



Technical Assistance Report

Project Number: 38412
December 2006

**India: Preparing the North Eastern Integrated Flood
and Riverbank Erosion Management Project (Assam)**
(Cofinanced by the Government of the United Kingdom and the
Cooperation Fund for the Water Sector)

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 1 December 2006)

Currency Unit	–	Indian rupee/s (Re/Rs)
Re1.00	=	\$0.02235
\$1.00	=	Rs44.74

ABBREVIATIONS

ADB	–	Asian Development Bank
ASG	–	Assam state government
BMP	–	Brahmaputra Master Plan
CSPU	–	country strategy and program update
EIA	–	environmental impact assessment
IEE	–	Initial environmental examination
FREM	–	flood and riverbank erosion management
IWRM	–	integrated water resources management
MFF	–	multitranchise financing facility
O&M	–	operation and maintenance
PM	–	person-month
PPCG	–	project preparatory core group
QCBS	–	quality- and cost-based selection
TA	–	technical assistance
WRD	–	Water Resources Department

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Agriculture and natural resources
Subsector	–	Water resource management
Themes	–	Sustainable economic growth, environmental sustainability, capacity development.
Subthemes	–	Fostering physical infrastructure development, natural resources management, institutional development

GLOSSARY

porcupine	–	Tetrahedron-shaped concrete frames commonly made of six concrete members each 3 meters long connected with bolts, which are placed or arrayed in the riverbed to retard flow and induce sedimentation.
revetment	–	A riverbank protection structure constructed on the bottom or banks of a river by placing a layer of material, such as rock, stones, concrete blocks, or mattresses.
spur	–	A riverbank protection structure built from the bank of a river in a direction transverse to the current, by placing a large quantity of rocks, stones, or concrete blocks (or earth armored with these heavy materials).

NOTE

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

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I. INTRODUCTION

1. The Asian Development Bank (ADB) country strategy and program update (CSPU) for India¹ included a project to operationalize cost-effective and sustainable flood and river erosion management for Assam. Following consultations in May 2004 and June 2005, and the subsequent request by the Government of India, the Fact-Finding Mission was undertaken during 16 February–7 March 2006 to formulate the project preparatory technical assistance (TA) for the North Eastern Integrated Flood and Riverbank Erosion Management Project (Assam).² The Mission discussed with representatives of the Government, Assam state government (ASG), and stakeholders to reach an understanding on the objectives, scope, costs, and implementation arrangements for the TA. The TA design and monitoring framework is in Appendix 1.

II. ISSUES

2. **Floods and Riverbank Erosion in India.** India is one of the most disaster-prone countries in the world. Floods and river erosion are major recurrent natural disasters, affecting on average 7.6 million hectares (ha) and causing damage of an estimated \$400 million annually between 1953 and 2003. The country has a flood-prone area of 46 million ha, which includes a quarter of its cultivable land. Vulnerability is high in the Ganges–Brahmaputra–Meghna river basins in Uttar Pradesh, Bihar, West Bengal, Assam, and other northeastern states, which have the lowest per capita incomes in India. The National Common Minimum Programme of 2004 has accorded priority to protection and development of these vulnerable low-income areas.

3. A comprehensive policy framework for flood control that has been in place since 1954 has promoted short- to long-term programs for both structural and nonstructural measures. Over the years, increasing emphasis has been placed on flood management recognizing that absolute physical control of floods and riverbank erosion is not feasible. The revised National Water Policy of 2002 further emphasized nonstructural measures, and incorporated an integrated approach with basinwide watershed management and stakeholder participation. Within this framework, 16 million ha of riverine land has been protected with flood embankments and other structures. A nationwide flood forecasting and warning system has also been set up.

4. **Assam State.** Despite an abundance of natural resources, poverty remains widespread in Assam. In 2000, 36% of its 26 million people were living below the poverty line. While the growth of Assam's gross state domestic product accelerated to over 5% in recent years, it still falls well below national gross domestic product level. Many other development indicators also continue to lag far behind national averages due to several factors, including poor infrastructure, remoteness, and inability to minimize the impacts of damage from frequent floods. The state's strategy for economic growth emphasizes rural development through strategic interventions, and rapid urban and industrial growth with private sector partnership in key infrastructure, including power, communication, and transport. Given that over 80% of Assam's poor live in rural areas, enhancing agricultural and rural development will be key to reducing poverty and accelerating social development.

5. Assam is mostly covered by the alluvial plains and adjacent low-lying hills of the Brahmaputra and the Barak river basins.³ The basins' most significant problems, and causes of significant flooding and river erosion, are the runoff from extremely heavy rainfall and high

¹ ADB. 2004. *India: Country Strategy and Update (2005–2007)*. Manila.

² The TA first appeared in *ADB Business Opportunities* on 13 March 2006.

³ The Brahmaputra River is 2,880 kilometers (km) long and drains an area of 580,000 km², of which 51%, 8%, 34%, and 8%, respectively, are in the People's Republic of China, Bhutan, India, and Bangladesh. About 640 km with 70,600 km² of drainage area is in Assam.

sediment loads from upper watersheds, which are geologically young and unstable and susceptible to earthquakes and landslides. Watershed degradation due to deforestation and shifting cultivation is also widespread, particularly in India. Total runoff from the Brahmaputra river basin is among the highest in the world, while its annual sediment transport of 500 million tons is second only to that of the Yellow River in the People's Republic of China.

6. **Floods.** Flooding is a perennial problem in Assam, causing significant economic damage each year. The state's flood-prone area amounts to 3.1 million ha, or some 40% of the total geographical area. This includes over 90% of the agricultural land and urban population centers, as well as its most valuable economic assets such as tea estates, oil fields, roads, and airports. Thus, effective flood management is crucial to the state's economic performance. On average, an estimated \$47 million in annual crop production is lost due to floods, while damage to homesteads and livelihood affects some 3 million people. In 2004, a devastating flood affected 12.3 million people and 2.9 million ha, with damage amounting to \$1.5 billion.

7. ASG has implemented a number of flood control schemes since the 1950s, covering 1.6 million ha of flood-prone areas with embankments and involving a flood forecasting and warning system linked to the central system.⁴ However, most schemes have deteriorated due to insufficient maintenance. After the 2004 flood, ASG is according high priority to rehabilitating and upgrading existing embankments that protect critical urban and rural centers with high growth potential. This should be accompanied by measures to ensure secure protection (such as effective supervision and secondary defense line of dikes), with sound maintenance systems. For other areas where land is unprotected and poverty incidence is high, more adaptive coping measures are called for.⁵ Overall, active stakeholder participation and agency coordination, including local governments, are required to attain the highest flood resistance, with integrated planning that explores a range of flexible options, and coordinated program implementation.

8. **Riverbank Erosion.** Riverbank erosion is also a chronic problem caused by dynamic shifting of channels flowing through unconsolidated heavy sand or silt strata of the floodplain, with high sediment discharge. Since 1954, Assam's 17 riverine districts have lost 7% of their land area to erosion. Some 8,000 ha of land (valued at \$20 million) is lost annually, which is accompanied by the appearance of low-lying unproductive sandbars. The social impact is huge. About 10,000 families are displaced each year and those who become landless are forced to move to increasingly congested nearby riverbank lines and dikes. More critically, progressive river erosion is threatening many flood embankments with possible devastating inundation and associated damage once it reaches and undercuts the embankments during the monsoon.⁶

9. The Water Resources Department (WRD) of ASG has provided protection structures—mostly spurs and a small number of revetments—to protect some 50 km of bank lines along vital state interests, while adopting an approach of retiring (setting back) embankments for other protected areas. However, experience indicates that protection structures require high capital cost (at \$1 million per km), often induce erosion and land loss between spurs, and require regular maintenance to withstand flow attacks. Embankment retirement is a cheaper option in the short run, but it may lead to much higher land loss and social displacement over the long run. There is a critical need to develop more cost-effective, and socially and environmentally desirable mitigation measures, which are within the fiscal capacity of ASG and local institutions and can be

⁴ The system covers other northeastern states and also receives hydrometeorological data from Bhutan and the People's Republic of China. However, further extension and modernization are needed to improve its accuracy.

⁵ Such as (i) flood proofing, (ii) small-scale flood protection with dwarf dikes (using existing and planned roads) in inland riverine areas, (iii) improved flood warning systems, and (iv) promotion of alternative cropping practices.

⁶ At present, about 130 locations face immediate threats. Among them are vital urban and state interests such as oil fields, tea gardens, and the Kaziranga National Park, habitat of one of the world's last single-horn rhino populations.

sustained in the highly dynamic morphological environment. There is a need for exploration and careful assessment of innovative and lower-cost options that have been applied within or outside India,⁷ and systematic development through field-testing and implementation. Significant opportunities also exist to lower program costs by setting up proactive management systems based on short-term erosion prediction using historic satellite images, and to plan and provide timely preventive measures before major erosion and channel shifting take place.

10. **Policy, Planning, and Institutional Basis.** While WRD does not have its own policy or strategy documents to guide its operations, it generally follows existing Government policy frameworks (para. 3) and the Brahmaputra Master Plan (BMP) in flood and riverbank erosion management (FREM). The BMP for the Brahmaputra and Barak rivers was updated by the Brahmaputra Board in 1996 and provides (i) a broad planning framework for FREM through better data and knowledge management; and (ii) short- to long-term measures, comprising flood forecasting and warning, floodplain zoning, flood proofing, and watershed management.⁸

11. Nevertheless, wide gaps exist between these national frameworks and ASG's sector operations. Specifically, their FREM tends to be focused on structural approaches, stand-alone, and top-down in its decision making. It is prudent to develop an effective strategy and action plan to make operations comprehensive, participatory, and sustainable.⁹ In this connection, lack of funding for operation and maintenance (O&M) is a major issue. There is a need for developing a dedicated revenue source (such as a flood cess) and a mechanism to earmark the collected funds for O&M, along the lines of similar reforms pursued in the road sector. Mechanisms for effective community participation in FREM need to be explored and established. Likewise, the institutional setup, resources, and functions of WRD and related organizations should be examined and strengthened. Key agendas include (i) a framework for agency coordination for more integrated planning and programming for FREM and related interventions; (ii) work on the social and environmental concerns in FREM; (iii) sound database and decision support systems; and (iv) realignment of staff resources, skills mix, and management to address these issues.¹⁰

12. The ASG submitted an investment proposal to ADB for improving key FREM infrastructure including embankments, riverbank protection and flood proofing works along the Brahmaputra and Barak rivers to protect vital state economic interests. Building on the proposal, an investment package needs to be prepared that is ready for prompt implementation, and can provide economic returns commensurate with ADB's lending terms, while strengthening the policy and institutional framework for integrated FREM. The TA will support this process by addressing the aforementioned issues, in line with the priorities of ADB's Water Policy and CSPU for India (2005–2007) that emphasizes upgrading infrastructure and facilitating rural development for broad-based economic growth and employment creation.

⁷ In recent years, pro-siltation measures, i.e., inducing silt deposit on the riverbed by placing tetrahedron-shaped concrete frames (or "porcupines"), have been introduced with good results in Assam. There are also opportunities for exploring alternative lower-cost designs for revetments and other works developed and applied in other countries.

⁸ The report of the Government's 2004 Task Force for Flood Management and Erosion Control, formed in response to the major floods in India's eastern states in 2004, also provides guidance.

⁹ In this context, an opportunity exists to start preparing a state water policy and investment plan to promote comprehensive FREM linked with watershed and environment conservation from an integrated perspective.

¹⁰ Given WRD's limited experience in externally funded investment projects, timely implementation to meet the procedural guidelines of the financiers also remains an issue despite the department's high technical capacities.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

13. The TA impact is increased effectiveness in protecting, sustaining, and enhancing incomes while reducing poverty along the Brahmaputra and Barak rivers. The TA outcome is the design of a sector-type project—with the possible use of a multitranche financing facility (MFF) agreed upon by ASG, the Government, and ADB—that will (i) reduce flood and riverbank erosion damage in vital state interests, and (ii) strengthen the policy and institutional bases to support comprehensive FREM. The ensuing project will tentatively comprise (i) participatory scheme planning; (ii) a range of FREM infrastructure (including flood embankments, riverbank protection, and flood proofing), and nonstructural measures (covering flood and other natural disaster risk zoning, preparedness and management); (iii) complementary support to enhance growth and poverty impacts; and (iv) institutional support and project management. Priority will be accorded to upgrading existing FREM systems protecting critical urban and rural areas.¹¹

14. To meet the MFF criteria, the TA outputs will comprise (i) a requisite road map toward operationalizing the relevant policy principles—including comprehensive FREM with integrated water resources management (IWRM) perspectives and sustainable O&M—along with a sound investment program; (ii) fully appraised sample subprojects to provide FREM and other interventions for inclusion in the first financing tranche, based on thorough analyses of innovative, cost-effective, and sustainable FREM options; (iii) a list of other subprojects assessed as meeting the set selection criteria and safeguard frameworks; (iv) institutional arrangements for proactive, timely, and effective planning and delivery of FREM programs responding to dynamic river processes; and (v) support programs to implement the above strategy and action plan.¹²

B. Methodology and Key Activities

15. The TA will (i) use WRD's existing technical capacities; (ii) explore alternative options for FREM infrastructure and nonstructural programs; and (iii) assist comprehensive subproject planning and related institutional studies, incorporating innovative international technology, lessons, and experience. A consultative approach will be taken through stakeholder workshops, including the media. Activities are in two phases.

16. **Phase 1: Strategy and Option Studies** (3.5 months). This phase will provide a strategic framework and options for integrated FREM at state and selected subproject levels. The TA will (i) prepare a FREM strategy and action agenda by analyzing basin conditions and state-level policy, planning, and institutional bases and gaps, with an IWRM perspective; and (ii) identify and assess options for the most effective approach to FREM in the sample subproject areas, by collecting necessary data and analyzing hydrology and morphology. Innovative and cost-effective measures and lessons from India and elsewhere will be explored to strengthen flood resistance while reducing the costs and negative impacts of erosion mitigation works.

17. **Phase 2: Subproject Proposals and Institutional Actions** (6.5 months). This phase will formulate an MFF project through feasibility studies, institutional analyses, and investment programming and project packaging. Specific activities are (i) finalizing participatory options and

¹¹ The ensuing project may also cover other states in the northeastern region, for which a separate TA will be prepared subject to official requests submitted through the Government.

¹² Up to four subprojects will be fully appraised and the remaining subprojects meeting the set selection criteria will be identified under the TA. The latter will be appraised prior to the launching of the concerned tranche. A process-type approach will be justified based on a conducive policy framework, institutional strengthening plan, clear investment packaging, and, in general, exclusion of subprojects having major safeguard implications.

detailed feasibility studies of sample subprojects; (ii) assessing safeguards and preparing the requisite action plans; (iii) formulating a social development strategy and action programs, including participatory mechanisms for the project; (iv) following a consultative process in preparing a sector road map, including actions for strengthening WRD, sustaining O&M, and fostering integrated FREM and IWRM; and (v) formulating an investment program and a project package ready for implementation. The initial poverty and social analysis is in Appendix 2.

C. Cost and Financing

18. The total cost of the TA is estimated at \$1.1 million equivalent. The TA will be cofinanced on a grant basis by the Government of the United Kingdom for \$800,000 equivalent and by the Cooperation Fund for the Water Sector for \$50,000 equivalent. Both grants will be administered by ADB. ASG will finance the remaining \$250,000 equivalent. The Government of India and ASG will also provide relevant information and analytical work. Details of the cost estimates and financing are in Appendix 3. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

19. WRD will be the Executing Agency (EA) of the TA, and will appoint a TA director at the level of chief engineer, under the guidance of the Ministry of Development of North Eastern Region and in coordination with other concerned central agencies. WRD will form a TA steering committee chaired by the secretary of WRD, with the participation of the department staff concerned.¹³ WRD will also mobilize a project preparatory core group (PPCG), including WRD staff (in planning, survey, quality control, and monitoring) and nominees from other departments representing the TA steering committee.¹⁴ ADB will provide intensive review and supervision by fielding missions at critical stages of TA implementation.

20. The TA will be implemented from February to December 2007. Consulting services will be provided in three teams. The phase 1 team will comprise 2 person-months (p-m) of international experts and 12 p-m of national experts. The phase 2 team will comprise 8.5 p-m of international experts and 34 p-m of national experts. The third team will comprise a panel of experts (3 p-m international and 2 p-m national). Outline terms of reference for each team are in Appendix 4. The phase 1 international consultant will be engaged as an individual by ADB, while national consultants will be engaged through a local firm using quality- and cost-based selection (QCBS) based on biodata technical proposals. Advance action will be taken on a noncommittal basis. All phase 2 consultants will be engaged through an international firm in association with national consultants following QCBS based on full technical proposals. The panel of experts will be engaged on an individual basis by ADB. All recruitment will follow ADB's *Guidelines on the Use of Consultants* (April 2006, as amended from time to time) and other arrangements satisfactory to ADB for selecting and engaging national consultants. The phase 1 team will prepare inception and final reports within 2 weeks and 4 months of fielding, respectively. The phase 2 team will prepare inception, draft final, and final reports within 2 weeks, 5 months, and 6 months of mobilization, respectively. Stakeholder workshops involving ASG, the Government, the consultants, and ADB will be organized to discuss these reports.

¹³ Including planning and development, disaster management, finance, revenue, resettlement and rehabilitation, public works, rural development, irrigation, forestry, soil conservation, agriculture, and fisheries.

¹⁴ Representatives of Government institutions, including the Brahmaputra Board, Central Water Commission, and North East Hydraulic and Allied Research Institute will also participate in the PPCG,

IV. THE PRESIDENT'S DECISION

21. The President, acting under the authority delegated by the Board, has approved ADB administering (i) technical assistance not exceeding the equivalent of \$800,000 to the Government of India to be financed on a grant basis by the Government of the United Kingdom, and (ii) technical assistance not exceeding the equivalent of \$50,000 to the Government of India to be financed on a grant basis by the Cooperation Fund for the Water Sector for preparing the North Eastern Integrated Flood and Riverbank Erosion Management Project (Assam), and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
<p>Impact Enhanced effectiveness in protecting, sustaining, and enhancing incomes and reducing poverty in the Brahmaputra and Barak river basins through integrated FREM</p>	<ul style="list-style-type: none"> • Reduced flood damage and increased economic growth rate and poverty reduction in subproject areas (to be quantified during the TA) • Measures taken to sustain O&M funding of FREM infrastructure • Institutional strategy and actions adopted for effective FREM and IWRM • Appropriate institutional arrangements adopted for participatory planning, implementation, and O&M • Institutional actions taken to establish IWRM at the state level, including start of formulating a state water policy and water plan • Above targets achieved within the time frame of the ensuing loan project 	<ul style="list-style-type: none"> • The Government and ASG statistics • Baseline and periodic monitoring reports • Other mechanisms to be determined during the TA 	<p>Assumptions</p> <ul style="list-style-type: none"> • The ASG will accept the loan terms and conditions offered by the Government for the follow-on investment project. • The recommended structural and nonstructural measures for FREM are implemented as designed with verification of the technical robustness. • Morphological and other risk factors such as abnormal floods and earthquakes are within the reasonably anticipated level reflected in the design.
<p>Outcome An MFF project proposal suitable for ADB financing that would</p> <p>(i) reduce flood damage and riverbank erosion through comprehensive, cost-effective, sustainable, and adaptive structural and non-structural works with stakeholder participation; and</p> <p>(ii) strengthen the policy and institutional bases for effective FREM, such as (a) WRD in planning and providing programs with stakeholder participation and interagency coordination; and (b) statewide policy, planning, and coordination framework from an IWRM perspective</p>	<ul style="list-style-type: none"> • Agreement reached on FREM options within 2 months of the start of phase 2 of the TA • Agreement reached on the proposal elaborating the loan design – objective, scope, implementation arrangements and financing plan within 10 months of the start of the TA • Agreement reached on the institutional actions toward effective FREM operation with IWRM perspective within 10 months of the start of the TA 	<ul style="list-style-type: none"> • The ASG and the Government confirm the AM of the review mission to finalize the options. • The ASG and the Government confirm the AM of the final tripartite review mission and endorse TA final report. • The ASG and the Government confirm the AM of the separate TA design. 	<p>Assumptions</p> <ul style="list-style-type: none"> • The ASG will support the selection of sample subprojects, and the findings of the feasibility studies. • The ASG and stakeholders will accept recommended FREM strategy and options for subproject areas. • The ASG will accept the action plan to put into operation effective FREM and sustainable maintenance funding mechanisms. • Effectiveness of the identified FREM options including those transferred from other countries is verified through necessary testing. • Although subprojects presenting safeguard issues will be avoided under the TA, the EA will, where impacts are unavoidable, accept ADB's safeguard requirements on resettlement, environment, and

Design Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
			indigenous peoples. <ul style="list-style-type: none"> Beneficiaries will show willingness to sustain the adopted FREM options and enhance economic activities.
<p>Outputs</p> <p>Phase 1</p> <p>1. An integrated FREM strategy and action agendas to put into operation the relevant policy principles and recommendations with IWRM perspectives</p> <p>2. FREM strategy and options assessments in the selected subproject areas</p> <p>Phase 2</p> <p>1. Fully appraised sample subprojects to provide comprehensive structural and nonstructural FREM and associated programs, with identification and assessment of cost-effective and sustainable FREM infrastructural interventions, with safeguards assessments and action plans, social development strategy, and effective participatory implementation arrangements</p> <p>2. Policy and institutional road map stipulating actions and supporting programs to institutionalize integrated FREM, including sustainable O&M funding mechanisms, steps toward operating IWRM, and institutional strengthening of WRD and other agencies involved in FREM</p> <p>3. Investment program and MFF project package including objective, scope, cost and financing plan, procurement plan, and institutional arrangements (including advance actions for recruiting consultants and procurement) to facilitate timely, proactive,</p>	<ul style="list-style-type: none"> TA agreement signed in January 2007, and phase 1 initiated by February 2007 Phase 1 FR finalized in 3.5 months of the start of the TA Agreement reached on FREM strategy and action agenda, and options at state and subproject levels in 3.5 months of the start of the TA Phase 2 consultants fielded in 4 months of the TA start Options report submitted in 5 months, and TA draft FR in 9 months of the TA start Agreement reached on the selection of FREM options in 5 months of the TA start Agreement reached on feasibility and safeguards assessment and action plans Interim assessment report submitted in 5 months of the start of the TA Agreement reached on necessary policy and institutional actions in 10 months of the start of the TA TA draft FR submitted in 9 months and FR in 10 months of the start of the TA Agreement reached on the project package in 10 months of the start of the TA 	<ul style="list-style-type: none"> Inception reports Phase 1 reports covering FREM strategy, action agendas, options, and consultations AM of ADB inception and phase 1 review missions Options finalization report Draft FR and FR AM of review mission for option finalization and final review mission confirmed Interim report, draft FR and FR AM of review mission for interim assessments and final review mission confirmed Options report, interim report, draft FR and FR AM of review mission and final review mission confirmed 	<p>Assumptions</p> <ul style="list-style-type: none"> Overall monitoring and quality support systems of the TA are effectively operated with the support of the consultants. Local political and security conditions are conducive to the field activities of the TA. Buy-in to proposed policy and institutional reform measures by ASG and the Government. Buy-in to proposed interventions by project beneficiaries with enhancement of economic activities. EA and support agencies provide necessary support, particularly data, information, and analyses. Information and analyses on innovative FREM options adopted outside Assam are readily available to the reasonable extent. The PPCG and interdepartmental TA steering committee will be effective in monitoring and coordinating TA activities and support provision. Local representatives of the Brahmaputra Board, Central Water Commission, and North East Hydraulic and Allied Research Institute will contribute to the PPCG. Participatory process for subproject planning is duly followed by all

Design Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
and effective planning and implementation of FREM programs that are responsive to dynamic natural river processes			<p>concerned.</p> <ul style="list-style-type: none"> • Consultants perform as expected. • Various stakeholder groups participate in TA consultative activities. • Beneficiaries and local institutions provide support to join participatory planning process.
<p>Activities with Milestones</p> <p>A. By ADB</p> <ul style="list-style-type: none"> (i) Recruit consultants in coordination with the Government and ASG (ii) Monitor and supervise TA activities regularly (iii) Guide the TA activities through inception and review missions (iv) Facilitate necessary coordination and participatory processes <p>B. By ASG/the Government</p> <ul style="list-style-type: none"> (i) Appoint counterpart staff, and form PPCG and interdepartmental TA steering committee (prior to TA start) (ii) Appoint counterpart staff from EA (prior to TA start) (iii) Prepare detailed DPRs of representative schemes (iv) Supervise TA activities regularly with active coordination with the consultants (v) Provide office space, data/information and documents, DPRs of representative schemes (and other inputs as appropriate), and other support to the TA (throughout TA period) <p>C. By Consultants</p> <p>Undertake designated TA activities in close interaction with ASG, the Government, stakeholders, and ADB:</p> <ul style="list-style-type: none"> (i) State-level integrated FREM strategy and action agenda (phase 1) (ii) Riverbank erosion mitigation options and strategy for sample subproject areas (phase 1) (iii) Flood management options and strategy for sample subproject areas (phase 1) (iv) Participatory subproject planning and feasibility studies (by end of phase 2), including finalization of FREM options (by November 2006) (v) Safeguards assessment and action plans (by end of phase 2) (vi) Social development strategy (by end of phase 2) (vii) Institutional road map including actions and programs (by end of phase 2) (viii) Investment program and MFF project package as draft final report (by end of phase 2) <p>D. By Stakeholders</p> <ul style="list-style-type: none"> (i) Participate in TA workshops and other consultations organized at various stages (ii) Participate in DPR and feasibility study preparation process 		<p>Inputs</p> <ul style="list-style-type: none"> • ADB will provide (i) TA inception and review missions; (ii) ongoing support from ADB HQ and the India Resident Mission; and (iii) mobilization of \$850,000 in grant financed from the DFID Trust Fund and Government of the Netherlands' Water Cooperation Trust Fund. • The ASG will provide in-kind contributions estimated at \$250,000 equivalent comprising provision of (i) office space; (ii) counterpart staff; (iii) draft DPRs of candidate schemes and other information and materials; and (iv) other counterpart support. • Stakeholders will contribute their time to participate in TA workshops and other consultations. • Consultant inputs comprising (i) 2 person-months of international and 12 person-months of national consultants in phase 1; (ii) 8.5 person-months of international and 34 person-months of national consultants in phase 2; and (iii) 3 person-months of international and 2 person-months of national consultants for the panel of experts. 	

ADB = Asian Development Bank, AM = aide memoire, ASG = Assam state government, DFID = Department for International Development of the United Kingdom, DPR = detailed project report, EA = executing agency, FR = final report, FREM = flood and riverbank erosion management, HQ = headquarters, IWRM = integrated water resources management, MFF = multitranches financing facility, O&M = operation and maintenance, PPCG = project preparatory core group, TA = technical assistance, and WRD = Water Resources Department.

INITIAL POVERTY AND SOCIAL ANALYSIS

A. Linkages to the Country Poverty Analysis

Is the sector identified as a national priority in country poverty analysis?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is the sector identified as a national priority in country poverty partnership agreement?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>Contribution of the sector or subsector to reduce poverty in India.</p> <p>According to the National Human Development Report (2002), incidence of poverty based on the head count ratio declined from 44.5% in 1983 to 26.1% in 1999–2000 in India. Significant strides have been made to reduce poverty in rural and urban areas; however, chronic and absolute poverty and entrenched poverty pockets persist in many states, despite an ongoing food surplus. This raises questions about intervention strategies, distribution of resources, inclusive development efforts, and participatory development to sustain development efforts. The report highlighted the marked differences in poverty incidence within the country. The northeastern region in particular lags far behind the national averages of most development indicators. The region is marked by low agricultural productivity, poor infrastructure, and low levels of industrial activity. In addition, ongoing ethnic tensions have constrained development in agricultural infrastructure and other private sector activities.</p> <p>The proportion of Assam's population living below the poverty line is quite high at about 36.1%. This is the highest among the seven northeastern states and substantially above the national average. Over two thirds of Assam's population is rural. Poverty is largely rural, with 40% of the rural population below the poverty line. Poverty is more widespread in Assam's western and southern districts and the hill districts.</p> <p>The Brahmaputra and Barak rivers and their tributaries dominate the economic and social life of Assam. Most of Assam's population live in either of the two river valleys, and over 90% of urban and agriculture land is located in the flood prone area. Thus, the regular occurrence of floods, waterlogging after floods, and loss of land due to river erosion constrain the state economic activities as a whole. Along with the service sector in urban and rural areas—that is affected by lack of employment opportunities associated with low level of investments—agriculture remains the primary economic sector, with paddy, wheat, mustard, potatoes, and other vegetables as the major crops. Its productivity is well below the national average, and only about half of the state's farmers cultivate their fields more than once a year. The uncertainties and vagaries of rainfall and associated floods hamper agricultural productivity.</p> <p>In view of the intrinsic linkage between flooding and river erosion and the state's economic performance, effectively managing annual flooding is critical to propel economic growth and make more rapid inroads into poverty reduction. The risk of flooding is cited as the main factor hampering urban and industrial development, as the risk of investment losses is considered very high in most areas. Given the concentration of the poor in the rural areas, enhancing agriculture and rural development also needs to be pursued within the context of the project. Increased rice production will require developing irrigated agriculture (only 20% of the state's cropland is irrigated), for which flood embankment and river erosion control will provide a conducive environment. The unpredictable nature of the annual floods has also made farmers risk averse, planting only one rainfed paddy crop annually. People have been made homeless and landless by progressive riverbank erosion, and have been forced into sharecropping arrangements to survive, with little incentive to invest in productivity-enhancing agrotechnology. Promoting irrigation in protected areas would allow for much greater crop production during the relatively safe dry season.</p>			

B. Poverty Analysis

Targeting Classification: General intervention

What type of poverty analysis is needed?

Participatory poverty analysis is required to analyze specific groups of the rural poor and disadvantaged sections, such as landless people, sharecropping tenants, scheduled tribes, and scheduled castes in the project areas. Specific strategies will have to be developed to meet their needs and priorities for enhancing their livelihood as well as their ability to cope with the impacts of floods and riverbank erosion.

People in the project area are vulnerable in many respects, including to the high risk of seasonal flooding and the possibility (but inherently unpredictable risk) of catastrophic flooding that may wipe out their farms and homesteads. The technical assistance (TA) will provide a comprehensive picture of poverty as it exists in the subproject areas, focusing on selected flood protection and riverbank erosion mitigation schemes. The TA will assess the impacts of annual flooding and riverbank erosion on poverty and the livelihood options that could arise from better protection and management. The TA will also analyze the concept of "living with the floods," its validity, and lessons learned from previous river embankment and erosion mitigation efforts. Options for enhancing nonstructural measures of flood management at the community level will also be explored.

Developing the asset base of the poor for income-generating activities through diversification of cropping patterns, fisheries etc., although outside the scope of the present Project, will be explored and recommendations for linkages to ongoing rural development projects provided. Farmers have adapted their land use and cropping pattern to flooding circumstances.

Besides paddy, fish is a major food source for the poor of Assam. However, river embankments might reduce floodplain fisheries production with consequent negative effects on the poor, whose access to this common property gives them a main source of animal protein in their diet. "Controlled flooding" in this context suggests the use of regulators in the embankments to allow for a two-way movement of fish species between the river and the floodplain. The TA will obtain more information on floodplain fisheries in embankment areas and feasible ways to maintain floodplain fisheries alongside fishponds. The level of poverty, livelihood options, and nonstructural measures for community-oriented flood management will be reflected in the project synthesis, with sample subproject proposals developed with the active participation of stakeholders during phase 2 of the TA.

To improve the impact on poverty reduction, poverty impact analysis will assess if flood protection and riverbank erosion mitigation will improve stakeholders' confidence in undertaking investments to enhance their livelihood and thus contribute to the overall economic growth of the effectively protected area. During the feasibility studies, distribution analysis will assess the equity of project impacts and determine how the costs and benefits of the project are shared among the poor and other stakeholders. It will identify the (i) costs to be incurred and benefits realized, (ii) impacts of the gains distributed to beneficiaries, (iii) beneficiaries' capacity and willingness to pay the costs, and (iv) impact of overall project performance and returns on equity considerations. The analysis will also suggest project design options and activities to enhance the impact on the targeted beneficiaries, which will culminate into action plans for poverty reduction. This will also provide a baseline database to be used for quantitative monitoring of the poverty reduction impacts of the project.

C. Participation Process

Is there a stakeholder analysis? Yes No

Is there a participation strategy? Yes No

Community participation in flood management is a new approach in coping with floods better and in a timely manner. Previous approaches are characterized by total dependence on government, which has its own limitations in response, inaccessibility, and outreach at the household level. Nongovernment organizations may not have a presence in many areas as well. Therefore, direct involvement of people in flood management is expected to be more effective and useful. This concept was introduced in India when Panchayats or community-based organizations elected by the people became functional at district, block, and village levels, as part of the Assam Panchayat Raj Act 1992.

The establishment of a community-oriented institutional framework for implementing flood management (both structural and nonstructural) will be examined during the TA and an effective and practical participation strategy developed. The framework needs to consider the interests of diverse population including mobile migrants of char land and riverine areas as appropriate. The constitution of flood management committees, complementary to already existing community structures, will also be explored. Possible linkages and cooperation with the existing systems, including self-help groups and development committees will be analyzed to see whether self-help groups can take on the task of flood management. If the Panchayat Raj system can take on the recommended flood management committee (it has committees for agriculture, health, education, etc.), the state may explore the possibility of according legal status to the flood management committees through appropriate legislative measures.

The TA will seek ways to turn people's interest in and need for embankments (i.e., to build houses on high land) into an advantage and obtain their assistance in providing regular operation and maintenance of embankments and other structures. The Assam state government operates various poverty, rural development, and relief schemes, including programs for the advancement of tribal people. The TA will explore ways to tap into such programs as the Employment Guarantee Scheme, which could be expanded in the near future, and provide employment vouchers to qualified people currently living on the embankments. The scheme could also be a focal point in restoring the livelihood of resettled people.

D. Gender Development

Strategy to maximize impacts on women:

A strategy to maximize the impact of structural and nonstructural measures for flood control and erosion mitigation will be prepared by the TA through gender assessments. Both women and men will equally benefit from a more secure environment, particularly river erosion mitigation. Women play a significant role in society and are active in matters of social concern, such as farming and selling of surplus produce in local markets. Apart from specifically targeting women as beneficiaries, women's participation will be ensured throughout the project cycle, and women will be provided with equal opportunities through gender mainstreaming in project implementation and administration positions. In particular, as women are paid less than men for equal work, the TA will also examine ways to include women (if interested) on an equal basis in the labor opportunities arising from the project.

Has an output been prepared? Yes No

E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	Resettlement impacts are anticipated in implementing subproject works, and are likely to require land acquisition and resettlement, including the population living on embankments that are to be rehabilitated or strengthened. The ensuing project could set up criteria for excluding subprojects having major impacts, in consultation with the Government of India and Assam state government. At this stage, the magnitude of the impacts cannot be determined, but could be significant, in particular for subprojects to protect urban, peri-urban, and populated rural areas. The TA will prepare a resettlement framework and resettlement plans for subprojects where resettlement impacts arise.	<input checked="" type="checkbox"/> Full <input type="checkbox"/> Short <input type="checkbox"/> None
Affordability	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Affordability aspects will be addressed during the TA, but are not expected to be significant to the population concerned, in particular the poor. However, the executing agency concerned and the state government will have to pursue reforms to ensure sufficient funding to maintain the completed facilities. This will be assessed during the TA.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None	It is not anticipated that the project will have adverse effects on labor issues in Assam. On the contrary, it could significantly expand opportunities for wage labor, including for women.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Indigenous Peoples	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Scheduled tribes and scheduled castes are present throughout the state, particularly on the northern river bank of the upper Brahmaputra, but they vary widely by district (e.g., the concentration of tribal people is particularly high in Dhemaji district). The TA needs to carefully assess the implications for the scheduled tribes and castes, although the Project will avoid subprojects having major negative impacts. Since the subprojects are still to be identified, the Project is provisionally classified as category B, which will be refined following more detailed investigations during the TA. The TA will prepare indigenous peoples action plans or development plans as required.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Other Risks and/or Vulnerabilities	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Not significant <input type="checkbox"/> None	Other risks and vulnerabilities will be determined by the TA. Particularly important will be to look into ethnic tensions in Assam, their underlying causes, and implications for project design and implementation. Careful analysis will also be undertaken during the TA to ensure the capacity of the Executing Agency and other implementing agencies for timely project implementation.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

COST ESTIMATES AND FINANCING PLAN

(\$'000)

Item	Total Cost
A. Government of the United Kingdom and the Cooperation	
Fund for the Water Sector Funding ^a	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	338.0
ii. National Consultants	197.0
b. International and Local Travel	
i. International Travel	60.0
ii. Local Travel ^b	30.0
c. Reports and Communications	5.0
2. Surveys and Studies	
a. Technical Surveys ^c	40.0
b. Socioeconomic Survey and Assessment ^d	30.0
c. Resettlement Survey and Assessment	20.0
3. Workshops and Seminars	10.0
4. Administrative and Support Services	
a. Office Operation and Maintenance	14.0
b. Equipment and Supplies ^e	11.0
5. Contract Negotiations	10.0
6. Contingencies	85.0
Subtotal (A)	850.0
B. Government Financing	
1. Office Facilities and Administrative Support	50.0
2. Counterpart Staff	50.0
3. Local Travel and Vehicles for Counterpart Staff	40.0
4. Studies, Surveys, Data Analysis, and Reports	110.0
Subtotal (B)	250.0
Total	1,100.0

^a Financed on a grant basis by the Government of the United Kingdom (\$800,000) and the Cooperation Fund for the Water Sector (\$50,000). Both grants will be administered by the Asian Development Bank (ADB).

^b Includes vehicle rental and operation and local airfares.

^c Includes satellite images procurement, topographical mapping, and river surveys.

^d Includes at least four schemes.

^e Includes five hand-held global positioning system, three computers and peripherals, a photocopier, and a fax machine, to be procured by the consultants following the ADB's *Procurement Guidelines* (April 2006, as amended from time to time), and handed over to the executing agency upon TA completion.

Source: ADB estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The technical assistance (TA) will support the preparation of a multitranche financing facility (MFF) loan for the North Eastern Integrated Flood and Riverbank Erosion Management Project for Assam in three groups of activities: (i) phase 1: preparing a strategy and action plan for integrated flood and riverbank erosion management (FREM) at the state and subproject levels; (ii) phase 2: formulating an MFF project with feasibility studies, institutional assessment, and project packaging; and (iii) a panel of experts to advise on the TA in light of international and Indian best practices. The consulting services will include international and national experts and undertake the tasks outlined here, which may be adjusted by the Asian Development Bank (ADB) as needed, in consultation with the Assam state government (ASG) and the Government of India.¹ The consultants will closely coordinate with and use the materials and analysis provided by ASG and the Government. Extensive consultation is needed to ensure the full ownership of the processes and outputs by ASG and the Government. The inputs of the consultants are shown in Table A4.

Table A4: Consulting Services Inputs

Expertise	Person-Months			
	Phase 1	Phase 2	POE	Total
A. International				
River Management Specialist ^a	2.0	4.0	0.5	6.5
River Morphologist/Engineer			1.0	1.0
Project Economist		2.0		2.0
Environment Specialist		1.5		1.5
Resettlement Specialist		1.0		1.0
Institutional Specialist			1.0	1.0
Fiscal Management Specialist			0.5	0.5
Subtotal (A)	2.0	8.5	3.0	13.5
B. National				
FREM Specialist ^a	3.5	5.0	2.0	10.5
Flood Management Specialist	3.0	2.0		5.0
Morphologist ^a	1.5	3.0		4.5
Water Resources Planner	2.0			2.0
Socioeconomist	2.0			2.0
Project Economist		4.5		4.5
Sociologist		4.5		4.5
Environment Specialist		4.0		4.0
Resettlement Specialist		3.0		3.0
Other Specialists ^b		8.0		8.0
Subtotal (B)	12.0	34.0	2.0	48.0
Total	14.0	42.5	5.0	61.5

FREM = flood and riverbank erosion management, POE = panel of experts.

^a Experts in phase 1, phase 2, and POE are recruited separately for the position.

^b Including fiscal management specialist, institutional specialist, watershed management specialist, agriculture specialist, participatory development specialist, and financial specialist.

Source: Asian Development Bank estimates.

A. Phase 1: Strategy and Action Plan Formulation (3.5 months)

2. Key activities during phase 1 comprise (i) refining and preparing state-level integrated FREM strategy and action agendas; and (ii) exploring cost-effective, adaptive, sustainable, and

¹ In this context, the TA may also support the preliminary studies including field works to formulate a separate TA to prepare investment components of the Project for other northeastern states as necessary.

innovative riverbank erosion mitigation options and a range of flood management options for the selected sample subproject areas, including alternatives to conventional measures.

3. **International River Management Specialist/Team Leader.** The team leader will provide overall leadership to guide and support the members of the team while integrating the technical and institutional aspects and maintaining liaison with ASG and the Government. Tasks include (i) overseeing and guiding the overall FREM sector review and draft strategy and action agenda incorporating a basinwide integrated water resources management (IWRM) perspective; (ii) reviewing the proposals for the selected subprojects and confirming the prospects for justifying their selection; (iii) developing design options for flood and erosion prevention with a performance review of existing work, assessment of local and international experience and lessons, exploration of alternative options, and outlining of additional studies; (iv) outlining key long-term activities for sustainable FREM, such as satellite image-based riverbank erosion prediction and river monitoring; (v) formulating draft FREM options, with basic designs and pre-feasibility-level cost estimates; (vi) guiding field-level socioeconomic data collection, stakeholder consultation, and a workshop in Guwahati for disseminating phase 1 concepts and alternative FREM, and summarizing contributions from workshop participants for a future strategy; and (vii) preparing a draft final report and final report of phase 1, presenting clearly (a) a draft FREM strategy and action plan for Assam, and (b) a range of design options for mitigating flood and riverbank erosion for the specified subproject areas.

4. **National Consultants.** A team of five national consultants will be recruited from a local firm to work under close supervision and guidance of the team leader, to prepare (i) an integrated FREM strategy and action agenda (incorporating an IWRM perspective) at the state level, and (ii) a study of FREM options for the selected subproject areas. A technical working group will be formed comprising experts from the Water Resources Department (WRD) and other organizations and consultants. To prepare the former, the consultants will (i) assess the status and issues of FREM in Assam, northeastern region, and India at large; (ii) review and list existing policies, strategies, plans, and recommendations of the Government and ASG on FREM; (iii) assess ASG's FREM strategy and plan, in light of the Government strategy and international practices and lessons; (iv) assess the objective and strategy, effectiveness of FREM, institutional capacity, policy and legal framework, structural and nonstructural measures, land-use planning (including flood risk zoning), disaster management, watershed management, financial resources adequacy, stakeholder participation, and environmental and social safeguards procedures and capacities; (v) assess the soundness of technical analysis, including hydrometeorological and morphological aspects; (vi) assess any weaknesses and gaps, and measures to address those weaknesses; and (vii) develop a comprehensive framework and appropriate strategy for integrated FREM, and propose an action agenda that may be pursued under the ensuing loan.

5. For the FREM options for subproject areas, the consultants will (i) collect and develop base maps for the subproject areas; (ii) collect and compile available hydrological information and analyses, including hydrology and flood risk/depth levels, morphological surveys, satellite imagery, maps, and satellite pictures; (iii) assess development constraints (covering agriculture, fisheries, forestry, industries, roads and transport) and impacts of flooding and river erosion, and explore opportunities to reduce risks and enhance coping measures; (iv) develop preliminary subproject selection criteria; (v) prepare socioeconomic profiles (economic activities, poverty, incomes, population, scheduled tribes and scheduled castes, agriculture, industries, and existing infrastructure); (vi) assess the stability of the Brahmaputra River based on existing analyses and systematic records of low and high water levels, and outline morphological parameters; (vii) assist WRD in carrying out supporting river and land surveys; (viii) outline morphological work for phase 2, including implications for future bank stabilization efforts and flood levels, morphological prediction tool based on low-water satellite imagery, and cost of support services; (ix) assess an appropriate FREM strategy and synthesize options that could be pursued in phase 2, with pre-feasibility

assessment of identified options; and (x) assess an appropriate institutional modality for community participation and local resource mobilization.

B. Phase 2: Option Finalization, Feasibility Studies, Institutional Assessments, and Project Package (6.5 months)

6. At the outset, the consultants will prepare a detailed work plan setting out the outputs and methodology for preparing an investment project that meets the required MFF criteria, along with an effective communication strategy with ADB support. They will then undertake (i) consultative selection of options identified in phase 1 for the subprojects; (ii) feasibility studies and investment programming; (iii) assessments of related safeguards on resettlement, indigenous peoples, and the environment; (iv) institutional analyses to define appropriate actions under the Project and capacity development; and (v) preparation of an MFF project package.

7. **Participatory Finalization of FREM Options.** The consultants will support the selection of the FREM design options including structural and nonstructural measures. They will (i) define an effective stakeholder participation mechanism in selecting FREM options, designing and implementing works, and undertaking operation and maintenance (O&M); (ii) elaborate the selection criteria for subprojects; (iii) prioritize the intervention sites and assess present conditions and necessary works; (iv) evaluate various design options for FREM for the priority sites at pre-feasibility level, following a multi-criteria analysis of technical, social, financial, and environmental criteria, with public meetings and focus group discussions with stakeholders; and (v) recommend preferred FREM options for consideration and decision of a tripartite meeting including the Government and ASG within 2 months after the start of phase 2. Upon selection of appropriate options, the consultants will then (i) design flood protection measures and their design parameters; (ii) conduct flood benefit analysis; (iii) design riverbank erosion and pro-siltation works, and other measures (such as strategic retirement of embankments including the use of inner dikes); (iv) draft a social development and poverty reduction strategy including gender; and (v) arrange for a cumulative environmental impact assessment for improving FREM.

8. **Feasibility Studies and Investment Programming.** The consultants will conduct feasibility studies of the selected FREM options to appraise up to four sample subprojects. Specifically, they will (i) prepare feasibility-level designs including engineering, cost estimates, and implementation schedules; (ii) undertake baseline survey by assessing the economic, financial, social, and environmental impacts including potential flood damage incorporating varying flood probabilities and following relevant ADB guidelines; and define the scope for mitigating such impacts; and (iii) assess the risks arising from the subproject interventions and identify risk management measures. At this stage, the consultants will also support (i) the evaluation and selection of further subprojects proposed for the ensuing project at pre-feasibility level, and (ii) preparation of an investment program commensurate with the MFF modality and requirement for the ensuing project.

9. The activities in para. 8 will be undertaken with an application of a participatory mechanism as defined in para. 7. At this stage, the consultants will also review other ongoing development programs in the subproject areas or other parts of the state, with a view to identifying activities that could stimulate economic growth and poverty reduction, identify any complementary programs that could be included in the Project, and incorporate as appropriate, in consultation with ASG and the Government, such activities in the feasibility studies. Specific programs may include (i) infrastructure development, (ii) agriculture and fishery development, (iii) community development, (iv) livelihood support programs (targeting women and the poor), and (v) social assistance and relief programs.

10. **Safeguards Assessments.** The consultants will prepare a safeguards framework and plans as required, following ADB's policies on involuntary resettlement (1995), indigenous peoples

(1999), and environment (2002); the Operations Manual on involuntary resettlement (OM Section F2); and ASG and Government policies concerned.² On resettlement, the consultants will (i) review ASG and the Government policies and guidelines; (ii) assess ASG operations and WRD's arrangements; (iii) identify all potential involuntary resettlement impacts; (iv) arrange land survey, census, and asset inventory, and consultation with the affected people; (v) identify options for relocation, measures required to assist with transfer to new sites and to restore livelihood; (vi) define mechanisms to redress grievances; (vii) specify responsibilities for approving, implementing, financing, and monitoring resettlement plans (RPs), and capacity development programs if required; (viii) assess a resettlement budget, annual financing plan, implementation schedule, and monitoring plan; (ix) use the above (i)–(viii) in formulating a resettlement framework (RF) and RPs for sample subprojects; and (x) assist ASG and the Government in ensuring timely disclosure of resettlement information to affected persons.³ As for indigenous people, the consultants will prepare a framework for their development, and sample development plan or action plan if the impacts are found insignificant.

11. Regarding environmental impacts, the consultants will (i) review all subprojects and develop an environmental screening format to determine the appropriate environmental assessment of subprojects; (ii) prepare environmental impact assessments (EIA) and initial environmental examinations (IEE) of sample subprojects, in accordance with the Government's EIA Notification⁴ and ADB's *Environmental Assessment Guidelines*,⁵ assuming responsibility for obtaining approval and for submission to ADB; (iii) prepare the environmental assessment and review procedures framework for the project;⁶ (iv) assess the capacity of WRD to undertake scoping of environmental impacts, supervise environmental studies, and implement measures defined in the IEEs/EIAs, while recommending staffing and training requirements; and (v) provide on-the-job training to designated counterpart staff of WRD.

12. **Institutional Assessments.** The consultants will undertake further institutional analysis to lay out a sector road map to address the agendas identified in phase 1, covering FREM and sustainable O&M financing. To address the former, they will (i) prepare a work plan to define appropriate actions while organizing an inception workshop to address the identified agendas (covering state policy and institutional framework, planning and programming, comprehensive structural and nonstructural measures, disaster preparedness, integration with watershed management, and design and implementation guidelines), with a media campaign as appropriate; (ii) undertake analysis of WRD and related institutions, identify weaknesses and needs, and recommend improvements (covering organizational structure, human resource management, financial management to ensure sound governance using the relevant ADB questionnaire, knowledge base and asset management, business processes and management, and other administrative matters); (iii) define suitable institutional setup and arrangements to put FREM in operation within WRD and ASG; (iv) outline future activities for accumulating sufficient knowledge for planning and implementing FREM interventions, and river monitoring requirements; and (v) facilitate the preparation of a draft state water policy and associated framework such as state water plan.

13. To address maintenance funding gaps, the consultants will liaise with the departments of revenue and finance, and look at relevant initiatives in other sectors, in particular the O&M

² The ensuing project may establish subproject selection criteria that exclude subprojects having major negative social and environmental impacts, in consultation with ASG and the Government.

³ The following publication may be used as a guide when preparing the RF and subproject RPs: ADB. 1998. *Handbook on Resettlement: A Guide to Good Practice*. Manila; and ADB. 2001. *Handbook on Poverty and Social Analysis*. Manila.

⁴ The Environment (Protection) Act, 1986, amended 1991 and EIA Notification, S.O. 60(E) of 27 January 1994.

⁵ Available: http://www.adb.org/documents/Guidelines/Environmental_Assessment/default.asp.

⁶ Available: http://www.adb.org/documents/Guidelines/Environmental_Assessment/eaguidelines005.asp.

financing approach pursued in the ADB-assisted fiscal management program loan and in the road sector. The consultants will explore (i) measures to secure a dedicated revenue source for O&M of FREM infrastructure (e.g., establishing a flood cess, introducing user charges, earmarking a portion of existing property or excise taxes, etc.) and budgetary mechanisms to earmark the funds collected (e.g., establishing a separate FREM O&M fund); (ii) action plans to establish a statewide management information system for scheme O&M performance monitoring, planning, and prioritizing; (iii) participatory approaches to elicit beneficiary participation in O&M, such as training beneficiary organizations to do routine maintenance tasks, developing locally based monitoring and evaluation systems, and mobilizing local financing sources; and (iv) linkages with other government and funding agency-financed programs to help defray O&M costs, for example by tapping into the pool of labor available under the Guaranteed Employment Scheme to undertake O&M.⁷

14. **Project Packaging.** On the basis of the TA findings and using ADB's project appraisal document format, a comprehensive project proposal meeting the MFF requirements will be prepared. The proposal will include (i) an investment program spanning 5–6 years of priority FREM subprojects including pilot testing of innovative approaches as identified; (ii) a policy and institutional road map to establish and operate a participatory FREM system based on the comprehensive strategy developed and lessons learned and encompassing structural and nonstructural measures—flood and riverbank erosion forecasting, flood risk zoning and insurance programs, disaster preparedness and management, etc., along with initiation of steps toward IWRM; (iii) a program to build capacity, particularly of WRD, to strengthen its institutional basis and initial operation of effective and participatory FREM; (iv) a component to establish linkages to other essential development programs to enhance subproject development impacts; (v) resettlement framework and plans, IEEs/EIAs, and indigenous peoples' plans as required; (vi) detailed cost estimates and implementation schedules covering all project components and expenditures and financing plan (prepared using COSTAB software); (vii) a project procurement plan and procedural directions for advance actions; (viii) a project design and monitoring framework with performance indicators, monitoring mechanisms, and key assumptions duly linked up with the baseline survey outputs; and (ix) a program of pre-construction and initial institutional strengthening activities, which could include local FREM committee formation, detailed design, preparation of tender documents, and implementation of resettlement plans that could be undertaken prior to loan approval.

C. Panel of Experts

15. The panel of experts will provide external advice to assist WRD and the TA consultants in phase 2, by scrutinizing the draft TA outputs, identifying any gaps that still need to be addressed to attain its objectives, and recommending practical ways to address those gaps, in the light of the international most advanced technology and best practices related to FREM, and experience and lessons gained elsewhere in India. Comprising international and national river engineers, and an international morphologist, FREM/IWRM institutional specialists, and a fiscal management specialist, the panel will cover (i) cost-effective, innovative, and sustainable riverbank protection measures that would be applicable and affordable in Assam; (ii) ways to operationalize integrated FREM and IWRM; and (iii) development of sustainable O&M funding mechanisms to support the Project. In principle, the panel will meet during the mid-term stage of phase 2 for these agendas. The individual consultants under the panel will provide assessment reports in consultation with WRD and ADB.

⁷ Sustainable maintenance funding arrangements should be included in the subproject selection criteria.