

ASIAN DEVELOPMENT BANK

TAR:PRC 37641

TECHNICAL ASSISTANCE
(Cofinanced by the Government of Spain)

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR

**PREPARING THE
HUNAN FLOOD MANAGEMENT PROJECT**

March 2004

CURRENCY EQUIVALENTS

(as of 23 February 2004)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.1208
\$1.00	=	CNY8.2771

ABBREVIATIONS

ADB	–	Asian Development Bank
EAR	–	environmental assessment report
FSR	–	feasibility study report
HPG	–	Hunan Provincial Government
HPWRD	–	Hunan Provincial Water Resources Department
IEE	–	initial environmental examination
PRC	–	People's Republic of China
RRP	–	Report and Recommendation of the president
TA	–	technical assistance

NOTE

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

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I. INTRODUCTION

1. During the 2003 Country Programming Mission, the Government of the People's Republic of China (PRC) requested the Asian Development Bank (ADB) to provide project preparatory technical assistance (TA)¹ to help the Hunan Provincial Government (HPG) prepare a flood management project (the Project) for possible ADB financing. The Project will support the HPG in reducing damage caused by floods by improving flood mitigation measures particularly in the most affected municipalities and counties in the mountainous areas of Hunan Province. The TA was included in the PRC country strategy and program for 2004. A fact-finding mission visited the PRC in February 2004 to hold discussions with HPG staff, and to draw up the detailed objectives, scope, costs, implementation, and financing arrangements for the project preparation TA for the Hunan Flood Management Project (the proposed ADB Project).

II. ISSUES

2. Hunan Province touches the middle reaches of the Yangtze River to the north, while its east, west, and southern areas are mountainous. The northern area, which accounts for some 25% of the area of the province, consists of Dongting Lake (covering about 7% of the province) and the low, flat floodplain of the Yangtze River. Hills in the central part of the province provide a transition zone between the surrounding mountains and the Yangtze floodplain. The Li, Xiang, Yuan, and Zi rivers, collectively termed the "mountain rivers," flow northward to deliver runoff from the mountainous areas to Dongting Lake, which then drains water to the Yangtze River. The orographical uplift of warm and wet frontal airflows over the mountains results in frequent rainstorms from April to October, which cause flash floods in the areas around the mountain rivers. Thus, Hunan is subject to two distinct types of floods: (i) Yangtze River floods—prolonged flooding in the northern part of the province caused by high flow in the Yangtze River constraining the outflow from Dongting Lake; and (ii) flash floods along the narrow strips of land of the steep mountain valleys. Cities and rural enterprises in the mountainous area of the province have typically developed along the narrow bottom lands flanking the mountain rivers and are thus exposed to the dangers of flash flooding and the consequent damage and loss of life. Unlike the slowly rising inundation in the Dongting Lake area, flash floods require immediate and effective protection mechanisms, and a quick response to flood warnings and emergency activities. Mountain river floods have been difficult to manage because the rapid onset of flooding does not provide much time for flood warning and response activities; high flood levels exacerbate flood hazard and damage, and curtail emergency transport operations.

3. Hunan Province consists of 14 municipalities and has 65 million people (2000). About 70% of the municipal and county-level cities of the province are in mountainous areas. These cities are important centers of government, finance, business, education, transportation, agriculture, and manufacturing. They produce machinery, textiles, metals, chemicals, paper products, mineral products, medicine, and processed food. During the past 20 years, Hunan Province has experienced rapid economic growth and urban expansion, and a steady increase in the urban population. The population of the urban areas in the mountainous cities is projected to increase by one third from the present levels (about 22 million) by 2010. However, the growth and economic development is constrained by the risk of damage from flash floods, from which these cities have very little protection. As the urban areas grow, flash flood losses will increase yearly. The low level of flood protection now provided hinders economic growth and urgently needs to be improved.

¹ The TA was first listed in *ADB Business Opportunities* on 4 August 2003.

4. Yangtze and mountain river floods have caused enormous loss of life and damage in Hunan Province. During the 1996 Yangtze flood, 145 flood protection dikes failed, forcing more than 1 million people to live for up to several months along the remaining dikes, and resulting in a direct economic loss of over \$1.2 billion. International development agencies pay much attention to the Yangtze River floods (under the jurisdiction of the Yangtze River Basin Commission), and international flood projects in Hunan have been predominantly directed toward flood management in and around Dongting Lake.² In the meantime, major flash floods occur frequently in the mountainous areas. Severe floods in recent years occurred in 1991, 1993, 1994, 1995, 1996, 1998, 1999, and 2002. The flood damage totaled \$92 million in 1991, \$229 million in 1993, and \$373 million in 1994. Direct losses amounted to \$1.2 billion in 1995, \$2.4 billion in 1996, and \$1.3 billion in 1998. During the 1996 flood, 130 people lost their lives. Each year, flash floods adversely affect almost 1 million people in the province, either through the direct onset of floodwaters or through poor drainage in the aftermath (waterlogging), causing socioeconomic damage and disruption that is almost as severe as that caused by Yangtze River floods around Dongting Lake in the province. In the mountainous areas of Hunan Province, internationally funded flood control projects have involved the construction of multipurpose reservoirs for hydroelectric power generation (under HPG).³ However, protection from mountain river flash floods has so far received no funding support. Economic development is constrained as a result, and the lives and property of residents are endangered.

5. HPG has instituted various flood control measures. The Hunan Province Flood Control Program⁴ provides a comprehensive framework for mitigating flooding along the four Mountain Rivers and around Dongting Lake, and incorporates improvements in flood emergency management and other nonstructural measures such as an improved data acquisition system to monitor rainfall and river levels; improved communication and computer systems to facilitate flood warning and the management of flood emergencies; the development of a decision support system to more rapidly and reliably assess flood management options; and a review of policies, laws, and regulations relating to flood and floodplain management. Under the Flood Control Program, HPG is investing \$626 million of local funds in the current Five-Year Plan (2001–2005) to improve flood protection in cities across the province: \$476 million (76%) is allocated for cities in the Dongting Lake area and \$150 million (24%) for cities in the mountainous areas (\$110 million for municipal cities and \$40 million for county-level cities). Flood control investments in the next Five-Year Plan (2006–2010) will be devoted solely to improving flood protection in cities in the mountainous areas. Accordingly, in 2003, HPG initiated a

² The Japan Bank for International Cooperation is funding flood control improvements at 23 urban centers around Dongting Lake (\$200 million). The World Bank is funding a project to strengthen 142 kilometers of dikes along the Yangtze River in Hunan Province and resettle 11,000 families (\$27 million), and is supporting research into flood control and waterlogging in Dongting Lake to improve early warning of impending floods and facilitate post-flood drainage (\$3 million). The Government of the Netherlands is funding a dredging project in Dongting Lake to improve water flow into and out of the lake for flood control (\$25 million, in two tranches). Australian Agency for International Development is funding the Yangtze River Flood Control and Management Project (\$12 million), which will improve flood forecasting, flood warning, and the operation of flood detention basins along the middle reaches of the Yangtze, including 24 detention basins (up to 300 square kilometers in area) around Dongting Lake. The Canadian International Development Agency has recently completed a major hydraulic modeling study to improve flood forecasting for Dongting Lake.

³ The World Bank funded the recently completed Jiangya Multi-purpose Project on Loushui River, a tributary of Li River (\$97 million). The governments of Austria, Canada, and Belgium, together with several private organizations, are funding seven hydropower projects in the mountainous areas of the province (\$116 million in total), which involve the construction of relatively low dams (25–30 m high) that will provide some flood control capacity.

⁴ Formulated in 2000 and submitted to the Ministry of Water Resources and National Development Reform Committee in 2001, the program is the basis of the 11th Five-Year Plan (2001–2005) and other relevant investment planning by the province.

comprehensive assessment and analysis of the flood-prone areas and recommended the early implementation of flood protection measures in 36 cities and county-level cities. Initial designs and preliminary cost estimates have been prepared, largely for the structural measures. HPG is aware of the need to review flash flood controls along the mountain rivers and identify the most cost-effective mix of structural and nonstructural measures. Some nonstructural measures under the Flood Control Program can be improved to better complement structural flood control measures in the mountainous areas.

6. The PRC Government has issued laws and regulations to promote integrated river basin management in the PRC, including revisions in the 1988 Water Law (2002) and the Flood Control Law (1997). The aim is to balance all uses of the natural resources of a river basin, including flood control. The Flood Control Law (1997) outlines ways of identifying the causes of floods and preparing and implementing remedial measures. Significant concepts embodied in this law include soil and water conservation, dike strengthening, and nonstructural measures such as limited development in flood detention areas, land-use controls, and floodplain zoning. HPG's Flood Control Program is in line with PRC Government policies, and the proposed Project is under the overall flood management framework for the province and complements other internationally funded flood management projects in Hunan.

7. ADB has been increasingly involved in water resources management in the PRC and has assisted the Government in incorporating integrated structural and nonstructural measures in the flood management strategies of previous projects. ADB has assisted the Yellow River and Songhua River basin commissions to strengthen their forecasting and warning systems.⁵ It has also assisted the PRC Government with strategic planning for flood management, including the comprehensive review of both structural and nonstructural management measures and policies, to identify further improvements. The proposed Project is in line with ADB's country strategy and supports the PRC Government's objectives in the water sector. It will further help (i) integrate structural and nonstructural measures to strengthen the Flood Control Program; (ii) assess the cost-effectiveness of selected structural and nonstructural measures, including flood zoning to provide for future urban expansion; and (iii) build capacity to improve the flash flood management decision support system. HPG recognizes the urgent need to improve flood protection for cities in the mountainous area of the province to reduce the hazard and suffering that flash floods inflict on populations at risk and to promote sustainable economic growth.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Output

8. The TA will prepare an investment project suitable for ADB financing. It will assist HPG in (i) reviewing, assessing, and identifying cost-effective flood protection measures for the four mountain rivers of Hunan Province; and (ii) formulating an improved and integrated flood management investment project with environmental impact assessment and resettlement plans consistent with ADB's policy and guidelines. The ensuing investment Project will reduce the adverse economic, social, and environmental impact of flooding in urban areas along the four mountain rivers by improving flood mitigation at the 36 subproject sites. The preliminary project framework is in Appendix 1.

⁵ ADB. 2001. *Report and Recommendation of the President for the Yellow River Flood Mitigation Sector Project*. Manila; ADB. 2002. *Report and Recommendation of the President for the Songhua River Flood Management Project*. Manila.

B. Scope

9. The TA will have three phases. In the first phase (1.5 months), studies will be conducted to (i) assess flood phenomena, existing flood protection facilities and the appropriateness of their design, conditions in the upper watersheds, hydro-meteorological data, flood preparedness, and zoning; (ii) review the Government's flood management strategies, priorities, and investment plans for the Flood Control Program, and in particular, assess the completeness and adequacy of the Flood Control Program for the mountainous areas in Hunan Province, on the basis of technical, institutional, environmental, social, economic, financial, and other relevant factors; (iii) improve selection criteria and prioritize potential interventions on the basis of their economic, financial, social, and environmental impact; the urgency of flood mitigation needs; and other criteria; and (iv) analyze background issues, constraints, proposed locations against selection criteria, institutional responsibilities, and other relevant sector work to provide rationale and opportunities of the investment project. In the second phase (2 months), the TA will (i) formulate a balanced food management strategy for these areas comprising structural and nonstructural measures, (ii) undertake or update 36 feasibility studies on selected 36 high-priority areas, and (iii) assist HPG in preparing or strengthening draft environmental impact assessment and resettlement plans according to ADB's guidelines and policies. The initial poverty and social analysis shown in summary form in Appendix 2 indicates significant resettlement issues to be addressed in the project design and preferences of those affected. The third phase of the TA will assist HPG in (i) formulating an overall investment project for ADB funding; (ii) consolidating the feasibility studies prepared in the second phase; (iii) formulating procurement needs and corresponding procurement arrangements; and (iv) determining if the Project is justified in financial, economic, social, and environmental terms.

C. Cost and Financing

10. The TA will cost \$875,000 equivalent, comprising \$446,000 in foreign exchange costs and \$429,000 equivalent in local currency costs. The Government requested ADB to finance the entire foreign exchange cost and \$254,000 equivalent of the local currency costs. The TA will be financed, on a grant basis, with a portion amounting to \$550,000 equivalent, being financed by the Government of Spain, and \$150,000 equivalent by ADB's TA funding program. The Government will provide the remaining local costs, equivalent to \$175,000, to cover in-kind counterpart costs and services. The Government has been advised that approval of the TA does not commit ADB to financing any ensuing project or to extending any further TA for the implementation of any recommendations of the TA. The detailed cost estimates are given in Appendix 3.

D. Implementation Arrangements

11. The Hunan Provincial Government will be the Executing Agency for the TA and will supervise and monitor TA activities, and coordinate with government agencies and organizations. The Hunan Provincial Water Resources Department (HPWRD) will set up project management offices at the provincial level and in each municipality and county in the Project area. The provincial project management office will be headed by an HPWRD deputy director general and will include representatives from HPWRD, the Provincial Development and Reform Commission, and the Provincial Department of Finance. HPWRD will assign an experienced full-time staff member to serve as TA task manager, and counterpart staff to work closely with the TA consultants. HPWRD will also provide office space; access to communications and copiers; and logistical support for TA implementation, including the conduct of socioeconomic,

poverty, and other required surveys. The Provincial Leading Group,⁶ chaired by a vice governor, will guide TA implementation. The members of the group are senior provincial officials from the departments of water resources, agriculture, forestry, and urban construction; the Financial Bureau; and the Planning and Reform Committee.

12. The TA will be carried out over 6 months, from July 2004 to January 2005. A total of 51.5 person-months of consulting services will be required (14.5 international and 37 domestic). The international consultants will provide expertise in (i) flood management, (ii) financial and economic analysis, (iii) resettlement planning and social impact analysis (poverty reduction), and (iv) environmental impact assessment. The domestic consultants will have expertise in (i) flood management, (ii) hydraulic structure engineering, (iii) project economics and financial analysis, (iv) environmental protection and conservation, (v) socioeconomic analysis, (vi) resettlement, and (vi) institutional and legal aspects of flood management. The outline terms of reference for the consulting services are given in Appendix 4. An international consulting firm in association with domestic consultants will be engaged according to ADB's *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for the selection and recruitment of domestic consultants. ADB will select and engage consultants on the basis of the quality- and cost-based selection method, following simplified technical proposal procedures. Equipment for the TA will be procured by the consultants in accordance with procedures acceptable to ADB.

IV. THE PRESIDENT'S DECISION

13. The President, acting under the authority delegated by the Board, has approved (i) ADB administering a portion of technical assistance not exceeding the equivalent of \$550,000 to be financed on a grant basis by the Government of Spain, and (ii) ADB providing the balance not exceeding the equivalent of \$150,000 on a grant basis, to the Government of the People's Republic of China for preparing the Hunan Flood Management Project, and hereby reports this action to the Board.

⁶ The group is functional under the World Bank Yangtze River Flood Project, and will continue to oversee the TA and the ensuing Project

PRELIMINARY PROJECT FRAMEWORK

Design Summary	Performance Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Goal To promote sustainable economic development in flood-prone areas</p>	<ul style="list-style-type: none"> • Environment for social and economic development improved. • Better security provided for property and residence. • Land value and use increased. 	<ul style="list-style-type: none"> • Government and provincial documents and reports • Monitoring and evaluation report of Hunan Provincial Water Resources Department (HPWRD) • Province and city statistics 	
<p>Purpose To reduce the adverse economic, social, and environmental impacts of flooding in mountainous areas of Hunan Province. To adopt an improved and more integrated approach to flood mitigation in Hunan Province.</p>	<ul style="list-style-type: none"> • Flood protection standard increased from 10–20 years recurrence to 50 years recurrence in the project cities, and from 5 years to 20 years recurrence in the project counties. • Direct losses due to flood reduced by ___% (to be defined during project preparation). • Structural and nonstructural measures better planned and coordinated. • High priority structural measures implemented, including <ul style="list-style-type: none"> (i) flood protection embankments in project cities and counties strengthened and improved, (ii) culverts and gates rehabilitated and newly built, (iii) pump stations rehabilitated and newly built, and (iv) flood diversion canal built. • High priority nonstructural measures implemented, including <ul style="list-style-type: none"> (i) flood forecasting and warning improved, (ii) flood emergency response and recovery measures enhanced, (iii) maps of flood risk areas prepared, and (iv) flood zoning and land use restrictions applied. • Institutional capacity strengthened and stakeholder involvement improved. 	<ul style="list-style-type: none"> • ADB review missions • Monitoring and evaluation reports of HPWRD • Project progress reports • Project performance monitoring system • Project completion report 	<p>Government remains highly committed to a more balanced and integrated flood management approach.</p> <p>Effective interagency coordination and implementation capacity of project cities and counties.</p> <p>Adequate and timely provision of counterpart funds during project implementation.</p> <p>Sufficient contributions from beneficiaries.</p>
Outputs^a			
Activities^a	Inputs ^a		

^a To be developed during technical assistance implementation.

SUMMARY INITIAL POVERTY AND SOCIAL ANALYSIS

A. Linkages to the Country Poverty Analysis

Sector Identified as a National Priority in Country Poverty Analysis? Although there is no country poverty analysis, the government's long-term development strategy identifies this sector as an important area for pro-poor intervention.	Sector Identified as a National Priority in Country Poverty Partnership Agreement? Environment sector is identified as one of the key national priorities in the country poverty partnership agreement (PPA).
Contribution of the Sector/Subsector to Reduce Poverty in the PRC: Flood mitigation measures and improved protection from disastrous floods contribute to poverty reduction; particularly flood-prone areas will be protected through land-use zoning and resettlements for improved housing, living conditions, and working conditions.	

B. Poverty Analysis

Proposed Poverty Classification: Other

What type of poverty analysis is needed? Poverty analysis will be carried out to identify the incidence of poverty in the project areas, and particularly the households affected by relocation of residences, peri-urban small farming plots, commercial shops, and industries. The analysis will identify the causes of poverty in the project area and demonstrate how the Project will help reduce poverty by incorporating specific intervention measures within the project scope. The analysis will be carried out following the *Handbook on Poverty and Social Analysis* and *Handbook for Integrating Poverty Impact on Economic Analysis of Projects*.

C. Participation Process

Stakeholder Analysis—Public consultation will be carried out by the Executing Agency during preparation of the feasibility study, initial environmental examination, social impact assessment, poverty analysis, and resettlement plan. Further consultation will be carried out during the technical assistance to enhance the environmental management plan, conducting social surveys of affected people and ethnic minorities.

Participation strategy required—Yes

D. Potential Issues

Issue	Significance	Strategy to Address Issues	Plan Required
Resettlement	Significant	Resettlement plan will be prepared following the Hunan Province Resettlement Regulations and Asian Development Bank Policy on Involuntary Resettlement. The plan will be disclosed to the public and affected people. An independent monitor will be hired during project implementation.	Full
Gender	Not significant	Flood-prone areas are not gender-specific, and expected no particular bias toward gender.	None
Affordability	Not Significant	The Project is financed by general revenues sources. No new user charges are planned.	None
Labor	Significant	The relocation of enterprises and commercial shops may impact employment and earnings; these issues will be addressed in the resettlement plan. Project construction will generate some temporary employment opportunities, which could be targeted for the poor.	Included in RP
Indigenous People	Uncertain	The number and magnitude of ethnic minority people affected under the project areas are expected to be minor. To check initial concerns and extent of indigenous people issue, a social analyst will assess the affected areas first through resettlement survey and propose further remedial actions, if needed.	Not known
Other Risks/Vulnerabilities	Uncertain	Appropriate mitigation measures will be prepared as part of initial environmental examination.	Not known

COST ESTIMATES AND FINANCING PLAN
(\$ '000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank (ADB) and the Government of Spain Financing			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	339	0	339
ii. Domestic Consultants	0	160	160
b. International and Domestic Travel	25	5	30
c. Survey, Reports, and Communications	0	35	35
2. Equipment and Software ^a	10	0	10
3. Miscellaneous Administration and Support Costs ^b	0	15	15
4. Representative for Contract Negotiations ^c	5	0	5
5. Contingencies	67	39	106
Subtotal (A)^d	446	254	700
B. Government Financing			
1. Office Accommodation and Transport	0	30	30
2. Remuneration and Per Diem of Counterpart Staff	0	30	30
3. Surveys and Investigations			
a. Environmental Impact Assessments (36 subprojects)	0	25	25
b. Socioeconomic Surveys (36 subprojects)	0	30	30
c. Project Design (36 subprojects)	0	40	40
4. Contingencies	0	20	20
Subtotal (B)	0	175	175
Total	446	429	875

^a Includes desktop computers, photocopier, and facsimile machine.

^b Includes office supplies and translation services.

^c Includes the cost of travel and per diem for government observers invited for contract negotiations.

^d To be financed by the Government of Spain on a grant basis, not exceeding \$550,000, and administered by ADB. The remaining balance of \$150,000 to be financed by ADB's technical assistance funding program.

Source: ADB estimates.

OUTLINE TERMS OF REFERENCE

A. Overall Scope of Work

1. The technical assistance (TA) will be implemented over a period of 6 months. Key activities of the TA are that the consultants, working in close association with the Executing Agency, Hunan Provincial Government (HPG), will (i) prepare a feasibility study report, including an assessment of the financial, economic, social and environmental impacts of the Project in accordance with the policies and guidelines of the Asian Development Bank (ADB); and (ii) formulate an investment project to reduce flooding, flood hazard, and flood damage in the mountainous area of Hunan Province by improving flood management within the context of integrated river basin management. Final output should include updated and strengthened subproject feasibility study reports of the selected 36 locations, and a consolidated final report covering overall feasibility, environmental impact, resettlement plans, and financial and economic analyses.

B. Expertise Required

2. The consultants will have demonstrated project-related experience in their fields, and should have had extensive experience, mainly in the People's Republic of China or in countries with similar conditions.

1. International Consultants

a. Flood Management Specialist and Team Leader (6 person-months)

3. The flood management specialist should have a master's or doctor's degree in civil engineering and about 20 years of work experience in flood management relevant to the preparation and the implementation of the flood management project. He or she will coordinate all activities of the consultants during TA implementation, including liaising with HPG as team leader. He or she will (i) prepare a detailed work plan and deploy team members to cover proposed project areas for data collection, and to complete necessary work in timely manner; (ii) review and assess flood management policies and measures in the Provincial Flood Control Program for Hunan Province, other relevant government programs and plans, and previous flood management activities in Hunan Province, paying special attention to the use of and effectiveness of structural and nonstructural measures; (iii) prepare recommendations for strengthening, extending, and improving the Government's existing Flood Control Program and other flood management programs, plans and activities, including the balance to be struck between structural and nonstructural management measures; (iv) propose the rationale, objectives, and scope of the Project, including the preparation of a problem analysis and project framework; (v) review and assess the feasibility study reports (FSRs) for the 36 subproject sites, mainly from flood management and engineering points of view, and ensure that the Project is consistent with the Provincial Flood Control Program and economically, financially, and technically sound for ADB's investment; (vi) propose further improvements to FSRs, where necessary, to comply with ADB's policies and guidelines, and facilitate the environment specialist, resettlement and social impact assessment specialist, and economic and financial analyst to undertake their studies; (vii) finalize feasibility-level designs for the flood protection facilities proposed at each subproject site, together with layouts, calculations, cost estimates, and justification, based on existing studies and reports prepared by HPG; (viii) assist the economic and financial analyst to prepare cost estimates and the economic and financial analyses of the Project; (ix) formulate financing and resources plans for operation and

maintenance, in conjunction with the economic and financial analyst; (x) prepare the project implementation schedule and detailed implementation arrangements; (xi) design the project management framework for monitoring, evaluating, and supervising project implementation; (xii) cooperate with and provide guidance to the domestic consultants; and (xiii) prepare the inception report, interim report, and draft final report, and finalize the TA report.

b. Environment Specialist (2.5 person-months)

4. The environment specialist should have a master's or doctor's degree in environmental survey and about 15 years of work experience in environmental assessment. He or she will (i) review and assess the environmental assessment reports (EARs) prepared by HPG for the 36 subproject sites and, in particular, determine whether the requirements of ADB's policies and guidelines have been met; (ii) update or prepare the appropriate level of environmental assessment required for the 36 subprojects—whether an initial environmental examination (IEE) or a full environmental impact assessment is required—in accordance with ADB's guidelines; (iii) plan and direct any supplementary studies, in conjunction with HPG, to update and improve the EARs, as necessary; (iv) prepare the environmental impact assessment of the Project in a timely manner to fulfill 120 days board circulation requirement, including preparation of the IEE; circulation of the summary IEE; disclosure of the summary to the public; and preparation of the environment management plan, budget, and environmental monitoring plan, in accordance with ADB's guidelines; (v) prepare the environmental management plan, including a budget; (vi) assist the team leader to incorporate environmental requirements in the design of the project management framework for monitoring, evaluating, and supervising project implementation; and (vii) prepare relevant sections of reports.

c. Resettlement and Social Impact Assessment Specialist (3 person-months)

5. The specialist should have relevant qualifications in social sector surveys and about 15 years of work experience in resettlement planning and social impact assessment. He or she will (i) review and assess the resettlement plans and the social analyses of the 36 subproject sites, as included in the FSRs prepared by HPG and, in particular, determine whether the requirements of ADB's policies and guidelines have been met; (ii) identify the expected beneficiaries and communities affected by the Project; (iii) plan and direct any supplementary studies, in conjunction with HPG, to update and improve the resettlement plans and social analyses, as necessary; (iv) update and prepare the social impacts of the proposed 36 subprojects in accordance with ADB's guidelines, paying particular attention to (a) poverty analysis to ensure that the percentage of poor people benefiting from the Project is higher than the percentage of the poor in the country; (b) gender analysis; (c) incorporation of concerns of ethnic minorities; (d) participatory development and involvement of nongovernment organizations; and (e) any adverse impacts anticipated from the Project, particularly on minorities and the poor; (v) prepare a resettlement plan for any subproject sites where the Project will entail significant land and house acquisition or disruption of livelihood, in accordance with ADB's guidelines; (vi) assist the team leader to incorporate social requirements in the design of the project management framework for monitoring, evaluating, and supervising project implementation; and (vii) prepare relevant sections of reports.

d. Economic and Financial Analyst (3 person-months)

6. The economic and financial analyst should have a doctoral degree in environmental economics or relevant fields. The position requires extensive knowledge of and experience in

ADB projects and guidelines in financial and economic analyses, and about 15 years of work experience in project financial and economic analysis. The analyst is also required to have full working knowledge of the Costab software and to have used this software in at least three projects funded by ADB or the World Bank. He or she will (i) review and assess the financial and economic analyses in the FSRs for the 36 subproject sites and, in particular, determine whether the requirements of ADB's policies and guidelines have been met; (ii) lead and guide local financial and economic analysts in collecting appropriate data for analyses, and structure model sample estimation methods in at least four typical locations; (iii) undertake financial and economic analyses of the proposed flood protection facilities at each subproject site and for the Project as a whole in coordination with local consultant counterpart; (iv) prepare logical frameworks for estimating detailed costs by expenditure items, by components, and by subproject, using Costab, and guide domestic consultants properly structuring Costab data, in accordance with ADB's guidelines; (v) assess the financial feasibility and loan payback sustainability of the proposed flood protection facilities and measures; (vi) formulate financing plans by source and assess the stability of financial resources to meet operation and maintenance costs; (vii) assist the team leader to incorporate financial and economic requirements in the design of the project management framework for monitoring, evaluating and supervising project implementation, including data from Costab; and (viii) prepare relevant sections of reports.

2. Domestic Consultants

a. Hydraulic Structure Design Engineers (2 persons for 4 person-months each) and Team Coleader (1 person for 6 person-months)

7. The engineers should have relevant qualifications in civil engineering and flood management and about 10 years of work experience in designing structural flood protection facilities. Three hydraulic structure design engineers are required. One will be appointed as team coleader and, with the international team leader, will be responsible for outputs under the TA. Reasonable working knowledge of English skills are required for the two hydraulic structure design engineers, and good English skills (both written and oral) are needed for the team coleader. The hydraulic structure design engineers will (i) assist the team leader to review and assess the Provincial Flood Control Program for Hunan, other relevant government programs and plans, and previous flood management activities in Hunan Province; (ii) assess, update, and prepare the FSRs for the 36 subproject sites from flood management and engineering points of view and, in particular, ensure that the Project is consistent with the Provincial Flood Control Program and is coordinated with other flood management projects and activities in the Province and river basins; (iii) assist the team leader to evaluate and propose further improvements of FSRs to comply with ADB's policies and guidelines, and assist the environment specialist, resettlement and social impact assessment specialist, and economic and financial analyst with their studies; (iv) conduct supplementary studies, in close coordination with HPG, to update and improve feasibility-level design for the Project; (v) finalize the feasibility-level design of the flood protection facilities at each subproject site, together with layouts, calculations, cost estimates, and justification, based on existing studies and reports prepared by HPG; and (vi) prepare relevant sections of reports.

b. Environment Specialist (6 person-months)

8. The environment specialist should have relevant qualification in environmental survey and about 10 years of working experience in environmental assessment. He or she will (i) review, assess, and update the EARs for the 36 subproject sites, prepared by HPG; (ii) conduct

supplementary studies, in conjunction with HPG and the international consultant, to update and improve the EARs, as necessary, acceptable for ADB standards and guidelines; (iii) prepare the environmental impact assessment of the Project in a timely manner to fulfill 120 days board circulation requirement, including preparation of the IEE; circulation of the summary IEE; disclosure of the summary to the public; and preparation of the environment management plan, budget, and environmental monitoring plan, in accordance with ADB's guidelines; (iv) conduct and document public consultation activities; and (v) prepare relevant sections of reports.

c. Resettlement Specialist (6 person-months)

9. The resettlement specialist will have relevant qualifications in social sector surveys and about 10 years of work experience in the resettlement plan. He or she will be knowledgeable about ADB guidelines on involuntary resettlement, and will perform the following tasks in collaboration with the social impact assessment specialist: (i) review and assess the resettlement plans and the social analyses in the FSRs for the 36 subprojects prepared by HPG; (ii) identify the expected beneficiaries and communities affected by the Project; (iii) conduct any supplementary studies, in conjunction with HPG, to update and improve the resettlement plans and the social analyses, as necessary; (iv) review, update, and prepare the social impacts of the 36 subprojects in accordance with ADB's guidelines; (v) prepare a resettlement plan for any subproject site where the Project entails significant land/house acquisition or disruption of livelihood, in accordance with ADB's guidelines; (vi) assess the need for an indigenous peoples development plan based on ADB's policy on indigenous people and prepare a plan, if found necessary; and (vii) prepare relevant sections of reports.

d. Social Impact Assessment Specialist (4 person-months)

10. The social impact assessment specialist should have relevant qualifications in social sector surveys and about 10 years work experience in the social and poverty impact assessment. He or she will have a master's degree in economics and be knowledgeable in ADB guidelines on social safety guard policy. He or she will perform the following tasks in collaboration with the resettlement specialist: (i) review and assess the resettlement plans and the social analyses in the FSRs for the 36 subprojects prepared by HPG; (ii) conduct any supplementary studies, in conjunction with HPG, to update and improve the resettlement plans and the social analyses, as necessary; (iii) identify the beneficiaries and communities expected to be affected by the Project; (iv) review, assess, and prepare the social impacts of the 36 subprojects in accordance with ADB's guidelines; (v) prepare socioeconomic and poverty profiles for the project area, by collecting information through statistical records, field surveys, and key informant interviews: participatory community appraisal techniques will include population, income levels, occupations, unemployment, education levels, health conditions, and other relevant socioeconomic data; (vi) analyze data by gender, ethnic group, town, and urban vs. rural setting, to provide a comprehensive baseline profile of socioeconomic conditions of affected project area; (vii) estimate (a) the number of project beneficiaries by area, and then by occupation and income levels; and (b) the number of adversely affected people by type of impact; and (viii) prepare relevant sections of reports.

e. Financial and Economic Analyst (6 person-months)

11. The analyst should have a doctoral degree in economics or relevant qualifications in financial economics and about 10 years of work experience in project financial and economics analysis. He or she will have extensive experience using Costab software, and demonstrated evidence of estimating financial and economic internal rates of return according to ADB's

guidelines. He or she will (i) review the appropriateness of the financial and economic analyses in the FSRs for the 36 subproject sites; (ii) update or undertake financial and economic analyses of the flood protection facilities proposed at each subproject site and for the Project as a whole; (iii) assess project costs using Costab and prepare financing plans in accordance with ADB's guidelines; (iv) assist the international economic and financial specialist to prepare costing, financing, and financial and economic analysis reports; and (v) prepare relevant sections of reports.

f. Legal and Institutional Specialist (1 person-month)

12. The specialist should have relevant qualifications in public administration and jurisprudence (particularly with respect to water sector) and about 10 years of work experience conducting studies for administrative reform. He or she will (i) review and assess the legal, institutional, and administrative aspects of the Provincial Flood Control Program for Hunan Province and of previous flood management activities in Hunan Province; (ii) identify constraints and propose improvements to the administrative and legal basis of integrated flood management in Hunan Province, and assist the team leader to prepare recommendations for strengthening, extending and improving the government's existing Flood Control Program and flood management activities in Hunan Province including the legal framework required; (iii) examine the capacity of HPG to implement any proposed administrative and legal changes to flood management in Hunan Province, and describe the organizational arrangements for project implementation and monitoring; and (iv) prepare relevant sections of reports.

C. Reporting Requirements

13. The consultants will produce three reports at the key stages of the TA. (i) An inception report, to be submitted within the first 4 weeks of TA commencement, will finalize the approach, present a detailed work plan and implementation schedule for the TA, and identify four representative subproject sites for which the FSRs prepared by HPG will be reviewed in detail and revised as necessary to determine a standard methodology for the review of the remaining 32 subproject sites. FSRs for the four selected subproject sites will be revised, including the environmental impact assessment and resettlement plans, and submitted within 1.5 months of the commencement of the TA. (ii) An interim report that presents a preliminary description of the investment project as a whole, including costing, findings, and recommendations, will be submitted 3.5 months after TA commencement, together with an interim environmental impact assessment and resettlement plans consolidated for the whole Project. The interim report will cover topics required in the Report and Recommendation of the President (RRP) chapter by chapter in detail. (iii) A draft final report (together with draft environmental impact assessment and resettlement plans), to cover detailed project design and cost estimates, financing plan, financial and economic justification, environmental safeguard measures, project implementation arrangements, procurement packages, and management, will be submitted 5.5 months after TA commencement, together with an FSR for the Project as a whole, plus individual revised FSRs for the 36 subproject sites. The draft final report will be structured in accordance with ADB's format for the RRP, and will cover each topic by chapter sufficiently for ADB to prepare the RRP document; (iv) A final report, to be submitted at the conclusion of the TA, will reflect comments made by the Government agencies and ADB, and other relevant parties. All reports are to be written in English and will be translated into Chinese. Seven copies of each report (in English) are to be submitted to ADB and five copies (in both Chinese and English) are to be submitted to HPG. The inception report, interim report and draft final report will be discussed in tripartite meetings among the consultants and representatives of HPG and ADB.