



# Technical Assistance Report

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Project Number: 39135  
November 2005

## Technical Assistance India: Integrated Coastal Management and Related Investment Development (Financed by the Government of the United Kingdom)

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 25 October 2005)

Currency Unit	–	rupee/s (Re/Rs)
Re1.00	=	\$0.0221
\$1.00	=	Rs45.05

## ABBREVIATIONS

ADB	–	Asian Development Bank
CRZ	–	coastal regulation zone
CZMP	–	coastal zone management plan
HTL	–	high-tide line
ICM	–	integrated coastal management
LTL	–	low-tide line
MOEF	–	Ministry of Environment and Forest
MOWR	–	Ministry of Water Resources
TA	–	technical assistance

## TECHNICAL ASSISTANCE CLASSIFICATION

<b>Targeting Classification</b>	–	Targeted intervention
<b>Sector</b>	–	Agriculture and natural resources
<b>Subsectors</b>	–	Environment and biodiversity
<b>Themes</b>	–	Sustainable economic growth, environmental sustainability
<b>Subthemes</b>	–	Developing urban and rural areas, natural resources conservation

## NOTES

In this report, "\$" refers to US dollars.

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Director General	K. Senga, South Asia Department (SARD)
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## I. INTRODUCTION

1. The Government of India and the Asian Development Bank (ADB) discussed a possible program in integrated coastal management (ICM) and related infrastructure development during the Country Strategy and Program Update Mission in May 2004, and included this advisory technical assistance (TA) in the 2005 program during the Country Program Confirmation Mission in December 2004. The TA was prepared on the basis of a consultation mission in September 2004 and a fact-finding mission in March–April 2005.<sup>1</sup> The impacts, outcome, outputs, and activities are summarized in the TA design and monitoring framework in Appendix 1.

2. Two concurrent but somewhat distinct activities served as catalysts for this initiative. The first was a review of the Coastal Regulation Zone (CRZ) Notification process by the Ministry of Environment and Forests (MOEF); and the second was an effort by the Ministry of Water Resources (MOWR) to consolidate state-level coastal erosion protection proposals into a systematic national coastal protection program.<sup>2</sup> The relevance of ICM as a strategy to address multiple development objectives within a specified coastal area had been demonstrated through a small-scale pilot program in the state of Kerala under an earlier ADB regional TA.<sup>3</sup> Several other states have also undertaken coastal area management initiatives—mostly under aid-assisted projects—and have adopted variations of ICM strategies in selected localities. However, there continues to be a need for better coordination in implementing multiple development and conservation activities within the coastal zone throughout India.

## II. ISSUES

3. **Coastal Regulation Zone Notification and Emerging Developments.** India has a coastline of about 7,500 kilometers (km), of which about 5,400 km surrounds the mainland. The remaining 2,100 km includes the shoreline of the Lakshwadeep and the Andaman and Nicobar islands. With nearly 250 million people, or around 20% of the population, living within a distance of 50 km of the shoreline, the population density of coastal areas (432 persons per square kilometer [km<sup>2</sup>]) is significantly higher than that of the country as a whole (256 persons per km<sup>2</sup>). The majority of coastal communities derive a livelihood from fisheries, agriculture, or tourism and related services. At the same time coastal areas support significant industrial and commercial activities and many urban centers. These multiple objectives and competing demands on the coastal zone require a coordinated management strategy.

4. India's coastal areas fall under the jurisdiction of the CRZ Notification, which was issued in February 1991 under the Environmental (Protection) Act (No. 29 of 1986). The notification aims to regulate activities of the area defined as the CRZ.<sup>4</sup> The CRZ of each state is mapped out

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<sup>1</sup> The TA first appeared in *ADB Business Opportunities* (internet edition) on 28 January 2005.

<sup>2</sup> Integrated coastal management (ICM) encompasses a broad legal and institutional framework. It is substantially different from the current coastal regulation zone (CRZ) notification process, which is primarily a (reactive) mechanism for approving development activities in the CRZ.

<sup>3</sup> ADB. 2001. *Technical Assistance for Coastal and Marine Resources Management and Poverty Alleviation in South Asia*. Manila.

<sup>4</sup> The CRZ is defined as coastal stretches of seas, bays, estuaries, creeks, rivers and backwaters that are influenced by tidal action (on the landward side). The area extending 500 meters (m) landward from the high-tide line (HTL) and the land between the low-tide line (LTL) and the HTL, including 500 m along tidal influenced water bodies to a minimum width of 100 m (whichever is less), are considered the CRZ. The CRZ is divided into four categories based on ecological, geomorphologic, and socio-demographic features: (i) CRZ I covers ecologically sensitive or important areas; (ii) CRZ II covers areas that are already developed; (iii) CRZ III comprises rural and less developed areas; and (iv) CRZ IV covers the coastal stretches of the Andaman and Nicobar Islands, Lakshwadeep, and some other islands.

in the respective state coastal zone management plan (CZMP).<sup>5</sup> Implementation of the notification is vested in the state Coastal Zone Management (CZM) Authority. However, most states have found it challenging to enforce the notification due to several reasons: (i) inadequate staff and resources in state CZM authorities; (ii) inconsistency between actual ground conditions and the classification of areas by CRZ category in state CZMPs; (iii) inadequate data to demarcate the high-tide line (HTL), low-tide line (LTL), and other features of the coastal zone; and (iv) confusion over the notification due to numerous amendments that have been approved to grant exemptions for selected activities.

5. In July 2004, MOEF commissioned an Expert Committee to review the CRZ Notification process and propose remedial measures to improve its effectiveness. The report of the Expert Committee,<sup>6</sup> which was completed in February 2005, highlighted the importance of establishing scientific principles in CZM. In particular, it recommended (i) introducing a zoning scheme that complements development trends and ensures protection of ecologically sensitive areas; (ii) establishing coastal setbacks, particularly in respect of dwellings and important infrastructure; (iii) basing such setbacks on vulnerability criteria;<sup>7</sup> and (iv) adopting principles of ICM as the means to encompass all of the above strategies and guide overall management of the coastal zone. The CRZ Notification is due to be revised on the basis of these recommendations MOEF has established technical working groups to flesh out the broad recommendations of the Expert Committee. The notification is likely to be revised before the end of 2005.

6. Revisions to the CRZ Notification in the manner described above will have significant implications for states. Shifting from the current prescriptive approach of the CRZ Notification to an ICM approach will fundamentally change the regulatory framework, from being precautionary and reactive to being enabling and proactive. States will bear greater responsibility and authority for coastal zone planning and management. In particular, the preparation and implementation of ICM plans will require establishing procedures and mechanisms for cross-sectoral coordination and multisectoral planning. Effective ICM also requires delegation of appropriate functions and responsibilities to local authorities. These changes will have implications for the institutional, financial, and technical capacity of states. They will also have a bearing on legal provisions that govern relevant activities in the coastal areas.

7. **Coastal Protection Measures.** Coastal erosion and related damage to settlements, infrastructure and livelihood are pervasive in the coastal states of India. In extreme weather events, such as during cyclones and tsunamis, such damage includes loss of lives as well. The tsunami of December 2004 dramatically illustrated the vulnerability of coastal communities and infrastructure to the ravages of the ocean.

8. Coastal protection measures adopted in India consist primarily of structural interventions (i.e., groins and seawalls). In Kerala, for instance, seawalls cover over half the coastline. Coastal protection works must be strategically designed and constructed to avoid shifting the erosion problem to another location further along the coastline. Similarly, it is widely believed that a combination of structural (e.g., seawalls, groins, beach nourishment) and nonstructural (e.g., mangroves and other shelter belts, setbacks) interventions could be more economical, environmentally and socially acceptable and perhaps equally effective in protecting the coastline.

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<sup>5</sup> A Supreme Court ruling on 29 January 1996 mandated all states to prepare CZMPs classifying coastal areas into the specified CRZ categories. The CZMPs were prepared hastily and contain many inconsistencies.

<sup>6</sup> Report of the committee chaired by Prof. M. S. Swaminathan to Review the Coastal Regulation Zone Notification 1991, submitted to the Ministry of Environment and Forest, February 2005.

<sup>7</sup> The report of the Expert Committee defines vulnerability by seven parameters relating to geomorphologic and ocean conditions.

Due to lack of technical knowledge and experience, however, interventions have been limited to the conventional techniques of groins and seawalls.

9. In a recent initiative, MOWR has begun to consolidate proposals for coastal protection works submitted by states. The proposals are being reviewed from a broader perspective, taking into consideration the dynamics of larger coastal systems. This initiative provides an opportunity to consider alternative coastal protection measures that can achieve the same intended level of protection. Alternatives could include a combination of structural and nonstructural measures. Alternative coastal protection measures must be evaluated in the context of coastal vulnerability. Assessing vulnerability and deciding on corresponding land uses will be a central activity in preparing ICM plans. Hence coastal protection measures, particularly structural measures, must be consistent with ICM plans.

10. Past ICM projects, including several ADB projects have revealed lessons that can serve to guide the TA. Some key lessons are as follows:<sup>8</sup> (i) ICM initiatives that depend solely on external financing lead to creation of unsustainable institutional and implementation arrangements that often cease to function when the funding is withdrawn; (ii) ICM projects should aim to institute ICM processes that are supported by stable technical and financial resources; (iii) sustainability of ICM initiatives is strongly linked to the presence of an enabling legal framework; (iv) it must be recognized that community-based approaches are essential for management decision making at the appropriate level; and (v) commitment and accountability to the ICM process at all levels of government are essential for sustainability of such initiatives.

### III. THE TECHNICAL ASSISTANCE

#### A. Impact and Outcome

11. The TA will contribute toward improved sustainable development of India's coastal zone. It will demonstrate the appropriate policy and institutional framework required to facilitate development and conservation of the coastal zone in an integrated manner. The TA will aim to achieve this outcome by delivering two specific outputs. First, it will support a process to establish the institutional framework for implementing ICM at the state level through demonstration in the state of Kerala. Based on experience with this exercise, the TA will produce a report assessing the viability of ICM as a strategy applicable to any state in general. Second, the TA will support an assessment of coastal protection measures taking all options into consideration, and report on the viability of alternative strategies. While these outputs are distinct in substance, it is expected that the procedures adopted in achieving them will converge, and help build consensus on an integrated development framework for coastal management.<sup>9</sup>

#### B. Methodology and Key Activities

12. As noted (para.11), the TA will deliver two outputs. The first will be to establish and, by doing so, demonstrate the practical implications of undertaking ICM at the level of a state government. It will involve a situation analysis of development and conservation programs applicable to the coastal zone in the state of Kerala and the corresponding policy and institutional environments. Next, key elements of an ICM framework will be used to assess policy and institutional gaps. Key activities will include (i) reviewing existing policy and institutional arrangements; (ii) establishing appropriate arrangements at the level of the state and the local

<sup>8</sup> For a comprehensive review of ICM projects in developing countries, see Christie, P. 2005. Is Integrated Coastal Management Sustainable? *Ocean and Coastal Management*. 48: 208-232.

<sup>9</sup> A project preparatory technical assistance (TA) of \$1 million is listed in 2006 to prepare a project for ICM and coastal protection. The outcome of the present TA will determine the viability and scope of the follow-on TA.

government to facilitate ICM; (iii) undertaking preliminary substantive activities related to ICM planning; (iv) assessing the replicability of arrangements in Kerala through comparison with corresponding arrangements in the state of Tamil Nadu; and (v) liaising with MOEF on corresponding revisions to the CRZ Notification.

13. The second output relating to the assessment of coastal protection measures will involve a technical analysis of various options. Empirical evidence from reviewing existing measures and experimental work in India will be supplemented with information on alternative strategies adopted under similar conditions elsewhere in the region. The analysis will constitute a preliminary feasibility study of alternative strategies and form the basis for considering a range of coastal protection measures suitable for different scenarios.

14. The TA aims to incorporate lessons from previous projects, which were summarized in para.10. As stated in para. 11, the expected outcome of the TA is to demonstrate an acceptable framework for ICM, which is supported at the national level and adopted at the state and local levels. Commitment to such a process should be the basis for continuing the ICM programs. The TA will contribute toward the ongoing revisions of the CRZ Notification, and thereby assist in creating an enabling legal framework. The TA's recommendations for continued support of ICM activities will hinge on progress achieved on the above fronts.

### **C. Cost and Financing**

15. The total cost of the TA is estimated at \$294,500 equivalent, comprising foreign currency of \$100,000 and local currency equivalent of \$194,500. The total foreign currency component and \$150,000 equivalent of the local currency cost will be financed on a grant basis by the Government of the United Kingdom. The Government of India will contribute the equivalent of \$44,500 through in-kind contributions as indicated in the detailed cost table in Appendix 2.

### **D. Implementation Arrangements**

16. The detailed TA activities relating to ICM will be undertaken largely at the state and local government levels. Kerala will serve as the focal state in terms of the detailed assessments. Within the state government structure, the state planning board is responsible for promoting cross-disciplinary and innovative initiatives. Accordingly, the Kerala State Planning Board will serve as the Implementing Agency of the TA. The TA will draw heavily from past and ongoing CZM programs in other states, particularly in Tamil Nadu. Such cross-state comparisons will serve to broaden the TA recommendations on ICM and ensure greater applicability across states. In Tamil Nadu, the state Department of Environment will serve as a focal agency for the TA.

17. TA activities relating to the assessment of alternative coastal protection measures will be supervised by MOWR. The technical analysis will be based on existing structures and experimental sites within Kerala and Tamil Nadu to the extent possible. But a limited number of sites outside those states may also be included to ensure a comprehensive assessment of alternatives and conditions representative of the entire coastline. MOWR will give guidance in selecting appropriate sites.

18. Although the detailed work of the TA will focus on the state and local levels, it will facilitate a process of dialogue at the national level with a view to reaching strategic policy directives on adopting ICM as a development framework. In this context, MOEF will serve as the Executing Agency of the TA. Since ICM directives require consensus across conventional sector lines, the planning commission may be required to assume a facilitation role at strategic points during TA implementation.

19. The TA will be implemented over 4 months, starting in December 2005 and ending in April 2006 (Appendix 3). The TA will require 5 person-months of international and 9 person-months of domestic consulting services in the areas of ICM and structural and nonstructural coastal protection. The international consultants will be hired as individuals following ADBs *Guidelines on the Use of Consultants*. The contract for domestic consultants and other TA inputs will be awarded by direct selection to the Center for Earth Sciences (CESS), a Kerala-based research institute with a strong background in coastal management and related fields. CESS will facilitate the state and national workshops and seminars of the TA relating to policy dialogue and formulation of institutional arrangements. The consultants will submit, as a team, an inception report within 1 month of TA start-up, a policy brief at the end of 3 months, and a final report containing the TA recommendations after the fourth month. The terms of reference of the consultants are in Appendix 4.

#### **IV. THE PRESIDENT'S DECISION**

20. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$250,000 to the Government of India to be financed on a grant basis by the Government of the United Kingdom for Integrated Coastal Management and Related Investment Development, and hereby reports this action to the Board.

## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<b>Impact</b> Contribute toward improved sustainable development of the coastal zone of India	Policy and institutional arrangements conducive to ICM and sustainable coastal protection are in place within the medium-term planning horizon.	State-of-environment reports	
<b>Outcome</b> Demonstrate the appropriate policy and institutional framework for ICM and related investments	Agreement reached at the national level on ICM as the basis for planning and implementing development and conservation programs within the coastal zone by June 2006	TA progress reports	<b>Assumptions</b> <ul style="list-style-type: none"> <li>• States receive a clear mandate to adopt ICM as a decision-making framework.</li> <li>• Subsequent investments in the coastal zone are in compliance with the agreed-upon ICM framework.</li> </ul> <b>Risks</b> <ul style="list-style-type: none"> <li>• ICM as a framework for decision making may not be socially and politically acceptable.</li> <li>• Suitable institutional arrangements are in place, technical and financial resources are made available.</li> </ul>
<b>Outputs</b> 1. Institutional framework for ICM established at the state level in Kerala  2. Alternative strategies for coastal protection assessed	ICM framework adopted at the state level in Kerala by June 2006  Assessment as basis for agreement on alternative coastal protection strategies at the national level by December 2006	TA progress reports	<b>Assumptions</b> <ul style="list-style-type: none"> <li>• Revisions to the CRZ Notification proceed on schedule.</li> <li>• Information is available on coastal erosion, impact of existing interventions, details of proposed interventions, and other related aspects.</li> </ul> <b>Risks</b> <ul style="list-style-type: none"> <li>• Multiple stakeholders are willing to cooperate in adopting an integrated approach.</li> <li>• Stakeholders are open to consideration of alternative approaches to coastal protection.</li> </ul>

<b>Activities with Milestones</b>	<b>Inputs</b>
<p>1.1 Review current development and conservation programs in Kerala and assess the policy and institutional changes required to adopt ICM at state and local levels.</p> <p>1.2 Establish the institutional arrangements for ICM at state and local levels, and commence ICM planning activities In Kerala.</p> <p>1.3 Compare policy and institutional settings in Kerala with those in other states, particularly Tamil Nadu, to determine general conditions and requirements for implementing ICM.</p> <p>1.4 Contribute to MOEF's revisions of the CRZ Notification.</p> <p>1.5 Support interagency coordination at the national level to build consensus on adopting principles of ICM.</p> <p>2.1 Assess conventional coastal protection interventions in terms of technical, financial, social, and environmental aspects.</p> <p>2.2. Review technical literature and undertake field-based technical assessment of ongoing experimental programs on alternative measures for coastal protection (structural and nonstructural).</p> <p>2.3. Engage key stakeholders in discussions to elicit acceptable guidelines and policy directives for future investments in coastal protection measures.</p>	<ul style="list-style-type: none"> <li>• Government of the United Kingdom - \$250,000</li> <li>• Government of India - \$44,500</li> </ul>

ADB = Asian Development Bank, CRZ = Coastal Regulation Zone, ICM = integrated coastal management, MOEF = Ministry of Environment and Forest, TA = technical assistance.

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. Government of the United Kingdom Financing<sup>a</sup></b>			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	90.00	0.00	90.00
ii. Domestic Consultants	0.00	60.00	60.00
b. International and Local Travel	10.00	10.00	20.00
c. Reports and Communications	0.00	7.50	7.50
2. Equipment	0.00	0.00	0.00
3. Seminars, and Conferences	0.00	7.50	7.50
4. Surveys and Studies	0.00	40.00	40.00
5. Miscellaneous Administration and Support Costs	0.00	5.00	5.00
6. Contingencies	0.00	20.00	20.00
<b>Subtotal (A)</b>	<b>100.00</b>	<b>150.00</b>	<b>250.00</b>
<b>B. Government Financing</b>			
1. Office Accommodation and Transport	0.00	17.00	17.00
2. Remuneration and Per Diem of Counterpart Staff	0.00	15.00	15.00
3. Others	0.00	12.50	12.50
<b>Subtotal (B)</b>	<b>0.00</b>	<b>44.50</b>	<b>44.50</b>
<b>Total</b>	<b>100.00</b>	<b>194.50</b>	<b>294.50</b>

<sup>a</sup> Administered by the Asian Development Bank (ADB).  
Source: ADB estimates.

### IMPLEMENTATION SCHEDULE

Activity	Month 1	Month 2	Month 3	Month 4	Month 5
<b>Mobilization</b>					
Office arrangements	■				
Other logistics	■				
<b>Consultation Phase</b>					
Kick-off workshop-state level		▲			
Inception report		▲			
Consultations—central and state levels		■			
Field visits		■			
Reviews of existing and ongoing programs		■			
Interim seminars and workshops		■			
<b>Analysis Phase</b>					
Review of ongoing pilot projects		■			
Situation analyses		■			
Small-scale demonstration programs		■			
Issues and options paper					
Midterm tripartite meeting			▲		
<b>Finalization and Dissemination</b>					
Report preparation			■		
Draft final report				▲	
Technical sessions and final workshop				■	
State level				■	
Central level				■	
Final report					▲
Final tripartite meeting					■
<b>Demobilization</b>					

Legend      ■      Activity period      ▲      Key milestone  
 Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

**A. Integrated Coastal Management (ICM) Specialists** (international, 2.5 person- months; domestic, 4.5 person-months)

1. The international ICM specialist must have at least a master's degree in coastal management or a related field, and at least 15 years of experience with ICM planning and/or implementation. A substantial part of the work experience must be in Asian countries with similar coastal conditions. The international ICM specialist will serve as the team leader of the technical assistance; however, the domestic ICM specialist will be responsible for overall coordination of the consultant inputs related to the ICM component.

2. The ICM specialists will undertake the following specific tasks:

- (i) In consultation with Ministry of Environment and Forest, assess the Swaminathan Committee Report and highlight key strategies that could be adopted in the new or revised Coastal Regulation Zone (CRZ) Notification.
- (ii) Undertake a situation analysis of the current implementation of the CRZ notification process at the state level in Kerala. Address prevailing institutional, technical (including data and information), financial, legislative, and human resource and sociopolitical conditions and impediments.
- (iii) Based on the situation analysis, assess the implications of adopting an ICM framework at the state level.
- (iv) Using the state of Kerala as a frame of reference, but in consultation with relevant state-level institutions in the state of Tamil Nadu and other states, develop a general conceptual framework for adopting ICM at the state level. The framework should address the key principles of ICM including division of responsibility and authority among local and community-level institutions.
- (v) Based on the conceptual framework, assist the state of Kerala to establish the enabling environment for undertaking ICM planning and implementation. Identify the corresponding institutional, technical, human resource, financial, and legislative gaps and requirements to establish a firm basis for ICM at the state level in any given state.
- (vi) In consultation with the coastal protection specialists, highlight procedural linkages at the central, state, and local levels to incorporate coastal protection measures within the framework of ICM.

**B. Coastal Protection Specialists** (international, 2.5 person-months; domestic, 4.5 person-months)

3. The international coastal protection specialist should have a master's degree or equivalent in coastal engineering or a related field, and have extensive work experience (minimum of 10 years) with designing and/or implementing coastal protection measures in countries with coastal conditions similar to those found in India. The domestic specialist(s) will have a minimum of 10 years experience with coastal protection works (structural and nonstructural) in India.

4. The specialists will undertake the following specific tasks:
- (i) Take stock of all ongoing coastal protection activities, pilot and demonstration projects, and research on coastal protection measures (structural and nonstructural).
  - (ii) Assist in formulating or enhancing the methodology for assessing alternative coastal protection measures (structural and nonstructural).
  - (iii) In consultation with Ministry of Water Resources, select several representative coastal areas that can serve as demonstration sites for assessing alternative coastal protection measures (structural and nonstructural) and conduct appropriate field verification studies.
  - (iv) Compare alternative coastal protection strategies on the basis of economic, environmental, and social criteria; and recommend a range of strategies suitable for different coastal conditions.
  - (v) In consultation with the ICM specialists, recommend procedural linkages at the national, state, and local levels to incorporate coastal protection measures within the framework of ICM.
  - (vi) Based on the recommendations, facilitate a series of discussions, seminars, and workshops at national and state levels (as appropriate) to initiate a dialogue on alternative coastal protection strategies.
  - (vii) Document the findings and conclusions of the seminars and workshops and identify the scope of follow-on activities in this area, if any.