



Regional Technical Assistance Report

Project Number: 40190
April 2008

Preparing the Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project (Financed by the Japan Special Fund)

Asian Development Bank

ABBREVIATIONS

ADB	–	Asian Development Bank
DRM	–	drought risk management
FMMP	–	Flood Management and Mitigation Program
FRM	–	flood risk management
IA	–	implementing agency
Lao PDR	–	Lao People’s Democratic Republic
LMB	–	Lower Mekong Basin
MRC	–	Mekong River Commission
NGO	–	nongovernment organization
NMC	–	national Mekong committee
NSC	–	national steering committee
RCT	–	regional consulting team
RETA	–	regional technical assistance
TWG	–	technical working group

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Agriculture and natural resources
Subsector	–	Water resources management
Themes	–	Sustainable economic growth, capacity development, regional cooperation
Subthemes	–	Fostering physical infrastructure development, institutional development, crossborder infrastructure

NOTE

In this report, “\$” refers to US dollars.

Vice President	C. Lawrence Greenwood, Jr., Operations Group 2
Director General	A. Thapan, Southeast Asia Department (SERD)
Director	U. S. Malik, Agriculture, Environment, and Natural Resources Division, SERD
Team leader	C. J. Wensley, Principal Water Resources Engineer, SERD
Team member	I. Makin, Senior Water Resources Management Specialist, SERD

I. INTRODUCTION

1. In 2004,¹ the governments of Cambodia, Lao People's Democratic Republic (Lao PDR), and Viet Nam requested the Asian Development Bank (ADB) for regional technical assistance (RETA) for the preparation of investment projects to strengthen flood management in their countries. A fact-finding mission visited all four countries of the Lower Mekong Basin (LMB) including Thailand² in April–May 2007 to consult with their key line agencies and national disaster management committees, National Mekong Committees (NMCs), and the Mekong River Commission Secretariat. The Mission formulated the RETA after reaching understandings with the governments on its impact, outcome, outputs, implementation arrangements, cost, financing arrangements, and terms of reference.³ The project design and monitoring framework is in Appendix 1.

II. ISSUES

2. The Mekong River is a major influence on the economies and lives of the people in Cambodia, Lao PDR, Thailand, and Viet Nam. Annual floods, which can last for up to 6 months, are normally seen as a source of livelihood and sustenance, but droughts, which may persist for several years, can cause widespread hardship. Flooding rejuvenates wetlands, breeding grounds for aquatic plants, fish, and animals (vital sources of income and food, especially for the poor); enriches soil with river-borne sediments and nutrients beneficial to agriculture; and replenishes reservoirs and groundwater tables as reserves against water shortages in the dry season. The rise and fall of water in the Mekong River determines the cropping cycle, and has given rise to various agricultural systems. Floods become disasters only when they are deeper than average, unexpectedly fast in onset, or unusually prolonged. Droughts, which occur as a result of periods of very low river flow accompanied by poor rainfall, cause severe food shortages. Serious floods in 2000, 2001, and 2002 caused significant hardship and loss of life, and in high economic costs. The droughts that followed from 2003 to 2005 compounded these impacts.

3. The four riparian countries of the LMB experience different types of floods. In Cambodia and Viet Nam, mainstream floods occur when the Mekong River overflows its banks due to a combination of high river flows from snowmelt in the Himalayas and heavy rainfall produced by the southwest monsoon and by typhoons making landfall on the coasts of central Viet Nam and southern People's Republic of China. Mainstream flooding takes place yearly, and inundates between 26,000 and 45,000 square kilometers of the Cambodian lowlands and Cuu Long Delta for 3 months or longer.⁴ Sporadic tributary floods⁵ occur when the tributaries of the Mekong River overflow their banks following intense rainfall during typhoons and tropical storms. A third type of flooding that may have increasing significance in the LMB is when water is suddenly released from a dam, typically in anticipation of an incoming flood (dam-release flooding).

¹ ADB. 2004. *Regional Cooperation Strategy and Program (RCSP) for the Greater Mekong Subregion (GMS 2004–2008)*. Manila. The concept paper for the proposed regional technical assistance and investment projects is included in this RCSP.

² Thailand was included in the RETA road map studies at the suggestion of the national Mekong committees of all four LMB countries. Its participation will ensure that planning and benchmarking for flood and drought mitigation, through the regional roadmap exercise, will be a regionally integrated approach, with the development of common goals, standards, milestones, understandings and programs. Also, Thailand's experience and expertise in flood and drought management in recent years will provide many valuable lessons learned.

³ The TA first appeared in *ADB Business Opportunities* on 11 June 2007.

⁴ Mekong River Commission. 2005. *Overview of the Hydrology of the Mekong Basin: Meeting the Needs, Keeping the Balance*. Vientiane (ISSN: 1728 3248).

⁵ Tributary floods are sometimes called "flash floods" because of their sudden and unexpected onset. The intense rainfall that causes tributary flooding often also causes "landslips," which can be significantly more hazardous than tributary floods. The term "tributary flood" is taken to include both river flooding and landslips because emergency agencies typically have to deal with both disasters at the same time.

4. The annual floods of 2000–2002 resulted in 1,300 deaths in Cambodia and Viet Nam (80% of them children), caused damage estimated at about \$600 million, and disrupted the lives of 10–12 million people.⁶ Although tributary flooding takes place in all four countries, it is most significant in Lao PDR⁷ and Thailand. Tributary floods in 2000–2002 in Lao PDR and Thailand took the lives of 60–80 people and otherwise affected 1–2 million others, and caused damage estimated at \$30 million–\$50 million. Badly regulated dam releases can also set off floods downstream of hydropower reservoirs that disrupt lives along the riverbanks and, in extreme cases, cause deaths of people and animals.⁸ Appropriate rules should therefore be drawn up to control reservoir operations in the LMB countries, given the anticipated increase in their hydropower use. Current research predicts that climate change could also lead to more frequent and more severe flooding, and raise sea levels at the mouth of the Mekong River.

5. Droughts can have just as devastating socioeconomic impact as floods in the LMB.⁹ The 2003–2005 droughts had a major socioeconomic impact on three of the four riparian countries.¹⁰ In Viet Nam, the yields from more than 10,000 hectares of winter rice in the Cuu Long Delta were affected by saltwater intrusion up the Mekong (at a cost of about \$60 million); coffee yields in the highlands dropped; and vegetable gardens failed, reducing the availability of cheap food. In Thailand, drought affected rice production on about 650,000 hectares, farm production costs increased by 40% because of higher water charges and fuel bills, and the water level in the Khorat Plateau reservoirs remained critically low. Forecasts of gross domestic product growth in both Thailand and Viet Nam had to be revised downward as a result of the droughts. In Cambodia, the droughts affected some 500,000 hectares of rice paddy and led to food shortages that affected up to 2 million people. On the other hand, in Lao PDR, where almost the entire rural population depends on rainfed rice, the wet seasons began as expected and the impact of the droughts was local and relatively small.

6. The impacts of floods and droughts in Cambodia, Lao PDR, Thailand, and Viet Nam are magnified because the affected communities are generally poor and vulnerable, and the recurring cycles of floods and droughts to some extent keep them that way. Helping these people to withstand the negative environmental impact of floods and droughts will improve their standard of living and enable them to climb out of poverty.¹¹

7. Many regional, national, and local initiatives, past and present, in the LMB have been carried out to reduce the risk of and vulnerability to flood and drought. The Mekong River Commission (MRC) has begun a major regional flood management and mitigation program (FMMP) to improve flood risk management in the four countries of the LMB.¹² The World Bank has recently

⁶ The 2000 flood event was classified as a “large flood.” It inundated about 45,000 square kilometers of the Cambodian lowlands and the Cuu Long Delta in Viet Nam.

⁷ Of most concern in the northern areas of Lao PDR is tributary flooding; in the central and southern areas, it is the combination of mainstream and tributary flooding at the confluence of rivers.

⁸ In 2000, releases from Yali dam in Viet Nam led to deaths of people in Cambodia. The operating rules have since been changed and other remedial works are being undertaken.

⁹ Droughts are of three types: meteorological (less than average rainfall over some prescribed period), hydrological (less than average streamflow over some prescribed period), or agricultural (less than average soil water content over some prescribed period). Each type has a different socioeconomic impact in the LMB: a meteorological drought can be devastating for annual rainfed crops; a hydrological drought in the Mekong River enables ocean salinity to penetrate further upstream into the Cuu Long Delta, thereby reducing the amount of land that can be irrigated from the river; and an agricultural drought can kill perennial crops.

¹⁰ Mekong River Commission. 2005. Lower Mekong Basin Drought Study: Analysis, Forecasting, Planning and Management. Draft Report.

¹¹ Although originally a flood risk management (FRM) project, the scope was expanded during formulation to include drought risk management (DRM) to recognize the significant negative impact of drought on flood-affected peoples and on poverty. DRM interventions will be incorporated where they are consistent with and can be supported alongside FRM interventions.

¹² The MRC’s FMMP is a multi-donor-funded program designed to investigate issues, promote best practice, and identify potential investment projects for flood management and mitigation in the Lower Mekong Basin. Budgeted at \$21.38 million, the program consists of five components: (i) establishment of a regional FMM center, (ii) planning for the

begun a nationwide program of natural disaster risk management in Viet Nam. The program supports flood risk management (FRM) improvements in the Cuu Long Delta, particularly in the forecasting of natural disasters by the Southern Region Hydrometeorological Service, the collection of hydrometeorological data, and sea-dike construction and reinforcement. A number of nongovernment organizations (NGOs) in all four countries are training local communities in emergency preparedness and response.¹³ Many activities in water resources management with an impact on flood and drought risks are also ongoing.¹⁴

8. There is increasing recognition of the need for both a regional and a national perspective on FRM, together with appropriate drought risk management (DRM) interventions, to reduce the vulnerability of the affected communities. With common benchmarks and targets, all countries in the LMB could define road maps to improve FRM and DRM. The road maps would help align programs and provide a framework for future funding by development partners by identifying gaps in current and proposed programs and prioritizing interventions to avoid duplication. This approach is consistent with ADB's disaster and emergency assistance policy,¹⁵ which supports activities that anticipate and mitigate the impact of disasters, and recognizes the importance of protective strategies that help save lives and safeguard property and resources.

III. THE PROPOSED TECHNICAL ASSISTANCE

A. Impact and Outcome

9. The RETA will improve the ability of communities in Cambodia, Lao PDR, Thailand, and Viet Nam to prepare for, respond to, and recover from the negative impact of floods and droughts. It will design separate investment projects for Cambodia, Lao PDR, and Viet Nam.¹⁶ Each investment project will comprise a balanced program of structural and nonstructural measures identified by the country concerned to manage its risks of flood and drought. Priorities for investments will be set through the preparation of one regional and four national road maps (including Thailand). The RETA will be implemented in close collaboration with the MRC's FMMP, and will use the outputs of that program. The initial poverty and social impact assessment is in Appendix 2.

B. Methodology and Key Activities

10. The key activities of the RETA will be to (i) identify and prioritize flood and drought issues regionally within the LMB and within in each country through regional and national road maps developed to improve flood and drought risk management, (ii) develop a prioritized program of

implementation of structural measures and flood-proofing, (iii) mediation of trans-boundary flood issues, (iv) strengthening of flood emergency management, and (v) land management. ADB is contributing \$1 million to cofinance component (ii) under ADB. 2003. *Technical Assistance for Support for the Mekong River Commission Flood Management and Mitigation Program*. Manila (TA 6149-REG, approved December). Component (ii) focuses on developing guidelines, tools and techniques for identifying structural and non-structural measures for mitigating the impact of floods, and also developing the capacity to apply these tools, etc. within the MRC and NMCs.

¹³ To learn from NGO experiences in Cambodia ADB recently funded a technical assistance project to formulate a methodology for mobilizing communities in the country to plan, design, and implement flood risk preparedness, prevention, and mitigation measures, and to train government staff, NGOs, and leaders to implement the strategy. (ADB. 2005. *Technical Assistance to the Kingdom of Cambodia for Community Self-Reliance and Flood Risk Reduction*. Manila [TA 4574-CAM, for \$500,000, approved in April])

¹⁴ See, for example, the ADB/World Bank review and assessment of the Mekong region, aimed at developing a Mekong water resources assistance strategy.

¹⁵ ADB. 2004. *Disaster and Emergency Assistance Policy*. Manila (R71-04).

¹⁶ Indicative investments include \$25 million for Cambodia (ADB \$20 million, government \$5 million) and \$80 million for Viet Nam (ADB \$30 million, cofinancing \$30 million, and government \$20 million) [ADB. 2006. *Regional Cooperation Strategy and Program Update (RCSP) for the Greater Mekong Subregion (GMS 2007–2009)*]. A fully cofinanced investment of \$22 million is proposed for Lao PDR (\$20 million cofinancing, and \$2 million government), [ADB 2007. *Lao People's Democratic Republic, Country Operational Business Plan (2008–2010)*].

structural and nonstructural FRM and DRM interventions in each country, and (iii) prepare feasibility studies for proposed investment projects in Cambodia, Lao PDR and Viet Nam on the basis of the national roadmaps. The RETA will identify target beneficiaries, address regional policy and cooperation issues, analyze costs and benefits, and establish implementation arrangements for investment projects for possible funding by ADB or other financiers.

11. Flood and drought risk management is a national responsibility, and each country will have different problems and priorities. The RETA will need to coordinate and harmonize with ongoing and proposed risk management initiatives being undertaken by national governments and international donors. In particular, the RETA will assess the outputs and recommendations from the five components of MRC's FMMP (footnote 12) and other national and regional initiatives for flood and drought risk management, to guide the preparation of the investment projects.

C. Cost and Financing

12. The total cost of the RETA is estimated at \$2.5 million equivalent. ADB will provide \$2 million, which will be financed on a grant basis by the Japan Special Fund, funded by the Government of Japan. The recipient governments will finance a total of \$500,000 equivalent by providing counterpart staff and per diem payments, office space for the consultants, data, administration and clerical services, and communications (Appendix 3).¹⁷ The governments have been informed that approval of the RETA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

13. The RETA will be carried out by ADB and implemented by the NMCs in the three countries (the Implementing Agencies, or IAs). A no objection letter from each of the governments will be obtained before the RETA is implemented in their respective country. After the RETA feasibility studies, the principal line agency for water resources management in each country is expected to assume the role of Executing Agency for the country's investment projects. The RETA will be undertaken over about 24 months, from March 2008 to March 2010.

14. Four committees—a regional coordination committee (RCC) and three national steering committees (NSCs)¹⁸—will be created.

- (i) The RCC will include representatives from the NMCs and national disaster management committees of Cambodia, Lao PDR, Thailand, and Viet Nam, as well as from MRC (FMMP) and ADB. The regional and national team leaders of the RETA consultants will also be members of this committee, which will provide overall coordination and serve as a forum for the discussion of common technical issues¹⁹ and those of a regional and trans-boundary nature. This committee will meet at least four times over the RETA period—once in each country (including Thailand), chaired by the host country's IA.²⁰
- (ii) Each national steering committee (NSC) will comprise representatives of appropriate line agencies and key stakeholders, such as the country's NMC, national disaster management committee, and river basin organizations (where these exist). The NSC will be chaired by the IA, and will meet at least three times during the RETA, or more often if needed.

¹⁷ The governments of Cambodia, Lao PDR, and Viet Nam will each contribute \$150,000 equivalent, and Thailand, \$50,000 equivalent.

¹⁸ Activities in Thailand will be coordinated through existing MRC FMMP implementation arrangements.

¹⁹ These include a wide range of basic technical parameters involved in the prediction, management and mitigation of floods and droughts, from sharing and dissemination of flood/drought warnings and climate and hydrological data, through digital terrain mapping and remote sensing, to socioeconomic and damage-related data collection.

²⁰ Where possible, the RCC meetings will be held in conjunction with the MRC FMMP Steering Committee Meetings.

15. A technical working group (TWG) will also be formed by each country. The TWG will include technical representatives of the line agencies and other key stakeholders and will provide technical guidance to the consulting teams and assist the NSC in reviewing the outputs of the RETA and directing implementation.

16. ADB will recruit an international consulting firm for the RETA studies, and an international specialist in flood and drought management to assist ADB to implement the RETA. The international consulting firm will provide four teams of consultants: (i) a regional technical team for overall conceptual design, technical and capacity needs assessment, training and awareness building in FRM and DRM, formulation of a regional road map consistent with MRC's basin initiatives, and overall RETA monitoring and coordination; and (ii) three national project preparation teams to prepare national roadmaps and the detailed RETA feasibility studies for Cambodia, Lao PDR, and Viet Nam. Before the start of the RETA, the IAs will each appoint a project director, and Cambodia, Lao PDR, and Viet Nam will appoint a full-time project manager and at least one full-time counterpart member of staff to work with the national project preparation team throughout the period of assignment.

17. The international consulting firm, together with national consultants, will be hired through quality- and cost-based selection (90:10) on the basis of a full technical proposal. About 40 person-months of international and 56 person-months of national consulting services will be needed in the following areas: water resources, flood, drought, and disaster risk management; economics; social assessment; institutional strengthening; community education and empowerment; poverty reduction; resettlement; environment; participatory rural appraisal; monitoring and evaluation; and geographic information systems. ADB will also hire an individual international specialist in flood and drought management to assist ADB staff in reviewing and managing the RETA for 4 person-months. Key members of the consulting team will assist ADB during loan fact-finding in each country. The hiring of consultants will conform to ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time). Outline terms of reference are in Appendix 4. All equipment to be procured under the RETA will be procured according to ADB's *Procurement Guidelines* (2007, as amended from time to time) and transferred to the national IA after the Project.

18. The regional and national technical teams will each prepare progress reports, a draft final report, and a final report in the ADB format, as well as occasional working papers on specific subjects as required. The regional team reports will identify and prioritize regional flood and drought issues and present a regional road map. Each national team will identify and prioritize the country's flood and drought issues, present a national road map, and prepare feasibility studies for the national investment program. ADB and the governments will review the progress of the RETA during its implementation. Tripartite meetings between the government, ADB, and the national project preparation team will be held in each country at key stages during the RETA, after the submission of the inception, midterm, and draft final reports. The individual international FRM/DRM specialist will undertake technical reviews of the RETA reports and participate in review missions. The products of the RETA will be posted on ADB's website and progress will be reported in the project information document on the website. National workshops will be held at key decision points during the RETA, particularly during the preparation of the investment projects, to seek feedback from and disseminate information to key stakeholders.

IV. THE PRESIDENT'S RECOMMENDATION

19. The President recommends that the Board approve the provision of technical assistance not exceeding the equivalent of \$2,000,000 on a grant basis for preparing the Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
<p>Impact</p> <p>Improved ability of communities and governments to prepare for, respond to, and recover from flood and drought events</p>	<ul style="list-style-type: none"> • Preparation and implementation of national, district, and provincial preparedness plans (by 2014) • Improved awareness and preparedness in the communities (by 2014) • Improved ability of communities to cope with floods and droughts (by 2014) • Integrated and sustainable approach of government agencies to flood and drought risk management (by 2014) 	<ul style="list-style-type: none"> • National statistics on casualties and cost of disasters • National, provincial, and district budgets 	<p>Assumptions</p> <ul style="list-style-type: none"> • Support from national, provincial, and district authorities • Support from nongovernment agencies • Adequate budget appropriations and staff resources made available for flood and drought risk management and mitigation by national, provincial, and district authorities <p>Risk</p> <ul style="list-style-type: none"> • Differences in country perspectives on regional cooperation and investment priorities
<p>Outcome</p> <p>Agreed design of the resulting investment projects for Cambodia, Lao PDR, and Viet Nam</p>	<ul style="list-style-type: none"> • Preparation of draft final reports (by September 2009) 	<ul style="list-style-type: none"> • RETA review missions and project progress reports 	<p>Assumptions</p> <ul style="list-style-type: none"> • Acceptance of regional road map • Adoption of national road maps • Agreement on prioritized list of interventions
<p>Outputs</p> <p>1. Regional and national road maps of prioritized interventions, with key milestones, to improve flood and drought risk management for Cambodia, Lao PDR, Thailand and Viet Nam</p>	<ul style="list-style-type: none"> • Regional and country road maps developed and used in flood and drought risk management by the countries (by March 2009) 	<ul style="list-style-type: none"> • RETA review missions and project progress reports • Regional and national road maps 	<p>Assumptions</p> <ul style="list-style-type: none"> • Cooperation and coordination among the participating countries through the regional coordination committee

Design Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
<p>2. Prioritized lists of country interventions to reduce risks of flood and drought</p> <p>3. Feasibility studies for investment projects to implement prioritized country interventions</p>	<ul style="list-style-type: none"> Country interventions identified and prioritized (by June 2009) Feasibility studies prepared for Cambodia, Lao PDR, and Viet Nam (by September 2009) 	<ul style="list-style-type: none"> List of prioritized interventions Progress, interim, and draft final reports 	<ul style="list-style-type: none"> Cooperation and coordination among line agencies, provincial/district governments, NDMC, NMC, NGOs and other key stakeholders within the project steering committee in each country Successful coordination among agencies represented in the technical working groups
<p>Activities with Milestones</p> <p>1. National and regional road maps</p> <p>1.1 Establish regional and national committees and working groups (by September 2008)</p> <p>1.2 Assemble data and review past, present, and proposed future flood and drought risk mitigation initiatives for the region and the individual countries (by November 2008)</p> <p>1.3 Consult with stakeholders in the communities and the local and national governments to identify flood and drought risk issues and needs (by December 2008)</p> <p>1.4 Identify key milestones in addressing country needs for the national road maps (by March 2009)</p> <p>1.5 Define the time frames and resource/capability requirements to achieve the desired milestones (by June 2009)</p> <p>2. Prioritize lists of country-specific interventions</p> <p>2.1 Define and develop appropriate country interventions for the management of flood and drought risks (by March 2009)</p> <p>2.2 Evaluate the cost-effectiveness of the proposed interventions (by March 2009)</p> <p>2.3 Develop a prioritized list of interventions (by April 2009)</p> <p>2.4 Consult with stakeholders to validate the priorities (by May 2009)</p> <p>3. Prepare feasibility studies for each country investment program on the basis of the prioritized list of interventions (by September 2009)</p>		<p>Inputs</p> <ul style="list-style-type: none"> ADB \$2.0 million Governments \$0.5 million <p>International Consultants</p> <ul style="list-style-type: none"> 4 person-months, flood and drought/ project management specialist (individual) 40 person-months, in the fields of flood and drought management, social studies, poverty reduction, resettlement, environment and economics (firm) <p>National Consultants</p> <ul style="list-style-type: none"> 56 person-months, in the fields of flood and drought management, social studies, GIS/data management, environment, and monitoring and evaluation (firm) 	

ADB = Asian Development Bank, GIS = geographic information system, Lao PDR = Lao People's Democratic Republic, NDMC = National Disaster Management Committee, NGO = nongovernment organization, NMC = national Mekong committee, RETA = regional technical assistance.

INITIAL POVERTY AND SOCIAL ANALYSIS

Country/Project Title:	Cambodia, Lao People's Democratic Republic, Thailand, Viet Nam/Preparing the Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project		
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Lending/Financing Modality:	Project	Department/ Division:	Southeast Asia Department/ Agriculture, Environment and Natural Resources Division
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I. POVERTY ISSUES

A. Linkages to the National Poverty Reduction Strategy and Country Partnership Strategy

1. Based on the country poverty assessment, the country partnership strategy and the sector analysis describe how the project would directly or indirectly contribute to poverty reduction and how it is linked to the poverty reduction strategy of the partner country.

ADB's GMS Regional Cooperation Strategy and Program (2004–2008) supports pro-poor, sustainable growth through, among other things, capability-building measures to address human resource development needs, and shared management of the environment and natural resources—especially the watershed systems of the Mekong River—to help ensure sustainable development and conservation. ADB's GMS strategy is intended to accelerate the achievement of the MDGs through support for economic growth objectives to reduce income poverty, and through investments and technical assistance to promote efficient policy choices that will reduce non-income poverty. One of the 11 "GMS flagship programs" specifically addresses flood control and water management. It involves strengthening land-use planning in the GMS countries to reduce risk to people living in hazardous floodplain areas, strengthening structural measures to reduce damage from floods, strengthening institutional capacity for flood preparedness and emergency management, and financing works and other measures to minimize the damage caused by floods in the region.

The negative impact of floods in Cambodia, Lao PDR, and Viet Nam is magnified by the limited economic capacity of those affected to deal with such events. The affected communities are generally poor and vulnerable, and to some extent are kept that way by recurring flood and drought. Reducing the vulnerability of these people to the negative economic impact of floods and droughts will improve their standard of living and help them climb out of poverty.

B. Targeting Classification

1. Select the targeting classification of the project:

General Intervention Individual or Household (TI-H); Geographic (TI-G); Non-Income MDGs (TI-M1, M2, etc.)

2. Explain the basis for the targeting classification:

The Project is classified as a general intervention as it will have a regional focus, albeit directed at the areas of the Lower Mekong Basin that are most affected by flood and drought.

C. Poverty Analysis

1. If the project is classified as TI-H, or if it is policy-based, what type of poverty impact analysis is needed?

2. What resources are allocated in the PPTA/due diligence?

A social specialist/sociologist will be part of the consulting team and will address social, poverty, indigenous peoples, and gender issues.

3. If GI, is there any opportunity for pro-poor design (e.g., social inclusion subcomponents, cross subsidy, pro-poor governance, and pro-poor growth)?

As noted, the affected communities are generally poor and vulnerable, and to some extent are kept that way by the cycles of flood and drought. Pro-poor design will be a key feature of this PPTA.

II. SOCIAL DEVELOPMENT ISSUES

A. Initial Social Analysis

Based on existing information:

1. Who are the potential primary beneficiaries of the project? How do the poor and the socially excluded benefit from the project?

The rural poor are the primary beneficiaries of this project since the negative impact of floods in Cambodia, Lao PDR, and Viet Nam is magnified by the limited economic capacity of the affected peoples to deal with such events.

2. What are the potential needs of beneficiaries in relation to the proposed project?

In addition to assisting national, regional, and local authorities in managing floods, the RETA will identify community-based flood and drought risk management (CBFDRM) activities to mitigate the impact of these natural disasters. Typical CBFDRM activities are surveys of key flood and drought risk issues in the villages; risk management planning for villages; implementation of local structural measures in villages (e.g., embankments, safe refuges, water tanks); improvement of access to education, health/medical facilities, shops, veterinary supplies, etc., during floods; and conduct of educational activities such as hazard reduction programs for children.

3. What are the potential constraints in accessing the proposed benefits and services, and how will the project address them?

Institutional, capacity, and financial constraints, as well as lack of access to information about floods and droughts, are key constraints on flood and drought risk management. The Project will identify the national, regional, and local constraints, as well as key initiatives to deal with these issues.

B. Consultation and Participation

1. Indicate the potential initial stakeholders.

The rural poor are the primary beneficiary stakeholders of the Project, as indicated in Section A.1. Other stakeholders are national disaster management organizations, local government units, NGOs, civil society organizations and relief agencies, the Mekong River Commission, and development partners.

2. What type of consultation and participation (C&P) is required during the PPTA or project processing (e.g., workshops, community mobilization, involvement of nongovernment organizations and community-based organizations, etc.)?

Stakeholder analysis and participation in the preparation of regional and national road maps for flood and drought risk management and mitigation are key features of the project design. The consultations with national, provincial, district, and community stakeholders will continue throughout the design phase of the country investment projects to ensure that the proposed investments are appropriately targeted and address the needs of the vulnerable communities.

3. What level of participation is envisaged for project design?

Information sharing Consultation Collaborative decision making Empowerment

Empowerment is a key to the success of CBFDRM activities in mitigating these natural disasters, as described in Section A.2.

4. Will a C&P plan be prepared? Yes No Please explain.

The planning of workshops to be conducted during the RETA will be a key activity in the inception phase.

C. Gender and Development

1. What are the key gender issues in the sector/subsector that are likely to be relevant to this project/program?

The concerns and needs of women and children are central to the development of CBFDRM strategies, and will be specifically addressed during the design of the country activities in these areas. The key gender issues are related to how families (men, women, and children) cope with natural disasters such as floods and droughts.

2. Does the proposed project/program have the potential to promote gender equality and/or women's empowerment by improving women's access to and use of opportunities, services, resources, assets, and participation in decision making? Yes No Please explain.

The Project is intended to address disaster mitigation, and, while addressing gender issues (as described in item 1 above), is unlikely to promote gender equality.

3. Could the proposed project have an adverse impact on women and/or girls or widen gender inequality?

Yes No Please explain.

For the reasons given in item 2 above, the Project is unlikely to have an adverse impact on women and girls or to widen gender inequality.

III. SOCIAL SAFEGUARD ISSUES AND OTHER SOCIAL RISKS			
Issue	Nature of Social Issue	Significant/Limited/ No Impact/Not Known	Plan or Other Action Required
Involuntary Resettlement	Resettlement issues are unlikely to be encountered in the Project since the activities are expected to be related to capacity building, institutional strengthening, and upgrading of existing flood and drought mitigation facilities. Since a wide range of possible interventions is likely, and will differ in each country, the specific resettlement issues will be addressed during the preparation of the country investment projects, and resettlement plans will be prepared if necessary.	Limited.	<input type="checkbox"/> Full Plan <input type="checkbox"/> Short Plan <input checked="" type="checkbox"/> Resettlement Framework <input type="checkbox"/> No Action <input type="checkbox"/> Uncertain
Indigenous Peoples	The focus of the Project will be the livelihood needs and safety of vulnerable groups affected by floods and droughts within the floodplains of the Lower Mekong Basin. Since indigenous peoples are often adversely affected by disasters and have different coping mechanisms, the RETA will examine this issue further during the investment project preparation.	Not known.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input type="checkbox"/> Indigenous Peoples Framework <input type="checkbox"/> No Action <input checked="" type="checkbox"/> Uncertain

Issue	Nature of Social Issue	Significant/Limited/ No Impact/Not Known	Plan or Other Action Required
Labor <input checked="" type="checkbox"/> Employment Opportunities <input type="checkbox"/> Labor Retrenchment <input type="checkbox"/> Core Labor Standards	The Project is not expected to have a negative impact on labor. On the contrary, it is intended to provide opportunities for communities to engage in their normal livelihood despite flood and drought, and is thus expected to have a positive impact on labor. No separate plan is considered necessary.	Limited.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
Affordability	A key feature of the proposed investment programs for the countries is ensuring the inclusion of vulnerable groups and communities in flood and drought risk mitigation activities, since these groups are most vulnerable to such disasters. High emphasis will be placed on ensuring that mitigation measures are affordable and targeted to the needs of the poor.	Limited.	<input type="checkbox"/> Action <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
Other Risks and/or Vulnerabilities <input type="checkbox"/> HIV/AIDS <input type="checkbox"/> Human Trafficking <input type="checkbox"/> Others (conflict, political instability, etc.), please specify	The Project will be carried out to address the needs of communities affected by flood and drought. Hence, the design of the investment projects will specifically address the risks and vulnerability of these communities. No separate plan is considered necessary.	No impact.	<input type="checkbox"/> Plan <input type="checkbox"/> Other Action <input checked="" type="checkbox"/> No Action <input type="checkbox"/> Uncertain
IV. PPTA/DUE DILIGENCE RESOURCE REQUIREMENT			
1. Do the TOR for the PPTA (or other due diligence) include poverty, social and gender analysis and the relevant specialist/s? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, please explain why.			
2. Are resources (consultants, survey budget, and workshop) allocated for conducting poverty, social and/or gender analysis, and C&P during the PPTA/due diligence? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, please explain why.			

ADB = Asian Development Bank, CBFDRM = community-based flood and drought risk management, C&P = consultation and participation, GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic, PPTA = project preparatory technical assistance, RETA = regional technical assistance.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
A. Asian Development Bank Financing^a	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	1,079.0
ii. National Consultants	168.0
b. International and Local Travel	228.0
c. Reports and Communications	39.0
2. Equipment ^b	39.0
3. Training, Seminars, and Conferences (Stakeholder Workshops)	213.0
4. Surveys ^c	60.0
5. Miscellaneous Administration and Support Costs	60.0
6. Representatives for Contract Negotiations	9.0
7. Contingencies	105.0
Subtotal (A)	2,000.0
B. Government Financing^d	
1. Office Accommodation and Transport	141.0
2. Remuneration and Per Diem of Counterpart Staff	152.0
3. Others	164.0
4. Contingencies	43.0
Subtotal (B)	500.0
Total	2,500.0

^a Financed by the Japan Special Fund, funded by the Government of Japan.

^b Computers, printers, geographic information system workstations, office equipment (fax, photocopier, etc.) for each project office.

^c Including social and technical surveys where needed for investment project preparation.

^d Financed in kind by the governments of Cambodia, Lao People's Democratic Republic, Thailand, and Viet Nam.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The Asian Development Bank (ADB) will hire (i) an international consulting firm to undertake the regional technical assistance (RETA) studies in association with national consultants, and (ii) an individual international specialist in flood and drought management to assist ADB in implementing the RETA, as described below.

A. International Consulting Firm

2. The international consulting firm will provide a regional technical team and three national project preparation teams. The firm will be chosen through quality- and cost-based selection, on the basis of a full technical proposal, and according to ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time).

3. The firm will provide four teams: (i) a regional technical team for overall conceptual design, technical and capacity needs assessment, training and awareness building in flood risk management (FRM) and drought risk management (DRM), formulation of country road maps consistent with Mekong River Commission's (MRC) basin initiatives, and overall monitoring and coordination of the RETA; and (ii) three national project preparation teams, one for each country, to prepare the detailed RETA feasibility studies.

4. A total of 40 person-months of international and 56 person-months of national consulting services in the following areas of expertise will be required: water resources management; flood, drought, and disaster risk management and mitigation; economics; social assessment; institutional strengthening; community education and empowerment; poverty reduction; resettlement; environment; participatory rural appraisal; monitoring and evaluation; and geographic information systems. Key members of the consulting team will assist ADB during loan fact-finding in each country.

1. Regional Consulting Team (RCT)

5. The RCT will comprise (as shown in Table A4.1):

- (i) a senior (international) FRM/DRM specialist, to serve as overall chief technical adviser/team leader (TL) and to oversee the development of the national FRM/DRM road map for Thailand;
- (ii) three international FRM/DRM specialists/hydrologists, to be assigned as team leaders of the national consulting teams (NCTs) for Cambodia, Lao People's Democratic Republic (Lao PDR), and Viet Nam;
- (iii) four regional/national water resources specialists, one each for Cambodia, Lao PDR, Thailand, and Viet Nam;
- (iv) an international economist, environmentalist, and social sector specialist, to be shared with the NCTs; and
- (v) a national geographic information system (GIS)/data management specialist.

6. The specific tasks of the RCT will be as follows:

- (i) In collaboration with the technical working group (TWG) in each country, identify key FRM and DRM stakeholders in the country.

- (ii) With reference to Tables A4.2 and A4.3, identify, refine, and describe the range of possible FRM and DRM interventions.
 - (iii) Consult with stakeholders in each country to assess their FRM/DRM capacity and training needs and the FRM/DRM issues that are of concern to them.
 - (iv) Identify the likely outputs, including their timing, from other FRM/DRM regional and national programs in the Lower Mekong Basin (LMB) and the three countries, including the MRC's Flood Management and Mitigation Program.
 - (v) Develop workshop material to educate key stakeholders in each country on the concepts and principles of integrated flood risk management (IFRM) and integrated drought risk management (IDRM).
 - (vi) Deliver a national workshop on IFRM/IDRM in each country, to educate the stakeholders and to have them rank the FRM/DRM needs and interventions. Incorporate the FRM/DRM needs and interventions into a combined program of FRM/DRM needs and interventions.
 - (vii) Conduct a regional workshop to (a) present the regional and national outputs expected from other FRM and DRM programs, and (b) present and discuss the identified national FRM/DRM needs, with the objective of developing a set of common regional needs and interventions, and three sets of specific national needs and interventions.
 - (viii) Develop economic, environmental, and social "effectiveness" indices for the various general categories of FRM and DRM measures. Use these indices to undertake feasibility appraisals of the identified regional and national FRM and DRM interventions.
 - (ix) From the identified regional and national needs, and in conjunction with the three national steering committees (NSCs), develop (a) a draft regional road map for FRM/DRM interventions, and (b) three draft national road maps for FRM/DRM interventions in each of the three countries. Each of the four draft road maps will be coordinated and integrated with expected outputs from other FRM and DRM programs and will include 2-, 5-, and 10-year SMART²¹ milestones against which to measure FRM and DRM progress.
 - (x) Hold a regional workshop to present and discuss the four draft road maps.
 - (xi) Work with MRC and the regional coordination committee to refine and finalize the regional road map and milestones and align it with the outputs of MRC's Flood Management and Mitigation Program.
 - (xii) Meet with the regional coordination committee every month, or as often as needed.
 - (xiii) Prepare the reports listed below.
7. The reporting requirements will be as follows:
- (i) an inception report within 4 weeks of mobilization, outlining the study implementation and personnel schedule;
 - (ii) bimonthly progress reports on overall project progress;
 - (iii) draft and final reports on the regional FRM/DRM needs and road map;

²¹ Specific, measurable, agreed, relevant, and time-bound.

- (iv) draft and final reports on the national FRM/DRM needs and road map;
- (v) workshop reports; and
- (vi) occasional working papers on specific technical subjects, as required.

2. National Consulting Teams (NCTs)

8. Each of the three NCTs will comprise the following:
 - (i) a national team leader, who will also be the country FRM/DRM/hydrology specialist in the RCT;
 - (ii) a national water resources specialist, who will be the national deputy team leader and also the country water resources specialist in the RCT;
 - (iii) an international economist, environmentalist, and social safeguard specialist, to be shared with the RCT;
 - (iv) a national specialist in community-based disaster risk mitigation; and
 - (v) specialists in economics, social safeguards, and resettlement, to assess the proposed regional and national FRM/DRM interventions with reference to ADB's policies and guidelines for the preparation of investment projects.
9. The specific tasks of each NCT will be as follows:
 - (i) In conjunction with the TWG, refine the list of national needs and proposed interventions identified by the RCT.
 - (ii) Conduct stakeholder consultations and a national workshop to validate the list of needs and proposed interventions.
 - (iii) Analyze in detail the technical, economic, environmental, and social feasibility of the identified interventions, as required for ADB financing (see section C below).
 - (iv) In conjunction with the TWG, refine the road map and milestones developed by the RCT to reflect any changes in the proposed interventions emerging from further analysis by the NCT.
 - (v) Conduct a national workshop to present and discuss the final national road maps and adopted interventions.
 - (vi) Prepare material for and attend tripartite meetings between the national government, ADB, and the NCT as required.
 - (vii) Attend meetings of the TWG and NSC, as required.
 - (viii) Prepare the reports listed below.
10. Each NCT will prepare the following reports:
 - (i) a national inception report after the third month of the Project, outlining the country implementation and personnel schedule;
 - (ii) a midterm national progress report after the sixth month of the Project, seeking endorsement of the list of needs and proposed interventions by the NSC and ADB;
 - (iii) a report on the national workshops held;

- (iv) a draft final report after the tenth month of the Project, including all design elements and supporting materials for the proposed investment program, in ADB's standard reporting format; and
- (v) a final report within 1 month of the final tripartite meeting for each country, incorporating the revisions agreed on at the meeting.

11. Tripartite meetings will be held 2–3 weeks after the submission of the inception, progress, and draft final reports. ADB and the national governments will jointly review the progress of the RETA during its implementation, and participate in joint review and tripartite meetings. The consultants will be required to assist a fact-finding mission, planned to coincide with the final tripartite meeting.

3. Investment Project Preparation

12. On the basis of the investment priorities determined for each country in the national FRM/DRM road maps described above, the consultants will prepare investment projects for Cambodia, Lao PDR, and Viet Nam that meet ADB's project preparation and social and environmental safeguard requirements. The consultants will undertake, among other things, the following specific activities:

- (i) Define the rationale of the Project, identifying performance indicators and analysis, and reviewing key problems and opportunities.
- (ii) Highlight recent sector experience and lessons learned.
- (iii) Identify and describe the project components, including the capability-building needs of key line agencies, if necessary.
- (iv) Prepare cost estimates and a financing plan for the Project.²²
- (v) Undertake economic, financial, social, and environmental analyses according to ADB guidelines and policies, and assess project risks and mitigation strategies.²³
- (vi) Propose implementation arrangements that reflect appropriate links at the central and local levels with other ministries and stakeholders participating in the Project.
- (vii) Identify contract packages and procurement methods, and prepare a procurement plan and implementation schedule for major activities.
- (viii) Identify the consulting requirements, and prepare detailed terms of reference and a schedule of consulting services.
- (ix) Prepare a project design and monitoring framework that meets ADB requirements, incorporating appropriate arrangements and indicators for monitoring and evaluation.
- (x) Prepare a sector assessment.
- (xi) Prepare an assessment of external assistance to the sector.

²² Using COSTAB software. COSTAB files must include investment costs, recurrent costs, duties, and taxes.

²³ According to (i) ADB's *Guidelines for Economic Analysis of Projects* (2001) and OMG1 on the economic analysis of projects; (ii) ADB's *Guidelines for the Financial Governance and Management of Investment Projects* (2001) and OMG2 on the financial analysis of projects; (iii) ADB's *Handbook on Poverty and Social Analysis* (2001) on the social analysis of projects; (iv) ADB's *Involuntary Resettlement Policy* (1995) and OMF2 on involuntary resettlement; (v) ADB's *Policy on Indigenous Peoples* (1998) and OMF3 on indigenous peoples; and (vi) ADB's *Environment Policy* (2002) and OMF1 on the environmental analysis of projects.

- (xii) Prepare a summary poverty reduction and social strategy, a resettlement framework, and a summary environmental impact assessment.
- (xiii) Prepare an institutional analysis of the proposed executing agency for the investment project.

B. Individual International Flood and Drought Management Specialist

13. An experienced individual international specialist in flood and drought management will be hired to assist ADB in implementing the RETA, according to ADB's *Guidelines on the Use of Consultants* (2007, as amended from time to time). Over a total of 4 person-months of intermittent input during the Project, the consultant will assist ADB missions and attend tripartite meetings during the inception, midterm, and final review mission periods; review and comment on documents prepared by the consulting team; and assist the ADB project officer in general oversight and management of the Project.

Table A4.1: Breakdown of Consulting Inputs of Experts of the Consulting Firm

Expertise	Int/Reg/Nat	Reg/Nat Road Maps	Proj Prep CAM	Proj Prep LAO	Proj Prep VIE	Total
Chief Technical Adviser ^a	Int	8				8
Flood/Drought Specialist CAM ^b	Int	2	4			6
Flood/Drought Specialist LAO ^b	Int	2		4		6
Flood/Drought Specialist VIE ^b	Int	2			4	6
Economist ^c	Int	2	2	2	2	8
Social/Resettlement Specialist ^c	Int		1	1	1	3
Environmental Specialist ^c	Int		1	1	1	3
Water Resources Specialist CAM ^d	Reg/Nat ^e	4	4			8
Water Resources Specialist LAO ^d	Reg/Nat	4		4		8
Water Resources Specialist THA ^d	Reg	4				4
Water Resources Specialist VIE ^d	Reg/Nat	4			4	8
GIS/Data Management Specialist	Reg/Nat	4				4
Social Specialist CAM	Nat		2			2
Social Specialist LAO	Nat			2		2
Social Specialist VIE	Nat				2	2
CB Disaster Management Specialist CAM	Nat		2			2
CB Disaster Management Specialist LAO	Nat			2		2
CB Disaster Management Specialist VIE	Nat				2	2
Environment Specialist CAM	Nat		2			2
Environment Specialist LAO	Nat			2		2
Environment Specialist VIE	Nat				2	2
M&E Specialist CAM	Nat		2			2
M&E Specialist LAO	Nat			2		2
M&E Specialist VIE	Nat				2	2
	Int	16	8	8	8	40
	Reg/Nat	20	4	4	4	32
	Nat	0	8	8	8	24
	Total	36	20	20	20	96

CAM = Cambodia, CB = community-based, GIS = geographical information system, Int = international, LAO = Lao People's Democratic Republic, M & E = monitoring and evaluation, Nat = national, Proj Prep = project preparation, Reg = regional, THA = Thailand, VIE = Viet Nam.

^a The chief technical adviser will also coordinate the preparation of the national flood risk management/drought risk management (FRM/DRM) road map for Thailand.

^b The international flood/drought management specialist will also be assigned as national team leader for his/her country.

^c The National Consultant Team for Cambodia, Lao PDR, and Viet Nam will share the services of the international social and environment specialists and the economist. These specialists will also provide input to the development of the national flood risk management/drought risk management (FRM/DRM) road map for Thailand, together with the chief technical adviser.

^d The regional water resources specialist will also be the national deputy team leader for his/her country.

^e The regional and national specialists will receive travel and per diem allowances when traveling outside their home country.

Source: Asian Development Bank estimates.

Table A4.2: Possible Flood Risk Management Interventions and Activities

Management Measure/Activity	Possible Interventions
Land-Use Controls	<ul style="list-style-type: none"> • Apply land-use controls in flood-prone areas.
Development and Building Controls	<ul style="list-style-type: none"> • Develop and/or implement a flood-proofing code for houses and buildings. • Develop and/or implement a flood resilience code for infrastructure.
Structural Measures	<ul style="list-style-type: none"> • Protect bridge abutments from erosion. • Build or strengthen embankments around items of key infrastructure. • Repair “colmatage” (fill) embankments and canals (Cambodia). • Provide increased protection (embankments) in major urban areas. • Build or strengthen embankments to protect agricultural areas.
Flood Emergency Planning	
<ul style="list-style-type: none"> • Community-Based Flood Risk Management (CBFRM) 	<ul style="list-style-type: none"> • Undertake surveys of flood risk management (FRM) management issues in the villages. • Develop and distribute work kits to promote CBFRM planning in the villages. • Implement local structural measures in the villages (embankments, safe refuges). • Improve access to education, health/medical facilities, shops, veterinary supplies, etc., during floods. • Implement a hazard reduction program for children—swimming training, flood education in schools. • Roll out current CBFRM programs in all villages.
<ul style="list-style-type: none"> • Flood Education 	<ul style="list-style-type: none"> • Develop CBFRM aids for villagers. • Develop children’s flood education programs for village schools.
<ul style="list-style-type: none"> • Financial Measures 	<ul style="list-style-type: none"> • Develop and implement a public-private microfinance system for flood recovery. • Implement a flood insurance program for villagers.
<ul style="list-style-type: none"> • Flood Forecasting 	<ul style="list-style-type: none"> • Define the features of an appropriate forecasting system. • Develop and implement an appropriate forecasting system
<ul style="list-style-type: none"> • Flood Warning 	<ul style="list-style-type: none"> • Determine the nature of appropriate warnings and an appropriate warning system. • Develop and Implement an improved warning system. • Improve communication systems for flood warning.
Flood Damage Assessment	<ul style="list-style-type: none"> • Develop unit cost curves for different land uses, etc. • Develop an integrated process of assessing flood damage. • Appraise the cost-effectiveness of FRM measures in the different countries.
Institutional Strengthening	<ul style="list-style-type: none"> • Improve working relationships between line agencies and NGOs. • Develop a flood risk management committee to coordinate and direct FRM planning nationwide.
Flood Simulation Modelling	<ul style="list-style-type: none"> • Assess the impact of embankments on floodplain conveyance. • Develop an embankment master plan (Cambodia). • Assess the impact of works in other countries on flood behavior in Cambodia, Lao PDR, and Viet Nam. • Provide modelling software packages.
Integrated Land-Use Planning	<ul style="list-style-type: none"> • Develop land-use plans for flood-prone areas.
Improved Hydrometeorological Monitoring	<ul style="list-style-type: none"> • Develop a technically, operationally, institutionally, and financially sustainable monitoring program. • Implement an improved monitoring program.

Management Measure/Activity	Possible Interventions
General and Specific Capacity Building	<ul style="list-style-type: none"> • Introduce hydrology and water resources programs in schools, for undergraduate students. • Assess flood damage. • Implement an integrated flood risk management system. • Implement flood simulation modeling. • Implement flood forecasting. • Implement land-use planning
Trans-boundary Considerations	<ul style="list-style-type: none"> • Strengthen trans-boundary consultation and assessment procedures.
Best-Practice Guidelines (MRC FMMP Component 2)	<ul style="list-style-type: none"> • Provide resources and training to implement guidelines from component 2 of the MRC FMMP.

CBFRM = community-based flood risk management, FRM = flood risk management, FMMP = Flood Management and Mitigation Program, MRC = Mekong River Commission, NGO = nongovernment organization.

Source: Asian Development Bank staff.

Table A4.3: Possible Drought Risk Management Interventions

Management Measure	Possible Drought Management Intervention
1. Land-Use Controls	<ul style="list-style-type: none"> • Not relevant
2. Development and Building Controls	<ul style="list-style-type: none"> • Install rainwater tanks, etc.
3. Structural Measures	<ul style="list-style-type: none"> • Construct district or commune reservoirs (covering more than one village).
4. Drought Emergency Planning	
<ul style="list-style-type: none"> • Community-Based Drought Risk Management (CBDRM) 	<ul style="list-style-type: none"> • Construct village ponds. • Construct village wells. • Install rainwater tanks. • Implement groundwater drilling for village supplies. • Develop agricultural drought management plans—crops, crop cycles, seeds, livestock, etc. • Assess the feasibility and effectiveness of drought monitoring in villages.
<ul style="list-style-type: none"> • Drought Education 	<ul style="list-style-type: none"> • Develop community-based drought planning and management aids for villagers. • Develop children's drought education programs for village schools.
<ul style="list-style-type: none"> • Financial Measures 	<ul style="list-style-type: none"> • Assess the feasibility of a public-private microfinance system for periods of drought recovery. • Assess the feasibility of a drought insurance program for villagers.
<ul style="list-style-type: none"> • Drought Forecasting 	<ul style="list-style-type: none"> • Assess the feasibility of an appropriate drought forecasting system • Develop and implement an appropriate drought forecasting system (at the national, provincial, district, commune, and village levels).
<ul style="list-style-type: none"> • Drought Warning 	<ul style="list-style-type: none"> • Determine the nature of appropriate warnings and an appropriate warning system. • Develop and implement an improved warning system.
Drought Damage Assessment	<ul style="list-style-type: none"> • Develop unit cost curves for different land uses, etc. • Develop an integrated process of assessing drought damage. • Appraise the cost-effectiveness of drought management measures.
Institutional Strengthening	<ul style="list-style-type: none"> • Develop effective working relationships between line agencies and NGOs. • Develop a drought management committee to coordinate and direct drought planning.
Improved Hydrometeorological Monitoring for Drought	<ul style="list-style-type: none"> • Assess the specific needs for drought monitoring, e.g., shortfalls in village rainfall. • Implement an improved drought monitoring program.

Management Measure	Possible Drought Management Intervention
General and Specific Capacity Building	<ul style="list-style-type: none"> • Introduce hydrology and water resources programs for undergraduate students • Assess drought damage. • Improve drought management in the provinces, districts, communes, and villages • Implement drought monitoring for management purposes in the villages. • Implement long-range drought forecasting at the central government level.
Trans-boundary Considerations	<ul style="list-style-type: none"> • Strengthen the procedures for trans-boundary consultation and assessment with respect to drought (low flows).
Simulation Modelling	<ul style="list-style-type: none"> • Implement drought simulation modelling (low flows and drought flows) for trans-boundary rivers.

CBDRM = community-based drought risk management, NGO = nongovernment organization.

Source: Asian Development Bank staff.

