ADB

Completion Report

Project Number: 45017-001
Technical Assistance Number: 8089
September 2017

India: Operational Research to Support Mainstreaming of Integrated Flood Management under Climate Change

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<table>
<tr><td colspan="3">TA Number, Country, and Name:

TA 8089-IND: Operational Research to Support Mainstreaming of Integrated Flood Management under Climate Change</td><td colspan="2">Amount Approved: $1,450,000

Revised Amount: Not applicable</td></tr>
<tr><td colspan="2">Executing Agency:
Ministry of Water Resources, River Development and Ganga Rejuvenation</td><td>Source of Funding:
Government of the United Kingdom and Multi-Donor Trust Fund[1] under the Water Financing Partnership Facility</td><td>Amount Undisbursed:
$263,004</td><td>Amount Utilized:
$1,186,996</td></tr>
<tr><td>TA Approval Date:

1 June 2012</td><td>TA Signing Date:

28 August 2012</td><td>Fielding of First Consultants:

20 December 2012</td><td>TA Completion Date
Original:
1 October 2014
Account Closing Date
Original:
1 October 2014</td><td>Actual: 31 December 2015

Actual: 27 June 2016</td></tr>
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Description

Based on the request from Ministry of Water Resources (MOWR), River Development and Ganga Rejuvenation, Asian Development Bank provided technical assistance (TA) support for the government in undertaking operational research to identify and test Integrated Flood Management (IFM) strategies appropriate for India. The strategies included structural as well as nonstructural measures and provided the mechanisms for mainstreaming IFM at different government levels. The studies under the TA were conducted for two sub-basins; one intra-state and another inter-state, for developing strategies and approaches appropriate for implementation in these sub-basins which can be replicated in other flood-prone basins and states. The TA was planned to promote change from a current structurally-focused flood protection intervention approach in the country towards mainstreaming of integrated and holistic flood management measures.

Expected Impact, Outcome, and Outputs

The TA impact was to strengthen the protection and resilience of the flood-prone areas in India. The outcome was to improve knowledge of integrated flood management (IFM) for decision making and program implementation. The TA has four outputs: (i) appropriate IFM plan for the focal sub-basin, incorporating climate change impacts, developed, (ii) comprehensive assessment and feasibility analysis of various approaches and best practices in IFM conducted, (iii) knowledge sharing and awareness program conducted, and (iv) knowledge products on appropriate IFM techniques developed.

Delivery of Inputs and Conduct of Activities

The TA was implemented in two phases as originally envisaged. Phase 1 was scoping and planning studies involving (i) review of the lessons learned from the integration of structural and nonstructural components of flood management in India and globally; (ii) identification of the scope and location of the research activities; and (iii) preliminary data collection, and initiation support for phase 2. Two international experts for 4 person-months and four national experts for 11 person-months were recruited through individual consultant selection method. The phase 1 study was completed in February 2014, covering various levels of consultations with MOWR, Central Water Commission (CWC) and state governments of Bihar and Odisha. The phase 1 began in March 2013 and completed in February 2014.

The phase 2 study was conducted by consultants from 19 February 2014 to 31 August 2015. It included operational research to support mainstreaming of IFM strategies considering projected future scenarios and climate change uncertainties. Based on the recommendations of phase 1, two pilot sub-basins, Brahmini-Bairatarni sub-basin in Odisha and Burhi-Gandak in Bihar were selected for developing appropriate IFM plans incorporating climate change impacts. A consulting firm with an internationally recognized portfolio of flood management research was engaged through a competitive process, with 3 international experts for 13 person-months and 15 national experts for 87 person-months. During the selection process of the consultants (individual and firm), no difficulty was faced in getting required expertise in accomplishing the scope of assignment. The consultants demonstrated great professionalism completing works as per their terms of reference in a focused manner. The consultants' services were rated satisfactory.

National Water Mission (NWM) under MOWR satisfactorily performed its key role of overseeing TA activities. CWC, an attached office of MOWR extended excellent support throughout TA implementation, provided office facilities,

[1] Financing partners: the governments of Australia, Austria, Norway, Spain and Switzerland. Administered by ADB.

facilitated sourcing relevant data inputs and coordination with various stakeholders including the state governments. The original TA closing date of 1 October 2014 was extended by 15 months due to initial procedural delays during phase 1 and subsequent delays in acquisition of relevant data from various agencies for phase 2 of the TA. ADB closely monitored the progress of the consultants and quality of deliverables, and provided guidance to the TA during implementation.

Evaluation of Outputs and Achievement of Outcome

The TA substantially achieved the expected outputs and outcome. The TA was implemented largely as planned and without any significant changes. One of the major outputs of the TA was developing appropriate IFM plans for one focal sub-basin and two secondary sub basins. The phase 1 report under the TA, the executing agency recommended to undertake detailed studies for two focal sub basins, one intra-state and another inter-state instead of planned detailed study for one focal sub basin and preliminary studies for two secondary basins. Accordingly, plans were prepared under phase 2 and accepted by the government for the two selected focal sub basins; Burhi-Gandak basin in Bihar and Brahmini-Baitarani basin in Odisha. The IFM plan included comprehensive assessment and analysis of various approaches and international best practices adapting to local context. As part of training and capacity building, international consultants worked closely with CWC officials in the development and setting up of flood forecasting model in these two selected sub-basins. The TA held extensive consultations with various stakeholders, including state and central government agencies, and received their inputs for the studies. All planned activities leading to project outputs and outcome were undertaken. However, considerable unutilized amount under the TA was primarily due to savings in reimbursable and out of pocket expenses which were based on actuals under phase 2 consultancy contract.

The TA conducted focus group discussions and household survey of approximately 500 families for community needs assessment, conducted specialized hands-on training courses for various government agencies, organized two state level workshops at Patna and Bhubaneswar on 14 and 20 October 2014, conducted two focus group discussions held at Bihar and Odisha in December 2014 and January 2015; and organized a roundtable meeting held in August 2015 for finalization of project outputs. The TA also provided suggestions on revisions to CWC's Guidelines on preparation of detailed project reports (DPR) for flood management schemes. In addition, Two peer reviewed papers on the topics agreed by the executing agency were submitted for publication in Hydrology and Current Science Journal and Current Sciences Journal. The TA analyzed both river basins, and found that around 90% of the average annual damage could be avoided by providing 1:25 return period flood safety standard for rural areas. In appraisal of flood schemes, the executing agency adopts the same standard for rural areas. The TA report and its recommendations were accepted by the MOWR in December 2015.

Overall Assessment and Rating

Overall, the TA is *successful* as it substantially achieved the design target. The TA was *relevant* since it was aligned with the government basin-wise integrated flood management approach adopted in 12 plan document and ADB strategies and policies on flood protection and flood risk management. It was *effective* since it achieved the expected outputs and outcome. It provided a strategic framework for preparing Integrated Flood Management plans for two focal sub-basins in flood affected states – Burhi-Gandak, Bihar and Brahmini-Baitarani, Odisha. The TA was also *efficient* with 82% of TA funds utilized. The 15-month extension was needed due to initial delays and time spent in acquisition of relevant data. The TA is *likely sustainable* as the outputs can be further scaled up by the government for replicating the IFM plans to other similar basins for strengthening flood mitigating program. The incorporation of climate change adaptation measures in CWC's guidelines for preparation of DPRs for flood control schemes would help the government to mainstream climate change aspects in future investments. The participatory approaches allowed a high-level stakeholder involvement in the IFM plans as well as in creating awareness and understanding to a wide range of stakeholders and in developing effective approach for IFM.

Major Lessons

The outputs and key activities under the TA have contributed towards developing strategic framework and approaches for state and national government partnerships in sub-basin strategic planning for preparing sub-basin IFM plans. The state governments are responsible for implementation of flood mitigation measures, and therefore integration of community participation in planning and decision making process is essential for prioritizing project investments and execution of IFM plans. Land zoning is not actively implemented as part of flood management as legislation is still not enacted in many states. The documents developed under the TA, suggested both national and state government's focused efforts to ensure adoption and implementation of flood management strategies.

Recommendations and Follow-Up Actions

The TA recommended basin-level flood risk analysis and evaluation for effective basin management to be implemented through river basin organizations (RBOs). It redefined roles and responsibilities of existing and new RBOs for the development and implementation of basin level flood management plans. The TA recommended

undertaking studies on embankment breaches using flood modelling and effective reservoir operation rules for preventing future disasters, guiding evacuation, rescue and relief operations. The substantial rise in flood hazard due to climate change, as projected in this study, warrant follow up studies to assess the uncertainties associated with the projections. The TA recommended adoption of urgent, short term and medium to long term flood mitigation measures for the selected sub-basins. It is recommended for the executing agency to continue taking steps necessary for adopting IFM strategies developed under the TA, replicating in other similar basins and integrating these into practice.

TA = technical assistance.

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