <p>b. 137 ha of farmland protected from erosion and saline inundation (2015 baseline: 0)</p> <p>c. 1,550 households and 26 km of village roads protected from erosion and wave damage (2015 baseline: 0 households, 0 km of village roads)</p>	<p>By 2021^a: a. 43 km of shoreline in the State of Karnataka protected and managed from erosion and saline inundation (21.5 km fully protected with no erosion, and 21.5 km partially protected with erosion reduced to 0.4 m/year) using soft technologies (2015 baseline: average erosion estimated at 1.0m/year) (OP 3.3.3, OP 3.3.4)</p> <p>b. 105 ha of farmland protected from erosion and saline inundation (2015 baseline: 0) (OP 3.2.1)</p> <p>c. 1,692 households and 26 km of village roads protected from erosion and wave damage (2015 baseline: 0 households, 0 km of village roads) (OP 3.2.1)</p>	<p>a. Partially Achieved. 28.4 km of shoreline in the State of Karnataka protected and managed from erosion and saline inundation (23 km fully protected with no erosion, and 6 km partially protected with erosion reduced to 0.4m/year) using soft technologies. Design revisions were required for subprojects based on the actual pre-construction site conditions, which indicated lower than estimated targets at approval. Actual areas to be protected were constrained by habitation in coastal infrastructure.</p> <p>b. Partially Achieved. 73 has of farmland protected from erosion and saline inundation</p> <p>c. Substantially achieved. Based on the actual number of households in the project areas, 1,550 households and 27.3 km of village roads protected from erosion and wave damage. Number of households at appraisal is maintained.</p>
<p>Outputs 1. Coastal erosion and instability mitigation structures constructed or upgraded</p> <p>2. Capacity for integrated shoreline planning and development enhanced</p>	<p>By 2020 1a. 9 km of rock revetment, 50 groynes, 9 T-groynes and 1 offshore reef, 180 ha of dune planting, 30,000 m³ of sand filled geotextile bag protection and 1.8 million m³ of beach nourishment completed (2015 baseline: 0)</p> <p>2a. CIMU transferred to PWPIWTD (2015 baseline: n.a.)</p> <p>2b. CMIS transferred to PWPIWTD and used in planning and monitoring (2015 baseline: n.a.)</p> <p>2c. CIMU and SMO staff trained on preparing two subprojects (2015 baseline: 0) (OP 6.1.1)</p>	<p>1a. 7.95 km of rock revetment, 60 groynes, 9 T-groynes and 2 offshore reefs, 43.15 ha of dune planting, 14,425 m³ of sand filled geotextile bag protection and 1.31 million m³ of beach nourishment completed (2015 baseline: 0)</p>	<p>1a. Achieved. 8.91 km of rock revetment, 60 groynes, 9 T-groynes, 2 offshore reefs, 15 ha of dune planting, 8,000 m³ of sand filled geotextile bag protection and 600,000 m³ of beach nourishment completed. The sand requirements were less than planned (due to sand replenishment resulting from project interventions as well as planned maintenance dredging which provided additional sand)</p> <p>2a. Achieved. CIMU was transferred to P&IWTD (formerly PWPIWTD) at project completion</p> <p>2b. Achieved. CMIS was transferred to P&IWTD in July 2020 and is being used in planning and monitoring.</p> <p>2c. Achieved. CIMU and SMO staff were trained starting in 2018 in preparing two subprojects:</p>

Results Chain	Performance Indicators	Revised DMF Indicators	Project Achievements
	<p>2d. 30 PWPIWTD staff trained on project management (2015 baseline: 0) (OP 6.1.1)</p> <p>2e. Shoreline management maintenance plans developed and maintained by local governments and SMOs (2015 baseline: n.a.) (OP 6.1)</p>		<p>Someshwara Phase 2, and Mukkachery.</p> <p>2d. Achieved. 30 P&IWTD staff were trained on project management in 2017.</p> <p>2e. Achieved. Shoreline management maintenance plans were developed and maintained by local governments and SMOs since 2017 and are still being used.</p>

CIMU = coastal information management unit, CMIS = coastal management information system, DMF = design and monitoring framework, P&IWTD = Ports and Inland Water Transport Department, OP = operational priority, PWPIWTD = Public Works, Ports and Inland Water Transport Department, SMO = shoreline management organization.

^a Approved minor change in scope on 11 October 2019.

Source: Asian Development Bank.

MULTITRANCHE FINANCING FACILITY AND TRANCHE 2 COST AT APPRAISAL AND ACTUAL

Table A2.1: MFF Cost at Approval and Completion (\$ million)

Sources	Approval			Actual		
	Tranche 1	Tranche 2	Total	Tranche 1	Tranche 2	Total
ADB						
Foreign Exchange	51.55	65.50	117.05	4.38	46.25	50.63
Local Currency	0.00	0.00	0.00	32.10		32.10
Total (A)	51.55	65.50	117.05	36.48	46.25	82.73
SEAs						
Foreign Exchange	0.00	0.00	0.00	0.00	0.00	0.00
Local Currency	11.12	28.04	39.16	13.77	19.24	33.00
Total (B)	11.12	28.04	39.16	13.77	19.24	33.00
Total (A+B)	62.67	93.54	156.21	50.25	65.49	115.73

ADB = Asian Development Bank, MFF = multitranche financing facility, SEA = state executing agency.

Note: Numbers may not sum precisely due to rounding.

Source: Asian Development Bank estimates.

Table A2.2: Tranche 2 Project Cost at Approval and at Completion (\$million)

Items	Approval			Actual		
	Foreign Exchange	Local Exchange	Total Cost	Foreign Exchange	Local Exchange	Total Cost
A. Investment Costs						
1. Civil Works	54.30	15.67	69.97	41.73	12.05	53.78
2. Equipment	0.44	0.19	0.63	0.00	4.20	4.20
3. Studies and Surveys ^a	0.05	0.28	0.32	0.00	0.00	0.01
4. Consultants	4.74	2.03	6.77	4.51	1.93	6.44
5. Staff and Office Expenses (PMU)	0.00	5.07	5.07	0.00	0.96	0.96
Subtotal (A)	59.53	23.24	82.76	46.25	19.14	63.59
B. Recurrent Costs					0.00	
1. Operation & Maintenance of Civil Works	0.00	0.70	0.70	0.00	0.00	0.00
Subtotal (B)	0.00	0.70	0.70	0.00	0.00	0.00
Total Base Cost (A+B)	59.53	23.94	83.46	46.25	19.14	63.59
C. Contingencies	5.97	1.83	7.81	0.00	0.00	0.00
D. Financial Charges during Implementation	0.00	2.27	2.27	0.00	0.10	0.10
Total Project Cost (A+B+C+D)	65.50	28.04	93.54	46.25	19.24	65.49

PMU = project management unit.

Note: Numbers may not sum precisely due to rounding.

^a Included in consultants cost item.

Source: Asian Development Bank estimates.

MULTITRANCHE FINANCING FACILITY AND TRANCHE 2 COST BY FINANCIER

Table A3.1: Cost by Financier for MFF
(\$ million)

Sources	Approval Estimate	Tranche 1 (Approval)	Tranche 2 (Approval)	Actual (MFF)
ADB	250.00	51.55	65.50	82.73
State Governments	119.80	11.12	28.04	33.00
Foreign Exchange	0.00	0.00	0.00	0.00
Local Currency	119.80	11.12	0.00	33.00
Total (B)	119.80	11.12	28.04	33.00
Other Sources including Private Sector	34.80	0.00	0.00	0.00
Total	404.60	62.67	93.54	115.73

Source: Asian Development Bank estimates.

Table A3.2: Tranche 2 Project Cost at Approval by Financier

Items	ADB		Government		Total Cost	
	Amount (\$ million)	% of Total Cost	Amount (\$ million)	% of Total Cost	Amount (\$ million)	Taxes and Duties
	A	A/C	B	B/C	C	D
A. Investment Costs						
1. Civil works	54.30	77.60	15.67	22.40	69.97	6.88
2. Equipment and supplies	0.44	69.84	0.19	30.16	0.63	0.04
3. Studies and surveys	0.05	12.50	0.28	37.50	0.32	0.04
4. Consultants	4.74	70.01	2.03	29.99	6.77	0.77
Subtotal (A)	59.52	76.61	18.17	23.39	77.69	7.73
B. Recurrent Costs						
1. Salaries	0.00	0.00	5.07	100.00	5.07	0.00
2. Operation and maintenance	0.00	0.00	0.70	100.00	0.70	0.00
Subtotal (B)	0.00	0.00	5.77	100.00	5.77	0.00
Total Base Cost (A+B)	0.00	0.00	23.94	28.68	83.46	7.73
C. Contingencies	5.97	76.44	1.84	23.56	7.81	0.76
D. Financial Charges During Implementation	0.00	0.00	2.27	100.00	2.27	0.00
Total Project Cost (A+B+C+D)	65.50	70.00	28.04	30.00	93.54	8.49
% Total Project Cost		70.00		30.00		100.00

Note: Numbers may not sum precisely due to rounding.

Source: Asian Development Bank estimates.

Table A3.3: Tranche 2 Actual Cost by Financier at Completion

Items	ADB		Government		Total Cost
	Amount (\$ million)	% of Total Cost	Amount (\$ million)	% of Total Cost	Amount (\$ million)
A. Investment Costs					
1. Civil Works	41.73	77.60	12.05	22.40	53.78
2. Equipment and Supplies	0.00	0.10	4.20	99.90	4.20
3. Studies and Surveys	0.00	70.00	0.00	30.00	0.01
4. Consultants	4.51	70.00	1.93	30.00	6.44
5. Staff and Office Expenses (PMU)	0.00	0.00	0.96	100.00	0.96
Subtotal (A)	46.25	70.70	19.14	29.30	65.39
B. Recurrent Costs					
1. Operation and Maintenance of Civil Works	0.00	0.00	0.00	0.00	0.00
Subtotal (B)	0.00	0.00	0.00	0.00	0.00
Total Base Cost (A+B)	46.25	70.70	19.14	29.30	65.39
C. Contingencies	0.00	0.00	0.00	0.00	0.00
D. Financial Charges during Implementation	0.00	0.00	0.10	100.00	0.10
Total Project Cost (A+B+C+D)	46.25	70.60	19.24	29.40	65.49
% Total Project Cost		70.60		29.40	

ADB = Asian Development Bank, PMU = project management unit.

Note: Numbers may not sum precisely due to rounding.

Source: Asian Development Bank estimates.

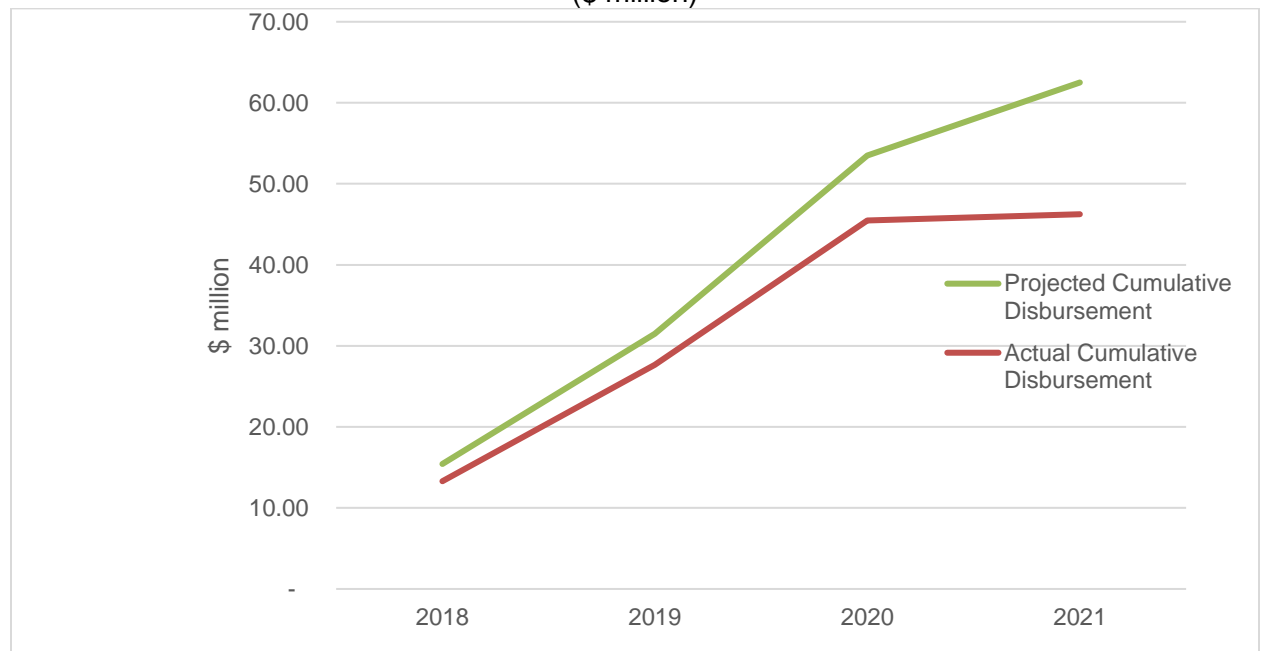
DISBURSEMENT OF ADB LOAN PROCEEDS – TRANCHE 2

Table A4: Annual and Cumulative Disbursement of ADB Loan Proceeds

Year	Annual Disbursement		Cumulative Disbursement	
	Amount (\$ million)	% of Total	Amount (\$ million)	% of Total
2017	0.82	1.80	0.82	0.00
2018	12.48	27.00	13.30	28.70
2019	14.36	31.10	27.66	59.80
2020	17.82	38.50	45.48	98.30
2021	0.77	1.70	46.25	100.00
Total	46.25	100.00	46.25	100.00

Source: Asian Development Bank.

Figure A4: Projected and Actual Cumulative Disbursement of ADB Loan Proceeds (\$ million)



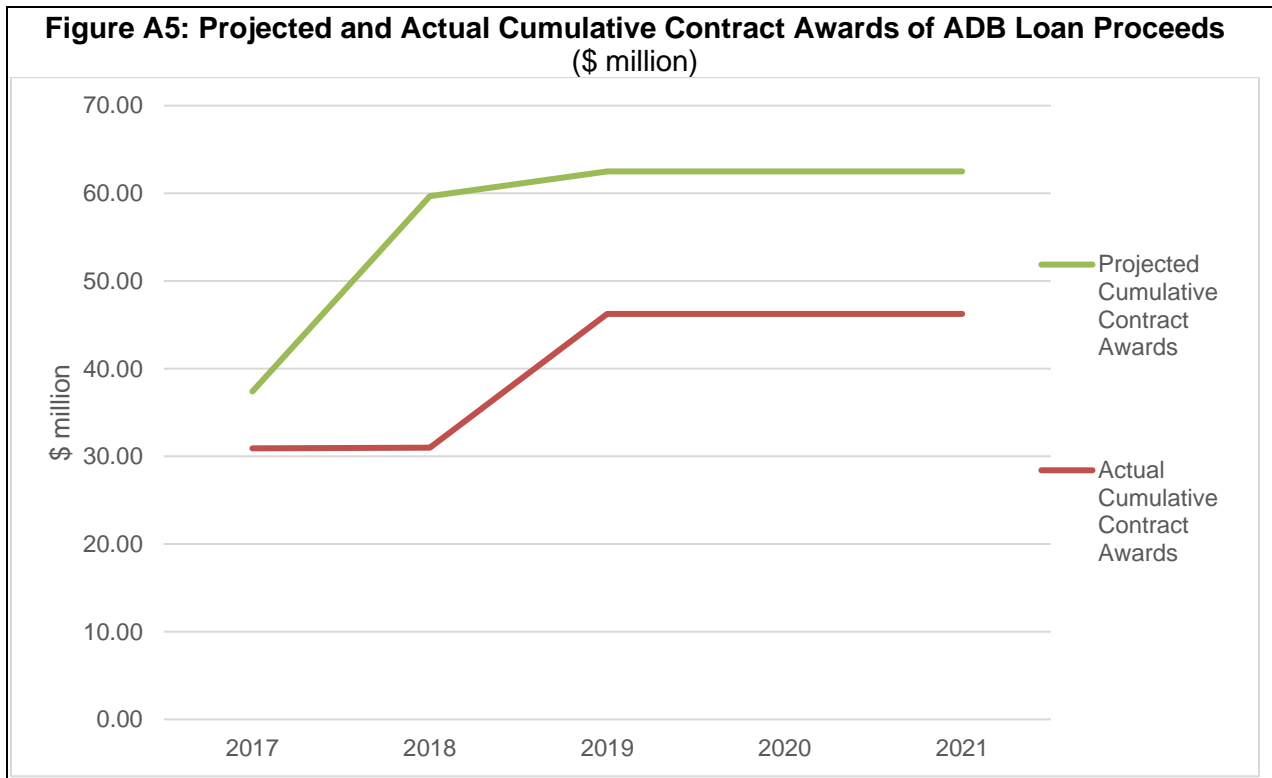
Source: Asian Development Bank.

CONTRACT AWARDS OF ADB LOAN PROCEEDS – TRANCHE 2

Table A5: Annual and Cumulative Contract Awards of ADB Loan Proceeds

Year	Annual Contract Awards		Cumulative Contract Awards	
	Amount (\$ million)	% of Total	Amount (\$ million)	% of Total
2016	7.76	16.80	7.76	16.80
2017	23.16	50.10	30.92	66.80
2018	0.09	0.20	31.00	67.00
2019	15.24	33.00	46.25	100.00
2020	0.00	0.00	46.25	100.00
2021	0.00	0.00	46.25	100.00
Total	46.20	100.00	46.25	100.00

ADB = Asian Development Bank.
Source: Asian Development Bank.



ADB = Asian Development Bank.
Source: Asian Development Bank.

PROJECT IMPLEMENTATION SCHEDULE

Task/Activity	2016				2017				2018				2019				2020			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1 MARAVANTHE: Construction of 24 groynes and sand redistribution																				
2 UDYAVARA: Construction of 35 No. of groynes and 810 m of seawall																				
3 KODIBENGRE: Construction of 4.1 km of rock revetment																				
4 SOMESHWARA-1: Construction of 10 Nos. of inshore berms																				
5 KODIKANYANA: Dune construction and plantation works																				
6 SOMESHWARA 2: Construction of 2 nos. of offshore reefs and beach nourishment																				
7 YERMALTHENKA: Construction 2.84km rock revetment and beach scrapping																				
8 MUKACHERRY: Rehabilitation of 635m long rock revetment																				
9 COMMUNITY PROJECT -1: Dune construction and plantation works																				
10 COMMUNITY PROJECT-2: Dune construction and plantation works																				
11 Project Management and Design Consultancy																				

 Planned  Actual

Source: Asian Development Bank

SUMMARY OF CONTRACTS

Contract Number/Date	Item Descriptions	Contract Amount (\$)	Contract Disbursed (\$)
0001 9 Dec 2016	Maravanthe – construction of rock and concrete groynes and sand nourishment for shoreline protection and management (CW-ICB-MV-01)	7,755,581.79	7,755,581.79
0002 20 Feb 2017	Udyavara – construction of rock groynes and beach nourishment for shoreline protection and management (CW-ICB-UV- 01)	7,694,474.26	7,694,474.26
0004 28 Sep 2017	Kodi Bengre – construction of rock revetment for shoreline protection and management (CW-NCB-KB-01)	2,494,080.34	8,460,406.26
0006 5 Jul 2017	Someshwara – construction of geotextile revetment for shoreline protection and management	87,204.75	2,494,080.34
0007 30 Jan 2017/3 Nov 2018	Plantation works at kodikanyana and community awareness and trainings on maintenance of plantations and nurseries. CW-NCB-KK-01	8,108,222.72	87,204.75
0008 11 Jul 2019	Someswara reef – construction of 2 nos of offshore reefs and sand nourishment for shoreline protection and management	4,294,274.28	8,108,222.72
0009 11 Jul 2019	Yermal thenka – construction of rock revetment for shoreline protection management	2,538,197.57	4,294,274.28
0010 24 Jul 2019	Mukkacherry – rehabilitation of 33 existing seawalls for shoreline protection management (CW-NCB-MK-01)	84,874.00	2,538,197.57
0012 7 Nov 2019	Community subproject 1 – dune construction & plantation works in Bailur & Thumbbeela Manki Uttara Kannada district CW-NCB-CP3-01(A)	213,399.86	84,874.00
0013 7 Nov 2019	Community sub-project 2 – dune construction & plantation works in Dharieswara–Kadle Birkodi & Gangekolli Uttara Kannada district (CW-NCB-CP3-01(B))	3,255,251.17	213,399.86
0005 30 Jan 2017	Project management and design consultants	1,255,392.24	3,255,251.17
0005 30 Jan 2017	Project management and design consultants	4,841.90	1,255,392.24
0011 15 Oct 2019	Purchase of laptops (3 nos.)	355,097	4,841.90

Source: Asian Development Bank.

SECTOR ROAD MAP ACHIEVEMENT MATRIX

Key Issues and Actions		Actions by	Time Frame	Performance Indicators	Achievement
1	Coastal Protection and Management Policy				
1.1	Formal establishment of States Program Steering committees (PSC). Improved liaison and cooperation between the State Environment Departments coastal management programs and SEA Coastal Protection and Management Project, MOEF, and MOWR.	States and SEA	PSC by July 2010, the rest to be by July 2011	Documented minutes of meetings.	Complied with by Karnataka as per GOK Government Order No PWD 62 PSP 2010, dated 15 Dec 2012, Bangalore; and Maharashtra. Complied by Karnataka First meeting occurred in 2012, and met every 6 months from 2012 to program completion (2020). For Maharashtra, Power delegated to CEO Maharashtra Maritime Board (MMB) as per government regulation (GR) on Date:5/March/2015
1.2	Empowerment and defining roles of SEA with that of central agencies such as CWC (Central Water Commission), CWPRS (Central Water and Power Research Station), and CPDAC (Coastal Protection and Advisory Committee)	SEA	January 2012	Scope and terms of reference for the SEAs.	Complied. The state executing agencies (SEAs) has established the practice of regular interaction with CWPRS and consultations for tranche 1 and Project 2. Involvement of central agencies (CWC, CWPRS, CPDAC) Formal establishment by SEAs were compiled by Karnataka as per GOK Government Order No PWD 62 PSP 2010, dated 15 Dec 2012, Bangalore
1.3	Mandating the SEA as the lead agency to coordinate coastal management and formal establishment of Coastal Information Management Unit (CIMU)	States PSC and SEA	July 2012	State notification for the establishment of CIMU and mandate to SEA.	Government of Karnataka has issued Government Order for setting up of CIMU on 21st February 2014 with 26 posts.
1.4	Establishment of processes and procedures for approval of coastal infrastructure plans and designs within SEA	State and SEA	July 2011	Guidelines available. Prequalified individuals and or organizations engaged.	Complied. SEAs have established committees (PSC, TAC, PAC and EC) as per loan covenant. These committees review and approve coastal infrastructure plans and designs. Subject matter experts and CWPRS have been engaged for further approval of coastal infrastructure plans and designs. CIMU has been established at MMB
1.5	Agreed states policy for Coastal Protection and Management: <ul style="list-style-type: none"> • Preparation of operation and maintenance plans for existing shoreline 	SEAs/State PSCs	December 2011		Complied. SEA government orders were issued for the formation of CIMUs on 21 February 2014 Karnataka). An office order was also issued on 17th April 2015 with roles and responsibilities of the identified CIMU officers. Operation and maintenance

Key Issues and Actions		Actions by	Time Frame	Performance Indicators	Achievement
	<ul style="list-style-type: none"> Organizational restructuring within SEAs for sustainable coastal protection and management <p>Shoreline protection</p> <ul style="list-style-type: none"> Action and management plans <ul style="list-style-type: none"> Increased PPP in coastal protection 		<p>July 2012</p> <p>July 2011</p> <p>July 2013</p>	<p>Documentations on the policy actions.</p> <p>Preparation of integrated shoreline plans becomes a part of the state policy.</p>	<p>have been included as one of the key roles and responsibilities of the officers.</p> <p>Complied. CIMUs were established in Karnataka and Maharashtra. The CIMU in Karnataka played a more proactive role in project 2.</p> <p>Complied. Shoreline management plans (SMP) were completed for all coastal districts and the entire states of Karnataka and Maharashtra.</p> <p>Not Complied. In Karnataka and Maharashtra, PPP options for dredging and survey vessel were explored and submitted in a report. However there was not much inclination towards this due to high maintenance cost. There was not much receptivity for the private sectors to participate in coastal protection and management. Also the PPP model for coastal protection and management was not favored by the SEAs, The SEAs, however, identified PPP opportunities in coastal sector.</p>
2	Planning and Design				
2.1	Training and capacity building to prepare shoreline plans.	State and Districts	July 2012	Training provided to State/Districts agencies, local experts/agencies, local bodies and stakeholders on integrated planning of shoreline. Effective mechanisms in place for participation by stakeholders.	Complied. Institutional review and training plan, for Karnataka and Maharashtra were prepared in July 2012 and updated in June 2014. This training plan identified 66 training and capacity building modules on coastal management, project and monitoring, environmental and social safeguard and other project related trainings. Training was conducted for 1,550 central and SEA government officials, project staff, community groups, and others.
2.2	Development of criteria and guidelines for planning, design for coastal projects including the use of soft technologies and requirements for environmental and	SEA and PMC consultants	July 2012	Development of criteria and guidelines and criteria for coastal	Complied. Review of the base list prepared under PPTA by the PMU and the Project management and design consultants for Karnataka for Project 1 subprojects. These included:

Key Issues and Actions		Actions by	Time Frame	Performance Indicators	Achievement
	social assessments. Agreed processes for selection of sub projects.			protection and management. States seek endorsement of CWC.	1. Criteria, guidelines for coastal protection 2. Consultations with district, state and community level stakeholders 3. Endorsement of CWC Coastal protection guidelines developed under the CRCPMP has been followed
2.3	Development of capacity through private sector and government institutions for detailed planning and design of projects including specialist skills in numerical modeling and design of soft engineering solutions. <ul style="list-style-type: none"> Development of database of experts & trainers. Training of trainers and extensive training to the states. 	SEA, State Institutes and local experts/agencies including the private sector	July 2014	Training assessments Baseline assessments, review assessments at end of year 3, 6, and 8.	Complied. In Karnataka and Maharashtra, PPP options were explored and submitted in a report. However, there was not much inclination towards this due to high maintenance cost, and less receptivity for the private sectors to participate in coastal protection and management. PPP models for coastal protection and management was not favored by the SEAs.
3	Community and Private Sector Engagement				
3.1	Beneficiary stakeholder including local bodies engaged in the management and maintenance of subprojects.	SEAs	July 2012	Agreed management plans for all sub projects. Monitoring and assessment of management and maintenance of completed projects.	Complied. Community development and shoreline economic development initiatives have been initiated
3.2	Community development and shoreline economic development initiatives established.	SEAs	July 2013	Training in income generating activities; and new initiatives towards income generation of local communities.	Complied. As the SMO's are registered, the community development activities have been initiated.
3.3	Promotion of private sector participation in the Coastal protection and management, to be incorporated into the project planning and development. This would include a preliminary plan for PPP in the coastal protection and management, scoping of investor opportunities, contracts and agreements for specific projects	SEAs	July 2013	State policies and guidelines for private sector participation prepared. Viable PPP projects identified for implementation.	Complied. In Karnataka and Maharashtra, PPP options were limited since there was not much receptivity for the private sectors to participate in coastal protection and management. The PPP model for coastal protection and management was not favored by the SEAs.

CEO = chief executive officer; CWC = Central Water Commission; CRCPMP = Climate Resilient Coastal Protection and Management Project; CWPRS = Central Water and Power Research Station; EC = executive committee; MOEF = Ministry of Environment, Forest and Climate Change; MOWR = Ministry of Water Resources, River Development and Ganga Rejuvenation; PAC = program advisory committee; PPP = public-private partnership; PPTA = project preparatory technical assistance; PSC = public service commission; SEA = state executing agency; TAC = technical advisory committee.

Source: Asian Development Bank.

SAFEGUARDS REASSESSMENT

A. Environmental Reassessment

1. The ADB-cleared environment category of Project 2 was “B” as per ADB’s Safeguard Policy Statement (SPS), 2009. Project 2 aimed to address immediate coastal protection needs from erosion and coastal instability using environmentally and socially appropriate solutions, with a focus on options such as artificial reefs, beach nourishments, and dune management. Project 2 supported subprojects consisting of coastal protection designed to address the issues of medium to severe coastal erosion and community subprojects for areas of low erosion resulting in the protection of approximately 54 km of coastline in Karnataka. Activities included (i) addressing immediate coastal protection needs; (ii) capacity building and institutional development; (iii) modeling and other analytical works to assess the impacts of climate change on selected sections of the coast; and (iv) comprehensive nearshore sand resources analysis designed to assess the issues of sand deficits of selected Karnataka beaches. The physical works were implemented during 2017 to 2021.

2. During project preparation, detailed environmental planning documents were developed by the state government. These included an initial environmental examination (IEE) report, including environmental management and monitoring plan (EMMP) and environmental assessment and review framework (EARF). These documents were prepared based on the then prevailing environmental regulatory framework of the Government of India and ADB’s SPS, 2009. The IEE report had identified site-specific environmental impacts associated with proposed works during pre-construction, construction, and operation and maintenance (O&M) phases, reflected consultations with the locals and other stakeholders, and proposed detailed environmental mitigation measures and monitoring plans for various environmental aspects including testing of parameters for ambient air quality, ambient noise levels and water qualities. The IEE report and the EARF were disclosed on ADB website in May 2016 in accordance with ADB’s disclosure requirement. The then designated executing agency, Public Works, Ports, and Inland Water Transport Department (PWPIWTD), Government of Karnataka, obtained the requisite statutory approvals, permissions and clearances and renewed subsequently as required under the then prevailing environmental and labor regulations prior to commencing with relevant works. PWPIWTD complied with the terms and conditions stipulated in the respective regulatory permissions. There were no reported instances regarding qualifications raised by the regulatory agencies during their inspections. PWPIWTD ensured that all requisite statutory permissions stipulated at the national, state, and local levels were obtained by the civil works contractors as applicable.

3. PWPIWTD had established a social and environment management unit (SEMU) within its project management unit (PMU) to supervise, monitor, guide and report the implementation of safeguards related requirements. During implementation, it engaged academically trained and professionally experienced environment practitioner on annual, renewable contract basis within SEMU to manage environmental safeguards related requirements. It had designated its existing engineering staff from the project implementation units (PIU) to further support the SEMU staff in managing day-to-day tasks pertaining to environmental safeguards. The supervision consultant had mobilized environment expert on intermittent basis to provide the necessary support during implementation pertaining to environmental safeguards related considerations. The civil works contractors had either designated their existing engineering staff or engaged qualified environment, health, and safety (EHS) officers to implement the provisions outlined in the ADB-cleared environmental management plans. The SEMU and other PWPIWTD officials attended

ADB organized capacity building programs on safeguards during the implementation. Further, safeguard staff from India Resident Mission (INRM) organized orientation programs on safeguards during the review missions for the project staff (PMU, PIUs, consultants and civil works contractors) as deemed necessary. These capacity enhancement events facilitated implementation of agreed environmental mitigation measures and its reporting by the civil works contractors and by PWPIWTD until closure of Project 2. The safeguards staff of ADB also provided handholding support to the project staff through virtual meetings that facilitated addressing the implementation issues.

4. The bids and contract documents for the proposed scope of works included the environmental management plan cleared by ADB. SEMU, supervision consultant and PIU staff coordinated with the civil works contractors for implementation of environmental management measures and monitoring plans. SEMU and PIU staff with the help of environment expert from the supervision consultant also carried out periodic consultations with locals and other stakeholders including regulatory agencies during implementation. SEMU staff also provided inputs to their engineering colleagues for improvements and better housekeeping based on the feedback received during such consultations. SEMU staff coordinated with the contractors and relevant state agencies including regulatory authorities for implementation of terms and conditions stipulated in the statutory approvals. During implementation, it was observed that some aspects such as safety arrangements at work sites (sturdy barricading, usage of personal protective equipment such as safety shoes, safety belts, helmets, reflective jackets, eye glasses, hand gloves, etc.), facilities at the labor quarters (properly lighted and ventilated quarters, provision of mattresses and mosquito nets, potable water supply, gender segregated sanitation arrangements, availability of medical facilities at camp sites, etc.), housekeeping arrangements (better fire and electrical safety arrangements, dust suppression for approach roads, work sites and camp sites) etc. required strengthening. ADB in close coordination with SEMU, designated PIU staff and environment expert from the consultant held periodic discussions and followed up on agreed actions for incremental improvements. The civil works contractors prepared periodic reports on the implementation of environmental management aspects with the help of environment expert from the supervision consultant and submitted to the PIUs. These reports were reviewed and shared with SEMU. SEMU guided PIU staff and the contractors to improve the implementation through field visits and review meetings. PWPIWTD submitted environmental monitoring reports to ADB. PWPIWTD had established a grievance redressal mechanism as outlined in the safeguards planning documents and it was functional until closure of project 2. SEMU ensured that complaint section were maintained at work sites and site offices and made efforts to address the grievances within reasonable timelines. The grievances mainly pertained to issues such as access to shore for fishermen to get their fishing boats to sea, maintaining and/or restoring damaged public utility facilities during construction, and increased ambient noise and dust levels. SEMU with guidance from environment expert held discussions with the project staff to provide solutions to their concerns. There were no major grievances pertaining to environmental safeguards and management aspects during implementation.

5. After completion of physical works, however, ADB received two complaints in May/June 2021¹ wherein the complainants alleged (i) lack of restoration of damaged fisheries road resulted due to movement of construction vehicles under ADB-financed projects (in Udupi); and (ii) significant erosion of shoreline and damaged road (in Someshwara) for not achieving the intended protection under ADB-financed intervention. The fisheries road at Udupi has since been reported to have been adequately restored with persistent follow-up from ADB. The complainants at

¹ A complaint was also received from an NGO alleging erosion of shorelines and structural failures at Someshwara, Mukkachery and other sites during the visit of ADB PCR Mission to Someshwara site.

Someshwara had approached ADB's Accountability Mechanism and sought redressal under ADB's problem-solving function. The complaint was deemed ineligible under the Accountability Mechanism by the Office of Special Project Facilitator in the absence of good-faith efforts by the complainants. The complainants were advised to approach the operation department of the India Resident Mission at ADB's South Asia Department to resolve their grievances. After several efforts by the operation department, the newly appointed executing agency (the Ports Department, formerly the PWPIWTD) has now been successful in getting an assurance for budget allocation from the state government for undertaking requisite temporary restoration measures as while its proposal for long-term solution estimated at approximately \$6 million has not been considered by the state finance department so far. It managed to dump some boulders as emergency measures which have not been quite effective in controlling the ongoing erosion of the shoreline. The operation department has succeeded in initiating a dialogue between the officials of the Ports Department with the complainant to explore longer-term, cost-effective, local solutions to the challenge. The Public Works Department responsible for the restoration of the damaged road has requested Ports Department to undertake necessary erosion control measures and provide assurance of the stability of the specific stretch of the coastline so that it (PWD) could undertake road restoration works on the restored coastline. Ports Department, being now part of Infrastructure Development Departments, has been provided budgetary resources starting 2021 up to midterm (2023) and is expected to continue to support KMB.

B. Social Safeguards Reassessment

6. Project 2 was categorized "C" for the involuntary resettlement (IR) and Indigenous Peoples (IP) aspects at appraisal for approved nine subprojects, in accordance with ADB's Safeguard Policy Statement (SPS), 2009. The subprojects do not involve any acquisition of land and works were being carried out within the available land belonging state government; however, the subproject envisaged impacts on three septic tanks, four coconut trees, and 30 drainpipes therefore during the implementation, the category for IR was upgraded to B in December 2019 to reflect the resettlement impacts in one subproject (Mukkacherry – additional scope of work). A resettlement plan was advised to be prepared, as per ADB's Safeguard Policy Statement, 2009 in line with the entitlement matrix of the agreed resettlement framework for the loan. A resettlement plan for the subproject was developed to reflect the envisaged impacts and disclosed on the ADB website in March 2020. The project was classified as category C for Indigenous Peoples at appraisal and remained so during implementation.

7. Detailed consultations were held with Gram Panchayat and the local communities during the detailed design and construction stage to avoid the resettlement impacts. With the help of technical precautions, identified impacts on coconut trees, septic tanks were avoided. To confirm that the no impacts on the remaining additional subprojects, due diligence reports (DDR) for the five subprojects confirming no social safeguards impacts, were prepared, and cleared by ADB. Overall, the implementation of social safeguards for project 2 is assessed to comply with SPS, 2009.

8. **Resettlement Plan and Due Diligence Reports.** On implementation of the resettlement plan, the subproject did not impact any coconut trees, and impacts on the septic tank were mitigated with the design and technical precautions. The project later found more drain pipes underground, therefore the project constructed the length of 137-meter leach/soak pit to cover the 635meter stretches to enable the residents to discharge their drain/sullage pipes in the constructed leach pits thus it also complied with the environmental regulations and created a positive impact of a healthy environment. The additional subprojects at the Someshwara-1, Kodi

Bengre, Udyavara, Yermal Thenka, and Community subprojects were due diligently assessed for social safeguards and found there were no land acquisition or any resettlement and livelihood (temporary or permanent) impacts on any titled or non-titled persons, and all works will be carried out within the available government land; however, the increase of 100m revetment length at Kodi Bengre necessitated interaction with the community residing adjacent and obtaining consent letters with no objection for constructing the extended revetment. Consents were obtained from these people.

9. **Information Disclosure, Grievance Redress, and Monitoring Reports.** Information disclosure, participation, and periodic consultation activities for the implementation of social safeguards were adequately carried out. Such activities included: (i) distribution and dissemination of resettlement information among identified households in the local language (Kannad); (ii) regular consultative meetings with Gram Panchayat, identified households, and other stakeholders during project implementation; and (iii) disclosure of social safeguards documents. A grievance redress mechanism was established in accordance with the agreed resettlement framework to address any project-related grievances pertaining to social safeguards. The project authorities confirmed that few grievances related to social safeguards were received and resolved during the project implementation such as access to the sea for fishermen's boats which was constructed and resolved, and to cover the remaining sea erosion areas near ADB's funded subprojects, it has been responded that these areas will be covered by state government's other projects. However, two complaints were received post-completion of the project by the project completion report mission for: (i) repairing the existing road damaged by the contractor during construction, which was resolved; and (ii) the Uchila Batapady beach was damaged, efforts are being there to resolve. The executing agency monitored and reported on the social safeguards throughout the implementation of the project and submitted one social monitoring report (disclosed) after recategorization. Overall, the implementation of social safeguards for this Project is assessed to be in compliance with SPS, 2009.

10. **Social Safeguards Staffing.** A dedicated social cum community development officer at the program management unit (PMU) was engaged for implementing safeguards requirements, who was further supported by a community development specialist of project management and design consultants on an intermittent basis. The overall institutional arrangements for the management of social safeguards are assessed as adequate, commensuration with the social safeguards impacts in project 2.

11. **Conclusion and Lessons Learned.** During implementation, the Muckacherry subproject did not impact any coconut trees, and impacts on the septic tank were mitigated with the design and technical precautions. Extensive consultations with the *Gram Panchayat* and the local communities should be undertaken for the successful implementation and completion of the project. The suggestions and guidance provided by the project team from time to time were implemented by the project authorities, which supported the proper implementation and documentation of social safeguard requirements.

STATUS OF COMPLIANCE WITH LOAN COVENANTS

	Covenant	Reference in Loan Agreement	Status of Compliance
	Disbursement Procedures		
1	Except as ADB may otherwise agree, the Loan proceeds shall be disbursed in accordance with the Loan Disbursement Handbook, and detailed arrangements agreed upon between ADB and the Borrower.	Loan Agreement (LA), Schedule 3, para. 4	Complied with.
	General		
2	The procurement of Goods, Works and Consulting Services shall be subject to and governed by the Procurement Guidelines, and the Consulting Guidelines, respectively.	LA, Schedule 4, para. 1	Complied with.
3	Except as ADB may otherwise agree, Goods and Works shall be procured, and Consulting Services shall be selected and engaged only on the basis of the procurement methods and the selection methods set forth below. These methods are subject to, among other things, the detailed arrangements and threshold values set forth in the Procurement Plan. The Borrower and EA may only modify the procurement methods and the selection methods or threshold values with the prior agreement of ADB, and modifications must be set out in updates to the Procurement Plan.	LA, Schedule 4, para. 2	Complied with.
4	All terms used in this Schedule and not otherwise defined in this Loan Agreement have the meanings provided in the Procurement Guidelines and/or the Consulting Guidelines, as applicable.	LA, Schedule 4, para. 3	Complied with.
	Goods and Works		
5	Goods and Works shall be procured on the basis of the methods of procurement set forth below: (a) International Competitive Bidding; (b) National Competitive Bidding; and (c) Shopping	LA, Schedule 4, para. 4	Complied with.
	National Competitive Bidding		
6	The State's standard bidding documents and procurement procedures used for national competitive bidding (civil works/goods) under ongoing ADB Loan No. 2679-IND as in use by the State were reviewed by ADB. These were found consistent with ADB's requirements and shall apply to the Project. The State shall submit any modifications to such standard bidding documents and procurement procedures to ADB, together with justification, for ADB's prior approval and incorporation in the Procurement Plan and use under the national competitive bidding.	LA, Schedule 4, para. 6	Complied with.
	Conditions for Award of Contract		
7	The Borrower shall ensure or cause the EA to ensure that no Works contract is awarded for a Subproject which involves environmental impacts until the EA has incorporated the relevant provisions from the EMP into the Works contract.	LA, Schedule 4, para. 7	Complied with. The EMP clause has been provisioned in all the works contracts that have been implemented. The contract documents include agreed EMPs.
8	The Borrower shall ensure or cause the EA to ensure that no commencement of Works is allowed under any Works contract under any Subproject which involves environmental impacts and requires environmental clearances, until the EA has obtained the final approval of (i) the IEE from ADB; and (ii) environmental clearance including approval of the environmental	LA, Schedule 4, para. 8	Complied with. All the subprojects under Project 2 have the necessary environmental clearances for carrying out the projects. The IEE and safeguards' due diligence reports for all the

	Covenant	Reference in Loan Agreement	Status of Compliance
	assessment report, from the relevant environment authority of the Borrower and the State.		subprojects and design modifications had been submitted and approved by ADB.
	Consulting Services		
9	Except as set forth in the paragraph below, the EA shall apply Quality- and Cost-Based Selection for Consulting Services.	LA, Schedule 4, para. 9	Complied with.
	Industrial or Intellectual Property Rights		
10	The EA shall ensure that all Goods and Works procured (including without limitation all computer hardware, software and systems, whether separately procured or incorporated within other goods and services procured) do not violate or infringe any industrial property or intellectual property right or claim of any third party.	LA, Schedule 4, para. 10 (a)	Complied with.
11	The EA shall ensure that all contracts for the procurement of Goods and Works contain appropriate representations, warranties and, if appropriate, indemnities from the contractor or supplier with respect to the matters referred to in subparagraph (a) of this paragraph.	LA, Schedule 4, para. 10 (b)	Complied with.
12	The EA shall ensure that all ADB-financed contracts with consultants contain appropriate representations, warranties and, if appropriate, indemnities from the consultants to ensure that the Consulting Services provided do not violate or infringe any industrial property or intellectual property right or claim of any third party.	LA, Schedule 4, para. 11	Complied with.
	ADB's Review of Procurement Decisions		
13	Contracts procured under international competitive bidding procedures and contracts for Consulting Services shall be subject to prior review by ADB, unless otherwise agreed between the Borrower and ADB and set forth in the Procurement Plan.	LA, Schedule 4, para. 12	Complied with.
	Implementation Arrangements		
14	The Borrower, State, and the EA shall ensure that the Project is implemented in accordance with the detailed arrangements set forth in the PAM. Any subsequent change to the PAM shall become effective only after approval of such change by the Borrower, the State, EA and ADB. In the event of any discrepancy between the PAM and this Loan Agreement and the Project Agreement, the provisions of this Loan Agreement and the Project Agreement shall prevail.	LA, Schedule 5, para. 1	Complied with.
15	The EA shall ensure that towards smooth implementation of the Project, grievances if any from stakeholders, relating to any Subproject implementation or use of funds are addressed effectively and efficiently.	LA, Schedule 5, para. 2 (a)	Complied with.
16	The Borrower shall ensure that the State and the EA comply with all the requirements and obligations on their part as included in this Loan Agreement and the Project Agreement to meet the objectives of the Project in a timely and efficient manner.	LA, Schedule 5, para. 2 (b)	Complied with.
	Subproject Approval and Implementation		
17	The Borrower shall cause the EA to ensure that all Subprojects are selected, processed for approval, and implemented in accordance with the criteria and procedures included under Schedule 4 to the FFA and safeguard requirements included under Schedule 5 to the FFA.	LA, Schedule 5, para. 3	Complied with.

	Covenant	Reference in Loan Agreement	Status of Compliance
	SAFEGUARDS Environment		
18	The Borrower shall cause the EA to ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project, and all Subprojects' facilities comply with (a) all applicable laws and regulations of the Borrower and the State relating to environment, health, and safety; (b) the Environmental Safeguards; (c) the EARF; and (d) all measures and requirements set forth in the respective IEE and EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	LA, Schedule 5, para. 4	<p>Complied with.</p> <p>(a) All subprojects ensured applicable laws and regulations of India and Karnataka state relating to environment, health, and safety.</p> <p>(b) Environmental Safeguards. All project 2 subprojects comply with the Environmental Safeguards requirements.</p> <p>(c) EARF. Project 2 has complied with EARF. Updated IEEs were submitted to ADB. Updated Health and Safety Guidelines to cover the COVID-19 Pandemic submitted by both PMU and the contractors to ADB in June 2020.</p> <p>(d) IEE and EMP: Project 2 subprojects have complied with environmental safeguards.</p> <p>Environmental Safeguard Monitoring Report for September 2017–September 2019 was prepared and submitted to ADB in February 2020.</p> <p>Semi Annual environmental monitoring report for the period ending 31 December 2020 has been submitted to ADB on 15 February 2021.</p>
	Involuntary Resettlement and Indigenous Peoples		
19	The Borrower shall cause the EA to ensure that the Project does not involve any involuntary resettlement or indigenous peoples risks or impacts within the meaning of the SPS. In the event that the Project does have any such impact, the Borrower shall take or cause the EA to take all steps required to ensure that the Project complies with all applicable laws and regulations of the Borrower and the State and with the SPS, the RF, and the IPPF as appropriate.	LA, Schedule 5, para. 5	<p>Complied with. Resettlement plan for Mukkachery project was submitted to ADB and approved on 30 September 2019. No other subproject involved resettlement or land acquisition.</p>
	Human and Financial Resources to Implement Safeguards Requirements		
20	The Borrower shall ensure, or cause the EA to ensure, that all necessary budgetary and human resources to fully implement the EMP are made available.	LA, Schedule 5, para. 6	<p>Complied with. The EMP costs have been determined for each of the subprojects and both budgetary allocations and human resources are made available for effective implementation of the EMP in all the subprojects.</p>
	Safeguards – Related Provisions in Bidding Documents and Works Contracts		
	The Borrower shall ensure, or cause the EA to ensure, that all bidding documents and contracts for Works contain provisions that require contractors to:	LA, Schedule 5, para. 7	Complied with.
21	comply with the measures and requirements relevant to the contractor set forth in the IEE and the EMP, and any	LA, Schedule 5, para. 7 (a)	1. The bidding documents and contracts for works for all sub-projects contain provisions that

	Covenant	Reference in Loan Agreement	Status of Compliance
	corrective or preventative actions set out in a Safeguards Monitoring Report;		require the contractors to comply with the IEE and EMP.
22	make available a budget for all such environmental and social measures;	LA, Schedule 5, para. 7 (b)	2. The EA has made available the necessary budget for effective implementation of the environmental and social measures.
23	provide the EA with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the IEE, or the EMP;	LA, Schedule 5, para. 7 (c)	3. Monthly environmental reports from contractors were submitted to provide updates on all concerns, complaints and grievances expressed by the community and measures addressed. PMU staff and PMDC conducted regular visits to the project sites to ascertain the effectiveness of EMP implementation.
24	adequately record the condition of roads, agricultural land and other infrastructure re prior to starting to transport materials and construction; and	LA, Schedule 5, para. 7 (d)	4. COVID-19 related Health and Safety Report were also submitted daily by the contractors.
25	fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre project condition upon the completion of construction.	LA, Schedule 5, para. 7 (e)	5. The baseline environmental conditions have been recorded for all subprojects.
26			6. Contractors were mandated to ensure restoration of all construction and campsites to its original condition prior to closure. This was ascertained by the PMU and PMDC prior to contract closure.
	Safeguards Monitoring and Reporting		
	The Borrower shall do, or cause the EA to ensure, the following:	LA, Schedule 5, para. 8	Complied with. Semi-annual safeguards monitoring reports submitted to ADB presented all relevant information and proposed corrective action plan to minimize impacts, if any.
27	submit semi-annual Safeguards Monitoring Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission;	LA, Schedule 5, para. 8 (a)	
28	if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the IEE, or the EMP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; and	LA, Schedule 5, para. 8 (b)	A Comprehensive (Consolidated) Environmental Safeguard Monitoring Report to cover the period September 2017 – September 2019 was submitted to ADB in February 2020.
29	report any actual or potential breach of compliance with the measures and requirements set forth in the EMP promptly after becoming aware of the breach.	LA, Schedule 5, para. 8 (c)	Semi Annual environmental monitoring report for the period ending 31 December 2020 was submitted to ADB on 15 February 2021.
	Prohibited List of Investments		
30	The Borrower shall cause the EA to ensure that no proceeds of the Loan under the Project are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of the SPS	LA, Schedule 5, para. 9	Complied with.

	Covenant	Reference in Loan Agreement	Status of Compliance
	Labor Standards		
31	The Borrower and the EA shall ensure that Works contracts under the Project follow all applicable labor laws of the Borrower and the State and that these further include provisions to the effect that contractors: (a) carry out HIV/AIDS awareness programs for labor and disseminate information at worksites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction; and (b) follow and implement all statutory provisions on labor (including not employing or using children as labor, and equal pay for equal work), health, safety, welfare, sanitation, and working conditions. Such contracts shall also include clauses for termination in case of any breach of the stated provisions by the contractors.	LA, Schedule 5, para. 10	Complied with. The works contract includes adherence to all labor rules, HIV/AIDS awareness programs, health and safety, welfare and working conditions and termination clause in case of any breach of the stated provisions by the contractors. HIV/AIDS awareness programs were conducted at all the subproject sites. Labor rules were complied with by the contractors. During the COVID-19 pandemic situation that emerged in March 2020, the contractor was required to comply with all COVID-19 related safety guidelines issued by the Government of India and Government of Karnataka. The PMU prepared a generic COVID-19 H&S Plan and submitted to ADB. Similarly, the contractor prepared a site-specific COVID-19 H&S Plan which was finalized by the PMU and submitted to ADB and implemented.
	Institutional Reforms		
32	The State shall ensure continued compliance with the institutional development actions identified in the sector road map in table 1 of Schedule 1 to the FFA.	LA, Schedule 5, para. 11	Complied with. The 8th Empowered Committee has decided to transfer all the assets created under SCPMIP to the Infrastructure development, Ports and Inland Water Transport Department. The newly formed Karnataka Maritime Board will be the CIMU for the management of the coast.
33	The State shall ensure that the EA: introduces dual signing system in which the civil works contractor awarded the contract shall also sign an anticorruption contract with the EA;	LA, Schedule 5, para. 12 (a)	Complied with. Website was established to ensure periodical inspection and to monitor withdrawal of funds to ensure timely implementation of the projects.
34	ensures periodical inspection by its Project management unit of the contractor's activities related to fund withdrawals and settlements; and	LA, Schedule 5, para. 12 (b)	
35	sets up website to foster transparency, timely awarding of contracts, and uploading detailed on Project activities and implementation.	LA, Schedule 5, para. 12 (c)	
36	The State shall take all necessary steps to empower the EA to coordinate all coastal protection and management programs. Specifically, during the first 24 months from the Effective Date, the CIMU shall undergo capacity and institutional development supported by the project management unit. After the first 24 months, the CIMU shall operate as an additional wing of the EA under the Director of Ports and Inland Water Transport, with the responsibility over the coastal management and protection related matters.	LA, Schedule 5, para. 13	Complied with. CIMU is established in Karnataka. 8th Empowered Committee has decided to transfer all the assets created under SCPMIP to the Ports and Inland Water Transport Department. The newly formed Karnataka Maritime Board is currently the CIMU responsible for management of the coast.

	Covenant	Reference in Loan Agreement	Status of Compliance
37	The State shall ensure evaluation of adequacy of budgetary requirements for necessary expenditures, in particular for operations and maintenance of subprojects. To ensure availability of the funds required to meet such expenditures, the State shall take into consideration various funding sources, including subsidies, financial performance of local bodies, introduction of schemes as necessary, to ensure financial sustainability through introduction of appropriate taxes as required and feasible	LA, Schedule 5, para. 14	Complied with. Adequate funds to meet all schemes and expenditures have been evaluated and considered.
	Counterpart Support and Financial Management		
38	The State shall ensure that its budget incorporates annual funding requirements of the Project for its contribution and the release of funds.	LA, Schedule 5, para. 15 (a)	Complied with. The annual budget incorporates adequate funds to meet all project expenditures on time.
39	The State shall ensure that sufficient counterpart funds are available from its budget for each fiscal year, in a timely manner, for the efficient implementation of the Subprojects under the Facility, including during and after the Subprojects' completion.	LA, Schedule 5, para. 15 (b)	
40	A finance and administration unit shall be established in the Project Management Unit of the EA to ensure compliance with Rules and regulations and reporting formalities to ADB. The Project finance manager shall be responsible for overseeing budgeting, accounting, and reporting of all financial transactions relating to the implementation of the Project under the overall supervision of the Project Director.	LA, Schedule 5, para. 16	Complied with. A finance and administration unit was established in the PMU to ensure compliance with rules and regulations and ADB reporting. The Deputy Director Finance was responsible for overseeing budgeting, accounting, and reporting of all financial transactions relating to the project implementation under the overall supervision of the project director.
	Procurement		
41	The EA shall announce the Project and business opportunities associated with the Project on its website. The website shall disclose the following information in relation to goods and services procured for the Project and Subprojects: (a) the list of participating bidders; (b) the name of the winning bidder; (c) the amount of the contracts awarded; and (d) the goods and services procured. In accordance with the Procurement Guidelines, the published information for International Competitive Bidding contracts shall also include the bid prices as read out at bid opening, the reasons for rejection of unsuccessful bidders, and the duration of the awarded contract	LA, Schedule 5, para. 17	Complied with. During implementation, the EA maintained two websites wherein project information, tender details, were published and uploaded.
	Communication and Participation		
42	The EA shall ensure that the Project is undertaken in conformity with the communication strategy as agreed between ADB, the Borrower, the State and the EA and referred in the PAM	LA, Schedule 5, para. 18	Complied with.
	Governance and Anticorruption		
43	The Borrower, the State and the EA shall comply with ADB's Anticorruption Policy (1998, as amended to date) and (a) shall ensure that the anticorruption provisions acceptable to ADB, the Borrower, the State and the EA are included in all bidding documents and contracts financed by ADB in connection with the Project, including provisions specifying the right of ADB to	LA, Schedule 5, para. 19	Complied with. Bidding documents incorporate anti-corruption policy provisions. Representatives are allowed to carry out random spot checks on the work in progress and utilization of funds for the project.

	Covenant	Reference in Loan Agreement	Status of Compliance
	review and examine the records and accounts of the EA and all contractors, suppliers, consultants, and other service providers as they relate to the Subprojects and the Project, and as included in the PAM; (b) shall allow and assist ADB's representatives to carry out random spot checks on the work in progress and utilization of funds for the Project; (c) acknowledge that ADB reserves the right to investigate directly or through its agents any alleged corrupt, fraudulent, collusive or coercive practice relating to the Project; and (d) cooperate with any such investigation and extend all necessary assistance for satisfactory completion of such investigation, and as included in the PAM.		
	Gender and Development		
44	The Borrower shall ensure that the principles of gender equality aimed at increasing Project benefits and impact on women in the Project area are followed during implementation of the Project. These include (a) equal pay to men and women for work of equal value; (b) enabling working conditions for women workers; and (c) taking necessary actions to encourage women living in the Project area to participate in the design and implementation of Project activities.	LA, Schedule 5, para. 20	Complied with. Community development and shoreline economic development initiatives have been planned and implemented to ensure gender equality and participation in the design and implementation of project activities. Gender representation in SMOs was adhered to. Women participation in all training and awareness programs were implemented.
45	The Borrower shall make the proceeds of the Loan available to the EA through the State upon terms and conditions mutually satisfactory to ADB and shall cause the EA to apply such proceeds to the financing of expenditures on the Project in accordance with the provisions of this Loan Agreement and the Project Agreement.	LA, Article III, Section 3.01	Complied with.
46	The proceeds of the Loan shall be allocated and withdrawn in accordance with the provisions of Schedule 3 to this Loan Agreement, as such Schedule may be amended from time to time by agreement between the Borrower and ADB.	LA, Article III, Section 3.02	Complied with.
47	Except as ADB may otherwise agree, the Borrower shall procure, or cause to be procured by the EA, the items of expenditure to be financed out of the proceeds of the Loan in accordance with the provisions of Schedule 4 to this Loan Agreement.	LA, Article III, Section 3.03	Complied with.
48	In the carrying out of the Project and operation of the Project facilities, the Borrower shall perform, or cause to be performed by the EA, all obligations set forth in Schedule 5 to this Loan Agreement and the Project Agreement.	LA, Article IV, Section 4.01	Complied with. All obligations set forth in Schedule 5 to this Loan Agreement and the Project Agreement are complied with.
49	The Borrower shall enable ADB's representatives to inspect the Project, the Goods and Works, and any relevant records and documents.	LA, Article IV, Section 4.02	Complied with. EA allows representatives to carry out random spot checks on the work in progress and utilization of funds for the project.
50	In so far as it relates to the Project, the Borrower shall cause the State to take all actions which shall be necessary on its part to enable the EA to perform its obligations under the Project Agreement and shall not	LA, Article IV, Section 4.04	Complied with.

	Covenant	Reference in Loan Agreement	Status of Compliance
	take or permit any action which would interfere with the performance of such obligations.		
51	In so far as it relates to the Project, the Borrower shall exercise its rights under the Financing Arrangements in such a manner as to protect the interests of the Borrower and ADB and to accomplish the purposes of the Loan.	LA, Article IV, Section 4.05 (a)	Complied with.
52	In so far as it relates to the Project, no rights or obligations under the Financing Arrangements shall be assigned, amended, abrogated or waived without prior concurrence of ADB.	LA, Article IV, Section 4.05 (b)	Complied with.
53	(a) The State shall carry out the Project with due diligence and efficiency, and in conformity with sound applicable technical, financial, business, and development practices. (b) In the carrying out of the Project and operation of the Project facilities, the State shall perform all obligations set forth in the Loan Agreement to the extent that they are applicable to the State.	Project Agreement (PA), Section 2.01	Complied with.
54	The State shall make available, promptly as needed, and on terms and conditions mutually acceptable to ADB and the Borrower, the funds, facilities, services, land and other resources as required, in addition to the proceeds of the Loan, for the carrying out of the Project.	Project Agreement (PA), Section 2.02	Complied with. EA allowed representatives to carry out random spot checks on the work in progress and utilization of funds for the project.
55	(a) In the carrying out of the Project, the State shall employ competent and qualified consultants and contractors, acceptable to ADB, to an extent and upon terms and conditions mutually satisfactory to ADB and the Borrower. (b) Except as ADB and the Borrower may otherwise agree, the State shall procure all items of expenditures to be financed out of the proceeds of the Loan in accordance with the provisions of Schedule 4 to the Loan Agreement. ADB may refuse to finance a contract where any such item has not been procured under procedures substantially in accordance with those agreed between the Borrower and ADB or where the terms and conditions of the contract are not satisfactory to ADB.	PA, Section 2.03	Complied with. The EA employed qualified consultants and contractors with prior consent of ADB. The EA procured all items of expenditures in accordance with the provisions of Schedule 4 to the Loan Agreement.
56	The State shall carry out the Project in accordance with plans, design standards, specifications, work schedules and construction methods mutually acceptable to ADB and the Borrower. The State shall furnish, or cause to be furnished, to ADB, promptly after their preparation, such plans, design standards, specifications and work schedules, and any material modifications subsequently made therein, in such detail as ADB shall reasonably request.	PA, Section 2.04	Complied with. The EA ensured that all plans, design standards, specifications and work schedules were disclosed promptly to ADB upon request.
57	(a) The State shall take out and maintain with responsible insurers, or make other arrangements satisfactory to ADB for, insurance of Project facilities to such extent and against such risks and in such amounts as shall be consistent with sound practice. (b) Without limiting the generality of the foregoing, the State undertakes to insure, or cause to be insured, the Goods to be procured, including imported for the Project against hazards incident to the acquisition, transportation and delivery thereof to the place of use or installation, and for such insurance any indemnity	PA, Section 2.05	Complied with.

	Covenant	Reference in Loan Agreement	Status of Compliance
	shall be payable in a currency freely usable to replace or repair such Goods.		
58	The State shall maintain, or cause to be maintained, records and accounts adequate to identify the items of expenditure financed out of the proceeds of the Loan, to disclose the use thereof in the Project, to record the progress of the Project (including the cost thereof) and to reflect, in accordance with consistently maintained sound accounting principles, its operations and financial condition.	PA, Section 2.06	Complied with. All necessary documents and records were prepared in accordance with sound accounting principles.
59	(a) ADB and the State shall cooperate fully to ensure that the purposes of the Loan will be accomplished. (b) The State shall promptly inform ADB through the Borrower of any condition which interferes with, or threatens to interfere with, the progress of the Project, the performance of its obligations under this Project Agreement or the Financing Arrangements, or the accomplishment of the purpose of the Loan. (c) ADB and the State shall from time to time, at the request of either party, exchange views through their representatives with regard to any matters relating to the Project, the State and the Loan.	PA, Section 2.07	Complied with.
60	1. (a) In so far as it relates to the Project, the State shall furnish to ADB all such reports and information as ADB shall reasonably request concerning (i) the Loan and the expenditure of the proceeds thereof; (ii) the items of expenditure financed out of such proceeds; (iii) the Project; (iv) the administration, operations and financial status of the State and financial condition of EA; and (v) any other matters relating to the purposes of the Loan. (b) Without limiting the generality of the foregoing, the State shall furnish to ADB periodic reports on the execution of the Project and on the operation and management of the Project facilities. Such reports shall be submitted in such form and in such detail and within such a period as ADB shall reasonably request, and shall indicate, among other things, progress made and problems encountered during the period under review, steps taken or proposed to be taken to remedy these problems, and proposed program of activities and expected progress during the following period. (c) Promptly after physical completion of the Project, but in any event not later than 3 months thereafter or such later date as ADB may agree for this purpose, the State shall prepare and furnish to ADB a report, in such form and in such detail as ADB shall reasonably request, on the execution and initial operation of the Project, including its cost, the performance by the State of its obligations under this Project Agreement and the accomplishment of the purposes of the Loan.	PA, Section 2.08	Complied with. The APFS finance and administration operations, loan utilization, financial condition of EA etc.
61	2. (a) The State shall (i) maintain separate accounts and records for the Project; (ii) prepare annual financial statements for the Project in accordance with financial reporting standard acceptable to ADB; (iii) have such	PA, Section 2.09	Complied with. EA has maintained separate accounts for the project and has prepared audited financial statements in accordance with

	Covenant	Reference in Loan Agreement	Status of Compliance
	<p>financial statements audited annually by independent auditors whose qualifications, experience and terms of reference are acceptable to ADB, in accordance with auditing standards acceptable to ADB; (iv) as part of each such audit, have the auditors prepare a report, which includes the auditors' opinion(s) on the financial statements and the use of the Loan proceeds, and a management letter (which sets out the deficiencies in the internal control of the Project that were identified in the course of the audit, if any); and (v) furnish to ADB, no later than 6 months after the close of the fiscal year to which they relate, copies of such audited financial statements, audit report and management letter, all in the English language, and such other information concerning these documents and the audit thereof as ADB shall from time to time reasonably request.</p> <p>(b) ADB shall disclose the annual audited financial statements for the Project and the opinion of the auditors on the financial statements within 14 days of the date of ADB's confirmation of their acceptability by posting in ADB's website.</p> <p>(c) The State shall enable ADB, upon ADB's request, to discuss the financial statements for the Project and its financial affairs where they relate to the Project with the auditors appointed by the State pursuant to subsection (a) (iii) hereinabove, and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB. This is provided that such discussions shall be conducted only in the presence of an authorized officer of the State, unless the State shall otherwise agree.</p>		<p>generally accepted accounting and auditing standards acceptable to ADB. The APFS provides the auditor's opinion accompanying the financial statements which includes the internal control. A management letter was provided in the final year of reporting (FY2021) but were not furnished in previous years since there were no internal control issues observed and reported. The financial management unit was created in INRM only in 2018. Subsequently, management letter observations of FY2021 were prepared. The 2021 management letter included audit observations related to violation of procurement guidelines on price adjustment clause, incorrect charging of accounts, and no internal audit. The executing has fully complied with the management letter finding and has been resolved at project closing. The APFS was furnished to ADB with 3 of 4 APFS delayed by 1 to 6.9 months. Only APFS for FY2020 was submitted on time. The final APFS has confirmed that the ADB disbursement was matched or reconciled with LFIS data.</p> <p>Complied with. All 4 APFS of FY end 2018, 2019, 2020 and 2021 were disclosed or posted in the ADB website.</p>
62	<p>The State shall enable ADB's representatives to inspect the Project, the Goods and Works and any relevant records and documents.</p>	<p>PA, Section 2.10</p>	<p>Complied with. The EA allowed representatives to carry out random spot checks on the project, goods and services and relevant records and documents (e.g., utilization of funds, etc.)</p>
63	<p>3. (a) The State shall, promptly as required, take all action within its powers to maintain its existence, to carry on its operations, and to acquire, maintain and renew all rights, properties, powers, privileges and franchises which are necessary in the carrying out of the Project or in the conduct of its operations.</p> <p>(b) In relation to the Project, the State shall at all times conduct its operations in accordance with sound applicable technical, financial, business, development and operational practices, and under the supervision of competent and experienced management and personnel.</p>	<p>PA, Section 2.11</p>	<p>Complied with. The EA took all actions necessary to acquire, maintain, and renew all rights, properties, powers, privileges, and franchises which are necessary in the carrying out of the project or in the conduct of its operations.</p>

	Covenant	Reference in Loan Agreement	Status of Compliance
	(c) In relation to the Project, the State shall at all times operate and maintain its plants, equipment and other property, and from time to time, promptly as needed, make all necessary repairs and renewals thereof, all in accordance with sound applicable technical, financial, business, development, operational and maintenance practices.		
64	Except as ADB may otherwise agree, the State shall not sell, lease or otherwise dispose of any of its assets which shall be required for the efficient carrying on of its operations or the disposal of which may prejudice its ability to perform satisfactorily any of its obligations under this Project Agreement.	PA, Section 2.12	Complied with. The assets were transferred to the Ports and Inland Water Transport Department at completion under Karnataka Maritime Board (KMB). All future coastal issues will be managed by the KMB.
65	Except as ADB may otherwise agree, in relation to the Project the State shall apply the proceeds of the Loan to the financing of expenditures on the Project in accordance with the provisions of the Loan Agreement and this Project Agreement and shall ensure that all items of expenditures financed out of such proceeds are used exclusively in the carrying out of the Project.	PA, Section 2.13	Complied with.
66	Except as ADB may otherwise agree, the State shall duly perform all its obligations under the Financing Arrangements, and shall not take, or concur in, any action which would have the effect of assigning, amending, abrogating or waiving any rights or obligations of the parties under the Financing Arrangements.	PA, Section 2.14	Complied with.
67	The State shall promptly notify ADB of any proposal to amend, suspend or repeal any provision of its constitutional documents, which, if implemented, could adversely affect the carrying out of the Project or the operation of the Project facilities. The State shall afford ADB an adequate opportunity to comment on such proposal prior to taking any affirmative action thereon.	PA, Section 2.15	Complied with.

ADB = Asian Development Bank, APFS = audited project financial statement, CIMU = coastal information management unit, EA = executing agency, EARF = environmental assessment and review framework, EMP = Environmental Management Plan, FY = fiscal year, IEE = initial environmental examination, KMB = Karnataka Maritime Board, LA = loan agreement, LFIS = loan financial information system, PA = project agreement, PAM = project administration memorandum, PMU = project management unit, SCPMIP = Sustainable Coastal Protection and Management Investment Program, SMO = shoreline management organization.

Source: Asian Development Bank.

ECONOMIC AND FINANCIAL REEVALUATION

I. ECONOMIC REEVALUATION

A. Introduction

1. In assessing the efficiency of ADB financing and the project, the economic and financial reevaluation analysis of project 2 and multitranches financing facility (MFF) under the Sustainable Coastal Protection and Management Investment Program (SCPMIP) was carried out in accordance with Asian Development Bank (ADB) guidelines.¹ The methodology adopted has been based on the approach used in the processing stage. Under project 2 (tranche 2), the following outputs were funded: (i) coastal erosion and instability managed and reduced; and (ii) enhanced capacity for shoreline management and development. Project 2 implemented subprojects consisting of coastal protection subprojects designed to address the issues of medium to severe coastal erosion and community subprojects for areas of low erosion which were targeted to result in the protection of approximately 54 km of coastline in Karnataka. At appraisal, the economic internal rate of return (EIRR) was computed ranging from 15.2% to 18.9% for project 1 (tranche 1).² For the MFF, consolidated economic evaluation of the two projects was undertaken, including sensitivity analyses.

B. Economic Rationale

2. About 20%–25% of Karnataka's population (or 12 to 15 million people) lives within 50 km of the coastline, and 70% of the population resides in rural areas. As such, effective and sustainable protection and management of the shoreline is vital to Karnataka's economic and social development and has a significant bearing on the economic sustenance and sustainable livelihoods of a large sector of population living in the coastal areas and the potential for further development. Coastline erosion has intensified in recent years and the anticipated rise in sea levels because of climate change and the likely increased frequency and intensity of storms will aggravate coastal erosion, with serious economic and environmental consequences for coastal states such as Karnataka. The economic rationale for project 2 is that without government intervention to protect and manage the coastline in a coherent and planned way the economic wellbeing of coastal areas will be threatened by continuing erosion of the shoreline and thereby affecting agricultural production, livelihoods and property, coastal infrastructure, ecological integrity and curtail investment in economic development, especially tourism.

3. The coastal plain of Karnataka state is narrow, except at estuaries. Rocky headlands, promontories and sea cliff are present along the northern part of the state with the prevalence of pocket beaches. Long, narrow, and straight beaches are observed in the central and southern parts of the state. Estuaries, spit, shallow lagoons, and mudflats are some of the geomorphic features found on the coast. Major port at New Mangalore and 10 other minor ports contribute to the economy of the coastal districts. Sand mining, petrochemical, fertilizer, and allied industries are seen along the coast. The coastal length of the state is about 313 km as estimated from 2016 satellite imagery. Shoreline analysis of the coast from 1990–2016 shows that 30% of the coast is accreting and 22% is eroding and 48% in stable state. It is observed that 45% of Dakshina Kannada district is relatively affected by erosion and Uttara Kannada is dominated by stable condition with a few pockets of erosion and accretion. Stable and erosion conditions are prevalent

¹ ADB. 2017. *Guidelines for the Economic Analysis of Projects*. Manila.

² At completion, 8 of the 10 subprojects of project 2 were completed (September 2020) and the remaining subprojects were completed in 2021.

along the Udupi coast with a few sectors of accretion. Eroding coastal stretches are Mukka, Ullal, Thalapadi, north of Thannirbavi, and Bathypadi in Dakshina Kannada District and Malpe, Mulur, Yermal, Kirimanjeshwara, Hejmadi, Pithrody, Kinara, Maravathey, Koravadi, and Kaipunjil regions of Udupi. Though Uttara Kannada District of the state is dominated by low accretion and stable coast, erosion is observed in Apsarakonda, Harwarda, Kasarkod, and about 11 km from Keserkudi to Jali. Accretion is observed along Bengere, south of Thannirbavi and Chitrapura in the southern end of the state and along Kadke, Udyavara, and Beejadi in Udupi district. Regions of Murudeshwar, Pavinakurve, Gokarna, Majali, Devbag, and Karwar beaches are observed to exhibit accretion.³ Table A11.1 below shows the erosion status of Karnataka's coastal districts.

Table A11.1: Erosion-stable-accretion status of Karnataka Coastal Districts

No.	District	Coast Length (in km)	Coast Length (in km)						
			High Erosion	Moderate Erosion	Low Erosion	Stable	Low Accretion	Moderate Accretion	High Accretion
1	Dakshinna Kannada	36.66	1.08	2.36	13.18	7.72	12.08	0.22	0.02
2	Udupi	100.71	0.32	0.98	34.92	35.69	25.44	2.36	1.00
3	Uttara Kannada	175.65	0.80	1.12	15.26	107.75	44.12	5.54	1.06
TOTAL		313.02	2.20	4.46	63.36	151.16	81.64	8.12	2.08

km = kilometers.

Source: Asian Development Bank

C. Economic Reevaluation of Project 2

4. The coastal stretches in the Project 2 areas are facing serious erosion problems during the monsoon season. These areas have suffered severely in the past because of coastal erosion. All the 10 subprojects were included in the economic analyses. The status of completion of project 2 subprojects are shown in Table A11.2.

Table A11.2: Project 2 Subprojects

No	Subprojects	Status of Completion-Project 2
1	Someshwara I	Revised Design
2	Someshwara II	New Project
3	Mukkachery	New Project
4	Yermal Thenka	Reduced Scope
5	Udyavara	No Beach Nourishment
6	Kodi Bengre	No change
7	Kodi Kanyana	No change
8	Maravanthe	Partial Sand Re-distribution
9	Murudeshwara	Dropped
10	Pavinakurve	Dropped
11	Community Project I	New Projects
12	Community Project II	

Note: Two subprojects were dropped from the above list of subprojects for technical reasons.

Source: Asian Development Bank

5. The economic reevaluation measured the costs and benefits in 2022 constant prices. The EIRR was calculated by comparing with-and without-project scenarios. All financial prices were converted into economic prices by applying the corresponding conversion factors.

³ R. Murthy et al. 2018. *National Assessment of Shoreline Changes along Indian Coast. Status Report for 26 Years, 1990–2016*. Chennai.

6. **Key Assumptions.** The economic analysis of the project is based on the following assumptions: (i) project life of 25 years including the construction period of three years with zero salvage value at the end of the period; (ii) project benefits built up in relation to the actual as well as projected coastal erosion and saline inundation at each site, (iii) economic costs and benefits are expressed in constant 2022 terms with an exchange rate of ₹76.2 = \$1.00; and (iv) taxes and duties, interest and price contingencies are excluded from the economic costs. Financial costs for project 2 included: costs for construction of offshore (artificial) reefs, groynes, revetments, reef and sand distribution and nourishment, and dune management and, among others. These financial costs were categorized into foreign exchange and local currency costs. Economic costs and benefits for traded goods and services were derived by adjusting their values by the shadow exchange rate factor (SERF) at 1.04, calculated using updated trade data. Non-traded components are valued using a conversion factor at 1.0. Operation and maintenance (O&M) costs are based on costs of the constructed facilities as provided by the state executing agency (SEA). The specific conversion factor for O&M costs was estimated to be approximately 1.0 and therefore no shadow pricing of O&M costs was undertaken. Total economic costs of subprojects at completion ranges from ₹6.2 million (Kodi Kanyana) to ₹604.4 million (Kodi Bengre). Table A11.3 presents the financial and economic costs for project 2.

Table A11.3: Financial and Economic Costs – Project 2
(₹ million)

Year	Financial Cost	Economic Cost
2018	1,345	1,354
2019	1,453	1,462
2020	1,802	1,814
2021	78	78
Total	4,677	4,708

Source: Asian Development Bank estimates.

7. Economic costs and benefits for non-traded goods and services were derived by adjusting their values by the SERF, which was calculated using a simple trade weighted approach. Traded inputs (15% of capital costs) were valued at their border price equivalent value (BPEV) and were converted to domestic equivalents using an estimated SERF of 1.04.⁴ Non-traded inputs were valued at domestic prices. Labor cost was assumed to be 15% of the local currency costs, and unskilled labor costs were assumed to be 30% of the labor costs. It was assumed that there are no significant distortions in the wage rates for skilled labor. In the case of unskilled labor, underemployment exists in the economy, and the shadow wage rate (SWR) of 0.75 was used for this reevaluation.⁵ The financial costs were converted to economic costs based on assumptions and conversion factors as shown in the Table A11.4.

Table A11.4: Conversion Factors Applied - Project 2

Items of Expenditure	Assumptions	Conversion Factor
Civil Works	Tradeable – 15%	1.04% SERF
Of which: Labor Costs	10% of total cost (35% unskilled)	0.75% SWRF
Equipment and Supplies	Tradeable – 15%	1.04% SERF
Consulting Services	Tradeable – 15%	1.04% SERF

⁴ SERF was estimated based on trade statistics 2019 and ADB. 2004. *Economics and Research Department (ERD) Technical Note Series No. 11: Shadow Exchange Rates for Project Economic Analysis: Toward Improving Practice at the Asian Development Bank*. Manila.

<https://wits.worldbank.org/CountryProfile/en/Country/IND/Year/2012/TradeFlow/Export/Partner/all/Product/Total>

⁵ Shadow wage rate (SWR) is based on recent completion reports: (i) ADB. 2020. *Completion Report. India: Rural Connectivity Investment Program (Tranche 1) (SWR: 0.74)*; and (ii) ADB. 2021. *Completion Report. India: Sustainable Coastal Protection and Management Investment Program (Tranche 1) (SWR: 0.75)*.

Studies and Surveys	Tradeable – 15%	1.04% SERF
SERF = shadow exchange rate factor, SWRF = shadow wage rate factor. Source: Asian Development Bank estimates.		

8. **Economic Benefits.** The economic analysis was carried out based on economic benefits from the project works derived from management of coastal erosion, reductions of threats from coastal flooding through development of more resilient coastal protection systems, and the saving of land from coastal erosion and monsoon storms. The main direct financial and economic impacts of the project pertain to the protection of land, buildings, and infrastructure from future damage caused by coastal erosion and monsoon storms. Benefits also accrue from the avoidance of some other associated costs; and from reduction of loss in productivity and/or income from agriculture and fishing. The protected land will increase the incomes and livelihoods of urban and rural households and businesses located on the coastlines. Tourism, rural farm and fishing households, ports and factories and their owners, operators, and workers will benefit from the subprojects. Removing the erosion risk will help encourage future investment in the coastal zone.

9. Benefits considered for the analysis thus include: (i) reduction in annual road construction and repair costs; (ii) reduction in land maintenance costs, (iii) reduction in annual resettlement costs; (iv) reduction in loss of agricultural productivity; and (v) reduction in annual income loss to affected fisherman families. For project 2, subproject benefits and beneficiaries comprised of (i) affected households due to sea erosion (ii) fishermen households who lost their earnings due to erosion, (iii) area of agriculture land affected by productivity loss; and (iv) road length affected. The beneficiary assessment was based on the protected coastal length planned during the appraisal stage (43 km). Considering the completed coastal length protected on the completion stage (28.4 km), the subprojects' beneficiary quantum was revised, and this figure was considered for analysis. Beneficiaries include 3,542 affected households, 912 fishermen households, 1,487 hectares of agricultural land, and 27.3 km of village road sections.

10. Land and assets have been valued in economic prices, and all benefits arising from the protection against damage are associated with a probability of occurrence without the implementation of the project. To understand the extent of damage caused to housing properties every year, an independent socio-economic survey (2014) was carried out in the affected area in addition to the information collected from the Panchayat offices where subprojects were located. Also, Google maps coastal information collected during the period 2012–2018 was employed. Based on the collected information, it was assumed that buildings and the road are directly or indirectly damaged each year during the monsoon season to varying degrees of severity. Some buildings close to the beach had been damaged each year if the nearby beach suffers erosion. Also, the coastal width is found to be eroded during this completion review period.

11. At completion, data were obtained through the following: confirmation survey at project completion report (PCR) preparation, discussions with beneficiaries and relevant agencies, documented reports, surveys and reports from districts, PCR for project 1, Validation Report for project 1, internet information, government websites, ADB data and guidelines, and others etc. The main items considered for quantification of benefits are listed as follows:

- (i) **Savings in annual road construction and repair costs:** The road that passes through project villages is a vital supporting infrastructure for fisheries activities. In the absence of coastal protection measures, the road will erode. Construction of a new road or repairing the erosion damages in base year price was considered as benefit on annual basis. Formation of new fisheries/coastal roads with concrete/bitumen top is ₹11.25 million per kilometer stretch of construction of

concrete and bituminous materials. Benefits under the project were estimated at around 2% of construction costs for temporary road repairs. Majority of the subprojects had annual savings from road construction and repair costs.⁶ Source: estimates provided by KMB.

- (ii) **Savings in land cost:** Owning land in a coastal area is an important asset for people. The measures protected land from erosion. Another important aspect is that reduced overtopping of saline water will also protect productivity. Land was valued at its opportunity cost of land measured by the value of its land use. Benefits from savings in land cost is assumed to comprise the productive value for agriculture and buildings through rental or agricultural yield. Sources: *gram panchayat* office, KMB, survey reports.
- (iii) **Savings in resettlement cost:** Avoidance of resettlement costs and flood management that may arise if land and buildings are eroded in the subprojects is considered as a benefit on an annual basis. Coastal property is regularly damaged through coastal erosion and eventually property and buildings will be destroyed. Based on local information, it was estimated that around 2,000 buildings are vulnerable to be directly or indirectly damaged each year during the monsoon season, to varying degrees of severity. These are assumed to have to be relocated and resettled at costs ranging from ₹0.06 million to ₹1.20 million per household, based on cost of repair of existing houses or construction of a new house at the construction rate of ₹1,500/square foot. Data sources: consultant report, KMB.
- (iv) **Savings in loss of agricultural productivity:** Agricultural lands in these areas are coconut plantations and other crops. Families owning these lands are cumulatively able to earn annually due to the project intervention. This was therefore considered as a benefit. Around 1,487 ha in total is at risk of total loss due to erosion and threatened by inundation with seawater. Average productivity losses consist of average yield of major crops of around 3,200 kg per hectare at selling prices which vary depending on the locality. Data was obtained from Udupi Survey Report 2021–2022, as well as information from Gram Panchayat and KMB.
- (v) **Savings in the annual income loss to fishermen families:** The subprojects protect livelihoods of fishing families in the subproject area and this annual reduction in income loss was considered as a benefit. The information from the socio-economic data was obtained to estimate this benefit. This was estimated based on per capita income in Karnataka (Karnataka Economic Survey 2021–2022.) Updated data on beneficiary households (families) was obtained from KMB (from local governments and other sources).

12. Other possible secondary benefits related to environment, tourism, and security, among other things, were not included. Other non-quantifiable benefits are: (i) increased security for artisan fishing and rural fishing families; (ii) improved security for households, farms and infrastructure at risk adjacent to the shoreline, providing improved livability and conditions for future investments; (iii) indirect favorable impacts on employment, tourism, and economic activities; and (iv) long-term benefits that may accrue from institutional strengthening and knowledge/skills upgrading of stakeholders. Table A11.5 summarizes estimated beneficiaries for the project.

⁶ Source of unit cost data: Public Works Department, Government of Karnataka.

Table A11.5: Estimated Beneficiaries for the Subprojects – Project 2

No.	Subprojects	Length of Coastal Line Protected by Erosion Reduced (km)		Number of Households Affected		Number of Fishermen Households Affected		Area of Agriculture Land Affected (hectares)		Road Length Affected (km)	
		Target at Approval	At Completion	Target at Approval	At Completion	Target at Approval	At Completion	Target at Approval	At Completion	Baseline	At Completion
		1	Someswara I	4.0	4.0	215.0	215.0	16.0	16.0	113.0	113.0
2	Someswara II										
3	Community Projects-I	20.0	5.2	2,060.0	2,060.0	412.0	412.0	247.0	247.0	5.0	5.2
4	Community Projects-II										
5	Kodibengre	4.5	4.1	314.0	286.0	11.0	10.0	41.0	38.0	5.2	4.1
6	Kodi Kanyana	1.5	1.5	195.0	195.0	100.0	100.0	50.0	50.0	1.0	1.0
7	Maravanthe	4.0	3.5	275.0	241.0	158.0	138.0	406.0	355.0	4.0	3.5
8	Mukkacherry	0.6	0.6	100.0	100.0	20.0	20.0	2.0	2.0	0.6	0.6
9	Udyavara	4.0	5.0	169.0	211.0	117.0	146.0	315.0	394.0	4.0	5.0
10	Yermal Thenka	4.4	4.5	228.0	234.0	68.0	70.0	280.0	288.0	4.0	4.1
	Total	43.0	28.4	3,556.0	3,542.0	902.0	912.0	1,454.0	1,487.0	27.6	27.3

Source: Asian Development Bank staff estimates.

13. The summary of annual benefits of each project and corresponding subproject costs are presented in Table A11.6 below.

Table A11.6: Summary of Annual Economic Benefits by Subproject – Project 2

₹ million)

Details	Someshwara I and II	Kodi Bengre	Kodi Kanyana	Maravanthe	Mukkacherry	Udyavara	Yermal Thenka	Community Projects
(i) Savings in Road maintenance cost	0.85	0.92	0.22	0.79	0.13	1.12	0.92	1.17
(ii) Savings in land lost	165.00	16.20	0.00	5.50	238.20	64.40	5.90	1.80
(iii) Avoidance of Annual Resettlement Cost	12.53	259.10	0.00	292.50	9.70	86.60	59.70	0.00
(iv) Savings in the loss in Agriculture Productivity	81.04	159.00	9.50	115.10	1.50	106.40	27.30	8.00
(v) Savings in the annual income loss to fishermen families	4.74	983.80	0.00	115.40	31.20	43.00	197.50	0.00
Total Benefits	264.16	1,419.06	9.70	529.30	280.80	301.50	291.30	11.00
Subproject Costs								
(i) Construction cost	797.50	592.60	6.40	542.00	191.20	537.80	322.50	18.50
(ii) O&M	108.50	35.30	0.50	35.20	15.00	31.10	14.70	1.50
Total Costs	906.00	627.90	6.90	577.20	206.20	568.90	337.20	20.00

14. **Economic Internal Rate of Return.** The EIRR compares the annual streams of economic capital and operating costs against benefits. All economic costs and benefits are expressed in 2022 constant prices. The cost-benefit calculations show that the investments remain economically viable at completion and have delivered significant economic benefits. The EIRR for the project is estimated to be 17.7%, well above the hurdle rate of 12%. The EIRR for the aggregate investment is in Table A11.7. The EIRR for each subproject is shown in Table A11.8.

Table A11.7: Economic Internal Rate of Return – Project 2
(₹ million)

No.	Year	Economic Costs			Economic Benefits						Net Benefits
		Capital Cost	O&M Cost	Total Cost	Savings in Road Maintenance	Savings in Land Lost	Avoidance of Resettlement Cost	Savings in Agriculture Productivity	Savings in Income Losses of Fishermen Households	Total Benefits	
	2018	1,101	–	1,101						0	(1,101)
	2019	1,133	–	1,133						0	(1,133)
	2020	1,365	–	1,365						0	(1,365)
	2021	38	–	38						0	(38)
1	2022	–	244	244	6.13	279	301	288	290	1,164	920
2	2023	–	244	244	6.13	279	301	288	290	1,164	920
3	2024	–	244	244	6.13	279	301	288	290	1,164	920
4	2025	–	244	244	6.13	279	301	288	290	1,164	920
5	2026	–	244	244	6.13	279	301	288	290	1,164	920
6	2027	–	244	244	6.13	279	301	288	290	1,164	920
7	2028	–	244	244	6.13	279	301	288	290	1,164	920
8	2029	–	244	244	6.13	279	301	288	290	1,164	920
9	2030	–	244	244	6.13	279	301	288	290	1,164	920
10	2031	–	244	244	6.13	279	301	288	290	1,164	920
11	2032	–	244	244	6.13	279	301	288	290	1,164	920
12	2033	–	244	244	6.13	279	301	288	290	1,164	920
13	2034	–	244	244	6.13	279	301	288	290	1,164	920
14	2035	–	244	244	6.13	279	301	288	290	1,164	920
15	2036	–	244	244	6.13	279	301	288	290	1,164	920
16	2037	–	244	244	6.13	279	301	288	290	1,164	920
17	2038	–	244	244	6.13	279	301	288	290	1,164	920
18	2039	–	244	244	6.13	279	301	288	290	1,164	920
19	2040	–	244	244	6.13	279	301	288	290	1,164	920
20	2041	–	244	244	6.13	279	301	288	290	1,164	920
	Total	3,638	4,874	8,511	122.65	5,575	6,029	5,762	5,762	23,281	14,769
	ENPV										1,486.4
	EIRR										17.7%

EIRR=economic internal rate of return, ENPV=economic net present value, O&M=operation and maintenance.

Source: Asian Development Bank estimates.

15. **Economic Internal Rate of Return and Sensitivity Analyses.** The EIRR for each subproject ranges from 12.7% for Someshwara I and II and to 22.2% for Yermal Thenka, as shown in Table A11.8, which indicate the economic viability of each of the subprojects.

Table A11.8: Economic Internal Rates of Return for Subprojects – Project 2

S.N.	Sub Project Name	EIRR (%)	ENPV (₹ million)
1–2	Someshwara I & II, Dakshina Kannada District	12.7%	40.1
3	Mukkachery, Dakshina Kannada District	17.6%	115.1
4	Yermal Thenka, Udupi District	22.2%	277.0
5	Udyavara, Udupi District	14.7%	104.9
6	Kodi Bengre, Udupi District	22.1%	516.1
7	Kodi Kanyana, Udupi District	14.9%	1.9
8	Maravanthe, Udupi District	15.1%	174.6
9–10	Community Subprojects I and II	17.3%	11.0

EIRR=economic internal rate of return, ENPV=economic net present value.

Source: Asian Development Bank estimates.

16. **Sensitivity Analysis.** The economic analysis confirms that the proposed investment is economically viable. Sensitivity analysis considered the following variable: (i) a 20% decrease in benefits, (ii) 20% increase in O&M costs, and (iii) combined scenarios. The analysis yields an EIRR of 14.9% based on decreased benefits, 18.3% assuming increased O&M costs, and 14.0% for combined scenarios, compared to 19.1% base case (Table A11.9).

Table A11.9: Sensitivity Analysis – Project 2

Change Variable	EIRR (%)	ENPV (₹ million)
1 Benefits decrease by 20%	14.9	660.4
2 O&M increase 20%	18.3	1,542.8
3 Combined benefits	14.0	437.7
4 Base Case	17.7	1,486.4

EIRR = economic internal rate of return, ENPV = economic net present value.

Source: Asian Development Bank estimates.

D. Evaluation of the Multitranches Financing Facility

17. At the time of MFF appraisal, the expected economic performance of the facility was undertaken for project 1 and an overall EIRR was estimated. This reevaluation provides an aggregated assessment of the economic performance of each of the two tranches of the MFF.

1. Economic Costs of the MFF

18. Financial costs were converted into economic costs for the facility, based on the same methodology adopted for tranche 2 (para. 3). The MFF cost benefit analysis has been updated to reflect the capital costs of tranches 1 and 2.

2. Economic Benefits of the MFF

19. The facility plays a crucial role in protecting the coastal regions of the country threatened by continuing erosion of the shoreline. The physical infrastructure created under the MFF through the establishment of shore protection solutions has been crucial in providing nature-based solutions appropriate to country-specific coastal settings. These include: (i) stabilization with retaining structures, such as straight and T-head groynes, supported by beach nourishment; (ii) beach nourishment and stabilization with offshore reefs; (iii) revetments of both rock and sand-filled geotextile bags; and (iv) dune construction and ecological dune stabilization through

vegetation planting. The economic benefits accrued from the projects under the MFF were calculated based on actual benefits that accrued to the program. The incremental benefits accrue principally from the protection of land, buildings and infrastructure from cumulative erosion saline water inundation and damage caused by the impact of the monsoon, and the avoidance of some other associated costs. For the consolidated EIRR, it is noted that the economic benefits for projects 1 and 2 were updated using the same methodology and assumptions at completion.

3. Economic Performance

20. Table A11.10 shows the EIRR for project 2 and the MFF as estimated at appraisal and as reevaluated during the preparation of PCRs. As appraised, the consolidated EIRR for project 2 was approximately 12.1% compared to the reevaluated EIRR of 17.7% at completion. MFF's consolidated EIRR of 15.2%–18.9% at appraisal compares favorably with the MFF's consolidated EIRR of 20.3% at completion which exceeds the 12% hurdle rate, indicating sufficient returns.

Table A11.10: Summary Economic Internal Rate of Return of the Multitranche Financing Facility and Project 2

	EIRR	
	At Approval (%)	PCR Reevaluation (%)
Project 2	12.1%	17.7
MFF	15.2–18.9	20.3

EIRR = economic internal rate of return, PCR = project completion report.

Source: Asian Development Bank estimates.

21. At appraisal, the economic analysis for the ADB facility was carried out for the investment plan of two subprojects of project 1 (see Table A11.11).

Table A11.11: Consolidated Economic Internal Rate of Return of the Multitranche Financing Facility
(₹ million)

Year	Economic Costs			Economic Benefits			Net Benefits
	Capital Cost	O&M Cost	Total Cost	Total Benefits Project 1	Total Benefits Project 2	Total Benefits MFF	
2011	106		106	–		–	(106)
2012	150		150	–		–	(150)
2013	207		207	–		–	(207)
2014	459		459	–		–	(459)
2015	519		519	26		26	(493)
2016	687		687	323		323	(365)
2017	592		592	714		714	122
2018	1,394	–	1,394	698	–	698	(696)
2019	1,133	–	1,133	698	–	698	(435)
2020	1,365	0	1,365	698	–	698	(668)
2021	38	0	38	698	–	698	659
2022	–	349	349	779	1,164	1,943	1,593
2023		244	244	784	1,164	1,948	1,704
2024		244	244	789	1,164	1,954	1,710
2025		244	244	796	1,164	1,960	1,716
2026		244	244	802	1,164	1,966	1,723
2027		349	349	810	1,164	1,974	1,625
2028		244	244	818	1,164	1,982	1,738
2029		244	244	827	1,164	1,991	1,747
2030		244	244	836	1,164	2,000	1,756
2031		244	244	847	1,164	2,011	1,767
2032		349	349	858	1,164	2,022	1,673
2033		244	244	871	1,164	2,035	1,791

Year	Economic Costs			Economic Benefits			Net Benefits
	Capital Cost	O&M Cost	Total Cost	Total Benefits Project 1	Total Benefits Project 2	Total Benefits MFF	
2034		244	244	881	1,164	2,045	1,802
2035		244	244	893	1,164	2,057	1,814
2036		244	244	907	1,164	2,071	1,827
2037		349	349	922	1,164	2,086	1,737
2038		244	244	939	1,164	2,103	1,859
2039		244	244	957	1,164	2,121	1,877
2040		244	244	978	1,164	2,142	1,898
2041		244	244	1,001	1,164	2,165	1,921
ENPV							\$2,169.9
EIRR							20.3%

EIRR = economic internal rate of return, ENPV = economic net present value, MFF = multitranche financing facility, O&M = operation and maintenance.

Note: Figures in parenthesis indicate a negative number.

Source: Asian Development Bank estimates.

22. The EIRRs calculated for the MFF have been subjected to sensitivity tests to illustrate the facility's ability to withstand changes in the assumptions used in the analysis. Sensitivity analysis at completion is shown in Table A11.12. The results confirm the economic viability as indicated by the EIRR and economic net present value of the program.

Table A11.12: Sensitivity Analysis of the Multitranche Financing Facility

Change Variable	EIRR (%)	ENPV (₹ million)
1 Benefits decrease by 20%	16.2	1,022.8
2 O&M increase by 20%	20.0	2,054.0
3 Combined Scenarios	16.0	994.8
Base Case	20.3	2,169.9

EIRR = economic internal rate of return, ENPV = economic net present value, O&M = operation and maintenance.

Source: Asian Development Bank estimates.

II. FINANCIAL REEVALUATION

23. A financial reevaluation was conducted for the SCPMIP's project 2 and was prepared in accordance with the guidelines of the ADB.⁷ The financial reevaluation includes financial sustainability analysis, based on budgetary data of Karnataka, actual project investment costs, and incremental operation and maintenance (O&M) costs.

A. Sustainability

24. Project 2 subprojects provided exposure to the new approaches and demonstrated benefits of appropriate shoreline management, community involvement in decision-making, and investments along the coastline. The MFF also contributed to introducing solutions that not only protect the coastline from erosion, but also has effectively enhanced income-generating opportunities for communities living near the affected project areas. The adoption of integrated planning approaches and institutionalizing the shoreline management plans (SMP)s, coastal management information system (CMIS), coastal information management unit (CIMU) and shoreline management organizations (SMOs), the MFF has enabled the participating SEAs to meet the long-term needs of sustainable and inclusive coastal protection and management. The integrated approach was appropriate given the multiple layers of government agencies involved in coastal management. Karnataka states' projected budget indicates sufficient resources for

⁷ ADB. 2019. *Financial Analysis and Evaluation: Technical Guidance Note*. Manila.

sustaining the positive outcomes envisaged under the program. The program and project interventions has contributed to reducing O&M costs due to the aforementioned interventions. With better planning and multistakeholder participation, funding for coastal protection is ensured.

25. **Incremental Fiscal Impact Analysis.** The program consisted of activities designed to support the SEAs in the implementation of the coastal protection sector roadmap and plans. The fiscal impact analyses is based on incremental O&M costs that accrue to the total Project 2 project cost of about \$65.49 million (Appendixes 2 and 3). The fiscal impact of the program is shown in Table A11.13, which presents: (i) the actual and projected total annual Public Works and Ports and Lighthouses' budgetary expenditures; (ii) the incremental O&M of the network of assets under the project; (iii) the funding needed to maintain incremental unconstrained O&M of the network of assets managed by the Ports and Inland Water Transport Department (P&IWTD) based on Ports and Lighthouses budgetary expenditures; (iv) inflation-linked increase in O&M, and (v) incremental requirement for the ADB project. Costs for continuing the implementation of activities related to following project interventions would be absorbed by the Ports and Lighthouses budget. Maintenance of works under the program such as the newly constructed and expanded coastal protection infrastructure as well as recurrent costs to maintain the CIMU, SMOs, and other capacity development would be absorbed by the public works (ports) subsector. Maintenance of civil works and equipment under the program would also be absorbed by the ports sector.

26. Table A11.13 provides a summary of the incremental recurrent cost analyses of SCPMIP. The fiscal impact analysis considered the overall O&M cost requirements of Ports and Lighthouses' unconstrained asset network (inclusive of project assets) against the financial capacity of P&IWTD. Ports and lighthouses budgetary expenditure from FY2017 to FY2030 (based on inflation) is expected to increase based on historical trends and on planned budgets as per the ports and public works sector plan. Based on projections, the annual unconstrained O&M requirements of Ports and Lighthouses is estimated to increase by around 8.3% annually during the 10-year projection period. The incremental recurrent cost analysis shows that the government, as the end-borrower, will incur O&M shortfalls in its unconstrained requirements and allocations. This shortfall is expected to decrease slightly from 19.2% in 2022 to 16.6% by 2030, due to fiscal space and from increased budgetary support to Ports and Lighthouses. It is noted that the ports sector is currently in transition, from P&IWTD to the Karnataka Maritime Board (KMB), an autonomous entity established in 2018. Under the new mandate, the KMB reports to the Infrastructure Development Department (IDD) and has been allocated incremental budget starting FY2020–2021. Due to its current status, the project is deemed to be financially sustainable post-project implementation, as the executing agency (KMB) is expected to gradually generate its own revenue sources from port fees and other income-generating activities.

27. It is noted that India's GDP growth has been moderated to 4.1% in FY2021–2022. India has been hit by the Omicron COVID-19 variant and the economic impact of the war in Ukraine. The moderated growth was a result of recent slow growth in private consumption, contraction in manufacturing, softening of private investment due to higher cost of borrowings, higher-than-expected inflation, and shrinking of net exports due to subdued global demand. Projected GDP growth has been revised to around 7.8% in 2022 and 2023 due to improvement in consumer confidence, resumption of travel, and opening of the economy. Although higher commodity prices will boost the country's mining industry, the manufacturing sector will bear the brunt of higher input costs due to rising oil prices.⁴⁷ Table A11.13 indicates the fiscal impact of O&M for the SCPMIP.

⁴⁷ ADB. 2022. *Asian Development Outlook (ADO) 2022. Supplement: Recovery Faces Diverse Challenges*. Manila.

Table A11.13: Karnataka State Budgets FY2017–FY2030 – Fiscal Impact Analysis
(₹ million)

Items	Actual				Budget			Projection	
	2017	2018	2019	2020	2021	2022	2023	2027	2030
National Budgetary Expenditure									
Capital expenditure	3,75,050	440,280	502,290	497,790	507,300	588,020	629,830	829,000	1,018,720
Revenue expenditure	1,319,210	1,424,820	1,643,000	1,742,570	1,791,950	1,874,050	2,031,110	2,802,460	3,567,750
Total expenditures	1,694,260	1,865,100	2,145,290	2,240,360	2,299,250	2,462,070	2,660,940	3,631,460	4,586,470
A Borrowings	311,560	351,230	419,140	504,590	703,820	713,320	911,580	2,431,260	5,074,100
B Receipts (except borrowings)	1,333,410	1,471,400	1,650,040	1,756,900	1,599,990	1,724,020	1,783,270	2,041,370	2,259,160
Total Receipts (A+B)	1,644,970	1,822,630	2,069,180	2,261,490	2,303,810	2,437,340	2,694,850	4,472,620	7,333,260
Sector Allocation (Coastal)									
Public Works	11,410	10,980	11,110	10,530	10,610	8,750	9,370	12,330	15,150
Ports and lighthouses	1,080	1,450	1,620	2,750	2,740	2,740	3,020	4,880	7,180
Ports Unconstrained O&M Requirements	220	250	300	300	290	330	380	620	910
Other Information									
Increase in budgetary expenditure	9.1%	10.1%	15.0%	4.4%	1.5%	9.9%	8.3%	8.3%	8.3%
Inflation	3.6%	3.4%	4.8%	6.2%	4.8%	4.8%	4.8%	4.8%	4.8%
Inflation linked increase in O&M						193.4	202.7	244.5	281.5
Coverage of Ports and Lighthouses' budget on unconstrained O&M requirements	20.3%	17.1%	18.3%	15.6%	10.7%	12.2%	12.5%	12.8	12.7%
Total Shortfall with ADB Project						19.2%	19.3%	17.8%	16.6%

CIMU = coastal information management unit, CMIS = coastal management information system, GIS = geographic information system, SEA = state executing agency, SMO = shoreline management organization.

Source: Asian Development Bank estimates.

CONTRIBUTION TO STRATEGY 2030 OPERATIONAL PRIORITIES

OP No.	Corporate Results Framework Indicators (Outputs and Outcomes)	Achieved Value	Expected and Implemented Method	Assessment
2.5	Women and girls with increased resilience to climate change, disasters, and other external shocks (number)	653 people, 196 women	Training, workshops, meetings	Achieved. Representatives of 600 people in Karnataka attended training events. Participation of women in these community organizations was less than 30% target due to the socioeconomic and political environment. Representatives of 53 people in Maharashtra represented within the SMO committees
3.2.	People with strengthened climate and disaster resilience (number)	50,900		Achieved. About 42,600 people benefitted from strengthened climate and disaster resilience from improved coastal protection in Ullal and Mirya bays under project 1 and 8,300 people under project 2. ^a
3.2.4	National and subnational disaster risk reduction and/or management plans supported in implementation (number)	10		Achieved. 3 district SMPs and 1 state SMP in Karnataka completed in 2017 and updated; In Maharashtra, 5 districts and 1 state SMPs.
3.3.3	Terrestrial, coastal and marine areas conserved, restored and/or enhanced (hectares)	676		Achieved. A total of 199 ha and 477 ha agricultural land conserved and restored under projects 1 and 2, respectively.
3.2.1	Area with reduced flood risk (hectares)	73		Achieved. Farmland protected from flood.
3.3.4	Solutions to conserve, restore, and/or enhance terrestrial, coastal, and marine areas implemented (number)	12		Achieved. Farmland protected from erosion and saline inundation; coastal and marine conservation through artificial reef construction; hybrid and nature-based solutions through grey infrastructure and soft technologies (offshore reefs, groynes, and breakwaters with sand nourishment; and dune construction)
6.1	Entities with improved management functions and financial stability (number)	20	Consultant services, systems development, GIS, stipends	Achieved. The SEA – Maharashtra – 1 CIMU, 7 SMOs and Karnataka – 1 CIMU and 2 SMOs in project 1 and (Karnataka) – 4 SMOs in project 2.
6.1.1.	Government officials with increased capacity to design, implement, monitor, and evaluate relevant measures (number)	228	Training, workshops	Achieved. In the 2 SEAs, officials and staff were trained on CMIS, project management, coastal management.

CIMU = coastal information management unit, CMIS = coastal management information system, GIS = geographic information system, SEA = state executing agency, SMO = shoreline management organization, SMP = shoreline management plan.

Source: Asian Development Bank.