



# Technical Assistance Report

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Project Number: 38327  
December 2007

People's Republic of China: Implementing the  
National Flood Management Strategy  
(Cofinanced by the Netherlands Trust Fund for the  
Water Financing Partnership Facility)

Asian Development Bank

## CURRENCY EQUIVALENTS

(as of 30 November 2007)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.135
\$1.00	=	CNY7.40

## ABBREVIATIONS

ADB	–	Asian Development Bank
DWR	–	Department of Water Resources
GDP	–	gross domestic product
MWR	–	Ministry of Water Resources
PRC	–	People's Republic of China
TA	–	technical assistance
TIO	–	TA implementation office
TMO	–	TA management office

## TECHNICAL ASSISTANCE CLASSIFICATION

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

## NOTE

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

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## I. INTRODUCTION

1. During the country programming midterm review mission in March 2006, the Government of the People's Republic of China (PRC) requested technical assistance (TA) from the Asian Development Bank (ADB) to implement the national flood management strategy.<sup>1</sup> The concept paper for the TA project was included in the country strategy and program update (2007–2008).<sup>2</sup> During the country programming review mission in November 2006, the Government confirmed its request. In June 2007, a fact-finding mission visited the PRC and reached understanding with the Government on the TA impact, outcome, output, cost estimates, financing plan, implementation arrangements, and the consultants' terms of reference. The TA design and monitoring framework is in Appendix 1.

## II. ISSUES

2. The PRC has a long history of loss of life and damage to property due to flooding, costing 1% of the gross domestic product (GDP) per year on average. The Government has traditionally relied on structural measures to control floods. However, as floodplains have become more densely settled due to population pressure, flood damage has risen, despite major public investment in structural flood control measures. The Government, recognizing the need for a more integrated approach to flood management, in 1997 passed the Flood Control Law. It demonstrates the Government's assessment that more integrated flood management is necessary in order to adapt to changing social, hydrological, and environmental conditions along the nation's major waterways. The Flood Control Law provided a platform for better integration of water disaster issues, with provisions for more coordination between administrative departments and for recognition of the role of land management in flood management. Furthermore, in the wake of the catastrophic floods of 1998—when the Yangtze and Songhua-Liao river basins flooded more than 2.5 million hectares, damaged 7 million houses, killed 3,500 people, and resulted in monetary losses of about \$30 billion—the Government announced a new policy emphasizing the importance of an integrated approach to natural resources management, including flood management.

3. To shift from dependence on structural measures for reducing flood damage to a balanced approach using both structural and nonstructural measures, the Ministry of Water Resources (MWR) supported by ADB's TA<sup>3</sup> prepared a national flood management strategy in 2005. This TA involved four major activities: (i) assessment of the present flooding situation in selected provinces, (ii) identification of options for flood management, (iii) formulation of the national flood management strategy and its action plan to provide a general basis for designing and guiding integrated flood management programs at the provincial level, and (iv) wider dissemination of study findings and awareness building. Preliminary ways to implement the national flood management strategy were identified, including strengthening an enabling institutional framework, combined with enhanced interagency and interministry coordination.

4. A basic conclusion of the previous TA was that the traditional PRC approach of using structural flood control measures, which relies on major civil works, is no longer practically or economically feasible. Integrated management of human occupation and use of floodplains should become the core of a new concept of flood management in the PRC. This concept is called flood risk management. Flood risk management is based on an analysis of the exposure

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<sup>1</sup> The TA first appeared in *ADB Business Opportunities* on 29 May 2007.

<sup>2</sup> ADB. 2006. *Country Strategy and Program Update (2007–2008): People's Republic of China*. Manila.

<sup>3</sup> ADB. 2006. *Technical Assistance to the People's Republic of China for the Flood Management Strategy Study*. Manila.

to flood hazards faced by a community. This is followed by identification, assessment, and implementation of appropriate measures to manage or reduce flood risk to levels regarded as acceptable. The measures used to manage or reduce flood risks can be structural or nonstructural. Structural measures involve construction of civil works, having the objective of keeping floodwater away from people or property that would otherwise be at risk. Nonstructural measures involve limiting exposure to flood risk through planning measures that regulate future development using land zoning, property acquisition, and resettlement. Nonstructural measures also involve reducing the vulnerability of people, property, and livelihood at risk by providing flood warnings, emergency response planning, flood proofing of buildings, and other similar relatively low-cost measures.

5. In general, structural flood control is significantly more expensive than nonstructural flood management. The feasibility of using large-scale structural works in the PRC is further limited because of scarce fiscal resources, especially in provinces where the need for social services is intense, and also because of the complexity and lack of effectiveness of large-scale structural works construction, particularly in areas prone to flash flooding. This supports the widespread adoption of flood risk management for flood control in the PRC's poor central and western regions.

6. In the southwestern region of the PRC, flash flooding has great impact. Flash flooding is especially severe and destructive to life, property, and means of livelihood in small upstream catchment basins where people often live at the bottom of narrow river valleys. In the central region, riverine flooding is the most common form of flooding. Periodic and long-term riverine flooding disrupts housing, infrastructure, and means of livelihood. The risk of flood damage on a recurrent basis inhibits public and private investment in flood detention basins.

7. In order to follow up the previous TA, which developed the national flood management strategy and action plan for the PRC, MWR has requested ADB for a new TA project to further develop and implement the national flood management strategy at the provincial level with a focus on the central and western regions of the PRC. During the fact-finding mission, the Government requested that pilot studies be implemented under the proposed TA in a typical mountainous area with serious flash flooding (Sichuan province) and a typical floodplain with flood detention basins (Hunan province), and that through pilot studies the TA implement (i) the introduction of nonstructural measures to manage vulnerability to the potential danger and damage caused by exposure to flood risk, including flood risk mapping, flood forecasting systems, flood warning, and an emergency response plan; (ii) the raising of local people's awareness of flood management; and (iii) the improvement of flood management policies.

8. ADB has been increasingly involved in flood management operations in the PRC, e.g., the Yellow River Flood Management Sector Project<sup>4</sup> and the Hunan Flood Management Sector Project.<sup>5</sup> The proposed TA will support provinces to adopt the national flood management strategy and also contribute to integrated water resources management by exploring the potential for integrating flood management with water resources management. The TA is therefore in line with the priorities of ADB's water policy in promoting a national focus on water sector reform and is fostering integrated management of water resources. The proposed TA is also in line with the country strategy and program update (2007–2008) and supports the Government's objectives in the water sector.

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<sup>4</sup> ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to the People's Republic of China for the Yellow River Flood Management (Sector) Project*. Manila.

<sup>5</sup> ADB. 2006. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Technical Assistance Grant to the People's Republic of China for the Hunan Flood Management Sector Project*. Manila.

### III. THE TECHNICAL ASSISTANCE

#### A. Impact and Outcome

9. The impact of the TA is to promote the sustainable economic and social development of flood-prone areas in the PRC through effective and integrated measures of flood management. The outcome of the TA is the implementation of the national flood management strategy at the provincial level.

#### B. Methodology and Key Activities

10. The TA will be implemented in two phases. In the first phase, to be conducted over a period of 5 months, the consultants will (i) review flood management in Hunan and Sichuan provinces, including existing provincial flood management strategies; (ii) identify key issues for future flood management in these two provinces; (iii) provide recommendations for improving existing provincial flood management strategies following the national flood management strategy; and (iv) develop provincial flood management action plans and implementation priorities, particularly for nonstructural measures, following the national flood management action plan in order to implement the national flood management strategy in the two provinces. Consultants will carry out these tasks through study, field investigation, and workshops. Workshops will be held in each province to gather information and data at the beginning and to obtain feedback on the developed provincial flood management strategies and action plans at the end of this phase.

11. In the second phase, to be conducted over a period of 7 months, the consultants will help local governments conduct pilot tests in implementing the national flood management strategy, particularly nonstructural measures, in the two provinces based on the provincial action plans developed in the first phase, and develop capacity of local government staff through the pilot tests. The consultants will introduce to local governments nonstructural measures to manage vulnerability to the potential danger and damage caused by exposure to flood risk, including flood risk mapping, flood forecasting systems, flood warning and emergency response, and raising of local people's awareness of flood management. These nonstructural measures will be implemented by local government staff under the guidance of the consultants in selected pilot-test areas in the two provinces. Prototype investment projects for flood management will also be proposed and appraised by local government staff under the guidance of the consultants and in accordance with the provincial action plans. Based on the activities in the first phase and the results of the pilot tests, the consultants will provide recommendations for implementing the national flood management strategy at the provincial level. A national workshop at central level will be undertaken at the end of the TA to disseminate its findings.

#### C. Cost and Financing

12. The total cost of the TA is estimated at \$650,000 equivalent. The Government has requested ADB to finance \$500,000 of the TA costs. The TA will be cofinanced on a grant basis by ADB's TA funding program for \$200,000 equivalent and by the Netherlands Trust Fund for the Water Financing Partnership Facility administered by ADB for \$300,000 equivalent. The Netherlands Trust Fund will be used for specific activities shown in Appendix 2. The Government will provide \$150,000 equivalent to cover in-kind counterpart costs and services, including the provision of necessary data, office space, counterpart staff, site transportation, and other administrative support. Detailed cost estimates and financing plan are in Appendix 2.

## D. Implementation Arrangements

13. MWR will be the Executing Agency for the TA. MWR is responsible for the overall administration of water resources throughout the PRC and has shown strong capacity for executing externally-assisted projects (footnotes 3, 4, and 5). A steering committee will be established under MWR to provide overall guidance for TA implementation. The steering committee members will be senior representatives from MWR, the Ministry of Finance, the National Development and Reform Commission, and other ministries, as necessary. A TA project management office (TMO) will be established in MWR to act as the secretariat of the steering committee, administer the day-to-day activities of the TA, and coordinate with ADB and the two provinces. MWR will assign an experienced full-time MWR staff member to serve as the director of the TMO, and counterpart staff to work closely with the TA consultants. MWR will also provide office space, access to communications and copiers, and logistical support for TA implementation. The director of the TMO will manage and liquidate funds provided by ADB and the Government for training, seminars, and conferences.

14. The respective departments of water resources (DWRs) of Hunan and Sichuan provinces will be the implementing agencies. A TA implementation office (TIO) will be established in each DWR. Each DWR will assign an experienced full-time DWR staff member to serve as TA task manager, and counterpart staff to work closely with the TA consultants. Each DWR will also provide office space, access to communications and copiers, and logistical support for TA implementation.

15. A panel of technical experts will be established as required to provide its opinions on the work of the TA consultants, the TMO, and TIOs. The panel members will be experts from relevant sectors. The panel will collaborate with the TMO and TIOs in organizing at least three 1-day panel meetings during TA implementation (at inception, midterm, and final phases).

16. The TA will be implemented over 12 months, starting in March 2008 and ending in February 2009. Substantial time will be devoted to survey, fieldwork, workshops, and capacity development. It is expected that at least two workshops in each province and a national workshop at central level will be undertaken. The consultants will submit an inception report within the first 4 weeks of the start of the TA, and an interim report 5 months after the TA starts. A draft final report will be submitted 10 months after the TA commencement, and a final report at the TA conclusion. The inception, interim, and draft final reports will be subject to review by the Government, and ADB. All reports are to be written in English and translated into Chinese. Outline terms of reference for the consultants are in Appendix 3.

17. The TA will be carried out by a team of consultants engaged through a firm. A total of 8 person-months of international consultancy services and 42 person-months of national consultancy services will be required. The consultants will be engaged by ADB in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time). The consulting firm will be selected by (i) inviting simplified technical proposals; and (ii) using the quality- and cost-based selection method, with a quality–cost weighting of 80:20. The office equipment provided under the TA for the consultants will be procured in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time) and will be handed over to MWR and the implementing agencies upon TA completion. Disbursement under the TA will be undertaken in line with ADB's *Guidelines for Disbursement of Technical Assistance Grants*. Advance payment procedures will be adopted to facilitate timely implementation of activities related to training, seminars, and conferences. ADB funds for training, seminars, and conferences will be transferred to an existing bank account of MWR and managed and liquidated by the director of the TMO. ADB will undertake intensive review and supervision by

fielding missions at critical stages of TA implementation, particularly at inception, midterm, and final stages, and extending regular support from both the headquarters and the resident mission.

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

18. The President, acting under the authority delegated by the Board, has approved (i) ADB administering a portion of the technical assistance not exceeding the equivalent of \$300,000 to be financed on a grant basis by the Netherlands Trust Fund for the Water Financing Partnership Facility, and (ii) ADB providing the balance not exceeding the equivalent of \$200,000 on a grant basis to the Government of the People's Republic of China for implementing the National Flood Management Strategy, 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><b>Impact</b></p> <p>Sustainable economic and social development of flood-prone areas in the People's Republic of China</p>	<ul style="list-style-type: none"> <li>Decreased threat of floods</li> <li>Promoted economic and social development of flood-prone areas</li> </ul>	<ul style="list-style-type: none"> <li>National and provincial statistics</li> </ul>	<p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Central and provincial governments continue to implement the national and provincial flood management strategies.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Lack of cooperation between national and provincial government agencies</li> </ul>
<p><b>Outcome</b></p> <p>Implementation of the national flood management strategy at the provincial level</p>	<ul style="list-style-type: none"> <li>Provincial regulations on flood management issued.</li> </ul>	<ul style="list-style-type: none"> <li>Central and provincial government documents and reports</li> </ul>	<p><b>Assumption</b></p> <ul style="list-style-type: none"> <li>Provincial governments remain highly committed to a balanced flood-management approach.</li> </ul>
<p><b>Outputs</b></p> <ol style="list-style-type: none"> <li>Recommendations for improving provincial flood management strategies of Hunan and Sichuan provinces following the national flood management strategy</li> <li>Development of provincial flood management action plans to implement the national strategy in the two provinces</li> <li>Pilot tests implementing the national flood management strategy in the two provinces based on the provincial action plans</li> <li>On-the-job capacity building through the pilot tests</li> <li>Dissemination of lessons learned to promote the implementation of the national flood management strategy at the provincial level</li> </ol>	<ul style="list-style-type: none"> <li>Recommendations for improving the provincial flood management strategies are appropriately provided.</li> <li>Provincial flood management action plans are developed to implement the national flood management strategy in the two provinces.</li> <li>Local government staff are capable to implement the national flood management strategy based on the provincial action plans.</li> <li>Lessons learned to promote the implementation of the national flood management strategy at the provincial level are disseminated to the other provincial governments.</li> </ul>	<ul style="list-style-type: none"> <li>Inception report</li> <li>Interim report</li> <li>Draft final report</li> <li>Final report</li> <li>MOU or aide memoire and BTOR of TA project review missions</li> </ul>	<p><b>Assumptions</b></p> <ul style="list-style-type: none"> <li>Necessary information is available on time.</li> <li>All geographical sites are accessible without any government restriction.</li> <li>MWR facilitates the required meetings, workshops, and training.</li> </ul> <p><b>Risk</b></p> <ul style="list-style-type: none"> <li>Lack of ownership and support from pilot local governments</li> </ul>

Activities with Milestones	Inputs (\$)
<ol style="list-style-type: none"> <li>1. Review flood management in Hunan and Sichuan provinces and identify key issues for future flood management (completed by week 14).</li> <li>2. Provide recommendations for improving provincial flood management strategies of Hunan and Sichuan provinces following the national flood management strategy, and develop provincial flood management action plans and implementation priorities to implement the national strategy in the two provinces (completed by week 21).</li> <li>3. Conduct pilot tests of implementing the national flood management strategy in the two provinces based on the action plans, and develop capacity of local government staff through the pilot tests (completed by week 43).</li> <li>4. Provide recommendations for the implementation of the national flood management strategy at the provincial level (completed by week 45).</li> <li>5. Prepare a draft final report (completed by week 47).</li> <li>6. Submit a final report (completed by week 51).</li> </ol>	<p><b>ADB 200,000</b></p> <ul style="list-style-type: none"> <li>• Consulting services, 14 person-months 100,500</li> <li>• International and local travel 9,000</li> <li>• Reports, communications, and translation 3,000</li> <li>• Equipment 17,000</li> <li>• Training, seminars, and conferences 50,000</li> <li>• Surveys 7,000</li> <li>• Miscellaneous administration and support cost 4,500</li> <li>• Contingencies 9,000</li> </ul> <p><b>Netherlands Trust Fund for WFPF 300,000</b></p> <ul style="list-style-type: none"> <li>• Consulting services, 36 person-months 246,500</li> <li>• International and local travel 14,000</li> <li>• Reports, communications, and translation 17,000</li> <li>• Miscellaneous administration and support cost 11,500</li> <li>• Contingencies, 11,000</li> </ul> <p><b>Government 150,000</b></p> <ul style="list-style-type: none"> <li>• Office accommodation and transport 60,000</li> <li>• Conference 15,000</li> <li>• Remuneration and per diem of counterpart staff 65,000</li> <li>• Others 10,000</li> </ul>

ADB = Asian Development Bank, BTOR = back-to-office report, MOU = memorandum of understanding, MWR = Ministry of Water Resources, TA = technical assistance, WFPF = Water Financing Partnership Facility.

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

Item	Total Cost
<b>A. Asian Development Bank (ADB) Financing <sup>a</sup></b>	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	47.5
ii. National Consultants	53.0
b. International and Local Travel	
i. International Travel	6.0
ii. Local Travel	3.0
c. Reports, Communications, and Translation	3.0
2. Equipment <sup>b</sup>	17.0
3. Training, Seminars, and Conferences <sup>c</sup>	50.0
4. Surveys	7.0
5. Miscellaneous Administration and Support Costs	4.5
6. Contingencies	9.0
<b>Subtotal (A)</b>	<b>200.0</b>
<b>B. Netherlands Trust Fund for the Water Financing Partnership Facility Financing <sup>d</sup></b>	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	112.5
ii. National Consultants	134.0
b. International and Local Travel	
i. International Travel	9.0
ii. Local Travel	5.0
c. Reports, Communications, and Translation	17.0
2. Miscellaneous Administration and Support Costs	11.5
3. Contingencies	11.0
<b>Subtotal (B)</b>	<b>300.0</b>
<b>C. Government Financing</b>	
1. Office Accommodation and Transport	60.0
2. Training and Conference <sup>e</sup>	15.0
3. Remuneration and Per Diem of Counterpart Staff	65.0
4. Others <sup>f</sup>	10.0
<b>Subtotal (C)</b>	<b>150.0</b>
<b>Total</b>	<b>650.0</b>

<sup>a</sup> Financed on a grant basis by the Asian Development Bank's technical assistance funding program.

<sup>b</sup> Includes office computers with wireless broadband internet access, printer, fax, and scanner machines, and other small peripherals for the consultants.

<sup>c</sup> Includes TA technical panel meetings and workshops for which advance payment facility will be established, managed, and liquidated by the director of a technical assistance management office to be established in the Ministry of Water Resources.

<sup>d</sup> Administered by Asian Development Bank.

<sup>e</sup> Includes steering committee meetings.

<sup>f</sup> Includes provision of necessary data and other administrative support.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

### A. Overall Scope of Work

1. The impact of the technical assistance (TA) is to promote the sustainable economic and social development of flood-prone areas in the People's Republic of China (PRC) through effective and integrated flood management measures. The outcome of the TA is the implementation of the national flood management strategy at the provincial level.

2. The TA will be carried out by a team of consultants engaged through a firm. A total of 8 person-months of international consultancy services and 42 person-months of national consultancy services will be required. The consultants will be engaged by the Asian Development Bank (ADB) in accordance with ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time). The consulting firm will be selected by (i) inviting simplified technical proposals; and (ii) using the quality- and cost-based selection method, with a quality–cost weighting of 80:20. The office equipment provided for the consultants under the TA will be procured in accordance with ADB's *Procurement Guidelines* (2007, as amended from time to time) and will be handed over to the Executing Agency<sup>1</sup> and implementing agencies<sup>2</sup> upon TA completion. The TA is expected to start in March 2008 and be completed in February 2009, and will be implemented in two phases.

#### 1. First Phase

3. The first phase will be conducted over a period of 5 months, as described below.

4. **Review of the National Flood Management Strategy.** The Ministry of Water Resources, supported by ADB's TA<sup>3</sup> prepared a national flood management strategy in 2005. The consultants will review the reports prepared under this TA, particularly the strategic framework for future flood management in the PRC, and the action plan to provide a general basis for designing and guiding integrated flood management programs at the provincial level.

5. **Review of Flood Management in Hunan and Sichuan Provinces.** A workshop will be held in each province at the beginning of this component for information and data gathering. The consultants, through study, field investigation, and workshops, will review:

- (i) relevant provincial policy and regulations,
- (ii) the institutional structure and administrative procedures,
- (iii) the current approach to structural and nonstructural measures,
- (iv) recent proposals for strategic framework,
- (v) how decisions are made,
- (vi) performance during recent floods, and
- (vii) constraints and barriers to improvement of practice in the two provinces.

6. **Identification of Key Issues for Future Flood Management in the Two Provinces.** The consultants will identify key issues for future flood management in the two provinces including (i) management of key types of flood problems, (ii) specific management issues, and (iii) strategic approaches.

7. **Recommendations for Improving Provincial Flood Management Strategies.** The consultants will provide recommendations for improving existing provincial flood management

<sup>1</sup> The Executing Agency is the Ministry of Water Resources.

<sup>2</sup> The implementing agencies are the departments of water resources of Hunan and Sichuan provinces.

<sup>3</sup> ADB. 2006. *Technical Assistance to the People's Republic of China for the Flood Management Strategy Study*. Manila.

strategies of Hunan and Sichuan provinces, following the national flood management strategy. Key elements of the recommendations are

- (i) institutional foundation;
- (ii) standardized planning procedures using a well-structured methodology for the development of flood management plans and for proposal and appraisal of projects;
- (iii) managing flood hazard by flood control works and catchment management;
- (iv) managing exposure to flood hazard by land use control;
- (v) managing vulnerability to the potential danger and damage caused by exposure to flood risk by nonstructural flood management measures such as flood risk mapping and a flood forecasting and warning system; and
- (vi) potential for integrating flood management with water resources management, including the operation of multifunction reservoirs for flood control and water supply, and the use of floodwaters for enhancing groundwater recharge.

8. **Development of Provincial Flood Management Action Plans.** The consultants will develop provincial flood management action plans and implementation priorities, particularly for nonstructural measures, to implement the national flood management strategy in the two provinces. This task will be guided by the national flood management action plan. Key elements of a provincial flood management action plan are (i) legislation and policies, (ii) institutional development, (iii) planning and administration, (iv) flood hazard management, (v) management of exposure, (vi) management of vulnerability, (vii) linkage between flood management and water resources management, (viii) research and education, and (ix) funding and resources.

9. A workshop will be held to gather feedback on the developed provincial action plan in each province.

## 2. Second Phase

10. The second phase will be conducted over a period of 7 months, as described below.

11. **Pilot Tests and Capacity Building for the Implementation of the National Flood Management Strategy.** The consultants will help local governments conduct pilot tests of implementing the national flood management strategy, particularly nonstructural measures, in the two provinces, based on the provincial action plans developed in the first phase, and develop the capacity of local government staff through pilot tests. The consultants will introduce to local governments nonstructural measures to manage vulnerability to the potential danger and damage caused by exposure to flood risk, including flood risk mapping, a flood forecasting system, flood warning and emergency response, and raising of local people's awareness of flood management. These nonstructural measures will be implemented by local government staff under the guidance of the consultants in selected pilot-test areas in the two provinces. Prototype investment projects for flood management will also be proposed and appraised by local government staff under the guidance of the consultants, in accordance with the provincial action plans.

12. **Identification and Dissemination of Lessons Learned.** Based on the activities in the first phase and the results of the pilot tests, the consultants will provide recommendations for implementing the national flood management strategy at the provincial level. A national workshop at central level will be undertaken to disseminate the TA's findings.

## **B. Reporting Requirements**

13. The consultants will produce (i) an inception report within 4 weeks of TA project commencement, (ii) an interim report 5 months after TA project commencement, (iii) a draft final report 10 months after TA commencement, and (iv) a final report at the TA project conclusion.

14. The inception, interim, and draft final reports will be subject to review by the Government and ADB. All reports are to be written in English and translated into Chinese. Five copies (English) of each report are to be submitted to ADB, and 15 copies (both Chinese and English) are to be submitted to the Ministry of Water Resources (as the Executing Agency) and the implementing agencies.

15. The inception report will present results of the review of the national flood management strategy and the initial review of flood management in the two provinces, and an approach for the TA project, including a work plan and an implementation schedule. For the two provinces, the interim report will present (i) results of the full review of flood management, (ii) key issues for future flood management, (iii) recommendations for improving existing provincial flood management strategies, and (iv) provincial flood management action plans and implementation priorities to implement the national flood management strategy. The draft final report will cover (i) contents of the interim report, (ii) results of pilot tests and capacity building for implementation of the national flood management strategy, and (iii) lessons learned to promote implementation of the national flood management strategy at the provincial level. The final report will reflect comments made by the Government and ADB.

## **C. Terms of Reference**

### **1. International Consultants**

#### **a. Flood and Water Resources Management Specialist and Team Leader (5 person-months)**

16. The specialist will have a postgraduate degree in civil engineering and over 15 years of work experience in flood management. Experience in working for flood management strategies and plans in the PRC will be highly regarded. The specialist will

- (i) coordinate all TA activities as team leader;
- (ii) review the reports of ADB's Technical Assistance to the People's Republic of China for the Flood Management Strategy Study (2006);
- (iii) finalize the approach for the TA, including a work plan and implementation schedule;
- (iv) appropriately assign team members for the necessary work;
- (v) review (a) the current approach to structural and nonstructural measures, (b) recent proposals for strategic framework, (c) performance during recent floods, and (d) constraints and barriers to improvement of practice in the two provinces;
- (vi) identify key issues for future flood management in the two provinces, including management of key types of flood problems, specific management issues, and strategic approach;
- (vii) provide recommendations for improving existing provincial flood management strategies of the two provinces in terms of (a) standardized planning procedures for the development of flood management plans and for proposal and appraisal of projects; (b) flood hazard management by flood control works and catchment management; and (c) the potential for integrating flood management with water resources management, including the operation of multifunction reservoirs for

- flood control and water supply and the use of floodwaters for enhancing groundwater recharge;
- (viii) develop provincial flood management action plans and priorities to implement the national flood management strategy in the two provinces, particularly for planning and administration, flood hazard management, and link between flood management and water resources management;
- (ix) prepare a handbook to disseminate recommendations for improving provincial flood management strategies and the developed provincial flood management action plans;
- (x) conduct pilot tests in implementing the national flood management strategy, particularly nonstructural flood management measures, based on the action plans, and develop the capacity of local government staff through the pilot tests; and
- (xi) provide recommendations for implementing the national flood management strategy at the provincial level.

17. The specialist will also (i) prepare the inception, interim, draft final, and final reports; and (ii) organize at least two workshops in each province at the beginning and end of the first phase, and at least one national workshop at central level at the end of TA implementation.

**b. Nonstructural Flood Management Specialist (3 person-months)**

18. The specialist will have a postgraduate degree in hydrologic flood studies and at least 10 years of work experience in nonstructural flood management including flood risk mapping and flood forecasting and warning systems. Experience in working for flood management in the PRC will be highly regarded. The specialist will

- (i) review current nonstructural measures and performance during recent floods in the two provinces;
- (ii) provide recommendations for improving existing provincial flood management strategies of the two provinces, particularly to manage vulnerability to the potential danger and damage caused by exposure to flood risk by nonstructural flood management measures such as flood risk mapping and flood forecasting and warning systems;
- (iii) develop provincial flood management action plans and implementation priorities to implement the national flood management strategy in the two provinces, particularly for vulnerability management;
- (iv) conduct pilot tests in implementing the national flood management strategy, particularly in vulnerability management, based on the action plans, and develop the capacity of local government staff through the pilot tests; and
- (v) undertake any other necessary work assigned by the team leader.

**2. National Consultants**

**a. Flood and Water Resources Management Specialists and Deputy Team Leaders (1 person for each of the two provinces; total of 16 person-months)**

19. The specialists will have university degrees or relevant qualifications in civil engineering and over 10 years of work experience in flood management. Experience in World Bank or ADB projects on flood management strategy will be highly regarded. The specialists will assist the team leader in accomplishing the tasks described in para. 16 and undertake any other necessary work assigned by the team leader.

**b. Nonstructural Flood Management Specialists** (one person for each of the two provinces; total of 8 person-months)

20. The specialists will have university degrees or relevant qualifications in hydrologic flood studies and over 5 years of work experience in nonstructural flood management including flood risk mapping and flood forecasting and warning system. Experience in World Bank or ADB projects for flood management will be highly regarded. The specialists will assist the international nonstructural flood management specialist in accomplishing the tasks described in para. 18 and undertake any other necessary work assigned by the team leader.

**c. Legal and Institutional Specialists** (one person for each of the two provinces; total of 5 person-months)

21. The specialists will have university degrees or relevant qualifications and over 5 years of work experience in legal and/or institutional studies. They will (i) review the institutional structure and administrative procedures in the two provinces; (ii) provide recommendations for improving the existing provincial flood management strategy of the two provinces in terms of institutional foundation; (iii) develop provincial flood management action plans and implementation priorities to implement the national flood management strategy in the two provinces, particularly for institutional development, planning and administration, research and education, and funding and resources; and (iv) undertake any other necessary work assigned by the team leader.

**d. Land Use Planning Specialists** (one person for each of the two provinces; total of 5 person-months)

22. The specialists will have university degrees or relevant qualifications and over 5 years of work experience in land use planning studies. They will (i) review the current approach to nonstructural measures in the two provinces, particularly management of exposure to flood hazard by land use control; (ii) provide recommendations for improving the existing provincial flood management strategy, particularly to manage exposure to flood hazard by land use control; (iii) develop provincial flood management action plans and implementation priorities to manage exposure to flood hazard by land use control; and (iv) undertake any other necessary work assigned by the team leader.

**e. Social Development Specialists** (one person for each of the two provinces; total of 2 person-months)

23. The specialists will have university degrees or relevant qualifications and over 5 years of work experience in social development studies. They will (i) conduct a stakeholder analysis including assessments of stakeholders' respective roles and the mechanism of their engagement for community-based flood risk management; (ii) conduct pilot tests raising public awareness of flood management involving stakeholders based on the stakeholder analysis, and develop the capacity of local government staff through the pilot tests; and (iii) undertake any other necessary work assigned by the team leader.

**f. Training Coordinators** (one person for each of the two provinces; total of 6 person-months)

24. The training coordinators will have over 3 years of work experience in training coordination. They will undertake necessary coordination for on-the-job training to be carried out through the pilot tests in selected areas in the two provinces.