Climate Investment Funds

PPCR/SC.8/4
June 9, 2011

Meeting of the PPCR Sub-Committee
Cape Town, South Africa
June 28 and 29, 2011

Agenda Item 5

STRATEGIC PROGRAM FOR CLIMATE RESILIENCE
CAMBODIA

Proposed Decision by PPCR Sub-Committee

The PPCR Sub-Committee, having reviewed the *Strategic Program for Climate Resilience for Cambodia* (document PPCR/SC.8/4),

a) endorses the SPCR as a basis for the further development of the projects foreseen in the strategic and takes note of the requested funding of USD50 million in grant funding and USD 55 million in other concessional resources. The Sub-Committee reconfirms its decision on the allocation of resources, adopted at its meeting in June 2010, that a range of funding for the country should be used as a planning tool in the further development of project and program proposals to be submitted to the PPCR Sub-Committee for PPCR funding approval, recognizing that the minimum amount of the range is more likely and that the upper limit of the range will depend on availability of funding.

   The range of funding agreed for a single country pilot program is USD 40-50 million in grant resources, and USD 40-55 million in other concessional resources. The Sub-Committee also recognizes that the quality of the proposed activities will be a significant factor in the funding to be approved by the Sub-Committee when project and program proposals are submitted for approval of PPCR funding.

b) approves a total of USD million in PPCR funding as preparation grants for the following projects to be developed under the SPCR,

   i. USD600,000 for the project, *Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin* (AsDB)
   ii. USD600,000 for the project, *Enhancement of Flood and Drought Management in Pursat and Kratie Provinces* (AsDB)
   iii. USD600,000 for the project *Promoting Climate-resilient Agriculture, Forestry, Water Supply and Coastal Resources in Koh Kong and Mondulkiri Provinces* (AsDB)
   iv. USD600,000 for the project *Climate Proofing of Agricultural Infrastructure and Business-focused Adaptation* (AsDB)
   v. USD600,000 for the project *Climate Proofing Infrastructure in the Southern Economic Corridor (SEC) Towns* (AsDB)
   vi. USD600,000 for the project *Flood-resilient Infrastructure Development in Sisopohon, Seam Reap, Kampong Thom, Battambang, Pursat and Kampong Cham* (AsDB)
   vii. USD200,000 for the project *Mainstreaming Climate Resilience into Development Planning in Key Vulnerable Sectors* (AsDB)

c) takes note of the estimated budget for project preparation and supervision services for the projects referenced above and approves a first tranche of funding for MDB preparation and supervision services as follows[1]:

[1] For private sector projects, MDB preparation and supervision costs are determined at investment development stage and requested at a later point in time.

i. USD390,000 for the project, *Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin* (AsDB)
ii. USD232,500 for the project, *Enhancement of Flood and Drought Management in Pursat and Kratie Provinces* (AsDB)
iii. USD390,000 for the project *Promoting Climate-resilient Agriculture, Forestry, Water Supply and Coastal Resources in Koh Kong and Mondulkiri Provinces* (AsDB)
iv. USD232,500 for the project *Climate Proofing of Agricultural Infrastructure and Business-focused Adaptation* (AsDB)
v. USD187,500 for the project *Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces*
vi. USD187,500 for the project *Climate Proofing Infrastructure in the Southern Economic Corridor (SEC) Towns* (AsDB)
vii. USD187,500 for the project *Flood-resilient Infrastructure Development in Sisopohon, Seam Reap, Kampong Thom, Battambang, Pursat and Kampong Cham* (AsDB)
viii. USD250,000 for the project *Mainstreaming Climate Resilience into Development Planning in Key Vulnerable Sectors* (AsDB)

d) requests the Government of Cambodia and the MDBs to take into account all written comments submitted by Sub-Committee members by July 15, 2011 in the further development of the projects.

Kingdom of Cambodia

Nation Religion King

Strategic Program for Climate Resilience (SPCR)

Prepared for the
Pilot Program for Climate Resilience (PPCR)
May 2011

ROYAL GOVERNMENT OF CAMBODIA

Abbreviations and Acronyms

ADB	Asian Development Bank
BCC	Biodiversity Conservation Corridors
CBDRM	Community Based Disaster Reduction and Management
CCA	Climate Change Adaptation
CCCA	Cambodia Climate Change Alliance
CCD	Climate Change Department
CCSAP	Climate Change Strategy and Action Plan
CCTT	Climate Change Technical Team
CSO	Civil Society Organizations
DANIDA	Danish International Development Agency
DFID	United Kingdom Department of International Development
DOM	Department of Meteorology
DRR	Disaster Risk Reduction
FAO	Food and Agriculture Organization of the United Nations
FWUG	Farmer Water User Groups
GDP	Gross Domestic Product
GEF	Global Environment Facility
IFC	International Finance Corporation
IWRM	integrated water resources management
JICA	Japan International Cooperation Agency
KAP	Knowledge, Attitudes and Practices
MAFF	Ministry of Agriculture, Forestry and Fisheries
MDG	Millennium Development Goals
MEF	Ministry of Economy and Finance
MEYS	Ministry of Education, Youth and Sports
MOE	Ministry of Environment
MOH	Ministry of Health
MOI	Ministry of Interior
MOP	Ministry of Planning
MOWRAM	Ministry of Water Resources and Meteorology
MPWT	Ministry of Public Works and Transport
MRC	Mekong River Commission
MRD	Ministry of Rural Development
NAPA	National Adaptation Programme of Action to Climate Change
NCCC	National Climate Change Committee

NCDM	National Committee for Disaster Management
NGO	Non-Governmental Organization
NP-SNDD	National Program for Sub-National Democratic Development
NSDP	National Strategic Development Plan
O&M	operations and maintenance
PAM	Project Administration Manual
PPCR	Pilot Program on Climate Resilience
PPG	Project Preparation Grant
PDWRAM	Provincial Departments of Water Resources Management and Meteorology
RRP	Request and Recommendation of the President
RGC	Royal Government of Cambodia
SEC	Southern Economic Corridor
SIDA	Swedish International Development Cooperation Agency
SNAP	Strategic National Action Plan for DRR
SNC	Second National Communication
SPCR	Strategic Program for Climate Resilience
TA	Technical Assistance
TTL	task team leader
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollars
WB	World Bank
WRMSDP	Water Resources Management Sector Development Program

Summary of Cambodia's Strategic Program for Climate Resilience (SPCR)

PILOT PROGRAM FOR CLIMATE RESILIENCE (PPCR) Summary of Strategic Program for Climate Resilience (SPCR)		
1. Country/Region:	**ROYAL GOVERNMENT OF CAMBODIA**	
2. PPCR Funding Request (in USD million):	***Grant: USD 50 million***	***Loan: USD 55 million***
3. National PPCR Focal Points:	*HE Mr. Mok Mareth, Senior Minister, Ministry of Environment (MOE)* *HE Mr. Chan Sothy, Deputy Secretary General, Ministry of Economy and Finance (MEF)*	
4. National Implementing Agency (Coordination of Strategic Program)**:**	*Ministry of Economy and Finance (MEF)*	
5. Involved MDB	*Asian Development Bank (with support from the World Bank)*	
6. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):	*ADB Headquarters – PPCR Focal Point: Daniele Ponzi* *WB Headquarters - PPCR Focal Point: Kanta Kumari Rigaud*	*ADB TTL: Ancha Srinivasan* *WB TTL: Samuel Wedderburn*

7. Description of the SPCR:

(a) Key challenges related to vulnerability to climate change/variability

- **Climatic change impacts and increase in the extreme weather events.** Cambodia is highly vulnerable to the impacts of climate change and variability due to high dependence of its economy on climate-sensitive sectors, and low adaptive capacity of its populations. The country's agricultural production system is dependent on the annual flooding and recession of Tonle Sap Great Lake, and is therefore particularly sensitive to potential changes in local climate and monsoon regimes. Cambodia's 435 km coastline and large parts of the Mekong River flood plain could be severely affected by sea level rise. Projections based on an analysis of 14 General Circulation Models suggested that, under the high emissions scenario, the rainy season will start later, wet season rainfall will increase but dry season rainfall will decrease and that extreme weather events will become more frequent. These changes may lead to more intense flood pulses and adversely impact agriculture, infrastructure and floodplain vegetation as well as reduce the fertile land area suitable for agriculture.
- **Vulnerability of water resources, agriculture, and infrastructure.** Agriculture and water resources are the most important sectors to the Cambodian economy, with around 57.6% of the population relying on agriculture for their livelihoods. The National Adaptation Program of Action (NAPA) determined that both sectors are highly vulnerable to climate change. Increased rainfall variability impacts surface and ground water availability including potable water supply, flood protection and irrigation. Likewise, rural infrastructure including roads, water supply and sanitation, suffers from impacts from floods and cyclones. In the Mekong River and its tributaries, climate induced changes in hydrological flow regimes in seasonality, timing and duration will adversely affect sensitive and economically productive wetland ecosystems such as Tonle Sap and fisheries productivity, a major source of livelihood.
- **Limited institutional and technical capacity for mainstreaming, and inadequate access to reliable early warning data.** Capacity to integrate climate change concerns into sectoral development planning is limited. Further, accurate and reliable local forecasts of extreme climate events are non-existent. Villagers in downstream areas essentially rely on word of

mouth from upstream areas to ready themselves for floods. Weather data from the Department of Meteorology (DOM) stations is not easily accessible and the number and type of hydrological monitoring sites are insufficient for effective early warning and expansion and upgrading will be required for any form of downscaled application (e.g. basin or sub-basin planning).

(b) Areas of Intervention – Sectors and Themes

Sectors: Water Resources, Agriculture, and Infrastructure

Themes: Climate risk management; Flood and drought management; Coastal resilience; Disaster risk reduction; Ecosystem-based adaptation; Business-focused adaptation; Climate proofing of infrastructure including water supply and sanitation, post-harvest facilities and roads; Capacity strengthening for mainstreaming resilience into development planning; Stakeholder participation

Component I: Promoting Climate-Resilience of Water Resources and Related Infrastructure

- Project 1: Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in Tonle Sap Basin, *as part of* ADB-funded Water Resources Management Sector Development Program
- Project 2: Flood and Drought Management in Pursat and Kratie Provinces, *as part of* ADB-funded Greater Mekong Sub-region (GMS) Flood and Drought Management Project

Component II: Enhancing Climate-Resilient Agriculture and Food Security

- Project 1: Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces, *as part of* ADB-funded GMS Biodiversity Conservation Corridors Project
- Project 2: Climate proofing of agricultural infrastructure and business-focused adaptation, *as part of* ADB-funded Agriculture Commercialization and Resource Conservation Project

Component III: Improving Climate-Resilient Infrastructure

- Project 1: Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces*, as part of* ADB-funded Provincial Roads Improvement Project
- Project 2: Climate Proofing Infrastructure in the Southern Economic Corridor (SEC) towns*, as part of* ADB-funded GMS Corridor Towns Development Project
- Project 3: Flood-resilient Infrastructure Development in Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Cham, *as part of* ADB-funded Sustainable Urban Development in the Tonle Sap Basin Project

Component IV: Cluster Technical Assistance for Strengthening Capacity to Mainstream Climate Resilience into Development Planning

Building on Phase 1 of PPCR, the technical assistance (TA) will enhance climate resilience of programs, plans, and/or policies by (i) strengthening institutional capacity for planning, budgeting, and implementing climate change related actions; (ii) strengthening the information base for decision making, and (iii) promoting synergies between adaptation and disaster risk reduction. Capacity-building activities will be targeted at technical staff and senior decision makers. The TA will include establishment of PPCR Coordination and Technical backstopping unit at the Ministry of Environment, and provision of support to civil society organizations to galvanize adaptation efforts at commune level. Feasibility studies on high priority NAPA projects will allow the TA methodologies to be replicated and the TA outputs including information and knowledge products to be disseminated throughout Cambodia, across the GMS and Southeast Asia.

(c) Expected Outcomes from the Implementation of the SPCR:

- Enhanced capacity, knowledge and incentives to mainstream climate resilience into development plans and investment programs at various levels, taking into account gender equity, and effective engagement of the private sector and the civil society
- Increased use of climate-related information (e.g., risk maps, vulnerability maps, climate change scenarios) within the sectors and by vulnerable groups
- Increased preparedness of the most vulnerable communities to flood and drought risks
- Enhanced food and water security and biodiversity conservation through reduced water and soil salinity and improved agricultural and fisheries production
- Improved capacity of government ministries and institutions at national to commune level to manage and coordinate investments and knowledge on climate resilient initiatives
- Enhanced climate resilient infrastructure development and investments (such as water supply and sanitation, irrigation, roads, post-harvest facilities, etc.)
- Increased involvement of women, civil society organizations and the private sector in decisions that enhance climate resilience at commune, provincial and national levels

8. Expected Key results from the Implementation of the Investment Strategy (consistent with PPCR Results Framework):

Results	Success Indicators
Investment Component I: **Promoting Climate-Resilience of Water Resources and Related Infrastructure** (a) Enhanced provincial and district administrative capacity in climate resilient development in the water sector (b) Scaled up investments and enhanced resilience of irrigation infrastructure to climate change (c) Improved and climate resilient irrigated agriculture and enhanced food security of rural communities (d) Improved technical skills, livelihood options, and adaptive capacity for water user associations and farmers (e) Reduced economic and human losses from floods and droughts (f) Enhanced capacity of communities to manage flood and/or drought events (g) Improved sub-regional cooperation for flood and drought management (h) New and additional resources for enhanced resilience in the water resources sector	• Number of households in project area with income lower than the poverty line reduced by 30% • Number of households in the project area with insufficient rice production for year-round consumption reduced by 40% • Average incomes in project area derived from agriculture increased by 30% • Number of provinces and districts whose administrative capacity in climate risk management and resilience strengthened • Number of people with secured and sustained access to irrigation increased • Flood protection for xxx people and yyy ha of agriculture lands improved • Number of farmers/women adopting new techniques better adapted to changing climate • Management of impacts of climate extremes improved. • National flood and drought forecasting improved and linked to a regional forecasting center • Leverage factor of PPCR funding in water sector

Investment Component II: Enhancing Climate-Resilient Agriculture and Food Security (a) Increased resilience and reduced poverty in the rural, climate-hazard prone areas (b) Enhanced protection of coastal areas from storm surge/sea level rise/saltwater intrusion (c) Improved resilience of agro-biodiversity (d) Enhanced and continued water supply during dry season and drought periods (e) Improved coping mechanisms of small farmers against climate change impacts (f) Enhanced demand side water efficiency (g) Improved design, construction/rehabilitation and maintenance of post harvesting facilities to withstand climate risks (h) Improved institutional structures to respond to climate change (e.g. weather-based insurance) (i) New and additional resources for resilience in the agriculture and related infrastructure, and in coastal areas	• Number of kilometres of coastal protection increased • Number of hectares of mangrove and non-mangrove area restored to protect against tidal surges and strong winds • Number of farm households adopting adaptive water management technologies and practices increased • Number of new irrigation technologies adopted • Percentage access to irrigable water sources increased and salt water intrusion decreased • Number of farmers/women adopting stress tolerant and adaptive varieties increased • Total area of cropped land under adaptive varieties increased • Area of farms equipped with water saving technologies increased • Area of crop farms equipped with all-weather post harvesting facilities increased • Access to credit to transform farm practices increased • Insurance mechanism against climate risk successfully piloted and ready to be adopted at a larger scale • Leverage factor of PPCR funding in agriculture sector
Investment Component III: Improving Climate-Resilient Infrastructure (a) Improved planning for national, provincial and rural road infrastructure to cope with climate change impacts (b) Increased capacity to withstand climate change impacts in project-specific priority infrastructure (c) Ecosystem-based adaptation strategies adopted focusing on green planning to improve flood and drought management (d) Improved emergency planning and management during natural disasters (e) Enhanced resilience to climate change through improvements in provincial roads and urban environmental infrastructure (f) Institutional capacities on technical and financial management of climate risks strengthened (g) New and additional resources for climate resilience in priority infrastructure (e.g. roads, water supply and sanitation)	• Continuity of services provided by road and water sanitation infrastructure ensured • Coverage under local early warning systems and pilot program for emergency management for provincial roads increased • Number and value of climate-resilient investments in infrastructure increased • Access to markets and other social services for communities improved • Livability of urban and peri-urban areas, and public health improved- incidence of environment related diseases reduced • Percentage of women in climate resilience-related economic opportunities increased • Number of households served by improved solid waste management and safe water supply during periods of extreme climate events increased • Incidence of seasonal flooding reduced • Number of households with potable water supply and sanitation services increased • Leverage factor of PPCR funding in climate proofing of infrastructure

Investment Component IV: Cluster Technical Assistance for Strengthening Capacity to Mainstream Climate Resilience into Development Planning (a) Improved integration of climate change adaptation into national development strategies, plans and policies (b) Strengthened information base for decision making among government agencies (c) Improved resilience to climate change and enhanced livelihood opportunities, especially for vulnerable groups including women (d) Increased knowledge and awareness of climate change among civil society and private sector (e) Enhanced integration of learning/knowledge into climate-resilient development in Cambodia (f) Increased involvement of vulnerable rural communities, civil society organizations and the private sector in adaptation efforts (g) Replication of PPCR lessons learnt and dissemination of information and knowledge products throughout Cambodia, and across the GMS and Southeast Asia	• Degree to which development plans integrate resilience into planning increased • Extent to which decision making is based on Cambodia-specific climate risks and vulnerability assessments • Number of line ministries updating country strategies for climate change resilience increased • Budget allocations to address climate vulnerability at commune level increased • Evidence of a working mechanism to coordinate investments and knowledge on climate resilience • Coverage of climate risk analysis and vulnerability assessments increased through studies on high priority NAPA projects with replication potential • Quality of participatory planning process as assessed by vulnerable communities • Relevance and quality of information and knowledge products on climate resilience in Cambodia increased • Extension of climate resilience principles beyond three priority sectors within Cambodia, and to non-PPCR countries in GMS and Southeast Asia

9. Project and Program Concepts under the SPCR							
Project/Program Concept Title	**MDB**	**Requested PPCR Amount (Million US $)[1]**			**Expected co-financing (Million US $)**	**Preparation grant request (Million US $)**	**Total PPCR request (Million US $)**
		TOTAL	**Grant**	**Loan**			
Investment Component I: Promoting Climate-Resilience of Water Resources and Related Infrastructure (US$ 33 Million)							
Project 1: Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin[2]	ADB	19.00	7.00	12.00	63.00	0.60	19.00
Project 2: Enhancement of Flood and Drought Management in Pursat and Kratie Provinces [3]	ADB	14.00	6.00	8.00	35.00 (80.00 total for GMS)	0.60	14.00
Investment Component II: Enhancing Climate-Resilient Agriculture and Food Security (US$ 23 Million)							
Project 1: Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces[4]	ADB	8.00	8.00	0.00	20.40 (76.77 total for GMS)	0.60	8.00
Project 2: Climate proofing of agricultural infrastructure and business-focused adaptation[5]	ADB	15.00	5.00	10.00	60.00	0.60	15.00

[1] Includes preparation grant and project/program amount.
[2] As part of ADB-funded Water Resources Management Sector Development Program - Proposed for Tranche 1 Funding
[3] As part of ADB-funded GMS Flood and Drought Management Project - Proposed for Tranche 1 Funding
[4] As part of ADB-funded GMS Biodiversity Conservation Corridors Project - Proposed for Tranche 1 Funding
[5] As part of the ADB-funded *Agricultural Commercialization and Resource Conservation Sector Development Program* - **Proposed for Tranche 2 Funding**

Investment Component III: Improving Climate-Resilient Infrastructure (US$ 42 Million)							
Project 1: Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces[6]	ADB	17.00	7.00	10.00	61.00	0.00	17.00
Project 2: Climate Proofing Infrastructure in the Southern Economic Corridor (SEC) towns[7]	ADB	15.00	5.00	10.00	20.00 (290.20 total for GMS)	0.60	15.00
Project 3: Flood-resilient Infrastructure Development in Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Cham[8]	ADB	10.00	5.00	5.00	40.00	0.60	10.00
Investment Component IV: Cluster Technical Assistance (US$ 7 Million)							
Mainstreaming climate resilience into development planning of key vulnerable sectors	ADB	7.00	7.00	0.00	0.00	0.20	7.00
Subtotal Grant Funding			**50.00**				
Subtotal Concessional Financing				**55.00**			
Total		**105.00**			**299.40 (670.77** total for the GMS)		**105.00**

[6] As part of the ADB-funded *Provincial Roads Improvement Project* (PRIP) - Proposed for Tranche 1 Funding
[7] As part of the ADB –funded GMS Corridor Towns Development Project) - Proposed for Tranche 1 Funding
[8] As part of the ADB-funded *Sustainable Urban Development in the Tonle Sap Basin Project* - **Proposed for Tranche 2 Funding**

10. Timeframe (tentative) – Approval[9] Milestones

Investment Component I: Climate-Resilient Water Resources & Infrastructure Development
Project 1: Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin (as part of the ADB funded Water Resources Management Sector Development Program)
Timeframe: Base Program and Project approved by ADB Board: September 2010; ADB Board approval of paper indicating change in scope to include PPCR grant and loan: 1st Q 2012; First SPCR Investment disbursement: 2nd Q 2012. Project Duration: 7 years

Project 2: Enhancement of Flood and Drought Management in Pursat and Kratie Provinces (as part of the ADB-funded GMS Flood and Drought Management Project)
Timeframe: Project Preparatory Technical Assistance completed for the base project: August 2011; Loan Fact finding: 2nd Q 2011; ADB Board Decision: 4th Q 2011; First SPCR Investment disbursement: 2nd Q 2012. Project Duration: 7 years

Investment Component II: Enhancing Climate-Resilient Agriculture and Food Security
Project 1: Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces (as part of ADB-funded GMS Biodiversity Conservation Corridors Project)
Timeframe: Base Program and Project approved by ADB Board: December 2010; ADB Board approval of paper indicating change in scope to include PPCR grant: 1st Q 2012; First SPCR Investment disbursement: 2nd Q 2012. Project Duration: 7 years

Project 2: Climate proofing of agricultural infrastructure and business-focused adaptation (as part of the ADB-funded Agricultural Commercialization and Resource Conservation Sector Development Program)
Timeframe: Concept Note Clearance 4th Q 2011; Project Preparatory Technical Assistance completed: 3rd Q 2012; Loan Fact finding: 2nd Q 2012; ADB Board Decision: 3rd Q 2012; First SPCR Investment disbursement: 4th Q 2012. Project Duration: 7 Years

Investment Component III: Improving Climate-Resilient Infrastructure
Project 1: Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces - (as part of the ADB-funded Provincial Roads Improvement Project)
Timeframe: Project Preparatory Technical Assistance completed for the base project: 3rd Q 2011; Loan Fact finding: 3rd Q 2011; ADB Board Decision: 4th Q 2011; First SPCR Investment disbursement: 2nd Q 2012. Project Duration: 5 years

Project 2: Climate Proofing Infrastructure in the Southern Economic Corridor (SEC) towns (as part of the ADB–funded GMS Corridor Towns Development Project) - Proposed for Tranche 1 PPCR Funding
Timeframe: Project Preparatory Technical Assistance completed: 1st Q 2012; Loan Fact finding: 1st Q 2012; ADB Board approval: 2nd Q 2012; First SPCR Investment disbursement: 4th Q 2012. Project Duration: 5 Years

Project 3: Flood-resilient Infrastructure Development in Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Cham - (as part of the ADB-funded Sustainable Urban Development in the Tonle Sap Basin Project)

[9] Expected signature of loan/grant agreement between government and MDB

Timeframe: Concept paper clearance 3rd Q 2011; Project Preparatory Technical Assistance completed: 2nd Q 2012; Loan Fact finding: 2nd Q 2012; ADB Board Decision: 3rd Q 2012; First SPCR Investment disbursement: 4th Q 2012. Project Duration: 5 Years

Component IV: Cluster Technical Assistance Project: Mainstreaming climate resilience into development planning of key vulnerable sectors
Timeframe: Concept paper clearance 3rd Q 2011; Full Project Documentation 1st Q 2012; ADB Board approval: 1st Q 2012; First SPCR Investment disbursement: 2nd Q 2012. Project Duration: 5 Years

11. Key National Stakeholder Groups Involved in and/or Consulted on SPCR Design

Several formal and informal consultations took place during preparation of Cambodia's SPCR. These have comprised two Joint Missions of the MDBs, two technical missions, three visits by consultants, and numerous informal consultations. Key groups of stakeholders include:

- **Government Ministries:** Ministry of Economy and Finance (MEF); Ministry of Environment (MOE); Ministry of Water Resources and Meteorology (MoWRAM); Ministry of Agriculture, Forestry and Fisheries (MAFF); Ministry of Public Works and Transport (MPWT); Ministry of Rural Development (MRD); Ministry of Planning (MoP); Ministry of Interior (MOI); Ministry of Women Affairs; Ministry of Health (MOH); National Committee for Disaster Management
- **Civil Society Organizations:** Action Aid International Cambodia; Cambodia Development Research Institute (CDRI); CARE; Catholic Relief Services (CRS); Child Fund Cambodia (CF); Concern World Wide; Cambodian Organization for Research and Development (CORD); East West Management Institution Cambodia (EWMI); Forum Syd; Gender and Development for Cambodia (GAD); International Development Enterprises (IDE); Oxfam America; PACT; Partnership for Development in Kampuchea (PADEK); Plan International; Save Cambodia's Wildlife (SCW); Save the Children Australia; The Asia Foundation (TAF); Wildlife Alliance; Wildlife Conservation Society(WCS); World Wildlife Fund (WWF) Greater Mekong Programme
- **Private Sector:** ANZ Royal Bank (Cambodia) Ltd., ANZ Royal, ACLEDA, AMK, CADTIS Consultant Co Ltd, Cambodia Fiber Optic Cable Network, Comin Khmere, EMI, Forte Insurance, GRET, Hwangds Bank, Kosan Engineering, Maruhan Japan Bank, Nagathom Fund, OSK, Royal Group, Siem Reap Chamber of Commerce
- **International organizations:** Asian Disaster Preparedness Center (ADPC); Food and Agriculture Organization of the United Nations (FAO); International Fund for Agricultural Development (IFAD); International Water Management Institute (IWMI); Mekong River Commission (MRC); United Nations Development Programme (UNDP); United Nations Environment Programme (UNEP); United Nations Agency for Human Settlements (UN-Habitat); World Fish; World Health Organization (WHO)
- **Academia:** University of Phnom Penh
- **MDBs:** ADB, IFC and World Bank

12. Other Development Partners Involved in and/or Consulted on SPCR Design:

Australian Agency for International development (AusAID); Agence Française de Développement (AFD); Canadian International Development Agency (CIDA); Danish International Development Agency (DANIDA); Deutsche Gessellschaft fur Internationale Zusammernarbeit (GIZ); European Union; Japan International Co-operation Agency (JICA); Swedish International Development Agency (SIDA), UK Department for International Development (DFID); United States Agency for International Development (USAID)

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Introduction

1. Established in 2008, the Strategic Climate Fund (SCF), one of the two funds under the Climate Investment Funds (CIF)[1] serves as an overarching framework to support three programs with dedicated funding to pilot new approaches aimed at a specific climate change challenge or sectoral response.[2] The targeted programs include the Pilot Program for Climate Resilience (PPCR), Forest Investment Program (FIP), and Scaling up Renewable Energy Program (SREP) in Low-Income Countries. The PPCR provides incentives for scaled-up action and transformational change in integrating consideration of climate resilience in national development planning consistent with poverty reduction and sustainable development goals.

2. Following the acceptance of the offer to participate in the program in May 2009, the Royal Government of Cambodia (RGC) confirmed its commitment to the PPCR objectives. The Ministry of Economy and Finance (MEF) is providing oversight to the program while the Department of Climate Change of the Ministry of Environment (MOE) is the key implementing agency in collaboration with other line ministries such as Ministry of Agriculture, Forestry and Fisheries (MAFF), Ministry of Water Resources and Meteorology (MOWRAM), Ministry of Health (MOH), Ministry of Rural Development (MRD), Ministry of Planning (MOP), Ministry of Public Works and Transport (MPWT), and Ministry of Interior, as well as the National Climate Change Committee (NCCC) and the National Committee for Disaster Management. Multilateral development banks, including the ADB and the World Bank Group, have actively been involved in the implementation of PPCR, in close consultation with various UN agencies and other development partners.

3. The objective of the PPCR for Cambodia is to build on National Adaptation Programs of Action (NAPA) and other relevant country studies and strategies to mainstream climate resilience into national and sub-national development policies, plans and projects supported by scaled up financing of adaptation activities in the key development sectors, underpinned by (i) strengthened participation and coordination among stakeholders, (ii) science-based adaptation planning, and (iii) enhanced links between adaptation and disaster risk reduction measures. The projects would be strategically aligned with MDB and other donor-funded activities to provide co-financing that will enhance their resilience to climate change while providing experience and knowledge for scaled-up adaptation measures. This would contribute to achievement of the PPCR's catalytic replication outcomes in institutional, physical, economic and social themes.

4. The PPCR is structured in two phases. Phase 1 involves putting in place the appropriate enabling framework to manage climate risks and preparation of the Strategic Program for Climate Resilience (SPCR). During Phase 2, while the activities initiated under Phase 1 will continue and strengthen the enabling environment, it will focus on the implementation of on-the-ground adaptation investments in the most vulnerable sectors, which include water resources, agriculture and infrastructure. Phase 1 includes five components: (i) National level mainstreaming of climate resilience in key ministries (strengthening institutional readiness to mainstream climate risks); (ii) Sub-national mainstreaming of climate resilience; (iii) Strengthening civil society and private sector engagement and gender considerations in climate change adaptation; (iv) Science-based adaptation planning; and (v) Outreach and the preparation of the SPCR for implementation under Phase 2.

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[1] The CIF are a unique pair of financing instruments designed to support low-carbon and climate-resilient development through scaled-up financing channeled through ADB, the African Development Bank, European Bank for Reconstruction and Development, Inter-American Development Bank, and World Bank Group

[2] The other one is the Clean Technology Fund.

5. The SPCR encompasses a set of pilot investments that will generate further bilateral and multilateral support to enhance resilience to climate change and measurably build a base encompassing adaptation information and knowledge products and enhance awareness amongst communities, government, and businesses in the country. In this context, the SPCR is designed to support inter-ministerial collaboration, effective engagement of stakeholders, workable institutional arrangements to facilitate collaboration within government agencies and with civil society organizations, other development partners and the private sector. The underlying measure of success lies in transforming national and sub-national development both at policy and operational levels to be risk-responsive, climate-resilient and gender-sensitive.

6. The SPCR investments and associated technical assistance will build on analytical studies and capacity building initiatives in Phase 1, and lead to a transformation from project-based to programmatic approaches to adaptation. As knowledge and information management is critical to a sustained effort to build climate resilience, special efforts will be made to disseminate information, knowledge products including best practices and lessons learned across the country, in the Greater Mekong Sub-region (GMS), and beyond.

Approach and Methodology to SPCR Design for Cambodia

7. In the development of the SPCR, the RGC established a set of criteria (e.g., innovation, transformative impact, incremental value addition of proposed investments, alignment with NAPA, alignment with MDB investments, co-financing from government and other development partners, synergies with other adaptation efforts, gender considerations, opportunities for private sector engagement, opportunities for civil society involvement, cost effectiveness, and workable institutional arrangements) to shortlist projects and programs amongst the existing and proposed initiatives related to the priority vulnerable sectors (water resources, agriculture, and infrastructure). Once these projects had been identified, the opportunities for strengthening climate resilience were considered and a form of risk screening was employed, which among other things, included:

- Brief assessment of ways in which vulnerable groups and sectors within the project areas are likely to be affected by climate change in the medium to long term and identifying opportunities to assist those vulnerable groups;
- Climate change risk assessment of on-going and planned development projects in the short term aimed at identifying the opportunities to reduce risk and build resilience; and
- Identifying opportunities for additional interventions that will reduce vulnerability to climate change within the project.

8. In addition, several guiding principles were considered in developing the SPCR. These include opportunities for strengthening (i) cross-sectoral and institutional coordination, (ii) technical and institutional capacities, (iii) national data collection and information dissemination systems in collaboration with national academic institutions and research organizations, (iv) integration of local knowledge and indigenous strategies in adaptation plans, (v) community-based adaptation and disaster risk reduction, and (vi) mechanisms for scaling up of successful adaptation experiences.

BACKGROUND AND RATIONALE

1. Country Circumstances

a. Location, Size and Topography

9. Cambodia covers an area of 181,035 km^2 extending approximately 580 km from east to west and 450 km from north to south. Cambodia's topography broadly consists of the low-lying central plains surrounded by mountainous and highland regions, and a 435 km coastline to the south. The Mekong River and its tributaries dominate Cambodia's hydrology. The Tonle Sap Lake, an outlet of the Mekong during the rainy season, covers an area of up to 10,400 km^2 in the northwest.

Figure 1: Map of the Kingdom of Cambodia

10. Agriculture has long been the most important sector to the Cambodian economy, with more than 80% of the population relying on agriculture for their livelihood (with rice being the principal crop).[3] The country in the last decade has seen rapid economic and industrial growth. Other important sectors include garments, construction, textiles, and tourism. In 2005, oil and natural gas deposits were found beneath Cambodia's territorial waters, and once commercial extraction begins in 2012-13, the oil revenues will affect Cambodia's economy.

[3] https://www.cia.gov/library/publications/the-world-factbook/geos/cb.html

11. Cambodia falls within several well-defined geographic regions. The largest part of the country, about 75 percent, consists of the Tonle Sap Basin and the Mekong Lowlands. To the southeast of this basin is the Mekong Delta, which extends through Vietnam to the South China Sea. The basin and delta regions are rimmed with mountain ranges to the southwest by the Cardamom Mountains and the Elephant Range and to the north by the Dangrek Mountains. Higher land to the northeast and to the east merges into the Central Highlands of southern Vietnam. The Mekong Valley, which offers a communication route between Cambodia and Lao PDR, separates the eastern end of the Dangrek Mountains and the northeastern highlands. To the southeast, the basin joins the Mekong Delta, which, extending into Vietnam, provides both water and land communications between the two countries.

b. Population and Demographics

12. The population in Cambodia increased from 11.4 million in 1998 to 13.4 million in 2008. This corresponds to an approximate annual population growth rate of 1.7%, which while being among the highest in Southeast Asia, has been gradually declining from an estimated rate of 4% between 1981 and 1993. Between 1975 and 1979, an estimated 1.7 million Cambodians, out of a population of 8 million, lost their lives during the Khmer Rouge regime (CGG, 2006). This has caused imbalances in Cambodia's demographic characteristics. The population is young, with about 61% of people under 24 years of age in 2005. More than 51% of the population is female, presumably due to higher mortality among men during the wars.

13. Two important demographic factors contribute to high vulnerability to climate change: high proportion of population dependent on agriculture (high sensitivity) and high rate of poverty (low adaptive capacity). In 2004, 84 per cent of Cambodia's population who live in rural areas are engaged in agriculture, though contributing only around 31.1 per cent of the country's GDP.[4] Approximately 52% of the population lives in the central plains, 30% around the Tonle Sap Lake, 11% in the highlands and mountainous areas, and 7% in coastal areas. Cambodia's population and population densities are much lower than that of its neighbors. While population densities reach 235 persons per km^2 in the central plains, it is less than 17 persons per km^2 in the highlands. The national average population density is 75 people per km^2. Levels of absolute poverty in Cambodia are very high. According to the World Bank's Poverty Assessment for 2006, some 34.7 per cent of all households in Cambodia were rated as poor in 2004. This rate subsequently fell to 30.1 per cent in 2007, but levels of inequality rose as the gini coefficient rose from 0.34 in 2004 to 0.36 in 2007.[5] The combination of high poverty levels and a high dependence on agriculture has made the country extremely vulnerable to climatic events such as recurring floods and droughts.

c. Climate Change in Cambodia: Trends and Projections

14. The climate of Cambodia is dominated by the monsoon system, which creates two main seasons in the country, with rain from May-November and a dry season from November-May. The southwest monsoon begins in mid-May and lasts until the end of October; it is responsible for 75% of the country's rainfall. Annual rainfall varies within the country, with coastal areas receiving up to 5,000mm of rain. Rainfall declines in the central plains but is strongly influenced by topography,

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[4] AusAID and Agrifood Consulting International (2006) 'Cambodia Agriculture Sector Diagnostic Report', www.ausaid.gov.au/publications/pdf/cambodia/agriculture_report.pdf.

[5] World Bank (2006) '*Cambodia Halving Poverty by 2015? Poverty Assessment 2006'*, Phnom Penh: World Bank.

and increases in the upland areas. Maximum temperatures reach 38^{o}C and minimum temperatures rarely dip below 10^{o}C; Mean monthly temperatures vary between 22^{o}C and 28^{o}C.[6]

15. For Cambodia and much of the Lower Mekong Basin, the most important climate variables are related to changes in hydrology of the river, its many tributaries and floodplains, and the Tonle Sap Lake. Indeed, changes in water flows and seasonality may have adverse impacts on sensitive and economically productive wetlands such as Tonle Sap.[7] Climate change projections conducted in the Mekong Basin (*ibid*) indicate that:

(i) The whole region will tend to be warmer, but the hot area will be much wider;
(ii) The hot period of the year will be much longer. Dry season will be longer and drier;
(iii) The wet season will start later (by around two weeks to a month), and will be shorter but also wetter;
(iv) Both daily maximum temperature and daily minimum temperature will increase; and
(v) Precipitation will be higher and of increasing intensity.

16. According to the latest technical assessment (MOE 2010[8]), Cambodia's temperature has been rising steadily over the past 50 years. The average temperature has increased since 1960 by 0.8°C, and the frequency of unusually hot days and nights has increased. A further 0.3-0.6°C increase is expected by 2025. The country can expect further increases in temperature during the course of this century, with an acceleration expected after 2030. Some studies suggest temperatures may increase from 0.7°C to 2.7°C by the 2060s (McSweeney et al. 2008). Temperature increases will be more severe from December to June. A number of studies indicate greatly varying degrees of the temperature change by the end of the century, depending on the model used and the level of anticipated GHG emissions.

17. Assessments by two General Circulation Models (GCM) indicate that under the High Emissions scenario, the rate of temperature increase will be at least 2^{o}C, and possibly as high as 2.5°C, by the end of the century. Within Cambodia, temperature increase is predicted to be high in low-altitude areas such as central Cambodia and the north-east (0.036°C per year) and lower in high-altitude areas such as the south-west (0.013°C per year). Despite such variations in predictions, a common story still emerges: of very significant change in temperature.

18. Analysis of past and future rainfall changes is complex due to lack of reliable data and the technical challenges of such aspects as modeling rainfall and runoff. While there is a clear need for more data and further research, the picture that emerges is of variations in precipitation expected in different locations and at different periods during this century, leading to an increase in variability and uncertainty of water availability (Johnston et al., 2010). Trend analysis of rainfall data from 1960 to 2000 showed that wet season rainfall in the Tonle Sap tended to increase, causing floods, but in other areas, particularly in northeast of the country, it tended to decrease. Projections based on an analysis of 14 General Circulation Models suggested that, under the high emissions scenario, the rainy season will start later, wet season rainfall will increase (bringing more flooding) but dry season rainfall will decrease. Under a low emissions scenario, the probability is lower but the trends are similar. A detailed analysis for the Tonle Sap region suggested that, under a high

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[6] RGC 2006 Cambodia National Adaptation Programme of Action. http://www.weadapt.org/knowledge-base/wikiadapt/cambodia - note-ftn1.

[7] Mekong River Commission 2009. Adaptation to climate change in the countries of the Lower Mekong Basin: a regional synthesis Report MRC Technical Paper No. 24.

[8] Source: Adopted from MOE 2010 (using SRESS model).

emissions scenario, rainfall will increase with greater variability. It is likely that extreme weather events will become more frequent.

19. All climate change models agree that average rainfall in Cambodia will increase, but the magnitude of change is uncertain. Estimates of the increase vary from as little as 3 per cent to as much as 35 per cent. Mean annual rainfall is predicted to increase, with the most significant increase in the wet season.[9] In contrast, water flows in the dry season are predicted to decrease. Rainfall increases are anticipated predominantly in the central agricultural plains stretching from southeast to northwest – a high population area historically of low rainfall yet known to be vulnerable to flooding and drought. Rainfall is expected to increase more in the lowlands than in the highlands. Climate change will bring more extreme weather events such as storms, heat waves, droughts and floods. Damage from intense cyclones has increased significantly in Cambodia in recent decades and may worsen.

20. The current climate change model results indicate that climate change will significantly affect the hydrology of the Mekong River and Tonle Sap Lake, particularly in the longer term (Vastila *et al.* 2010).[10] The hydrological conditions of the Cambodian floodplains are determined by both the seasonality of the Mekong discharge and the tides of the South China Sea. The tides have naturally the greatest impact in the Mekong Delta, which undergoes strong daily and seasonal changes in water level. The hydrological regime of the Delta is strongly regulated by humans through flood control works and large-scale irrigation systems. The intensively cultivated areas of the Delta are prone to damage caused by natural phenomena such as floods, droughts and saline water intrusion. While there are also local climate-related changes expected in the Tonle Sap area, the most radical climate-related impacts in the area are expected to occur through regional changes in the hydrology of the entire Mekong River Basin.

21. Recent studies indicate that the wet-season water level in the Tonle Sap Lake is likely to increase and as a result the seasonally flooded area and the height of the flood peak will increase. In addition, the timing and duration of the flood pulse is estimated to change: the flood is likely to start several days earlier and end a few days later than currently. These changes may lead to more intense flood pulses and adversely affect agriculture, infrastructure and floodplain vegetation as well as reduce the fertile land area. The changes may result in some positive impacts, however, by for example boosting the ecosystem productivity and enhancing dry-season water availability.

22. Cambodia's 435 km coastline and large parts of the Mekong River flood plain could be severely affected by sea level rise. The draft Second National Communication (SNC) projects coastal inundation in Cambodia based on the rate of sea level rise predicted by the Intergovernmental Panel on Climate Change (IPCC (2007)), which indicates a rate of about 1.7 cm per year under the "high GHG emission scenario". At this pace, the permanent inundation of some 25,000 ha of coastal zone following a 1m sea level rise is expected by the year 2100. Current experience in coastal areas also points to the risks of increased salinity. As a tropical country, Cambodia is vulnerable to a number of tropical diseases such as malaria and dengue fever. Weak health care systems combined with poverty and a high illiteracy rate makes people more vulnerable to diseases that may become widespread due to climate change.

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[9] Eastham et al. 2008. Mekong River Basin Water Resources Assessment: Impacts of Climate Change. CSIRO: Water for a Healthy Country National Research Flagship.

[10] Vastila, K, M Kummu, C. Sangmanee and S. Chinvanno, 2010: "Modelling climate change impacts on the flood pulse in the Lower Mekong floodplains", Journal of Water and Climate Change1(1), pp 67 -86.

d. Perceptions on Climate Change

23. In 2010, the MOE commissioned the BBC World Service Trust to conduct a Knowledge, Attitudes and Practices (KAP) survey on climate change and provide recommendations to inform future communication and information initiatives. The study consisted of a nationally representative survey of 2401 Cambodians, including people from farming and fishing communities, teachers and businesspeople, housewives and government employees. In-depth interviews were undertaken with 101 key informants from media, industry, national and provincial governments, celebrities, and local leaders, including commune council leaders, village chiefs, village elders, and religious leaders (MOE 2011).[11] As per the report "Understanding Public Perceptions of Climate Change in Cambodia", many Cambodians noted that the weather and environment are changing. Yet rural people's explanations for why the climate has been changing are remarkably similar. The changes are firmly linked to perceptions of deforestation and land-use change. While these perceptions partially hold true (globally deforestation and forest degradation contribute up to 16% of GHG emissions), they also indicate the limited awareness of people that climate change is caused largely by GHG emissions from burning fossil fuels. More than half of respondents think they are currently unable to respond to weather changes (59%) and say they do not have the information they need to respond (52%). The three most important barriers identified are a lack of money, lack of tools and a lack of information. Key recommendations from the report include the following:

- Design communications on climate change around the information sources that most Cambodians use and trust: TV, radio and word-of-mouth;
- Address gaps in current disaster preparedness and disaster response strategies within a national climate change communications strategy;
- Provide practical support to communities as they respond to their changing weather by improving public communication on science;
- Build public understanding of global climate change upon the experiences of Cambodian people; and
- Explain that climate change brings long-term effects and enhance communication on practical solutions that correspond to the experiences of Cambodian people.

e. Hazards, impacts and vulnerabilities – Floods and Droughts[12]

24. Cambodia suffers from droughts, often in the same year as floods. In both cases the major physical cause of these disasters is the unpredictability of rainfall and dry-spells, both from year to year and within seasons. High levels of rural poverty and dependence on agriculture and fisheries as the basis for livelihoods exacerbate the impact of these events. Community surveys carried out in preparation of the National Adaptation Program of Action (NAPA) note that while coping strategies exist for these hazards they are limited in their effectiveness and often reinforce poverty and increase vulnerability to the next hazard. Windstorms, which happen two or three times a year, are a real hazard in rural areas and often damage large numbers of houses.[13]

25. Livelihoods in the Mekong Basin are dependent upon the annual flooding events of the Mekong River and the Tonle Sap. Therefore, abnormal changes in water flows and seasonality could have potentially adverse impacts on Tonle Sap, which is a hydrologically sensitive and

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[11] Ministry of Environment, Jan. 2011. Understanding Public Perceptions of Climate Change in Cambodia. Phnom Penh, Cambodia. (Implemented by BBC World Trust and supported by UNDP, DANIDA and Oxfam)

[12] See also Annex 1: Cambodia Risk Profile (natural hazards).

[13] Ministry of Environment, March 2005. Vulnerability and Adaptation to Climate Hazards and to Climate Change: A Survey of Rural Cambodian Households. Phnom Penh, Cambodia.

economically productive wetland. The regular movement of massive amounts of fresh water makes the Tonle Sap one of the most productive freshwater ecosystems in the world. Annual flooding adds nutrients to soils, provides water for rice farming and habitat for breeding fish. Thus, floods are considered to be an integral part of rural livelihoods, and are beneficial as long as they correspond to normal predictable patterns. When floods occur earlier or later than expected, last longer and have higher intensity, they spell disaster for rural communities. In the year 2000, Mekong saw the worst floods in approximately 40 years. Eight hundred people died, nine million people were affected, and the costs of damages reached over $455 million.[14]

26. Drought impacts are particularly severe in every way: economic losses, health problems, social tensions, and environmental damage, making recovery from drought that much more difficult. Women suffer particularly badly. If future climate scenarios tend to be wetter, rainy seasons may be shorter and more intense, thereby posing enormous challenges for agriculture. Drought is only partly a result of low rainfall; it can also be compounded by mismanagement of water resources, storage, and access practices. Therefore, non-climate factors can exacerbate climate change induced negative impacts.

27. Based on data for the past 5 years, loss in rice production has occurred mainly due to the occurrence of flood (>70%), drought (~20%) and other causes such as pests and diseases (~10%). Floods and droughts have not always been associated with the ENSO events. Floods mostly occurred due to the increase of water level of the Mekong River and Tonle Sap Lake. Provinces which are vulnerable to floods and droughts are shown in Figures 2 and 3 below (Heng, 2009).[15]

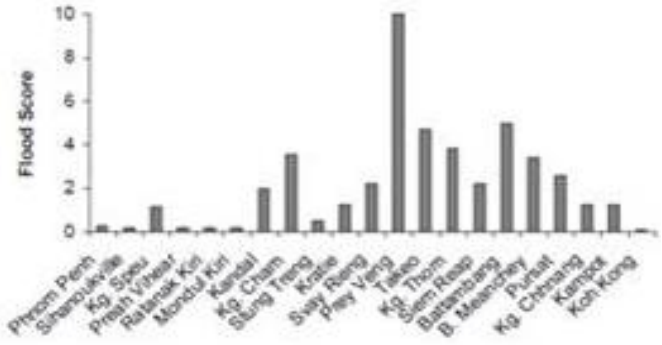

Figure 2: Vulnerability to Floods in Cambodia at provincial level

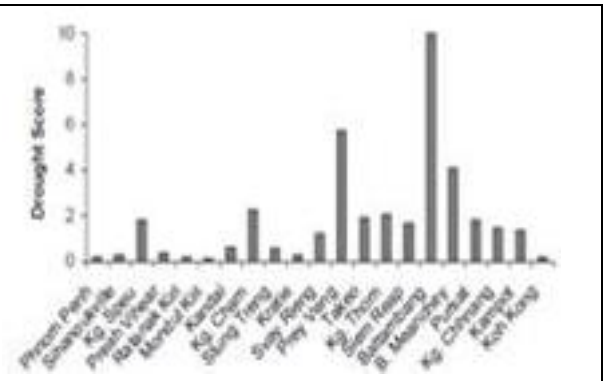

Figure 3: Vulnerability to Droughts in Cambodia at provincial level

Source: NAPA 2006

28. As shown above, major hazards that Cambodia faces are floods and droughts. Mekong and Tonle Sap flooding may soon become catastrophic in the provinces of Kandal, Kampong Cham, Kratie, Prey Veng, Stung Treng, Svay Rieng and Takeo. Flash floods in tributaries around the Tonle Sap affect several other provinces as well. Delays in early warning of the monsoon rains and erratic rainfall contribute to droughts affecting agriculture in particular. As the population in the

[14] Reliefweb (2001) Southeast Asia: Mekong Floods 2001, Information Bulletin No. 1, 27 August 2001, www2.reliefweb.int/rw/rwb.nsf/db900SID/OCHA- 64BTCN?OpenDocument.

[15] Heng CT, 2009: "Vulnerability and Adaptation Assessment to Climate Change in Agriculture Sector in Cambodia", PowerPoint presentation during Workshop on Building Climate Resilience in the Agriculture Sector of Asia and the Pacific ADB HQ, Manila, Philippines, 14-15 May 2009.

Mekong floodplain continues to increase mainly due to rural-to-urban migration, new vulnerabilities continue to accumulate. Lack of appropriate building codes and their weak enforcement in urban areas further add to increased vulnerability.

29. With 80% of the population being rural (of which 90% are poor), rural livelihoods (mostly agriculture, fisheries and forestry) are increasingly affected by drought and floods. Deforestation, soil erosion, land degradation, inadequate irrigation systems all contribute to increasing pressures on the environment and upstream pollution along the Mekong. Since three quarters of the population depend on natural resources and rely on stable climatic conditions for survival, almost any major climate change related disaster can overwhelm current coping mechanisms and strategies. As shown in Table 1, disaster events from 1992 to 2001 have taken a heavy toll of the population. In 2009, Typhoon Ketsana hit Cambodia hard, causing damage at the estimated value of US$132 million. About US$56 million was damage in the agricultural sector alone.

30. Despite the regular occurrence of drought, drought preparedness and response on the part of the responsible government agencies is not well developed. Major deficiencies include the absence of credible drought-forecasting mechanisms, lack of a clear definition of drought, and the lack of consistent response mechanisms. Government's response to drought has often resulted in short-lived solutions. This is in contrast to the flood response since floods are more obvious phenomenon and therefore response mechanisms are better developed.

Table 1: Natural Disasters in Cambodia 1991-2002

Year of Occurrence	Disaster Event	No. of Persons Affected	Location (Provinces)
1991	Flood	650,000	Kampong Cham, Prey Veng, Kampot, Kampong Speue, Takeo, Kandal
1994	Flood	29,000	Batambang, Kampong Cham, Kampong Speue, Takeo. Phnom Penh
1995	Drought, famine	2,500,000	-
1996	Drought, famine	2,500,000	Prey Veng, Kampong Chang, Kampong Speue, Takeo
1997	Flood	1,300,000	Kratie, Phnom Penh, Ratanak Kiri, Stung Treng, Kampong Cham, Kandal, Prey Veng
1998	Crop failure, famine	900,000	(not available on source)
1999	Flood	106,670	Takeo, Kandal, Kampong Speue, Phnom Penh Pursat
1999	Epidemic (Diarrheal / Enteric Disease)	1,254	Ratak Kiri
2000	Flood	3,448,000	Stung Treng, Kratie, Kampong Cham, Pursat, Kampong Thorn, Takeo, Siem Reap
2001	Flood	1,669,182	Stung Treng, Kratie, Kampong Cham
2001	Drought	300,000	

Source: Center for Research on the Epidemiology of Disasters and World Food Program, 2005

2. Development Context and Climate Risks

31. As an agrarian country, Cambodia is highly vulnerable to the impacts of climate change and variability. The country's entire agricultural production system is dependent on the annual flooding and recession of Tonle Sap Great Lake, and is therefore particularly sensitive to potential changes in local climate and monsoon regimes. Moreover, Cambodia's 435 km coastline and large parts of the Mekong River flood plain could be severely affected by sea level rise. As stated earlier, projections based on an analysis of 14 General Circulation Models suggest that, under the high emissions scenario, the rainy season will start later, wet season rainfall will increase but dry season rainfall will decrease and that extreme weather events will become more frequent. These changes may lead to more intense flood pulses and can cause economic losses for agriculture, infrastructure and floodplain vegetation as well as reduce the fertile land area.

a. Economy

32. From 2004-2008, the Cambodian economy expanded by 10.2% per year, with the garment sector and the tourism industry driving the growth, and inflation remaining relatively low. The onset of the global recession led to a sharp drop in economic growth to 0.1% in 2009, but growth resumed in 2010 at an estimated rate of 6.3%.[16] Cambodia remains heavily reliant on foreign assistance – about half of the central government budget depends on donor assistance. Foreign direct investment (FDI) has increased dramatically since 2004 as sound macroeconomic policies, political stability, regional economic growth, and government openness toward investment attracted growing numbers of investors.

33. In spite of recent progress, the Cambodian economy continues to suffer from the legacy of decades of war and internal strife. Per capita income and education levels are lower than in most neighboring countries. Infrastructure remains inadequate, although road networks are improving rapidly. Most rural households depend on agriculture and its related subsectors. Governance-related problems continue to hamper economic opportunity and competitiveness. The economy also has a relatively poor track record in creating jobs in the formal sector, and the challenge will only become more daunting in the future since 2/3rd of the population is under 24 years of age and large numbers of job seekers will begin to enter the work force over the next 10 years.[17]

34. Cambodia's GDP is strongly influenced by the climate. Because of a high reliance on agriculture and fisheries, extreme climate events such as flood and drought have significant adverse impacts on GDP. Annual GDP growth rate from 2000 to 2009 fluctuated widely from 6.7% in 2002 and 2008 to 13.3% in 2005. In 2008, GDP grew by 6.7% with agriculture, fisheries and forestry accounting for 28.4 percent of GDP, industry for 29.5 percent and services for 42.1 percent. The contribution of industry to GDP has roughly doubled since 1993, but a substantial proportion of the population is still dependent on the farming and fisheries sectors.

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[16] Cambodia's gross domestic product (GDP) is projected to increase by 6.5 percent in 2011, up 0.2 percentage points from last year, with strong performances in agriculture, tourism and garment industries, said the Asian Development Bank's Outlook 2011 released on Wednesday 6 April.

[17] US Department of State: http://www.state.gov/r/pa/ei/bgn/2732.htm, accessed 20 April 2011.

b. Vulnerability Context[18]

35. Most of the over 80 percent of the population who live in rural areas are engaged in rain-fed and subsistence agriculture. With only limited land under irrigation and low level of infrastructure for water management, the agriculture sector is particularly vulnerable to changes in rainfall patterns. In the Mekong River and its tributaries, fisheries productivity is largely determined by climate change sensitive hydrological flow regimes, the timing, duration and extent of flooding and the quality of habitats that are inundated. The impacts of climate change on Cambodian agriculture are predicted to adversely affect food production and food security, especially in rural areas. Reduced agricultural production could lead to hunger and malnutrition, and also adversely affect overall economic performance. This would hinder the achievement all of the nine Cambodia Millennium Development Goals (MDG).

36. Despite this, most development projects in Cambodia do not consider information provided by climate change models and scenarios, apparently on account of limited access to reliable information. Consequently, reservoirs and irrigation channels designed for current rainfall patterns may not be able to handle larger peak flows, which are likely to damage to physical infrastructure and reduce the overall area under irrigation. The problem is exacerbated on account of limited or non-existent availability of accurate and reliable area specific climate change relevant information. Villagers in downstream areas essentially rely on word of mouth from upstream areas to ready themselves for floods. While the Department of Meteorology (DOM) has 21 manual and nine automatic weather stations throughout Cambodia, most the automatic stations have been dysfunctional for the past few years. Weather data from the DOM stations is not easily accessible and the number and type of hydrological monitoring sites are insufficient for effective early warning. Expansion and upgrading will be required for any form of downscaled application (e.g. basin or sub-basin planning). More recently, however, there has been a surge in interest and activity to generate more information and develop knowledge products, which must be analyzed and disseminated to potential beneficiaries.

37. **Water resources:** Cambodia's water resources are highly vulnerable to climate change impacts on account of its unique hydrological system, primarily dependent on monsoons The Mekong River and Lake Tonle Sap are connected by the Tonle Sap River, which reverses its direction of flow twice a year. From July to the end of October, when the level of the Mekong is high, water flows into the Tonle Sap River, which fills Lake Tonle Sap, thereby increasing the size of the lake fourfold from 2,600 km^2 to about 10,500 km^2 at its maximum. The storage capacity of Lake Tonle Sap is estimated at 72 km^3. In early November, when the level of the Mekong decreases, the Tonle Sap River reverses its flow, and water flows from Lake Tonle Sap to the Mekong River and thence to the Mekong Delta. The seasonal rise of the Mekong floods the soils around the lake, provides breeding habitat for fish, and leaves rich silt when the waters recede, resulting in fertilisation of land and distribution of fish.[19] Obviously, any variations in the timing of the monsoons and the magnitude of rainfall consequent to climate change would have significant impacts the otherwise stable hydrological regime and as a consequence on the stability of its water resources, critical for the economic growth and development.

38. Two major areas of vulnerability in Cambodia's water resources relate to potable water supply, and flood protection and irrigation. While the general situation of potable water in the urban areas is improving, up to 7 million people in rural areas do not have adequate safe water supply.

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[18] See also Annex 1: Cambodia Risk Profile (natural hazards).

[19] Source: Water Profile of Cambodia, http://www.eoearth.org/article/Water_profile_of_Cambodia.

In 2004, only 29% of the rural population had access to improved water supply and only 8% to improved sanitation, against 34% and 16% of the total population, respectively. Climate change is likely to exacerbate this challenge. Since climate change impacts such as unusually heavy flooding can cause significant damage to infrastructure, rehabilitation and climate proofing of flood control and irrigation infrastructure is crucial.

39. **Agriculture:** Cambodia's entire agricultural production system is dependent on the annual flooding and recession of Tonle Sap Lake, and is therefore particularly sensitive to potential changes in local climate and monsoon regimes. Rice contributes about 80 percent of Cambodia's total agricultural output, and most of it is produced in rain-fed (non-irrigated) areas. Thus, Cambodia's rice production depends heavily on wet season rainfall. Under a high emissions scenario, rice yields will fall by 5 percent by 2020, 25 percent by 2050 and 45 percent by 2080 compared to current levels. As a result, Cambodia might not be able to remain a rice exporting country after 2020. Rice production in Cambodia is, therefore, highly sensitive to changes in wet season rainfall, and the rice farming system might be exposed to high risks of flood and drought in the future. However, the impact of climate change on rice production will be much less under a low emissions scenario than under a high emissions scenario.

40. Two strategies for increasing resilience of agricultural production systems are proposed in the draft version of SNC to the United Nations Framework Convention on Climate Change (UNFCCC). The short-term strategy is to increase system's capacity to cope with current climate risks through the improvement of climate risk management and community livelihoods, while simultaneously reducing greenhouse gas emissions. The long-term strategy is to increase system resilience by revitalizing development programs and by evaluating current programs in addressing climate risks and designing pilot projects. There should also be evaluation activities and a research agenda to redesign, enhance or revitalize the current programs to address current and future climate risks. Therefore, the bulk of the PPCR Investment Program is aimed at scaling up activities that address precisely such needs. The key message is that Cambodian agriculture can adapt to climate change and compensate for production losses, by adopting a number of proactive adaptation strategies. Among these are to increase crop productivity, enhance irrigation capacity to increase the planting index, and expand rice planting to low risk areas.

41. Fisheries are critical to human well-being in Cambodia, where fish provide up to 80 per cent of all animal protein in the diet. Capture fisheries and aquaculture contribute about 10 per cent of Cambodia's gross domestic product and are even more important in terms of local livelihoods. Fishing and related activities are the primary sources of income for about one third of the people living around Tonle Sap and a secondary source of income for half of those who live around the lake. As runoff throughout the Mekong Basin is expected to increase by 21 per cent by 2030, it may intensify sediment loading in Cambodia's rivers, lakes and wetlands, with higher nutrient levels boosting fishery productivity. However, this effect may be offset by sediment retention behind the many dams that are likely to be constructed upstream.

42. By 2030, climate change may raise the wet season flood level of the Tonle Sap Lake by 2.3 meters, expanding the feeding grounds and encouraging fish production. On the other hand, dams to be developed in the Mekong Basin will store water during the monsoon and thus will decrease wet season flood levels. The net result of these two processes is unknown. It is similarly difficult to predict the specific effects of climate change on fish species composition and abundance in Cambodia. Patterns of change in fertility, recruitment, nutrition and growth will depend on both species and interactions between species. Some of the 500 or so Cambodian freshwater species will thrive in a changed climate, while others may die out. An assessment is needed of climate change effects on the commercially dominant species that comprise the bulk of the catch.

43. Extreme weather events could further harm fish production in Cambodia by causing loss of aquaculture stock and destroying fishing and aquaculture infrastructure. Changes in fishery production are likely to have the greatest impact on people who depend on fishing as their primary livelihood activity. As these people are often poorer and more marginal than those who own land and have other primary sources of income, the effects of climate change on fisheries will harm those least equipped to cope.

c. Vulnerabilities at the local government level

44. Studies on assessment of vulnerabilities at the local level are very few. However, a recent study examined awareness and perceptions on vulnerabilities at the local government level in one of the drought-prone provinces of Cambodia, Svay Rieng.[20] The lessons are multiple, including awareness-building needs, health issues and community-based adaptation initiatives. Interviews with a wide range of stakeholder groups including women revealed that many stakeholders recognized the changing disaster profile of the province in terms of increasing frequency and intensity of droughts. They reported that rainfall was decreasing over the years, the days were becoming hotter, and the seasons were unpredictable.

45. Local officials noted that the changing climate encouraged them to be more prepared, in terms of finding additional funds for irrigation systems, conducting capacity-building programmes in agriculture and animal husbandry, providing high-yielding varieties of seeds, and raising awareness among communities about the changes happening and the need for enhanced preparedness. They recognized that local community participation in designing adaptation programs has been very limited, and that very few development partners are supporting long-term community-based adaptation projects. They recognized that significant amounts of funds would be required to support livelihood diversification and stop migration due to changing climate.

46. The human, financial, and technical capabilities of local governments were reported to be insufficient when compared with those of NGOs. Capacity at the commune level was insufficient to assess drought conditions or to initiate proactive drought risk-reduction measures. Responses at the commune level were always delayed as drought assessment is often carried out at the district level. Some important drought risk-reduction initiatives that were adopted include the distribution of fast-growing rice cultivars, training on agricultural practices, training of villagers in animal husbandry and veterinary practices, and integrated pest management.

d. Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA)

47. There are clearly overlapping agendas of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) which could lead to potential synergies. This common interest comes from a simultaneous recognition that risk reduction requires a more comprehensive approach than has been previously been applied. Neither DRR nor CCA is about disasters or climate change only, but rather together, they are about all of the social, physical and economic factors that influence the magnitude of certain hazards, a changing climate being one such hazard. The following linkages between climate change adaptation and disaster risk reduction are relevant to the SPCR.

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[20] *Drought Management Considerations for Climate Change Adaptation: Focus on the Mekong Region, CAMBODIA report,* Oxfam Cambodia and Graduate School of Global Environmental Studies of Kyoto University, Japan, 2008.

48. **Large scale humanitarian disasters** are caused by war, epidemics and natural events like floods, droughts and earthquakes. These may be triggered or exacerbated by impacts of climate change on natural resources, e.g. conflicts over access to water resources. Disaster management options include mainly response and relief. DRR focus is on reducing the vulnerability, e.g. early warning systems and contingency plans for disaster preparedness. Reduced vulnerability increases resilience and ability to cope. The SPCR projects, especially those in the water resources and infrastructure sectors, will assist Cambodia with better disaster preparedness and reduce losses as investments can withstand the impacts of climate-related hazards.

49. **Disasters caused by extreme events** (e.g. droughts, storms, floods, landslides): Extreme events are part of natural climate variability, but climate change can exacerbate their frequency and magnitude. Disaster management options include preparedness and response to disasters, e.g. through early warning systems. SPCR investments aim at reducing the impacts extreme weather events by addressing the vulnerability through development planning, e.g. reduce the risks of flooding and landslides through appropriate water resources management, and drought-resistant agricultural practices for drought.

50. **Incremental impacts of climate change and climate variability:** Impacts on health and infrastructure that are gradual may not be easily identified as disasters, but may be part of CCA. The response is to decrease uncertainty related to climate change as well as to capitalise on opportunities to reduce vulnerability in development planning, e.g. changes in cropping patterns in agriculture. Some accumulated risks may increase vulnerability to hazards and thereby increase disaster impacts. The SPCR projects can help to develop skills to easily recognise these changing patterns and act appropriately, with relevant gender considerations well represented in all cases.

e. Gender and the Impacts of Climate Change

51. Climate change does not affect men and women in the same way. The impact of climate change on natural resource-based sectors, such as agriculture, water, forestry and fisheries, imply increased hardship for vulnerable rural women, as women make up 56 percent of the primary workforce in subsistence farming and 54 percent of the workforce in market-oriented farming. In rural areas, women are responsible for more than 80 percent of food production. Women provide firewood and household water, spending twice as much time in collecting water during the dry season as they do during the rainy season. Often they are working on marginal lands without irrigation, and using saved seeds. Women represent 52% of the total population,[21] but they are mostly engaged in the informal sector and in low-productivity agriculture. They have no formal training and limited access to extension services and credit. Indeed, more than 50% of the women farmers are illiterate.[22] Even though women play a key role in sustaining livelihoods in rural Cambodia, they are more exposed and vulnerable to natural disasters than men.

52. Given their role in the well being of households and communities, and their expertise and experience, women must be an integral part of any climate change discussion aimed at finding appropriate adaptation solutions. Gender equity must be integrated into adaptation plans, policies and strategies. . In this context, the Gender Mainstreaming Action Plan (GMAP), prepared in 2009 with UNDP assistance, provides valuable insights to ensure that both gender and climate risk management are mainstreamed into sectoral development planning.

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[21] http://www.adb.org/documents/news/carm/2006/carm200602.asp

[22] CAMBODIA, Country Gender Action Plan (C-GAP) for FY2011 – 2013, World Bank 2011.

f. Poverty and Climate Change

53. Poverty remains a serious social issue in Cambodia. The poverty line is based on the cost of a basket of food providing a 2,100-calorie per day intake, and a minimum for non-food allowances. At current exchange rates, the poverty line corresponds to about US$0.60 per day. The poverty headcount, based on US$0.60 cents per day, was estimated at 34.7% of the Cambodian population in 2004, while the food poverty headcount, based on a 2,100- calorie per day diet, stood at 20%. Poverty incidence is highest in rural areas (39%) and lowest in the Phnom Penh (5%). In other urban areas the incidence of poverty is 25% (NPRS 2002, World Bank 2006). Households engaged in agricultural activities have the highest incidence of poverty. In 2007, the poverty incidence had fallen to 30.1 %. Constraints in terms of access to land, forests, fisheries and other natural resources, as well as few opportunities in the industry and service sectors, further perpetuate the cycle of poverty. Poor health combined with high healthcare expenditures is a major cause of household impoverishment. Furthermore, Cambodia ranked 129th out of 177 countries in 2004 in terms of Human Development Index (HDI), which is a composite measure of three dimensions of human development: life expectancy, education, and standard of living (UNDP 2006). Indeed, Cambodia's human development lags behind that of its neighbours.

54. People living in poverty contribute the least to climate change but they suffer its worst consequences with few resources to adapt and respond. The effects of climate change – increasingly limited access to water, reduced crop yields, more widespread diseases, and increased frequency of natural disasters make the lives of poor people even more precarious. High levels of poverty and low levels of human development limit the capacity of poor households to manage climate induced risks.

55. With limited access to insurance, low incomes and meagre assets, poor households deal with climate related shocks under highly constrained conditions. Adaptation to climate change will only be effective, therefore, if it builds upon an understanding of the multi-dimensional nature of poverty and vulnerability. Rural Cambodians have highly evolved livelihood strategies to cope with environmental changes. Adaptation strategies should therefore build on existing local and indigenous knowledge and coping mechanisms. Further, adaptation to climate change must be considered as part of the development process and must be integrated into national economic planning and poverty eradication initiatives. Obviously, priority Investment projects for PPCR support may be guided by the impacts the investment projects can and will have on vulnerable groups, with those most vulnerable often also being the very poor in rural areas.

g. Private Sector and Climate Change Adaptation

56. Many private businesses are vulnerable to impacts of climate change but their awareness of climate change is limited. Likewise, climate change offers new opportunities for the private sector development, especially in areas such as insurance and new adaptation technologies. However, the penetration of private sector into areas related to climate change adaptation has been extremely limited to date in Cambodia. SPCR investments may proactively engage the private sector to pilot new initiatives such crop insurance and deployment of water-saving technologies such as drip irrigation with a view to enhance overall climate resilience in the country.

3. Overview and Linkage to Existing Development Plans and Programs

a. National Actions on Climate Change Adaptation

57. **Climate Change Strategies and Action Plans.** Cambodia acceded to the UNFCCC in December 1995, and ratified the convention in December 1996. It established the National Committee on Climate Change (NCCC) in 2006. Since 2009, the NCCC has been chaired by the Prime Minister. **National Adaptation Programme of Action (NAPA)** was completed in 2006 and included 20 high priority adaptation projects with a combined budget of USD 130 million. The SNC's revised vulnerability analysis, and revised adaptation plan are being used to update the NAPA. The goal of NAPA is to provide a framework to guide the coordination and implementation of adaptation initiatives through a participatory approach, and help build synergies with other relevant environmental and development programs. It presents priority activities to address *urgent and immediate* needs and concerns of the people at the grassroots level for adaptation to the adverse effects of climate change in various vulnerable sectors. Identification of priority activities is based on comprehensive stakeholder consultations and policy reviews and is supportive of the Government's development objectives. Consistent with the overall objective of PPCR, NAPA when fully implemented, will contribute to sustainable development under changing climatic conditions, enhance opportunities for scaled-up action and facilitate transformational change in mainstreaming climate change in development planning consistent with national poverty reduction goals.

58. **Strategic National Action Plan for Disaster Risk Reduction, 2008-2013 (SNAP).** In March 2009, Cambodia launched SNAP, which covers a number of themes relevant to climate change adaptation, including mainstreaming disaster risk reduction into (i) national, sector and local development policies and plans; (ii) national and local risk assessments; (iii) improved flood forecasting and early warning capabilities; (iv) education and awareness raising; and (v) promotion of structural and non-structural measures to enhance resilience to climate change.

59. **The Rectangular Strategy for Growth, Employment, Equity and Efficiency in Cambodia.** This strategy provides the broad overarching policy framework for Cambodia's long-term vision for growth, employment, equity, and efficiency. The Phase II Rectangular Strategy announced in September 2008 does not address climate change directly, however, although there is some indirect reference in the contexts of potential global food market pressures and forest management. The Strategy also places emphasis on flood and sea protection levies and other measures to boost agricultural production and reports on past success in rescuing and providing support to 'victims of natural disasters'.

60. **National Strategic Development Plan (NSDP).** The NSDP Update for the period 2009-2013 was finalized and approved by the National Assembly and enacted in June 2010. It is closely aligned with the Rectangular Strategy, translating the Strategy into concrete goals, targets, and strategies and has mainstreamed some aspects of climate change adaptation and disaster risk reduction. It is not clear to what extent the local and regional impacts of climate change have been factored into national infrastructure planning, including large hydropower developments. The recent update included also, a directive on the strengthening of the National Committee for Disaster Management (NCDM), which is the national inter-ministerial body responsible for providing emergency relief and disaster risk management, including relating to climate hazards.

61. The Implementation Plan for Decentralization and De-concentration under the National Programme for Sub-National Democratic Development (NP-SNDD) 2010-2019, calls for the mainstreaming climate change. The sectoral National Strategy on Disaster Risk Reduction, the National Social Protection Strategy, and the draft National Environment and Health Action Plan also recognize the importance of addressing climate change. Cambodia will shortly commence the preparation of the Climate Change Strategy and Action Plan (CCSAP) to provide a strategic framework for climate change adaptation and mitigation in Cambodia.

62. Notwithstanding the above progress, the impacts of climate change on economic performance and the achievement of long-term socio-economic objectives have not been well articulated.[23] Sector development policies and plans rarely consider adaptation to climate change, primarily on account of constraints that include (i) inadequate awareness of potential impacts of climate change on sector development projects and programs; (ii) inadequate availability and access to reliable location-specific and/or sector-specific data, information and assessments of climate change vulnerabilities and impacts; (iii) information gaps and limited institutional capacities to meet the challenges imposed by climate change; and (iv) limited funding options and resources given that climate resilient development investments are much more expensive than standard development interventions. Evidence of these challenges and constraints can be found in some of the sector-specific examples situation described below. Obviously, there is an urgent need to address these constraints to move towards a climate-resilient development pathway.

63. **Water Resources.** Adverse impacts to the water resources constitute the principal climate change risk in Cambodia. Even though NAPA identified water resources as one of the most vulnerable sectors to climate change, there is no evidence yet of integration of climate change adaptation concerns into national water strategies, policies, plans and programs. For example, the Strategy for Agriculture and Water (2006-2010) does not refer to climate change adaptation.

64. **Agriculture Sector**: Although the agriculture sector is considered the most vulnerable in Cambodia, public sector capacity to plan and implement climate adaptation strategies in the sector is weak. It is constrained by (a) inadequate institutional arrangements and a lack of policy guidance; and (b) insufficient human and financial resources. While there are scattered references to climate change and sustainable agriculture development in key policy and planning documents, such as the NSDP, there is not yet a coherent and comprehensive policy framework in place to guide action in the agriculture sector. The Master Plan for Agricultural Research (2006) contains no reference to climate change, nor does the Development Scenario for Agriculture Sector in Cambodia (2007), a planning document supported by JICA. Awareness and knowledge about climate change and climate resilience is generally minimal across departments at MAFF, MOWRAM and MRD, and even less at sub-national levels.

65. **Infrastructure sector:** Functionality of infrastructure such as road networks is a prerequisite to virtually all forms of poverty reduction, economic development and disaster relief. Even though impacts of climate change such as floods seriously damage infrastructure in Cambodia, climate risk and resilience were not integrated into infrastructure development plans at both national and sub-national plans. For example, the strategy and policy documents of the Ministry of Public Works and Transport (MPWT), Ministry of Rural Development (MRD), and

[23] For example, the following are excerpts from the Update mentioning climate change adaptation: Paragraph 430: "Promote the implementation and update the National Action Programme on climate change adaptation; Paragraph 426: Seek for financial resources and support for dealing with climate change issues, both the adaptation measures and reduction measures for green-house gas emission".

Ministry of Industry, Mines and Energy (MIME) do not address climate change and resilience. In many cases, energy infrastructure including hydro electric power plants, and other planned generation facilities are at risk to flood, drought and local inundation. Integration of climate resilience concerns in infrastructure planning and investments thus requires interventions at multiple levels.

66. **Sub-national policies:** Climate change adaptation is yet to be integrated into sub-national policy, planning and budgeting processes. There is limited budget to meet even current priority development needs, let alone the additional cost of adaptation. Limited understanding of climate risks and lack of technical capacity to integrate climate risk management into planning processes are major challenges at sub-national levels. There has been no evidence of any training organized at provincial and commune levels to provide this capacity.

b. Investment Programs of Development Partners on Climate Change Adaptation

67. Development partners in Cambodia have been providing significant support for climate change adaptation recently (Annex 2). Most of these initiatives are, however, in early stages of implementation. Harmonization of various initiatives would be important to avoid overlap and redundancies. One of the initiatives with somewhat similar objectives as that of PPCR is the Cambodia Climate Change Alliance (CCCA) funded by the European Union, UNDP and SIDA and DANIDA. CCCA has three result areas: (i) policy formulation and mainstreaming; (ii) platform for knowledge management and outreach, climate change awareness, education and information; and (iii) trust fund management. As some of these result areas are closely linked to the PPCR aims and objectives, effective coordination between CCCA and PPCR will ensure synergies, information exchange and sharing of experience and lessons learned. In this context, it has been agreed that coordination would be ensured through sharing of work plans and identifying synergies, establishing an e-mail group for information sharing, organizing bi-monthly formal meetings between the implementation teams, and preparing a semi-annual joint event calendar and a one-page summary of coordination activities reported on a quarterly basis.

68. The Mekong River Commission (MRC), with support from Australia, launched the Climate Change and Adaptation Initiative (CCAI). This project aims to focus on climate resilience of water resources and their management. As the core priority of PPCR investments is on water resources, there are opportunities to build synergies between PPCR and CCAI.

69. The United Nations Environment Program and Global Environment Facility (UNEP-GEF) has launched a $4.62 million four-year 'Vulnerability Assessment and Adaptation Program for Climate Change in the Coastal Zone of Cambodia considering Livelihood Improvement and Ecosystems". Likewise, the Food and Agriculture Organization of the United Nations (FAO) is now preparing an agricultural adaptation project using resources from Least Developed Countries' Fund (LDCF). UNDP and IFAD are implementing another project entitled "Promoting Climate-Resilient Water Management and Agricultural Practices in Rural Cambodia". It is expected that these projects will provide substantial inputs to successful implementation of PPCR investments.

70. Several bilateral development partners such as Australian Agency for International development (AusAID); Agence Française de Développement (AFD); Canadian International Development Agency (CIDA); Danish International Development Agency (DANIDA); Deutsche Gessellschaft fur Internationale Zusammernarbeit (GIZ); European Union; (GIZ); Japan International Co-operation Agency (JICA); Swedish International Development Agency (SIDA), UK Department for International Development (DFID); United States Agency for International Development (USAID) have also begun to support various climate change adaptation projects. An

International Development Research Center of Canada (IDRC)-funded project is aiming to build capacity of researchers in Royal University of Phnom Penh, through a region-wide project. PPCR should aim to promote synergies and build effective linkages with these projects.

71. The Asian Development Bank (ADB) long-term strategic framework 2008-2020 (Strategy 2020) reaffirms the importance of inclusive economic growth, environmentally sustainable growth, and regional integration to achieve poverty reduction and improvements in the quality of life for people in Asia and the Pacific. As one of the five core areas of ADB operations, environment is becoming increasingly integrated across the Bank's operations and investment portfolio, with an emphasis on climate change and a range of complimentary and supportive actions. In particular, ADB's strengths in infrastructure development and finance, and it's experience in the energy, transport, urban, water and natural resource management sectors, offer tremendous potential to address environment and climate challenges in Asia and the Pacific.

72. With specific reference to Cambodia, ADB's country operations business plan (COBP), 2009–2012 reflects (i) adjustments in ADB's corporate priorities as elaborated in Strategy 2020; (ii) responsiveness to key external challenges, such as the impact of the global economic crisis and climate change; (iii) the form and pace of democratization and decentralization reforms; and (iv) assumptions regarding the shift from a mix of Asian Development Fund (ADF) loans and grants to ADF loans only beginning in 2011. The COBP incorporates the priorities endorsed by the 15th GMS Ministerial Conference and ensures that all regional interventions are well-grounded in the national program. Thus, the GMS programming reflects the increasing engagement with the environment and climate change through an "environment for development" agenda in both natural resources and infrastructure.

73. The new ADB-Cambodia Country Partnership Strategy (CPS) 2011-2013, endorsed by the Government and scheduled for approval by the ADB Board on 4 July 2011, identifies environment and climate change as a key cross-cutting theme or challenge for Cambodia. Specifically, the CPS calls for ADB to: (i) mainstream climate change challenges in sector analysis and planning and project design; (ii) continue to develop improved approaches to resource conservation in the Tonle Sap basin; (iii) coordinate national and sub-regional programs on climate change and the environment; and (iv) access finance from internal and external sources to support climate change activities in new and existing projects (including the PPCR).

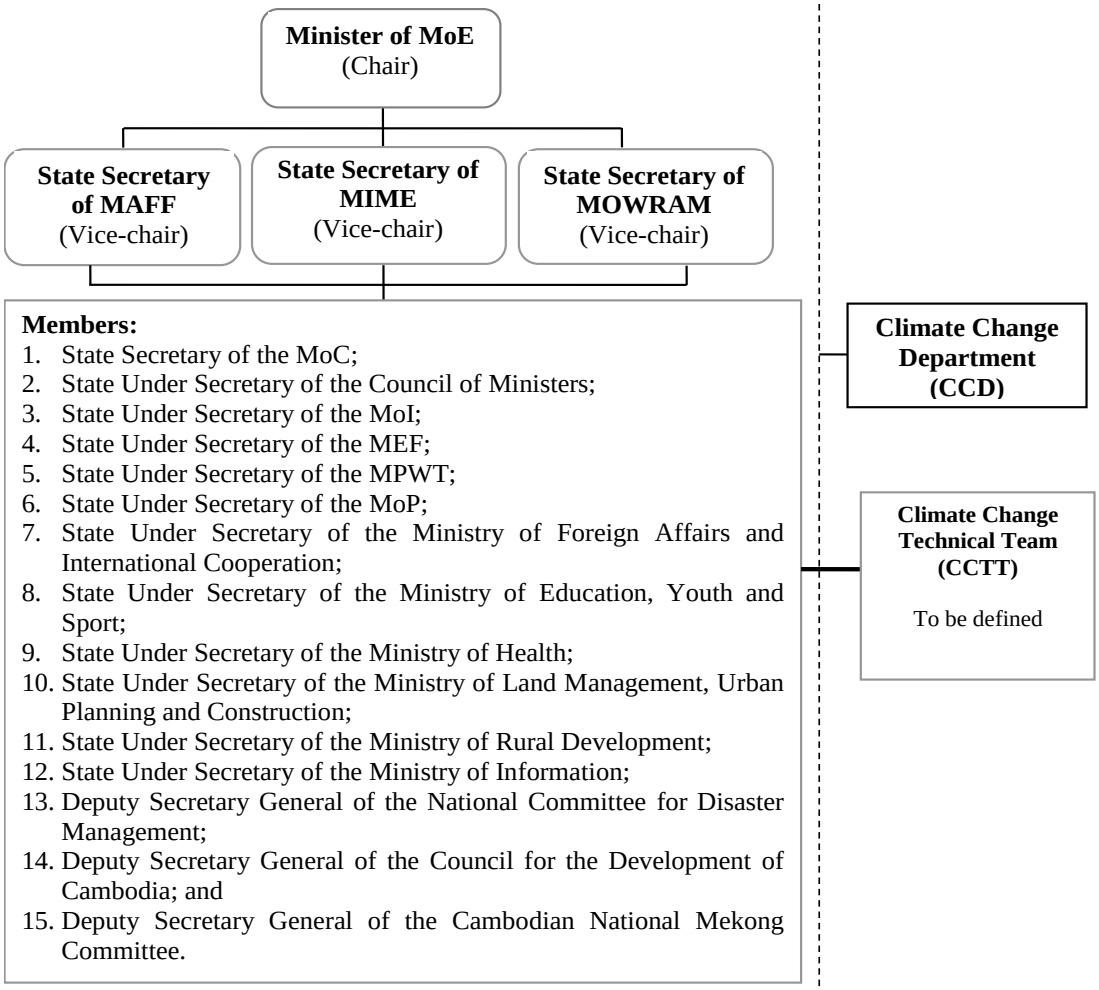
74. Climate change interventions would focus on environmentally sustainable natural resource management based on upfront analytical work and financial resources that would be available under the PPCR. In the agriculture and rural development sector, the COBP aims to foster pro-poor and socially-inclusive economic growth by enhancing environmentally sustainable agriculture and rural development and by diversifying the sources of rural growth and bolstering poverty reduction efforts, including agriculture commercialization and resource conservation. The geographic focus efforts would continue to be the Tonle Sap basin, where most of Cambodia's rural poor live. Interventions such as the GMS Biodiversity Conservation Corridor Project are aimed at climate-resilient development, inclusive growth, and enhanced environmental performance of GMS economic corridor investments. The Water Resources Management Sector Development Program would target additional improvements, including expansion of small- and medium-scale irrigation systems, and development of more effective farmer water-user communities. The GMS Provincial Road Improvement Project and other Rural Roads Asset Management Projects would improve connectivity internally within the region and extend the connecting rural roads network to improve access to markets and social services of the rural poor. The Sustainable Urban Development in Tonle Sap Basin and the Rural Water Supply and Sanitation II Project would provide a platform for the Government's own investment efforts and form part of the basis for the

GMS Corridor Towns Development Project. ADB's project and programs portfolio, therefore, reflects an array of potential investments that require enhanced resilience to climate change and as a result qualify for support under the PPCR as blended investments.

4. Institutional Analysis

75. The main institutional responsibility for climate change coordination rests with the National Climate Change Committee (NCCC). Established in 2006, it is chaired by the Senior Minister of Environment (the Prime Minister is the honorary chair since 2009) and comprises high-level representatives from 19 line ministries, including the MEF. The NCCC is responsible *inter alia* for (a) coordinating the implementation of climate change activities in Cambodia; (b) developing climate change policies, strategies, legal instruments, plans and programs; and (c) the integration of climate change concerns into relevant policies, strategies and legal instruments. Its Secretariat, the Cambodian Climate Change Department (CCD) in MOE, has been functioning since 1999 as a project unit although limited staff and constrained financial resources have limited its ability to effectively implement its mandate. The NCCC organizational diagram is presented in Figure 4.

Figure 4: Structure of National Committee for Climate Change



76. The NCCC is also responsible for the establishment of the Climate Change Technical Team (CCTT) which acts as a technical advisor on climate change issues to support the NCCC. Due to delays in the establishment of the Climate Change Technical Team, the CCD acts as an interim secretariat and provides technical advice and input on climate change related matters to the NCCC. Once established, the CCTT will comprise of government ministries' and agencies' representatives and will be based at MOE.

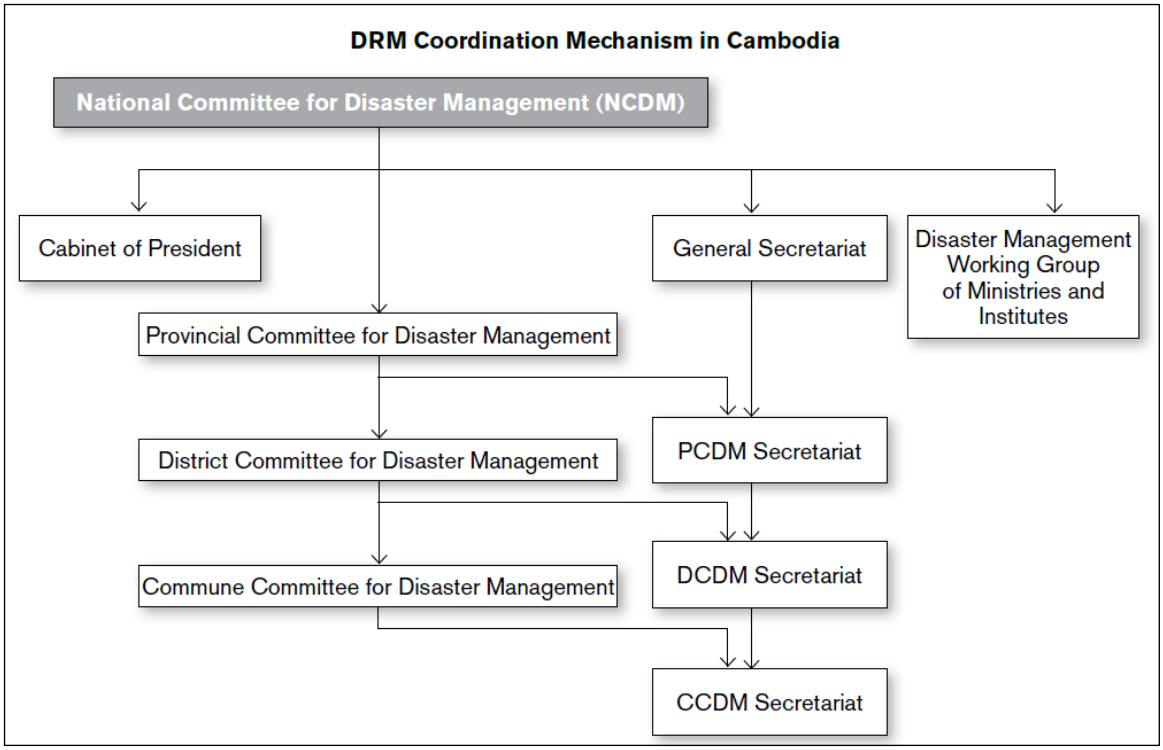
77. **Climate Change Department (CCD):** The CCD receives direct guidance from the Minister of Environment and the National Climate Change Committee (NCCC). The Office comprises of eight fulltime staff from the MOE and seven part time staff from other key ministries or agencies working in four technical support units: greenhouse gas (GHG) Inventory, GHG Mitigation, Vulnerability and Adaptation, and UNFCCC Implementation. The primary tasks of the CCD include, but not limited to, coordinating the implementation of UNFCCC activities (national communications, clean development mechanism, NAPA, and international climate change negotiations), Global Environment Facility projects, and donor funded projects on climate change (e.g. Cambodian Climate Change Alliance [CCCA] and PPCR); preparing the Climate Change Strategy and Action Plan [CCSAP] and conducting public campaigns on climate change. As noted earlier, staff capacity to handle these multiple issues is limited. Even though CCD is proactively coordinating with other ministries, it would require substantial support. PPCR can provide additional support to CCD in cross-sector coordination.

78. The main institutional responsibility for coordination of activities related to Disaster Risk Management (DRM) rests with the National Committee for Disaster Management (NCDM). Established in 1995, the NCDM is chaired by the Prime Minister with membership from all ministries, as well as representatives from the Royal Cambodian Armed Forces, Cambodian Red Cross and Civil Aviation Authority. The NCDM has five departments: i) Emergency Response and Rehabilitation; ii) Administration and Finance; iii) Information and Relations; iv) Preparedness and Training; and v) Search and Rescue. A working group on Disaster Coordination, Response and Recovery was established with five sub-working groups on emergency response; food security; health; small scale infrastructure; hygiene, water and sanitation; and preparedness and mitigation. The NCDM coordination mechanism from the central to the commune levels is illustrated below:

79. Despite close linkages between climate change adaptation and DRM, a formal coordination mechanism for these activities is not present. It is anticipated that the Technical Assistance to CCD in Phase 2 will enhance the institutional coordination among MOE and line ministries, including NCDM to promote synergies of activities on climate change adaptation and DRM. Capacity building of NCDM and other key government agencies will also be undertaken.

80. The National Committee on Democratization and De-concentration (NCDD) is beginning to strengthen institutions at sub-national levels, but integration of climate risks into sub-national planning is still limited. The Provincial Departments of Agriculture, Rural Development, and Water Resources Management allocate small budgets indirectly to cope with disasters but it remains unknown if such budget allocation is arbitrary or based on a systematic risk assessment. Several NGOs and civil society organizations (CSOs) are also supporting local initiatives related to climate change adaptation and disaster risk reduction. An NGO Climate Change Network was established recently. While some international NGOs are fully aware and have a few resources allocated for adaptation, many local NGOs face significant technical, financial and awareness-related barriers in implementing adaptation initiatives (Annex 3).

Figure 5: Disaster Risk Management (DRM) Coordination Mechanism in Cambodia



81. Despite many potential opportunities (e.g. crop insurance, water-saving technologies), the role of private sector in climate change adaptation in Cambodia has been limited so far. A few firms have developed greenhouse gas mitigation projects to take advantage of the Clean Development Mechanism and voluntary carbon markets, but their involvement in adaptation is limited. Many private businesses are yet to integrate climate risk and resilience into business planning.

5. Participation Process

82. The planning process that resulted in the development of Cambodia's SPCR followed an extensive and in-depth participatory process, engaging a large number of people from various line ministries of the government, development partners, civil society and the private sector. The key stakeholder groups involved are listed in Annex 4. The framing of the climate vulnerabilities, impacts and adaptation options was based on an inclusive and consultative process.

83. In order for the SPCR to be truly driven by local and national needs, consultations involved various groups including those most affected by climate change, those most vulnerable to adverse climate impacts, and those in a position of responsibility to effect societal and community change. As women, children and the elderly and infirmed are especially vulnerable, specific efforts were made to ensure gender mainstreaming. Throughout the consultation process, it has been recognised that the proposed transformational actions to build resilience must result in a quantifiable reduction in losses from the impacts of climate hazards, for various communities.

84. **First Joint Mission:** The preparation of Phase 1 commenced with the first joint mission from October 12 to 22, 2009 led by the Ministry of Economy and Finance (MEF) and comprising the ADB, IFC and the World Bank with participation by UNDP and DFID. The mission held separate consultation meetings with government agencies, the private sector, civil society, and development partners. The purpose was to provide stakeholders with an update on the PPCR; discuss climate risks and vulnerabilities as well as the climate resilience activities being undertaken in the country; and begin discussions on sectoral and other priorities that could be addressed by the PPCR. At the provincial level, the mission held discussions with local leaders as well as staff of key line agencies. At a commune level, consultations were held with a Commune Council. These various consultations confirmed that the priority vulnerable sectors or themes for Cambodia that could be addressed by the PPCR are agriculture, water resources, and rural infrastructure.

85. **Government Process:** Following the First Joint Mission, the MEF and Ministry of Environment (MOE), with the support of UNDP, requested key ministries (MEF, MOE, Ministry of Agriculture, Forestry and Fisheries [MAFF], Ministry of Water Resources and Meteorology [MOWRAM], Ministry of Planning [MOP], Ministry of Interior [MOI], Ministry of Rural Development [MRD], Ministry of Public Works and Transport [MPWT]) to nominate climate change focal points. This focal point network facilitated the formation of Ministerial teams structured along functional lines and including technical staff, gender focal points, communications and outreach officers, policy makers, project and programme staff, advisors and senior management. Additional consultation workshops were undertaken in March 2011 to gather inputs from all relevant ministries to schedule milestones for preparation of the SPCR. Also, a range of individual meetings were undertaken one-on-one to further clarify and confirm priorities for the investments and the associated Technical Assistance package to be proposed for implementation under Phase 2.

86. **Private Sector Engagement:** In parallel with the Government process, IFC and UNDP, with participation by the World Bank and ADB, undertook a series of consultations with key private sector representatives including companies working in agriculture, manufacturing, irrigation, rural electricity and financial services. The meetings assessed overall awareness, on-going investment activities in climate adaptation, future opportunities and obstacles that need to be addressed to unblock such investment opportunities. Some of these opportunities have been included as elements under Project II, Component 2.

87. **Second Joint Mission**: The preparation of Phase 2 commenced in March 2011 with a range of one-on-one meetings with various ministries and agencies, a Workshop with all relevant Government Ministries, follow-up meetings, and then concluding with the Civil Society Roundtable meeting. The agenda and organization of the Second Joint Mission was commenced at this time. The Second Joint Mission was held from 9-13 May 2011 to comprehensively discuss aspects of content, approach and methodology, geographical coverage, implementing agency responsibilities, gender issues, knowledge management opportunities, capacity building initiatives and other aspects of the SPCR.

88. **Civil Society Consultations**: Following from the large group consultation undertaken during the First Joint Mission in October 2009, the World Bank and UNDP, with participation of ADB, undertook several small group and one-on-one meetings with representatives from key local and international Civil Society Organisations in Cambodia. During the initial consultation, it was clear that some CSOs are active in climate change activities, coordination mechanisms on climate change are emerging - notably with the establishment of an NGO Climate Change Network (NCCN) but that across the broader NGO community there is limited awareness and strategic and practical capacity to address climate change issues. It was therefore proposed that specific actions

would be undertaken during Phase 1 of PPCR to enhance engagement with CSOs. This would then inform the participation of CSOs in PPCR implementation and design of a suitable support mechanism. To kick-start the process, the World Bank engaged a consultant to explore with CSOs specific options for their effective engagement in Phase 2. Follow-up consultations were continued from March to May 2011 with a Roundtable discussion and review of the first draft SPCR. It was also an opportunity to discuss the consultant report (Civil Society Engagement Study) on the design of a CSO support mechanism.

89. The Roundtable discussions with selected CSOs in May 2011 were partly a follow-up to the "Workshop on Civil Society Engagement in the PPCR" which was convened during the preparation of the CSO Engagement Study. More than sixty participants from all corners of Cambodian civil society attended, including: leaders of organizations active in the National Climate Change Network; leading civil society organizations active in the Disaster Risk Reduction Forum; and other strategically identified NGOs whose programs portfolios indicated an interest and/or commitment to climate change and adaptation. The CSO Engagement Study made an assessment of capacities of various CSOs at local and national levels, and included a summary assessment of Civil Society capacity for adaptation, and discussed a mechanism for supporting CSOs in future.

90. Discussions with CSOs revealed that there are significant opportunities for engaging and integrating civil society knowledge, experience and capacity in implementation of the PPCR. Each of the Investment Projects and the technical assistance indicate such opportunities. CSOs across Cambodia themselves need to adapt their planning and programming to become more climate-resilient. The consultations agreed on a number of issues. They include:

- **Knowledge and awareness building**: The need throughout the Cambodian society for better knowledge of the causes of climate change; its potential impact; and adaptation strategies.
- **Monitoring of impacts:** There is currently no meaningful baseline of information or strategy for capturing lessons from the impacts of climate change and potential adaptation strategies.
- **Sub-national level:** Given their role in communes, CSOs are often well positioned at sub-national level to implement adaptation projects with communities and test a range of resilience building models and tools. They are also well positioned to support the collation of information on local coping strategies and adaptation options.
- **Gender:** CSOs see themselves as having a role to play in measuring and strategizing a response to gender-based impacts.
- **Communications:** A well-coordinated communications strategy is considered critical to raise awareness of the impacts of climate change across and CSOs can contribute to such efforts.
- **Future improvement:** CSOs believe they have a reservoir of knowledge that is not being tapped or acknowledged at present. They also acknowledge that their efforts are under-performing.

6. Rationale for PPCR Support

91. Cambodia is one of the most vulnerable countries in the region to the impacts of climate change and other climate-related hazards. Cambodia's vulnerability to climate change is linked to its characteristics as a post-civil war, least developed, agrarian country with nearly 80 percent of the population living in rural areas, weak adaptive capacity, and poor infrastructure. Floods and droughts, now exacerbated by climate change, are recognized by the government as the main contributors to poverty. During the 20-year period from 1987-2007 a succession of droughts and floods resulted in significant loss of life and considerable economic losses. Moreover, given the vulnerability of agrarian rural populations, women dominated workforce in both industry and agriculture (around 54% of the workforce), regular occurrence of hazard impacts, most devastating floods and droughts, poor condition of infrastructure to withstand climate change impacts, limited knowledge and awareness of the government, businesses and communities, and the need for enhanced skills in climate change adaptation, investments that result in enhanced resilience to climate change are critical. Support for a full range of activities and technical assistance for building climate resilient businesses and communities (including decision-makers) is a priority now and will remain so for the foreseeable future.

92. Addressing the impacts of climate change through an appropriately designed adaptation program is an imperative for Cambodia as this is the only option that will enhance resilience to climate change as the means to ensuring food and water security, managing disaster risk, protecting climate sensitive infrastructure, maintaining health security, ensuring social protection, tackling involuntary migration and addressing overall environmental degradation.

93. The PPCR can add substantial value to RGC's efforts in leading the country to a climate resilient development path, consistent with its poverty reduction and sustainable development goals. Based on extensive stakeholder consultations held over several years, sectors such as water resources, agriculture and infrastructure were identified as the main priorities for enhancing climate resilience. The PPCR support is solicited for undertaking both soft interventions such as capacity strengthening, as well as hard interventions such as climate proofing of infrastructure in areas of high vulnerability to impacts of climate change. The PPCR support is critical to Cambodia because the country lacks adequate human, institutional, technological and financial resources to implement such interventions on its own. Further, the PPCR support will facilitate a rapid shift in Cambodia's approach to development planning by ensuring that its development efforts are not threatened by future impacts of climate change at both national and sub-national levels. The PPCR support will also serve as a catalyst for mobilizing additional investments in climate resilience and for scaling-up actions by development partners. The proposed actions are considered highly cost-effective, as preliminary calculations suggest that every $1 invested in PPCR will enhance climate resilience of nearly $4 invested in development planning. As PPCR projects will be implemented over at least 5-7 years, it is expected that substantial capacity to mainstream climate change adaptation into development will be built across the country to ensure that it is sustainable.

94. A key ingredient for successful adaptation is to ensure that appropriate policies, procedures, guidelines are in place and the institutions are adequately empowered and enabled to carry out their roles in addressing the potential impacts of climate change. Obviously, given the weakness of several institutions, constantly changing climatic patterns, inadequate access to information and knowledge, a capacity building program that would strengthen the institutions and enable them to handle the climate change issues effectively and decisively, address information

and knowledge gaps and address other constraints, will facilitate a move towards climate-resilient development path.

95. Capacity building encompasses (i) enhancing awareness of climate change vulnerabilities and impacts and adoption of climate change resilient techniques and technologies; (ii) creating conditions for promulgation and enforcement of appropriate policies for transformation; (iii) establishing partnerships among institutional and non-institutional stakeholders in promoting the development and adoption of appropriate technologies that enhance climate resilience. Support and assistance by multilateral development institutions and bilateral development partners would be critical in mobilizing resources and encouraging the decision makers to undertake climate change relevant research and development activities and facilitate their adoption as a means of adaptation to climate change.

96. Major costs of adaptation in Cambodia are associated with upgrading of critical infrastructure. Roads, bridges, river embankment stabilization, rural agriculture infrastructure, wharf construction (technologies), inland and river flood defences and possible future relocation of buildings and infrastructure: these are costs for hard interventions. The costs for soft interventions are what will contribute significantly to building and sustaining climate resilience. They include development of awareness, knowledge and understanding amongst businesses, and communities living and working in vulnerable areas. Knowledge management is probably the investment that will provide the greatest return. In all, the total costs of all measures and investments proposed in the SPCR will make a significant start to the transformation of Cambodia into a climate resilient development pathway, an example to all of the GMS and indeed other countries in Southeast Asia.

97. The PPCR support will contribute to and facilitate improvements in (i) upgrading and climate proofing physical infrastructure; (ii) natural resource protection and conservation; (iii) legislative and regulatory frameworks; (iv) knowledge management and a more informed populace; (v) gender-sensitive and more climate-resilient communities; (vi) community infrastructure protection; (vii) well designed pilot projects that can test larger development plans; and (viii) preservation and creation of livelihoods increasing the social and economic capital of the country. In terms of enhanced institutional capacities and programs for resilience to climate change, the PPCR will (i) strengthen the capacity of the Secretariat of NCCC Management; (ii) promote and coordinate the mainstreaming of climate change in concerned sectors; (iii) help prepare a National Strategy and Action Plan for Climate Change; (iv) promote establishment of a national fund for climate change; (vi) promote the implementation and update the National Action Programme on climate change adaptation; and (vii) educate and inform the public on climate change adaptation.[24]

98. The PPCR support will lead to a shift towards climate resilient development planning and scaled-up action towards adaptation as has been articulated in the recent Update of NSDP (2010-2013), which identifies actions that will bring climate change adaptation into common parlance of government policy at the national level, and equally as importantly, at the sub-national level.

99. The proposed investment projects in the SPCR will showcase practical and replicable examples of how development projects and programmes can be enhanced by building in climate adaptation and resilience building activities and components. The direct beneficiaries would be the communities within the project areas. Economic, social and environmental benefits will be the foundation for this investment which will provide incentives for scaling up and lay the groundwork for other areas, so that more communities can benefit from these investments.

[24] From National Strategic Development Plan (NSDP) Update for the period 2009-2013, paragraph 430.

100. Cost effectiveness of proposed investments can be measured in at least two time frames: i) the immediate near future (1-3 years) and ii) the longer term (5-10 years). The first measurement will be for communities that have benefited from the implementation of the proposed investment programme. The second measure is able to measure real cost effectiveness by measuring the level of sustained action and the longer-term impacts of the initiatives.[25] The immediate cost effectiveness can be measured in terms of the numbers of vulnerable men, women and children to benefit from the total impacts of the interventions over the next three to five years.

101. An ADB study for four countries in Southeast Asia (Indonesia, Philippines, Thailand, and Viet Nam) suggests that the cost of climate change could be as high as 6.7% of GDP by 2100.[26] No figure is available for Cambodia, but the ADB work should be viewed as indicating that the cost of climate change for Cambodia without adaptation could be significant. There is a shared and global concern that the overall costs of adaptation measures such as infrastructure protection will be beyond the financial means of any nation, including Cambodia. In addition to the increased cost of construction for climate resilient infrastructure, the increased cost of insurance may be an important factor to take into consideration, especially in view of the fact that property insurance is extremely sensitive to the effects of catastrophic events such as climate change associated events such as cyclones and floods. Design and implementation of climate resilient infrastructure, as contemplated in the SPCR, would require significantly higher investments, given the higher incremental costs of climate resilient design and implementation. Obviously, the magnitude of resources required is beyond the means of a country like Cambodia, and therefore a significant portion of such resources must be in the form of grants, whereas any shortfalls would be met through concessional credit.

102. The SPCR is designed to support the three pillars of sustainability: society, environment and the economy. Implementation of the SPCR projects will increase jobs, and develop methods and technologies to improve performance and productivity. There is much to be learned, and lessons to be captured. The projects will contribute to natural resources conservation (enhanced water conservation and use), will not pollute, will provide women with improved opportunity for addressing their needs, and focus on the most needy, especially those in vulnerable rural areas.

103. Probably the biggest contributing factor in measuring or gauging the sustainability of the proposed investments, lies in the practical impacts of the over-arching focus on communities. This would include then, the delivery of awareness building, knowledge and skills to improve adaptation capacity of farmers, especially women, all the way up to sub-national authorities and the national government decision-makers.

104. In the planning and design process for the SPCR, it was evident that within the many and varied activities designed for Phase 1, there would be significant benefit gained from continuing some of these actions further into the implementation of Phase 2. Therefore, in each of the investment projects, specific connection to the activities in Phase 1 has been clearly stated as these activities would be continued during Phase 2 implementation and would provide the needed support for the design and implementation of proposed investments.

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[25] It is recommended that the CIF consider establishing such a medium-to-long term M+E Strategy to collect baseline information that can be the beginning of a larger PPCR impact evaluation in 3, 5 and ten years from now.

[26] ADB, 2009: A Review of the Economics of Climate Change in SE Asia, Manila, Philippines

PART II: PROPOSED INVESTMENT PROGRAM COMPONENTS FOR PPCR FINANCE

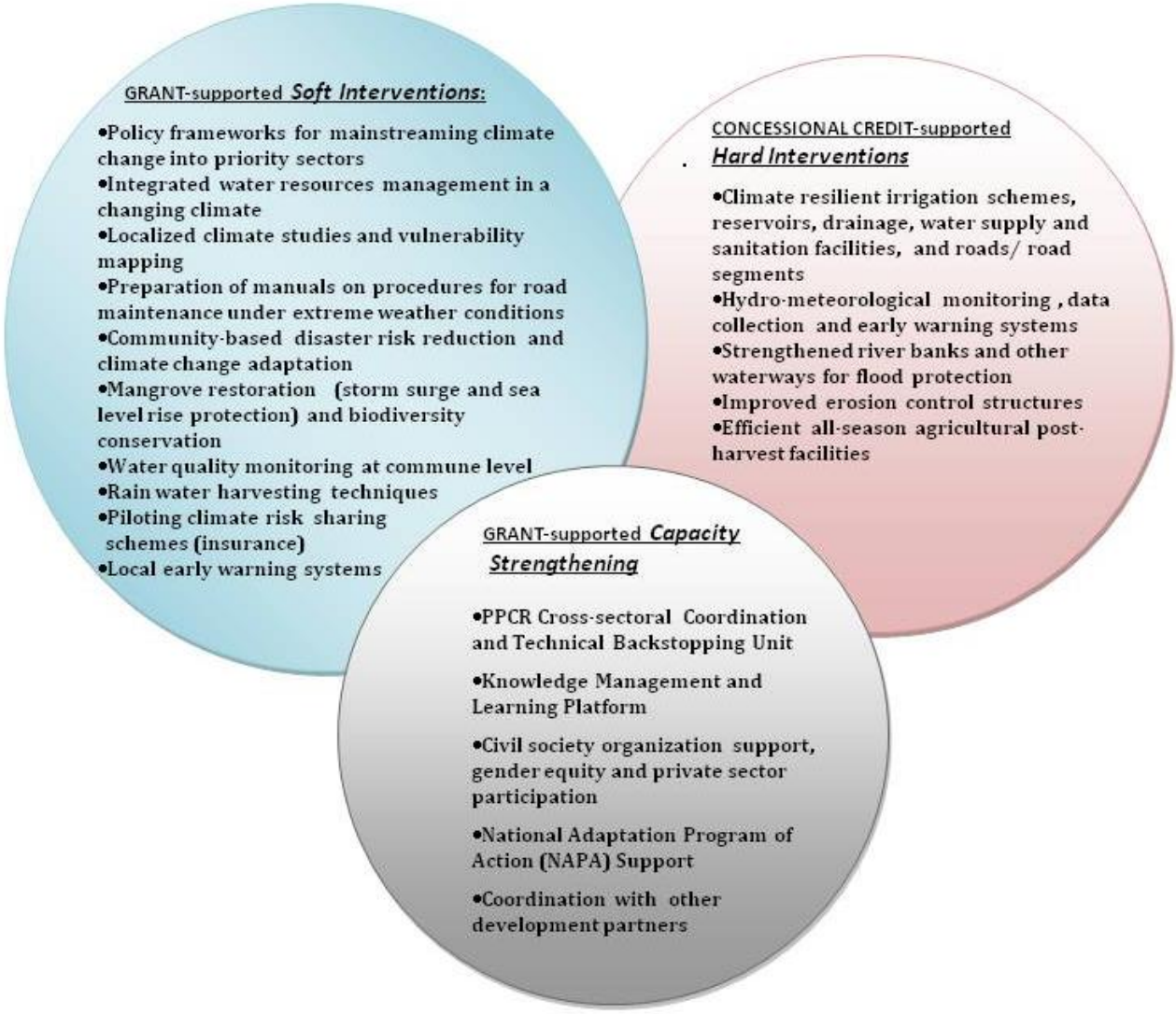
1. Overview

105. As noted in Part 1, Cambodia faces enormous challenges in terms of climate risks that threaten its sustainable development. Integrating climate change adaptation concerns into various aspects of development (by mainstreaming them into strategies for growth and poverty reduction) and defining a common agenda for action is the primary goal of the PPCR. However, achievement of this goal is beset with challenges and constraints, which range from inadequate awareness of climate change and its impacts or simply an indifference, limited institutional capacities, lack of access to reliable climate change relevant information and knowledge products or existence of information gaps, lack of experience in dealing with new and emerging challenges, and above all, financial constraints.

106. In many developing countries including Cambodia, knowledge gaps are a key impediment to integrating climate risks into development initiatives such as agriculture and water resources management or major high-value infrastructure investments. In this context, information on the likely impacts of climate change at the country, sector, and local levels for a set of climate change scenarios is necessary. It is also useful to know how will adaptation unfold at the grassroots level, and how can the process be supported by national policies. Social impacts need to be explored by understanding how the rural and urban poor will be affected by climate change, how migration within and across borders will take place, and to what extent climate change will exacerbate conflicts. While significant efforts in this context are underway under various national climate change relevant programs, as well as with the assistance of multilateral development banks and other development partners, it is still a long way to achieving the kind of information, knowledge products, institutional capacities, and the level of awareness, and above all else, the required funding to meet the challenge.

107. The PPCR is a holistic program to illustrate ways in which climate risk and resilience may be integrated into the country's core development planning and implementation. It follows a non-conventional approach to development by designing climate-resilient development programs and projects, taking due account of sector-specific climate change scenarios in a given location, while at the same time recognizing the weaknesses and constraints in ensuring effective implementation. The SPCR for Cambodia has adopted a similar approach conforming to principles and processes of the PPCR. In this context, at the outset, an assessment has been made of the vulnerabilities of priority sectors to climate change, especially water resources, agriculture and infrastructure, recognizing data limitations. The process is followed by analyzing various ongoing and programmed investment activities in these priority sectors, and a determination is made, in consultation with stakeholders, likely options for priority investments. Following a further scrutiny and discussions with stakeholders including the development partners, a refined list of investment options is developed, making sure that these are integrated either with an ongoing or a programmed investment activity supported by an MDB, and endorsed by other development partners. The process also involves identification of stand-alone technical assistance for capacity building, technical backstopping, and associated activities. The SPCR for Cambodia thus consist of three groups of initiatives (soft and hard interventions and capacity strengthening) that will converge into scaled-up and transformational actions to move the country forward amidst growing threat of climate change (Figure 6).

Figure 6: PPCR in Cambodia: A Programmatic and Transformational Approach



2. Outline of Investments

108. The proposed SPCR investment package consists of a grant funding of $50 million, and concessional credit of $55 million. The proposed PPCR investments for the water resources sector amount to $33 million, for agriculture and food security: $23 million, and for infrastructure development, $42 million. Additional grant funding to support a cluster technical assistance (Cluster TA) for strengthening capacity to mainstream climate resilience into development planning amounts to $7 million. The proposed allocations for individual projects, including associated project preparation costs, are given below in Table 2. Brief descriptions of SPCR interventions are given below:

Table 2: Project and Program Concepts under the SPCR							
Project/Program Concept Title	**MDB**	**Requested PPCR Amount (Million US $)[27]**			**Expected co-financing (Million US $)**	**Preparation grant request (Million US $)**	**Total PPCR request (Million US $)**
		TOTAL	**Grant**	**Loan**			
Investment Component I: Promoting Climate-Resilience of Water Resources and Related Infrastructure (US$ 33 Million)							
Project 1: Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin[28]	ADB	19.00	7.00	12.00	63.00	0.60	19.00
Project 2: Enhancement of Flood and Drought Management in Pursat and Kratie Provinces [29]	ADB	14.00	6.00	8.00	35.00 (80.00 total for GMS)	0.60	14.00
Investment Component II: Enhancing Climate-Resilient Agriculture and Food Security (US$ 23 Million)							
Project 1: Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces[30]	ADB	8.00	8.00	0.00	20.40 (76.77 total for GMS)	0.60	8.00
Project 2: Climate proofing of agricultural infrastructure and business-focused adaptation[31]	ADB	15.00	5.00	10.00	60.00	0.60	15.00

[27] Includes preparation grant and project/program amount.
[28] As part of ADB-funded Water Resources Management Sector Development Program - Proposed for Tranche 1 Funding
[29] As part of ADB-funded GMS Flood and Drought Management Project - Proposed for Tranche 1 Funding
[30] As part of ADB-funded GMS Biodiversity Conservation Corridors Project - Proposed for Tranche 1 PPCR Funding
[31] As part of the ADB-funded Agricultural Commercialization and Resource Conservation Sector Development Program - Proposed for Tranche 2 Funding

Investment Component III: Improving Climate-Resilient Infrastructure (US$ 42 Million)							
Project 1: Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces[32]	ADB	17.00	7.00	10.00	61.00	0.00	17.00
Project 2: Climate Proofing Infrastructure in the Southern Economic Corridor (SEC) towns[33]	ADB	15.00	5.00	10.00	20.00 (290.20 total for GMS)	0.60	15.00
Project 3: Flood-resilient Infrastructure Development in Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Cham[34]	ADB	10.00	5.00	5.00	40.00	0.60	10.00
Investment Component IV: Cluster Technical Assistance (US$ 7 Million)							
Mainstreaming climate resilience into development planning of key vulnerable sectors	ADB	7.00	7.00	0.00	0.00	0.20	7.00
Subtotal Grant Funding			**50.00**				
Subtotal Concessional Financing				**55.00**			
Total		**105.00**			**299.40 (670.77** total for the GMS)	**3.80**	**105.00**

[32] As part of the ADB-funded Provincial Roads Improvement Project (PRIP) - Proposed for Tranche 1 Funding
[33] As part of the ADB –funded GMS Corridor Towns Development Project) - Proposed for Tranche 1 Funding
[34] As part of the ADB-funded Sustainable Urban Development in the Tonle Sap Basin Project - Proposed for Tranche 2 Funding

a. Component 1: Promoting Climate-Resilient Water Resources and Related Infrastructure

109. The proposed $33 million investment in the water resources sector will be implemented as two components (Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin, and Enhancement of Flood and Drought Management in Pursat and Kratie Provinces) to support both soft and hard interventions. Soft interventions include capacity building of relevant agencies, institutions, and entities to integrate climate resilience into water resources planning and management agenda; agricultural support services through preparedness to climate extreme events; enhancement of skills and livelihood opportunities for farmers and women; increased capacity of relevant local government agencies on flood and drought forecasting and early warning; and capacity building for community-based disaster risk reduction and climate change adaptation. Hard interventions include rehabilitation of irrigation structures; installation of hydro-meteorological monitoring facilities; retrofitting reservoirs; and construction and upgrading of flood protection systems and early warning systems.

110. The Ministry of Water Resources and Meteorology (MOWRAM) will be the Project's Executing Agency. The Ministry of Agriculture, Forestry and Fisheries (MAFF), the Ministry of Environment (MOE), and the National Committee for Disaster Management (NCDM) are expected to be the main collaborating agencies. Since the Project will be implemented only in selected provinces, key government stakeholders at the provincial, district, and commune levels will be closely involved. Other important stakeholders will be NGOs and CSOs, water user associations and local communities. CSOs are expected to play an important role, especially in mobilizing and assisting communities in implementation.

b. Component 2: Enhancing Climate-Resilient Agriculture and Food Security

111. The proposed $23 million investment in the agriculture and natural resources sector will also be implemented as two components (Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces, and Climate proofing of agricultural infrastructure and business-focused adaptation) to support both soft and hard interventions. Among the activities to be funded by grant element include: (i) development of small-scale flood protection structures against sea level rise, wind generated waves, and storm surge; (ii) rainfall harvesting, increased water supply and use efficiency and improved water storage; (iii) mangrove and non-mangrove species restoration as a means to protect communities from wind force, flooding due to sea level rise and storm surge and at the same time enhanced ecosystem and biodiversity maintenance; and (iv) introduction of climate-adaptive rice varieties. This proposed investment would also be used to enhance the uptake of water saving technologies; options to increase the demand-side water use efficiency; and piloting of crop insurance scheme. Construction and/or rehabilitation of agricultural post-harvest facilities to cope with both current and future impacts of climate change may be considered for concessional credit support.

112. The Ministry of Environment (MOE) and Ministry of Agriculture, Forestry and Fisheries (MAFF) will be the Executing Agencies of the two components of the project respectively. The Ministry of Water Resources and Meteorology (MOWRAM), Ministry of Rural Development (MRD), Ministry of Public Works and Transport (MPWT) and the Ministry of Women Affairs (MWA) are expected to be the main collaborating agencies. Since the Project will be implemented only in selected provinces, key government stakeholders at the provincial, district, and commune levels will be closely involved. Other important stakeholders will be NGOs and CSOs, water user associations and local communities. CSOs are expected to play an important role, especially in mobilizing and assisting communities in implementation. The private sector will be closely involved in piloting crop insurance and deployment of water saving technologies.

c. Component 3: Improving Climate-Resilient Infrastructure

113. The proposed $42 million investment in the infrastructure sector will be implemented as three components (Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces; Climate Proofing Infrastructure in the Southern Economic Corridor (SEC) towns; and Flood-resilient Infrastructure Development in Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Cham) to support both soft and hard interventions. Soft interventions to be supported primarily by grant funding include: capacity strengthening of relevant national and sub-national government agencies to provide safe, cost-effective and climate risk resilient infrastructure; generation of knowledge/ information based on scientific inputs, for policy and decision making; and raising awareness of vulnerable communities to environmental concerns in general and climate change in particular. Such climate change risk information will also be incorporated in manuals on operation for road maintenance along with guidance on ways to cope with impacts of extreme climate events. Hard interventions to be primarily supported by concessional credit include efforts to increase climate resilience of provincial and rural roads; drainage systems; improved riverbanks flood protection facilities, and water and sanitation facilities under a concessional credit scheme.

114. The Ministry of Public Works and Transport (MPWT) will be the Executing Agency for all three projects under this component. The Ministry of Rural Development (MRD), Ministry of Water Resources and Meteorology (MOWRAM), National Committee for Disaster Management (NCDM) and the Ministry of Women Affairs (MWA) are expected to be the main collaborating agencies. Since the Project will be implemented only in selected provinces, key government stakeholders at the provincial, district, and commune levels will be closely involved. Other important stakeholders will be NGOs and CSOs, water user associations and local communities. CSOs are expected to play an important role, especially in mobilizing and assisting communities in implementation. The private sector will be involved in deployment of water saving technologies in urban and peri-urban areas.

d. Component 4: Cluster Technical Assistance – Coordination and Support for Mainstreaming Climate Resilience into Development Planning

115. The proposed $7 million grant as cluster technical assistance will be used to enhance the overall coordination of the entire SPCR at the national level and to provide means for more effective involvement of civil society. A PPCR Coordination and Technical Backstopping Unit will be established at the Ministry of Environment (MOE), with administrative oversight to be provided by the Ministry of Economy and Finance (MEF). Other activities to be supported by cluster technical assistance include (i) the development of a knowledge management and learning platform (in close collaboration with the EU-UNDP-SIDA-DANIDA funded Cambodia Climate Change Alliance), (ii) a support mechanism for civil society to promote mainstreaming climate resilience especially at commune and provincial levels, and to enhance gender equity and private sector participation, and (iii) a NAPA support mechanism to further explore possibilities to support other priority concerns on adaptation in areas not covered by investment projects in the country.

3. SPCR Results Management

116. Consistent with the PPCR Results Framework, the overall performance of the SPCR will be monitored through the indicators given in Table 3. Progress in various indicators will be monitored at the program, component and project levels. The effectiveness of adaptation interventions will

also be monitored at the provincial and other sub-national levels such as commune level in all investment projects. Appropriate mechanisms for monitoring and evaluation at sub-national levels will be further determined during the project preparation stage.

Table 3: Cambodia PPCR Results Framework

Cambodia PPCR Results Framework				
Scope and Time Frame	**Outcomes and Impacts**		**Performance Indicators**	**Performance Targets**
GLOBAL - PPCR FINAL OUTCOME (10 – 15 YEARS)	Improvements in the lives of people who live in the areas most affected by climate variability and change		▪ Global MDG Indicators ▪ Lives lost/injuries sustained from extreme climate events (as % of population) ▪ People affected annually by extreme climate events (as % of population) ▪ Damage/Economic losses due to extreme climate events (as % of GDP)	▪ Global MDG progress unaffected by weather and climate ▪ Clear downward trend in all three percentages
CAMBODIA – PPCR TRANSFORMATIONAL IMPACT (10 – 15 YEARS)	Lives and livelihoods are climate resilient (especially for those currently most vulnerable)	Transformative social and economic development, with increased resilience to climate change, including extremes and variability	▪ Reduction in land degradation (e.g. soil conservation programs, reforestation) ▪ Number of people in poverty in the most affected areas (as % of population) ▪ Existence of insurance or other risk management mechanisms ▪ Allocations for climate change adaptation in national and sub-national budgets	▪ Clear downward trend in first two indicators
CAMBODIA – PPCR CATALYTIC REPLICATION OUTCOMES (10 – 15 YEARS)	• Further up scaling of efforts in other parts of the country, improved knowledge and practices in climate risk management, based on good practices and lessons learned. • Knowledge transfer nationally and throughout the Greater Mekong Subregion through regional organizations, annual meetings, shared databases and electronic documentation, and other mechanisms.	• Enhanced climate resilience (and investment) in social, economic and environment sectors. A comprehensive programmatic approach is the basis to enhancing climate resilience. • Mechanisms established for engaging civil society and the private sector in comprehensive climate resilient development.	▪ Policies implemented (such as Rectangular Strategy and National Sustainable Development Policy) which include climate risks and resilience including use of scientific information, gender sensitive V&A assessments, etc. ▪ Change in awareness regarding climate change adaptation ▪ Processes in place for the effective engagement of civil society ▪ Value of programme-based adaptation investment projects (as % of total investment in adaptation) ▪ Value of investments in each targeted sector that include management of climate risks (as % of total investment for each sector)	▪ Surveys show changes in the indicators ▪ Clear upward trends in both percentages

Cambodia PPCR Results Framework				
Scope and Time Frame	**Outcomes and Impacts**		**Performance Indicators**	**Performance Targets**
CAMBODIA – PPCR PROJECTS/PROGRAMMES OUTCOMES (2 – 7 YEARS)	• Climate resilience is incorporated into development plans and investment programs at various levels, taking into account gender equity, and participation of private sector and civil society • Increased use of climate-related information (e.g., risk maps, vulnerability maps, climate change scenarios) within the sectors and by vulnerable groups • Increased preparedness of the most vulnerable communities to flood and drought risks • Reduced water and soil salinity and thereby improvements in agricultural and fisheries production, and biodiversity	• Improved capacity of government ministries and institutions at national to commune level to manage and coordinate investments and knowledge on climate resilient initiatives • Enhanced climate resilient infrastructure development and investments (such as water and sanitation, irrigation, roads, post-harvest facilities, etc.) • Proactive involvement of women, civil society organizations and the private sector in decisions that affect climate resilience at local, provincial and national levels	▪ Number of development plans that include climate-sensitive investment initiatives that are based on reliable National and Regional climate information and climate risk management approaches (as % of total number of investment initiatives) ▪ Number of communes and Provincial Authorities with access to current vulnerability and risk maps (as % of total number of communes and Provinces) ▪ Number of women involved in adaptation deliberations (training, decision-making, awareness building etc.) at various levels of government and community (as a % of total) ▪ Number of CSO and private sector organizations involved in adaptation activities in collaboration with implementing agencies and MDBs (percentage increase in total over baseline at project commencement)	▪ Clear upward trend in the percentage ▪ Significant upward swing in percentages. ▪ Number of newly established partnerships.
CAMBODIA – PPCR PROJECTS/ PROGRAMMES ACTIVITIES (1 – 7 YEARS)	**PROMOTING CLIMATE-RESILIENCE OF WATER RESOURCES AND RELATED INFRASTRUCTURE**	• Enhanced provincial and district administrative capacity in climate resilience in the water sector • Scaled up investments and resilience of irrigation infrastructure to climate change • Improved irrigated agriculture and	▪ Number of water resource management plans at provincial and district level ▪ Total investments in improved water and irrigation infrastructure ▪ Measured change in actual levels of food security ▪ Employment figures ▪ Reduced losses from hazard impacts ▪ Overall impacts of droughts and floods decreased (measure by lost work days, land area degraded, injury and loss of life) ▪ Number of multi-country flood or drought cooperative/collaborative initiatives.	▪ Measured increases in all indicators ▪ Decreased losses from hazard impacts ▪ Successful sub-regional collaboration.

Cambodia PPCR Results Framework				
Scope and Time Frame	**Outcomes and Impacts**		**Performance Indicators**	**Performance Targets**
		enhanced food security of rural communities • Improved technical skills, livelihood options, and adaptive capacity for water user associations and farmers • Reduced economic and human losses from floods and droughts • Enhanced capacity of communities to manage flood and/or drought events • Improved sub-regional cooperation for flood and drought management	• Number of households in project area with income lower than the poverty line reduced • Number of households in the project area with insufficient rice production for year-round consumption reduced • Average incomes in project area derived from agriculture increased • Number of provinces and districts whose administrative capacity in climate risk management and resilience strengthened • Number of people with secured and sustained access to irrigation increased • Flood protection for xxx people and yyy ha of agriculture lands improved • Number of farmers/women adopting new techniques better adapted to changing climate	
CAMBODIA – PPCR PROJECTS /PROGRAMMES ACTIVITIES (1 – 7 YEARS)	**ENHANCING CLIMATE-RESILIENT AGRICULTURE AND FOOD SECURITY**	• Increased resilience and reduced poverty in the rural, climate-hazard prone areas • Enhanced protection of coastal areas from storm surge/sea level rise/saltwater intrusion • Improved resilience of agro-biodiversity • Enhanced and continued water supply during dry season and drought periods • Improved coping mechanisms of small farmers	▪ Number of kilometres of coastal protection increased ▪ Number of hectares of mangrove area restored to protect against tidal surges and strong winds ▪ Number of farm households adopting adaptive water management technologies and practices increased ▪ Number of new irrigation technologies adopted ▪ Percentage access to irrigable water sources increased and salt water intrusion decreased ▪ Number of farmers/women adopting stress tolerant and adaptive varieties increased ▪ Total area of cropped land under adaptive varieties increased ▪ Area of farms equipped with water saving technologies increased ▪ Area of crop farms equipped with all-weather post harvesting	▪ Quantitative increase in all indicators ▪ Improved crop yields and decreased vulnerability of agricultural livelihoods ▪ Improved food security

Cambodia PPCR Results Framework				
Scope and Time Frame	**Outcomes and Impacts**		**Performance Indicators**	**Performance Targets**
		against climate change impacts • Enhanced demand side water efficiency • Improved design, construction/rehabilitation and maintenance of post harvesting facilities to withstand climate risks • Improved institutional structures to respond to climate change (e.g. weather-based insurance) • New and additional resources for resilience in the agriculture and related infrastructure, and in coastal areas	facilities increased ▪ Access to credit to transform farm practices increased ▪ Insurance mechanism against climate risk successfully piloted and ready to be adopted at a larger scale	
CAMBODIA – PPCR PROJECTS /PROGRAMMES ACTIVITIES (1 – 7 YEARS)	**IMPROVING CLIMATE-RESILIENT INFRASTRUCTURE**	• Improved planning for national, provincial and rural road infrastructure development to cope with climate change impacts • Increased capacity to withstand climate change impacts in project-specific priority infrastructure • Ecosystem-based adaptation strategies adopted focusing on environmental/green planning for	• Continuity of services provided by roads and water & sanitation infrastructure ensured • Coverage under local early warning systems and pilot program for emergency management for provincial roads increased • Number and value of climate-resilient investments in infrastructure increased • Access to markets and other social services for communities improved • Livability of urban and peri-urban areas, and public health improved- incidence of environment related diseases reduced • Percentage of women with new economic opportunities increased by climate resilience activities (direct and indirect)	▪ Measurable improvements in indicator real numbers ▪ Adverse affects of flooding on fewer people in rural areas ▪ Improved sanitation and access to water

Cambodia PPCR Results Framework				
Scope and Time Frame	**Outcomes and Impacts**		**Performance Indicators**	**Performance Targets**
		project roads to improve flood and drought management • Improved emergency management planning for national and provincial roads • Climate resilient improvements in provincial roads and urban environmental infrastructure • Institutional capacities on technical and financial management of climate risks strengthened • New and additional resources for climate resilience in priority infrastructure (e.g. roads, water supply and sanitation)	• Number of population served by improved solid waste management and safe water supply during periods of extreme climate events increased • Incidence of seasonal flooding reduced • Number of households with year-round supply of potable water and sanitation services increased	
CAMBODIA – PPCR PROJECTS /PROGRAMMES ACTIVITIES (1 – 7 YEARS)	**STRENGTHENING CAPACITY TO MAINSTREAM CLIMATE RESILIENCE INTO DEVELOPMENT PLANNING**	• Improved integration of resilience into national development strategies, plans and policies • Strengthened information base for decision making among government agencies • Improved resilience and livelihoods, especially for vulnerable groups including women	• Degree to which development plans integrate resilience into planning increased • Extent to which decision making is based on Cambodia-specific climate risks and vulnerability • Number of line ministries updating country strategies for resilience increased • Budget allocations to address climate vulnerability at commune level increased • Evidence of a working mechanism to coordinate investments and knowledge on climate resilience • Coverage of climate risk analysis and vulnerability assessments increased through studies on high priority but un-funded NAPA	▪ Successful comprehensive climate change adaptation mainstreamed into Government policy and planning ▪ Climate change common knowledge in rural and urban areas ▪ Sustained climate resilience in Cambodia

Cambodia PPCR Results Framework				
Scope and Time Frame	**Outcomes and Impacts**		**Performance Indicators**	**Performance Targets**
		• Increased awareness of climate change among civil society and private sector • Enhanced integration of learning/knowledge into climate-resilient development in Cambodia • Increased involvement of vulnerable rural communities, civil society organizations and the private sector in adaptation efforts • Replication of PPCR learning throughout Cambodia, GMS and Southeast Asia	projects with replicability potential • Quality of participatory planning process as assessed by vulnerable communities • Relevance and quality of knowledge assets on climate resilience in Cambodia increased ▪ Extension of climate resilience principles beyond three priority sectors within Cambodia, and to non-PPCR countries in GMS and Southeast Asia	▪ Vulnerability to climate change reduced ▪ Regional collaboration a regular occurrence

4. Risks

117. The overall risk to the PPCR in Cambodia is of medium scale. Details of risks and measures to address these risks are given in the Table 4.

Table 4: Country-wide analysis of risks and countermeasures

Risk	Measures to address risks	Risk Rating
Inadequate policy and institutional framework to support adaptation mainstreaming into key development processes	Phase 1 is expected to strengthen the framework for mainstreaming climate resilience, additionally, a cluster TA is to be implemented which would help strengthen the policy and institutional framework and supplement capacity improvements programmed under individual projects.	M

Weak administrative capacity in the Climate Change Department (CCD) of MOE for overall management and coordination of the program	The CCD is being strengthened through the CCCA and this support will be further augmented by the capacity building efforts under the PPCR Phase 1, which will be continued through the TA project to be implemented in Phase 2, enabling the CCD to play the important role of coordinating the program in the long term, as well as taking responsibility for M&E and Knowledge Management.	M
Limited technical capacity in relevant line agencies, including at sub-national level, for understanding and managing climate risks.	Each investment project includes sub-components for building technical capacity on climate risk management in the relevant sector organizations.	M
Lack of or limited ownership of the expected results at the departmental and local government levels, given the large number of involved agencies and broad scope of planned interventions.	Line ministries have been involved in identification of the investment program and a participatory approach also involving sub-national actors will continue. Moreover, through the awareness raising efforts described previously a deeper level of understanding about climate change impacts should encourage greater interest and involvement of all stakeholders.	M
Given the number of activities, major efforts will be required to ensure that lessons and good practices arising from each project are disseminated to the others.	A knowledge management component aimed at capturing and disseminating lessons has been included in the TA project and these activities will also be programmed into each investment project.	M
Limited awareness of climate change adaptation issues among some key stakeholders, especially at community level, which could delay the uptake of project interventions	The knowledge management activities mentioned above will address the deficit in awareness about climate change adaptation.	M
Overlap with similar activities being supported by other development partners, which could result in duplication of efforts on the ground.	Specific arrangements have been put in place for coordination with similar activities such as the CCA.	M
Overall risk rating		M

5. Support for related NAPA priority projects

118. Initial examination of the list of NAPA projects showed that there are potential for synergies with the SPCR investments (Table 5). Further feasibility studies could lead to merging of some proposed activities in the NAPA projects into the PPCR investment activities, or leverage new funds (e.g., LDC Fund, Adaptation Fund and Green Climate Fund) for other NAPA project locations different from those of SPCR.

Table 5: List of NAPA Projects with Close Links to Investments in PPCR Phase 2

NAPA Projects	Proposed PPCR Phase 2 Investments
Development and Improvement of Community Irrigation Systems	Investment Component 1 – Projects 1 and 2
Strengthening of Community Disaster Preparedness and Response Capacity	Investment Component 1 – Projects 1 and 2, Investment Component 3 – Project 1, and Component 4 – Cluster Technical Assistance
Establishment and Improvement of Farmer Water User Communities	Investment Component 1 – Project 1
Enhancement of the National Weather Forecast Centre (Department of Meteorology)	Investment Component 1 – Projects 1 and 2
Community and Household Water Supply in Coastal Provinces	Investment Component 2 – Project 1
Development and Rehabilitation of Flood Protection Dikes	Investment Component 2 – Project 1 and Investment Component 3 – Projects 2 and 3
Water Supply for Rural Communities	Investment Component 1 – Project 1, and Investment Component 3 – Project 2
Development and Improvement of Small-Scale Aquaculture Ponds	Investment Component 2 – Project 1
Community Mangrove Restoration and Sustainable Use of Natural Resources	Investment Component 2 – Project 1
Community Based Agricultural Soil Conservation in Srae Ambel District, Koh Kong Province	Investment Component 2 – Project 1

119. The detailed description of three investment components and their projects, and cluster technical assistance is given below. However, the exact scope of each project, amount of financing needed and additional adjustments to implementation arrangements will be made during detailed preparation of each project.

INVESTMENT COMPONENT I: Promoting Climate-Resilient Water Resources and Related Infrastructure

Introduction

120. Cambodia's economy is highly dependent on water resources. The importance of water resources for food production, rural livelihoods and economic development is recognized in Cambodia's "Rectangular Strategy for Growth, Employment, Equity and Efficiency" adopted in July 2004, and in the "National Strategic Development Plan 2006-2010 (NSDP)" adopted in May 2006. The Rectangular Strategy and the NSDP stress the need to improve agricultural productivity through the expansion of irrigation and the management of water resources to reduce vulnerability to natural disasters. The NSDP also acknowledged that there exists a high-level recognition of climate change as a threat. Rainfall distribution and river discharges are highly seasonal, variable and unpredictable, with a natural pattern of wet and dry seasons, typhoons, floods and droughts. Coupled with this, the annual rise and fall of the Mekong River[35] has both positive and negative effects—sustaining the critical water cycles of the Tonle Sap Lake and Lower Mekong delta necessary for agriculture and fisheries production, but with the potential to cause major flooding and damage to infrastructure and crops, and loss of life.

121. It is anticipated that climate change will increase the challenges to water resources management; less rainfall is anticipated during the dry season and more during the wet season, with more frequent extreme weather events and potentially worse seasonal water shortages and floods. The national strategy for water resources development by the Ministry of Water Resources and Meteorology (MOWRAM) recognizes these threats. The proposed investment component comprises two projects: (i) Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin (integrated with the ADB funded Water Resources Management Sector Development Program); and, (ii) Enhancement of Flood and Drought Management in Pursat and Kratie Provinces (integrated with the ADB-funded GMS Flood and Drought Management Project).

Project 1: Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin[36]

Background

122. The proposed additional financing from PPCR is expected to facilitate the mainstreaming of climate change adaptation concerns in water resources development and planning both at policy and operational levels. At the operational level, rehabilitation of small- and medium-scale irrigation schemes will be a key issue to be addressed under the project portion of ADB's Water Resources Management Sector Development Program (WRMSDP) in Cambodia.

123. WRMSDP is a sector development program[37] which comprises (i) a program to address national water resources management and irrigation policy issues in Cambodia; (ii) a project to assist the MOWRAM to rehabilitate small- to medium-scale irrigation systems and deliver irrigation services within the Tonle Sap basin;[38] and (iii) supporting capacity development technical assistance (CDTA).

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[35] About 86% of Cambodia lies within the Mekong basin, about 20% of which is in Cambodia.

[36] Proposed for Tranche 1 PPCR Funding

[37] ADB. 2009. Program Lending. *Operations Manual* OM D4. Manila.

[38] The scope of the project component envisages the rehabilitation of about 15,000 ha of small- and medium-scale irrigation schemes out of 27 schemes (27,489 hectares) identified in three provinces to support Cambodia to meet its

124. The program component[39] will consolidate institutional frameworks of mainstreaming climate change in the water sector in general and integrated water resources management (IWRM) in particular. The sector development program, which was approved on 23 September 2010, has three key outputs: enhanced capacity for sustainable water resources management at national and provincial levels; enhanced capacity of MOWRAM to manage and deliver irrigation services; and sustainable rehabilitation of small- and medium-scale irrigation schemes in the Tonle Sap basin. The first two outputs are related to the program, the third is related to the project which will be supplemented by PPCR resources. Enabling environment for building resilience and adaptation to climate changes, which includes strengthened institutional frameworks and capacity in IWRM and climate change adaptation, will be established by the program portion of WRMSDP.

125. Reliable water supply from irrigation systems can widen the possibility to adapt farming practices to changing climate conditions in Cambodia. Irrigated agriculture, if designed and managed properly, enables farming practices and cropping patterns adaptable and resilient to droughts while stable wet season rice cropping through supplemental irrigation is a prerequisite for rural food security and poverty reduction. Furthermore, if these systems would have inter-season storage capacities, they could provide vital opportunities for climate change adaptation by reducing the adverse impacts of flood and significantly increasing the available amount of water in dry seasons. However, these potentials have not yet been harnessed due to poor condition of irrigation system and management. Deteriorated irrigation systems together with poor O&M and lack of access to proper agricultural support services result in low agricultural productivity and climate vulnerability, thereby increasing food insecurity and climate risks in the project area. Expansion of actual irrigated areas in dry seasons as well as average yield of rice in wet seasons can be an indicator for adaptation. The proposed funds from PPCR will be used to upgrade the investments under the project so that climate change adaptation measures are embedded in rehabilitation works and the operation and maintenance (O&M) on the ground.

126. WRMSDP will also address the needs of: (i) a clearer demarcation of the roles and responsibilities of MOWRAM,[40] the provincial departments of water resources management and meteorology (PDWRAMs), and farmer water user committees (FWUCs); (ii) their links with the provincial departments of the Ministry of Agriculture, Forestry and Fisheries (MAFF); (iii) engineering and project management human resource capacity and competences for irrigation and drainage O&M; (iv) improvements in administration, financial and business processes in line with the government's public financial management reform program; and (v) development of a national asset management system to identify O&M costs, benchmarks and budgets for supporting long-term O&M. The sustainability of irrigation services is highly dependent on the capabilities and responsibilities of farmers.

Development Objectives

127. The objectives of the PPCR-funded investment component are to: (i) rehabilitate irrigation systems and improve management of water resources to cope with impacts of climate change;

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food security, poverty reduction, and economic development targets under the NSDP and to strengthen the delivery of irrigation services.

[39] This program portion is to support the process of (i) strengthening national water sector policy, regulatory and the institutional environment; and (ii) improving integrated water resources management (IWRM) performance in river basins, focusing on the Tonle Sap basin and the Stung Sen sub-basin.

[40] Reflecting ADB's Water Policy, the program has been designed to assist MOWRAM to distinguish between its role of "service provider" and that of "regulator", and develop appropriate institutional mechanisms and capacities.

and, (ii) strengthen irrigation and related infrastructure in Kampong Tom, Banteay Meanchey, and Siem Reap provinces. The PPCR loan and grant, by supporting the project activities of WRMSDP and by focusing on integrating climate risk and resilience in design and implementation, will improve irrigated agriculture in general and food security of rural communities in particular.

Key Indicators and Baseline

128. The current status of the agriculture sector in the project area include: (i) high dependence on rain-fed agriculture with limited actual irrigation coverage; (ii) limited access to good quality inputs and improved farming technologies to cope with climate change impacts; (iii) limited capacity to cope with flood and droughts; and (iv) limited access to markets and financing instruments for crop insurance against climate risks.

129. The proposed PPCR financing will enhance the impact and outcome expected from WRMSDP. The impact will be increased food security in the project area and the outcome will be improved management of water resources and more efficient and sustainable irrigation services in the project area. Climate change adaptation and resilience is an integral ingredient for the improved water resources management and irrigation services.

130. Key performance indicators at the impact, outcome and output levels are as described in the design monitoring framework of WRMSDP. Baseline data collection, monitoring and evaluation will be done as part of the project management under WRMSDP.

Table 6: Key Performance Indicators

Output	**Outcome**	**Impacts**
By 2015: 15, 000 hectares of irrigation schemes fully rehabilitated to cope with impacts of climate change in the provinces of Kampong Thom, Banteay Meanchey, and Siem Reap	Wet season yield increased from 2010 level of 0.8 t/ha to 1.9 t/ha	By 2018 (from 2010 levels) Number of households in project area with income lower than the poverty line reduced by 30%
By 2015: FWUC management committees established and sensitized on climate resilience in all rehabilitated schemes under the project (target: 30% of members to be women)	Dry season yield increased from 2010 level of 1.7 t/ha to 3.6 t/ha	Number of households in the project area with insufficient rice production for year-round consumption reduced by 40%
By 2018: FWUC members and farmers have received vocational training in irrigation water management, climate risk management and system operations (target: 30% of beneficiaries)	Cropping intensity increased from 2010 level of 100% to 160%	Average incomes in project area derived from agriculture increased by 30%

Anticipated Activities

131. The requested funding from PPCR will be invested to (i) strengthen provincial and district administrative capacity in integrating climate resilience considerations in development planning; (ii)

rehabilitate and improve the existing small- and medium-scale irrigation infrastructure in the Tonle Sap basin within the provinces of Kampong Thom, Banteay Meanchey, and Siem Reap; (iii) enhance technical skills, livelihood opportunities and capacity for FWUCs and farmers; and (iv) cover the costs of project management. Planning and design on concrete structures will consider future scenarios of climate change to upgrade standards for operational measures to minimize the adverse impacts of climate change, such as early release of impounded irrigation water before flood, and conservative releases of irrigation water in dry seasons. Dikes for reservoirs would be rehabilitated either to restore the original capacities in some areas or to enhance the capacities in other areas.

132. The PPCR funds will support the development and implementation of climate resilient irrigation infrastructure in about 15,000 hectares.[41] Major activities include:

(i) Installation of hydro-meteorological monitoring systems and irrigation system operation, and data collection and management support;
(ii) Additional local climate study and standardized climate proofing engineering design;
(iii) Strengthening water source structures such as main barrages and reservoir dikes to make them resilient to hydrological events beyond those of the planned return period based on historical databases, subject to the improved design standards; and
(iv) Development of on-farm storage facilities and climate proofing of canal systems where applicable.

133. Topographical, hydro-meteorological and geological data will be collected as the basis for climate proofing design and operation. The funds will also assist agriculture in project area for efficient and effective water use and O&M of irrigation systems for better readiness to climate extreme events. Improved capacity of FWUCs and PDWRAMs on agricultural support services and irrigation management will enhance resilience in changing climate conditions. Some funds would be directed to establish community-based early warning systems, with special attention given to areas of importance for women, indigenous communities and youth.

134. Learning and Knowledge Management Activities: Efforts will be directed to disseminate lessons learned and knowledge gained through implementation of the project, especially in terms of mainstreaming climate resilience in water resources planning and management. Such efforts will be designed to benefit stakeholders nationwide.

Institutional arrangements for Implementation

135. The project including the portion financed by PPCR grant and loan will follow the implementation arrangements of WRMSDP. MOWRAM is the executing agency for the project as part of the program. MOWRAM is responsible for providing irrigation services, including the development of all irrigation infrastructure (large, medium and small), O&M, and support for farmers to manage irrigation schemes.[42] MOWRAM has the capacity to oversee and manage investment projects with external assistance, but needs capacity strengthening and resources at national and provincial levels to improve irrigation operations and strengthen skills related to climate risk and resilience. There is also a need to consider the capacity of the implementing agencies, PDWRAMs for implementing rehabilitation works and in mainstreaming climate risks in

[41] As reflected in the original WRMSDP financing.
[42] MOWRAM's Strategic Development Plan (2009) identifies 2,403 irrigation schemes with a total wet season irrigated area of 773,188 ha, and total dry season area of 347,058 ha; for a total area of 1,120,246 ha.

operations. Additional inputs of consulting services for civil works and FWUC and agricultural support related to climate resilience will be provided under the PPCR financing.

Risks

136. Limited capacity of PDWRAMs to mainstream climate risks is a project implementation related risk and this will be addressed through on-the-job capacity development and technical support by consulting services. The roles and responsibility of FWUCs will also be decided through discussions under the program component of WRMSDP, which will affect the functions of FWUCs in the project. Some technical risks are as follows: (i) climate proofing engineering design may not be decided due to limited data available; (ii) climate-resilient crops and varieties specific to the needs in the project area may not be available; and (iii) on-farm water-saving techniques to cope with droughts may not be available. These risks will be mitigated through close collaboration with research institutes abroad. Further analysis through a project preparatory phase is required to ensure that the enhanced project design is technically feasible and economically viable.

Investment Costs and Co-Financing

137. The PPCR funding will comprise: (i) the grant portion of US $7.00 million (including a project preparatory assistance of $0.6 million), and (ii) concessional credit of $12 million, adding to the approved co-financing of $63 million. A sector-type approach identified for WRMSDP will be followed to finance the project activities. The preparatory assistance funds will bring on board international and national consultants with expertise in hydrology, geology, climate proofing engineering, climate change adaptation, agricultural support, and institutional development support. Preliminary analysis indicated that about 20% of asset value of irrigation systems will be required for enhanced resilience to climate change.

Table 7: Financing Plan

Category	Amount (Million $)
PPCR Grant[b]	7.00
PPCR Concessional Credit	12.00
Co-financing from ADB and others	63.00
Total	**82.00**

[b] *Including preparatory phase grant*

138. The grant portion will finance such activities as (i) preparatory grant (ii) FWUC and PDWRAM training on mainstreaming climate risk and resilience into development planning, (iii) agricultural adaptation support services including support for NWISP and Stunt Chinit project, and (iv) hydro-meteorological and related data collection for better projection of climate change impacts at local level. The concessional credit will support (i) improving hydro-meteorological data management networks; (ii) additional studies for climate change adaptation and resilience to be incorporated into subproject design in different ecological and natural resources environs and engineering capacity development of MOWRAM and PDWRAMs for climate proofing, (iii) additional civil works on reservoir and other irrigation facilities for climate change adaptation, and (iv) project management.

Results and Performance Framework

139. The Table 8 provides only an indicative results and performance framework. A detailed framework will be developed during the project design based on the scoping study and baseline data.

Table 8: Expected Key results (consistent with PPCR Results Framework)

Results	Success Indicators
• Enhanced provincial and district administrative capacity in climate resilience in water sector • Scaled up investments and resilience of irrigation infrastructure to climate change • Improved irrigated agriculture and enhanced food security of rural communities • Improved technical skills, livelihood options, and adaptive capacity for water user associations and farmers • New and additional resources for improving climate resilience in the water resources sector	• Number of households in project area with income lower than the poverty line reduced by 30% • Number of households in the project area with insufficient rice production for year-round consumption reduced by 40% • Average incomes in project area derived from agriculture increased by 30% • Number of provinces and districts whose administrative capacity in climate risk management and resilience strengthened • Number of people with secured and sustained access to irrigation increased • Leverage factor of PPCR funding in the water sector

140. **Enabling environment** for building resilience and adaptation to climate change will be created by the program portion of WRMSDP. The necessary regulatory and legal frameworks to enhance the effectiveness of adaptation interventions will be identified during project design. As stated earlier, the enabling environment includes strengthened institutional frameworks and capacity in IWRM and climate change adaptation. Building on this, the project component will undertake location-specific climate change adaptation through irrigation system rehabilitation, and upgrade O&M and agricultural support services; thus mainstreaming climate change adaptation concerns into local development planning, budgeting and fiscal systems. Therefore, the funding will directly and efficiently contribute to the climate change resilience on the ground.

Project 2: Enhancement of Flood and Drought Management in Pursat and Kratie Provinces[43]

141. The Flood and Drought Management Project**,** an ADB-funded Greater Mekong Sub-region (GMS) regional investment project, includes subprojects in Cambodia, Lao PDR, and Viet Nam. The Project impact will be to reduce economic losses from flood and drought events. The proposed PPCR financing will contribute to strengthening the capacity of RGC and affected communities to reduce the risks associated with climate extremes, namely flood and drought events in two most vulnerable provinces to floods and droughts. The PPCR financing will support additional irrigation and river bank protection infrastructure costs for increased resilience to climate change in two provinces; and will provide additional consulting services and capacity development support to communities to better manage and mitigate risks associated with increasing climate extremes.

142. In Cambodia, 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

[43] Proposed for Tranche 1 PPCR Funding

3 months or longer. Sporadic tributary floods 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 is when water is suddenly released from a dam, typically in anticipation of an incoming flood (dam-release flooding).

143. The outcome of the Project will be improved preparedness to manage and reduce the impacts of flood and drought events. The reduction of risks associated with flood and drought events will enable the communities to benefit substantially from the Project by: (i) avoidance of loss of properties and reduced casualties (deaths, injuries and water-borne diseases during and after floods); (ii) increased agricultural productivity and incomes due to the improved management and availability of water; (iii) improved access to rural roads and canals; and (iv) reduction of economic losses from disruption of business and agricultural activities. The financing for Cambodia is $30 million as ADF loan.

Development Objectives

144. The Project will improve flood and drought risk management in Cambodia by strengthening the capacity of the government and the involved communities in preparing for, responding to, and recovering from the impacts of flood and drought. It will emphasize risk reduction strategies aimed at preventing flood and drought events from becoming disasters for the affected population. It will also build on coping strategies and mechanisms of communities and promote community-based disaster risk reduction and management.

145. The PPCR funding is sought to: (i) to support additional infrastructure costs due to expected increases in extreme flows in the Pursat river resulting from climate change over the life of the developed infrastructure and additional infrastructure required for river bank protection in Kratie town; (ii) to strengthen capacity of water users in the project area and to provide techniques and technologies to assist farming communities adapt to emerging climate change impacts; (iii) to enhance community based flood risk management capacities, including training of first responders in areas expected to become flood prone due to increased severity of rainfall; (iv) to assist MoWRAM to update hydraulic structure design standards for the Mekong Delta, in collaboration with the parallel efforts by the Ministry of Agriculture and Rural Development in Viet Nam; and (v) to strengthen national capacity for flood and drought forecasting and event management.

146. As this is a regional project covering three countries, a key benefit of PPCR investment would be to replicate improved flood and drought management practices across a wider region. Although infrastructure-related interventions will be limited to two provinces, the lessons learned in these two provinces could be valuable for other provinces in Cambodia, as well those in Lao PDR and Viet Nam.

Key Indicators and Baseline

147. The annual flooding of the Mekong River and Tonle Sap Lake is essential for agriculture, but the unpredictability of the flooding can damage infrastructure, agriculture and livelihoods; for example severe floods from 2000-2002 affected 3.4m people and destroyed 7086 houses.[44] Cambodia also suffers from droughts, often in the same year as floods. In both cases the major physical cause of these disasters is the unpredictability of rainfall and dry-spells, both inter-annually and within seasons, and high levels of rural poverty and dependence on agriculture and

[44] Proceedings of the First National Forum on Climate Change, October 2009, Royal Government of Cambodia

fisheries as the basis for livelihoods exacerbates the impact of these events. Community surveys carried out in preparation of the NAPA note that while coping strategies exist for these hazards they are limited in their effectiveness and often reinforce poverty and increase vulnerability to the next hazard.

148. The Table 9 indicates the possible outcomes and impacts for the Enhancement of Flood and Drought Management in Pursat and Kratie Provinces.

Table 9: Outcomes and Impacts

Interventions	Outcome/Indicator	Impacts
Damnak Choeukrom Irrigation Works, Pursat River	• 16,000 ha of irrigation service area improved • Flood protection of Pursat town improved	• Water management infrastructure upgraded Economic and social losses from flood and drought events are reduced
Kratie Protection Works	• 5km of flood protection works improved • Flood protection for XX people and YY ha of properties improved in Kratie town	• Water management infrastructure upgraded • Economic and social losses from flood and drought events are reduced
Agricultural Adaptation strategies	• Xxx Farmers adopt new techniques and technologies better adapted to changing climate conditions	• Communities are better able to manage flood and/or drought events
Community Based Disaster Reduction and Management	• Capacity for community based F&D management developed • Management of climate extremes risks improved	• Communities are better able to manage flood and/or drought events
Improved hydraulic design standards	• MoWRAM and other agencies have improved guidelines for climate resilient design of structures in the Mekong Delta (and elsewhere) and better capacity for cross-border flood management	• Improved regional cooperation for flood and drought management
National flood and drought forecasting	• National flood and drought forecasting improved and linked to regional forecasting center	• Improved regional cooperation for flood and drought management

Source: ADB Staff estimates

149. The project including the portion financed by PPCR grant and credit will follow the implementation arrangements of the financing agreement between the Government of Cambodia and ADB. MOWRAM will be the executing agency for the project. The project utilizes the experience of both MOWRAM and the Pursat PDWRAM, and will also provide technical assistance through: (i) project implementation consultants; (ii) strengthened collaboration with the Mekong River Commission Flood Management and Mitigation Program and the Regional Flood Management and Mitigation Center in Phnom Penh; and increased collaboration with the Southern Water Resources University in Ho Chi Minh City, Viet Nam. Capacity development and increased

inputs by the project implementation consultants will be provided under the PPCR financing. In addition, the necessary regulatory and legal frameworks to enhance the effectiveness of adaptation interventions will be identified during project design.

Sub-Components and Activities

150. The base project will support three outputs: (i) Development and/or upgrading of water management infrastructure; (ii) Enhanced capacity for community based flood and drought management developed; and (iii) Strengthened regional coordination for management of climate extremes. The proposed PPCR Phase 2 financing will enable the ADB-funded Project to support additional investment to make the infrastructure more climate-resilient to reduce the adverse impacts of flood events on communities and agricultural production, thereby enhancing both food and water security in those provinces. The PPCR investment will support the following activities:

(i) The design and construction of irrigation and flood protection scheme in Pursat River to develop about 16,000 ha of irrigation and to improve flood protection to Pursat town downstream;
(ii) Strengthening of the National Flood and Drought forecasting and warning center;
(iii) Consulting services for detailed design and project implementation; and,
(iv) Learning and knowledge management activities related to disaster risk reduction, integrated water resources management, and planning and investment strategies for sustainable water infrastructure

Investment Costs and Co-Financing

151. The PPCR additional funding will comprise: (i) the grant portion of $6 million (including a project preparatory assistance of $0.6 million), and (ii) concessional credit of $8 million, adding to the co-financing of the GMS Flood and Drought Project of $35 million for Cambodia and a total co-financing of $80 million for the GMS sub-region.

Table 10: Financing Plan

Category	Amount[b] (Million $)
PPCR Grant[a] PPCR Concessional Credit	6.00 8.00
Co-financing from ADB and others	35.00
Co-financing for the entire GMS	80.00
Total for Cambodia	**49.00**
Total for GMS region	94.00

[a] *Including preparatory phase grant*
[b] *Source: ADB staff estimates – to be confirmed during fact finding (June 2011)*

Results and Performance Framework

152. Table 11 provides only an indicative results and performance framework. A detailed framework will be developed during the project design based on the scoping study and baseline data.

Table 11: Expected Key results (consistent with PPCR Results Framework)

Results	Success Indicators
• Reduced economic and human losses from floods and droughts • Enhanced capacity of communities to manage flood and/or drought events • Improved sub-regional cooperation for flood and drought management • New and additional resources for improving climate resilience in the water resources sector	• Flood protection for xxx people and yyy ha of agriculture lands improved • Number of farmers/women adopting new techniques better adapted to changing climate • Management of climate extremes improved. • National flood and drought forecasting improved and linked to a regional forecasting center • Leverage factor of PPCR funding in water sector

Linkages to NAPA

153. Both Projects of the investment program on promoting climate resilience of water resources and related infrastructure have strong links to Cambodia's NAPA. Among the 20 high priority projects identified in NAPA, two are covered by this investment proposal on water resources in several provinces (Table 12). The investment proposal has also strong links with a medium priority NAPA project on water user groups. Thus the current project components in the investment proposal for PPCR Phase 2 give the opportunity to start, to continue or to complement the implementation of NAPA projects in selected provinces in Cambodia.

Table 12: High Priority NAPA Projects in Water Resources

Title	Locations
Development and Improvement of Community Irrigation Systems • To provide sufficient water for rice farming; • To reduce the risk of crop failures from water shortage; and • To enhance food security and assist in eliminating poverty among rural people.	Banteay*, Meanchey*, Battambang, Kampong Cham, Kampong Chhnang, Kampong Speu, Kampong Thom,* Kampot, Kandal, Kratie*, Prey Veng, Pursat*, Ratanak Kiri, Siem Reap*, Svay Rieng and Takeo
Strengthening of Community Disaster Preparedness and Response Capacity - To ensure preparedness for and effective response to climate hazards at the community level; and - To reduce climate disaster risks for local communities.	Banteay Meanchey, Kampong Cham, Kampong Speu, Kampot, Kandal, Prey Veng, Svay Rieng and Takeo
Establishment and Improvement of Farmer Water User Communities**	
Enhancement of the National Weather Forecast Centre (Department of Meteorology) **	

*Areas covered by the proposed PPCR Phase 2 Investment Project I

** Medium priority NAPA projects, but partly covered in the investment proposal

Linkages to PPCR Phase 1

154. Opportunities to continue implementation of activities in PPCR Phase 1 to Phase 2 exist, such as in the mainstreaming of climate resilience in key ministries at the national level such as MOWRAM and the local government units at the provincial and community levels; strengthening civil society and private sector engagement and gender considerations in climate change adaptation; and science-based adaptation planning (for example, use of climate change scenarios in planning and budgeting activities in key government agencies, and in the design of infrastructure projects). Lessons learned in Phase I could be used by Phase 2 to carry forward projects by following good practices and lessons learned. Phase 2 could build up on the knowledge products that Phase 1 projects have implemented.

Gender Mainstreaming

155. Gender relations in Cambodia are undergoing tremendous change. The culturally defined behavior norms for women, known as the *Chba'p*, has previously constrained their opportunities outside of the household.[45] However, economic, social and political developments are opening up new opportunities for Cambodian women to pursue. As a result, they are now a more integral part of the country's economic and social development. In general, women and men perceive and use water in different ways. There is a need to include women's views on water resource management if projects need to be generally more effective in their implementation and sustainability.[46]

156. Both projects of the investment proposal on water resources will involve women at various stages of the project cycle including project design, construction, operation and O & M, training, and monitoring and evaluation (M & E). Opportunities to consider women's concerns range from participation of women in the consultation process, and an active role in community activities, particularly in community-based disaster risk reduction and management (CBDRM), and integrated water resources management. Women will be trained for livelihood activities such as the introduction of climate-resilient farming and irrigation practices, improved pest and disease management; and better access to credit for input and output marketing, and investments. The women will also take part in disseminating knowledge and information on early warning of floods and droughts. Among the significant justifications for carrying out the investment projects is the amount of energy, time, and money saved by women on water and water-related activities which would then be applied towards income-generating activities to become self-sufficient.[47]

Participation of Local Governments, Civil Society and the Private Sector

157. Specific opportunities will be explored in the investment proposal to proactively involve the local governments, private sector and civil society at various stages of its implementation. The private sector will be specifically involved in deployment of water-saving technologies such as drip irrigation, purchase and distribution of quality seeds for stress resilient varieties to heat, submergence and drought, high value crops, and high yielding varieties, and in investment and financing. Wherever possible, the private sector will also be involved in capacity building activities on climate risk and resilience in the water resources sector.

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[45] UNIFEM, WB, ADB, UNDP and DFID/UK. 2004. A Fair Share for Women: Cambodia Gender Assessment. Phnom Penh, ISBN:1-932827-00-5

[46] Zwarteveen, M., and V. Bennett, 2005: *The Connection between Gender and Water Management.* Opposing currents-The Politics of Water and Gender in Latin America. Eds.. Vivienne Bennett, Sonia Davila Poblete, and Maria Nieves Rico. University of Pittsburg Press: 2005.

[47] Zwarteveen, M., and V. Bennett, 2005: Same literature as above

158. Local governments, farmers and other CSOs will be actively involved in various stages of implementation of both components. Besides capacity building, civil society will be involved in activities such as CBDRM, generation and management of knowledge and information about water resources and management, gender mainstreaming, and monitoring and evaluation.

Scalability and Replication Potential

159. Methods and procedures to include climate change risk factors in the hydraulic design and implementation of water resources projects and IWRM can be scaled up from the pilot sites to the national level in Cambodia. The leadership of MOWRAM in this regard is highly important. Since the investment component projects are also part of regional loan and technical assistance project under ADB's administration, there is a high possibility of replicating good practices and lessons learned across various countries (Lao PDR and Viet Nam) in the GMS region.

Knowledge management, dissemination of lessons learned and best practices

160. Appropriate toolkits and knowledge products focusing on mainstreaming climate change concerns into water resources planning and management will be developed and widely disseminated in Cambodia and the GMS. Guidelines on climate-proofing water infrastructure employing both soft and hard engineering options will be prepared in each component. Information on local strategies and indigenous knowledge to cope with floods and droughts, and on ways to fine tune them under various agro-ecological settings will be disseminated. The "knowledge generation, management and learning platform" of the technical assistance project will be effectively used to disseminate the lessons learned and best practices. The platform will have a dedicated project web site hosted at MOE and MOWRAM. In addition, the project will organize several information dissemination and workshops aimed at water resource managers and other key stakeholders in collaboration with national academic institutions.

INVESTMENT COMPONENT II: Enhancing Climate-Resilient Agriculture and Food Security

Introduction

161. Agriculture and natural resources management are key components in any poverty reduction strategy in Cambodia. The rural areas in Cambodia heavily rely on a combination of access to agricultural land, forest resources and fisheries in order to have diversified and sustainable livelihoods. Agriculture sector contributed 30% to the country's gross domestic product (GDP) in 2010 and grew at an average rate of 7.7% per annum during 2005–2010. Although the sector's share in GDP has declined from an average of 38% over the past 4 years and the annual growth rate declined from 15.7% in 2005 to 5.0% in 2010, agriculture remains the primary source of employment and income for the vast majority of the rural population, which makes up about 85% of the country's population. The sector is particularly significant for the Tonle Sap Basin, which is home to one-third of the country's population and covers 42% of the land area in Cambodia.

162. Sector underperformance is seen in low primary output volumes and values, modest exports, low farmer and enterprise profitability, limited enterprise formation, low sector value addition, forest and biodiversity losses and the compromising of resources quantity and quality. Main causes include, among others, (i) an increasingly compromised natural resource base; (ii) high vulnerability to climate change impacts, such as floods and droughts, and sea level rise in coastal zones; (iii) unmet demand for rural infrastructure including roads, irrigation systems and rural power that limits access to value adding input and product markets; (iv) low access to productivity-improving know-how due to limited agriculture research, extension and other information services; (v) limited access to credit to purchase improved technology; (vi) incomplete policy and institutional reforms - continuing weaknesses in public institutional capacity to effectively deliver public goods and services to users; and (vii) weak sector governance enforcement that hampers Government's ability to protect property rights and the common property natural resource base such as forests, river basins and land concessions awards.

163. Agriculture is one of the most vulnerable sectors to climate change, as evidenced by studies conducted as part of the first and second national communications to the United Nations Framework Convention on Climate Change (UNFCCC). Climate change is expected to increase the number of extreme climate events such as floods and droughts. In the coastal regions, the impacts of sea level rise and saltwater intrusion are expected to be severe by 2050. Food insecurity is already a problem in many provinces of Cambodia and climate change is expected to exacerbate food insecurity. In order to enhance climate resilience of agriculture and associated natural resources, as well as to enhance the role of the private sector in sustainable intensification and commercialization of agriculture, two projects are being proposed for investment with PPCR support. These include: (i) Promoting climate-resilience of agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces (integrated with the ADB funded GMS Biodiversity Conservation Corridors Project; and (ii) Climate proofing of agriculture infrastructure and business-focused adaptation (blended with the ADB-funded Agricultural Commercialization and Resource Conservation Sector Development Program).

Project 1: Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces[48]

Background

164. Based on earlier surveys and field observations, ecosystems in Koh Kong and Mondulkiri provinces of Cambodia have been found to be facing several stresses. Despite rich biodiversity, people in these provinces have remained poor, and both agricultural and forest ecosystems and livelihoods of several farming and forest-dependent communities are under serious threat. The Government of Cambodia and ADB have, therefore, signed a Grant Agreement in December 2010 to implement the Greater Mekong Subregion (GMS) Biodiversity Conservation Corridors (BCC) Project in Koh Kong and Mondulkiri provinces over an eight-year (2011 – 2018) period to protect and sustain agricultural and forest ecosystems. The expected outputs are: (i) Strengthened institutions and communities for biodiversity corridor management; (ii) Restoration, protection and maintenance of biodiversity corridors; (iii) Provision of support to livelihoods and small-scale infrastructure; and (iv) Project management and support services.

165. The ADF-funded Grant Project on GMS BCC covers 10 communes in Koh Kong and 12 communes in Mondulkiri. In Koh Kong province, key climate change related stresses include floods and salt water intrusion due to sea level rise and tidal waves. For example, in communes such as Peam Krasoab (Koh Kong), which is a target commune of 282 households with a population of 1313 in 2010, food insecurity is a persistent problem caused by salt water intrusion, lack of freshwater, and loss of agricultural land. The commune area is annually flooded by sea water between November and December.

166. Field surveys and questionnaires with households in Koh Kong communes revealed that they would require development of infrastructure for adaptation such as: (i) flood protection dikes that assist in regaining land for rice cultivation and reducing salt water intrusion; (ii) community and household supply of potable water by construction of cement water tanks (water reservoirs) for rain harvesting and household level rain harvesting containers; (iii) introduction of short-duration rice varieties in areas affected by salt water intrusion; and (iv) restoration of mangrove and non-mangrove species. The construction of the dike will increase rice cultivation area, thus improving food security. For this investment project, the idea is to replicate the success in other communes of Koh Kong.

167. In Mondulkiri, the situation is different. It is a landlocked province with no coastal area. It is highly drought-prone and the preliminary climate projections indicate that severity of drought may increase. Therefore water sources need to be conserved by building of irrigation facilities and freshwater reservoirs to enhance agricultural productivity and food security during the dry season. As more forest area is coming under stress through land use change and rapid development, it is anticipated that rainfall may be adversely affected through decline in precipitation. Moreover, hydropower facilities are under construction in Mondulkiri, which will need sound watershed management and downstream linkages to irrigation and water supply. Appropriate adaptation measures, therefore, are needed to avoid serious consequences in terms of food insecurity and livelihoods for a growing population vulnerable to the impacts of climate change.

[48] Proposed for Tranche 1 PPCR Funding

Development Objectives

168. The expected outcome of this investment component is improved resilience of agriculture in Koh Kong and Mondulkiri provinces, to floods and droughts. The specific objectives are to (i) pilot flood protection dikes to reduce salinity and regain rice growing land for selected communes (from sea level rise); (ii) restore and conserve mangrove and non-mangrove species to reduce the impacts of sea level rise and coastal flooding; (iii) improve rainwater harvesting system and enhance resilience of community water supply; (iv) enhance resilience of small scale agriculture through introduction of high yielding drought, flood and salinity-tolerant crop varieties, small scale irrigation, water harvesting and other water saving technologies.

Key Indicators and Baseline

169. For Cambodia,[49] a vulnerability and adaptation assessment to climate change using global climate models from the Center for Climate Systems Research (CCSR) and Centre for Australian Weather and Climate Research (CSIRO) and emission scenarios SRESA2 and SRESB1 showed 1.35 to 2.5 degrees Celsius increase in temperature in 2100 and 3-35 percent increase in annual rainfall. In Koh Kong Province, in particular, the rainfall in four main river basins is predicted to increase between 2 and 15 percent thereby increasing water flow by 2-10 m^3/s, and a 1m rise in sea level would put 44 km^2 of the province (0.4 percent of total provincial area) permanently under water and about 56 percent of the settlement areas flooded. In addition to the profound damage to the coastal ecosystem and economies, potential economic loss from damage of infrastructure will be manifold. The potential impacts of climate change to the coastal zone, particularly Koh Kong's coast, could be reduced by adequate planning and various adaptation measures in the context of integrated coastal management.

170. Under the GMS BCC Project, a village-level rapid assessment in the Peam Krasaob commune in Koh Kong Province showed that rice fields and mangrove restoration areas are now inundated with sea water. Construction of a 1.3 km long dike, with a laterite surface thickness of 300 mm is expected to protect the village from sea water flooding. An added value is that the dike can be used as a laterite road in the village. Since both surface and groundwater will contain more salinity due to sea level rise, the main challenge is to secure sources of non-saline water. The study will identify the most cost effective sources, including surface water intake from upstream of rivers, impounding reservoirs to store fresh water, and small desalinization plants for drinking purpose. In order to exploit scale economy, multiple communes may share facilities, such as intake and transmission mains. The component will include support to develop capacity of communes to monitor water quality and manage the sources properly.

171. In contrast to coastal communes in Koh Kong, Mondulkiri suffers from drought as well as flooding. In Srae Lavi village in Srae Khtum commune, currently being covered under GMS BCC Project, the village level rapid assessments indicated that the areas where community has rice fields, are affected both by flooding during rainy season and by drought during dry periods.

172. A more comprehensive baseline study will be conducted prior to implementation of activities for this investment component. The anticipated indicators, outcomes and impacts of this component are outlined in Table 13.

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[49] UNDP, 2009: Meeting Challenges of Climate Change at the Local Level through ICM, Theme 2. Natural and Man-made Hazard Prevention and Management in: The East Asian Seas Congress 2009. "Partnerships at Work: Local Implementation and Good Practices" Manila, Philippines, 23-27 November 2009, p.11

Table 13: Key indicators

Intervention	Indicators	Outcomes	Impacts
Piloting flood protection dikes reducing salinity and regaining rice growing land for selected communes	Xxx length of dikes in each target commune in Koh Kong province constructed or repaired	Reduced salinity in potential rice growing area	Sea water intrusion decreased; Co-Benefit: Food production / food security increased
Community-based soil conservation, and restoration and sustainable use of mangroves and non-mangrove species	Xxx hectares of mangrove and non-mangrove area restored per commune (15 communes)	Protected coastal area from sea level rise; Improved fish breeding, crustacean and biodiversity	Coastal areas protected from storm surge/se level rise Maintenance of biodiversity improved. Co-Benefit: **s**ustainable fish production
Improved rainwater harvesting system & safer community water supply (Climate-resilient potable water supply system)	Approx 100 households per commune (25 communes in Koh Kong and 12 communes in Mondulkiri) benefit from potable water in all seasons	Improved water supply during dry season and drought periods	Water borne diseases reduced thus improving human health (Millennium Development Goal)
Climate resilient small scale irrigation using improved technologies with introduction of drought/ flood/ salinity tolerant crop varieties	Approx 400m of dike protection per commune (12 communes), Number of farming households adopting adaptive water management technologies and practices increased Number of new irrigation technologies adopted technologies Increased access to irrigable water sources Number of farmers adopting stress tolerant and adaptive varieties increased Total area of cropped land under adaptive varieties increased	Improved coping mechanisms against CC impacts	Food security increased

Sub-components and Activities

173. The activities proposed for PPCR funding in *Sub-component Koh Kong* include the following:

(i) Piloting flood protection dikes to reduce salinity and regain rice growing land for selected communes;

(ii) Community-based soil conservation, and restoration and sustainable use of mangroves and non-mangrove species;

(iii) Identification and promotion of adaptive and efficient water management technologies and practices including improved rain water harvesting systems, small farm ponds, drip irrigation, low lift pumps, alternate wetting and drying technology, solar irrigation pumps etc.

(iv) Development of climate-resilient and safer potable water supply system. An early warning system for farmers in times of natural calamities such as tidal surge, cyclone, flash flood, etc. may be implemented through a community information centre model and in conjunction with the other initiatives under PPCR/donor funded projects focused on Early Warning Systems for the coastal communities.

174. The activities proposed for sub-component Mondulkiri include the following: (i) Identification and promotion of adaptive and efficient water management and small scale irrigation technologies and practices including improved rain water harvesting systems, small farm ponds, drip irrigation, low lift pumps, alternate wetting and drying, solar irrigation pumps etc.; (ii) Development of climate-resilient and safer potable water supply system safer community water supply system (gravity schemes); (iii) Introduction of drought tolerant crop varieties. Raising awareness and promoting the use of stress tolerant, short duration and hybrid varieties of rice and other crops will be an important activity. In addition, learning and knowledge management activities will be a priority.

Institutional Arrangements for Implementation

175. While funding will be channeled through the GMS BCC project, for which the executing agency is MOE, the implementing agency will be the relevant line ministry (e.g. MAFF, MOWRAM) responsible for coordination and technical oversight with consultants recruited for design and feasibility and procurement of contractors for civil works and for goods. In addition, the necessary regulatory and legal frameworks to enhance the effectiveness of adaptation interventions will be identified during project design.

Risks

176. Limited capacity to handle climate change components at the provincial level is a source of uncertainty in the project implementation. However, project preparatory advance actions are expected to provide targeted capacity building and training to address this risk.

Investment Costs and Co-Financing

177. The total estimated costs of the proposed climate change adaptation activities in Koh Kong and Mondulkiri provinces for PPCR funding amount to $8 million. These include the costs for surveys and preparatory assistance of $0.60 million, civil works, mangrove rehabilitation and capacity building exercises. Expected co-financing for this project in Cambodia is $20.4 million, and in GMS it is $76.77 million (Table 14).

Table 14: Financing Plan

Category	Amount[b] (Million $)
PPCR Grant[a]	8.00
Co-financing from ADB and others	20.40
Co-financing for the entire GMS	76.77
Total for Cambodia	**28.40**
Total for GMS region	84.77

[a] *Including preparatory grant*

Results and Performance Framework

178. Small-scale infrastructure support will primarily focus on (i) commune-based potable water schemes; (ii) mangrove restoration and (iii) improvement and upgrading of rural dikes to protect household and agricultural lands from sea water intrusion. The transformational aspect of investments under SPCR is that the area to rehabilitate mangroves would cover all 15 additional communes in Koh Kong. These constitute over one-third of the long coast line of Cambodia, which would translate to greater protection from the impacts of sea level rise and climate change-related hazards. Special attention will be given to ensure that the poor and ethnic minority groups participate equitably in subproject benefits. The table below provides only an indicative results and performance framework. A detailed framework will be developed during the project design based on the scoping study and baseline data. Table 15 lists the expected key results and indicators.

Table 15: Expected Key results from the Implementation of the Investment Project

Results	Success Indicators
(a) Increased resilience and reduced poverty in the rural, climate-hazard prone areas (b) Enhanced protection of coastal areas from storm surge/sea level rise/saltwater intrusion (c) Improved resilience of agro-biodiversity (d) Enhanced and continued water supply during dry season and drought periods (e) Improved coping mechanisms of small farmers against climate change impacts	• Number of kilometres of coastal protection increased • Number of hectares of mangrove and non-mangrove species area restored to protect against tidal surges and strong winds • Number of farm households adopting adaptive water management technologies and practices increased • Number of new irrigation technologies adopted • Percentage access to irrigable water sources increased and salt water intrusion decreased • Number of farmers/women adopting stress tolerant and adaptive varieties increased • Total area of cropped land under adaptive varieties increased

Project 2: Climate proofing of agricultural infrastructure and business-focused adaptation[50]

Background

179. In general, the agricultural production environment in Cambodia is more severe than the fertile lowlands of other countries in the GMS region. Soils are generally poor, often becoming waterlogged during the wet season, and three-quarters of the agriculture is rainfed. The predominance of rice-based farming systems on infertile, poorly structured soils leads to the fact that Cambodia has low agricultural productivity on the basis of both labor and land area. Water management is a particular challenge for both dry land and irrigated cropping. The flatness of many prime rice-cropping areas means that it is difficult to both control flooding through drainage management and impound water for later use in irrigation.

[50] Proposed for Tranche 2 Funding

180. Combined with the problems of low productivity, the Cambodia's predominantly rainfed farming systems are also highly prone to the effects of seasonal climate variability and, in the long term, impacts of climate change. The poorest farmers will bear the brunt of climate change because they live in the more-vulnerable areas. The impacts of climate change will amplify food security issues. The overwhelming driver for most Cambodian smallholder farmers is to secure their household food production to avoid annual hungry periods.

181. The ADB-funded Agricultural Commercialization and Resource Conservation Sector Development Program will address agricultural commercialization in combination with resource conservation, which is critical in gradually eliminating the binding constraints for the sector development. The Program will include a policy lending component and an investment component. The investment component will focus on four Tonle Sap Basin provinces, i.e., Banteay Meanchay, Kampong Cham, Kampong Thom, and Siem Reap.

182. The Program's impact will be improved productivity, resilience and profitability of farmers and small- and medium sized enterprises (SMEs), while the outcome would be sustainable commercialization of agriculture products without compromising natural resources base. The three expected outputs of the Program are: (i) Enabling business environment for small and medium-sized enterprises; (ii) Rural SMEs financially and operationally strengthened to develop value chain integration; and, (iii) Agricultural productivity and resilience to climate change impacts enhanced (Irrigation Water Efficiency; Post harvesting Facilities; Crop Insurance Pilots). PPCR funding support is sought to achieve the third output.

Development Objectives

183. The objectives of the investment component are to: (i) enhance demand-side water use efficiency through piloting water-saving technologies for improved climate resilience; (ii) strengthen climate-resilience of post-harvest infrastructure; and (iii) pilot crop insurance using the weather-based index. The expected outcome is improved resilience of agriculture to floods and droughts through integrated crop management, thereby increasing agricultural productivity and food security in target provinces.

Key Indicators and Baseline

184. A more comprehensive baseline study will be conducted prior to implementation of activities for this investment component. The anticipated indicators, outcomes and impacts of this component are outlined in Table 16.

Table 16: Key Indicators

Intervention	Indicators	Impacts
Irrigation Water Efficiency	20,000 ha of crop farms equipped with drip irrigation and/or other water saving technologies	Irrigation water efficiency increased, thus productivity is enhanced.
Post harvesting Facilities	20,000 ha of crop farms equipped with all-weather post harvesting facilities	Post-harvest losses reduced. Shelf life of crops extended Good quality of agricultural and fishery products maintained.
Crop Insurance Pilots	100,000 ha of crop farms in 4 provinces (Banteay Meanchay, Kampong Cham, Kampong Thom, and Siem Reap) insured on the pilot schemes	Climate risk resilience and poverty alleviation of farmers in the climate hazard prone areas.

Activities and Outputs

185. The anticipated activities for this investment component include the following.

(i) **Enhanced demand side water efficiency** through the use of drip irrigation and other water saving technologies in small farms. These may consist of the following sub-activities: Design of the drip irrigation system based on the concept of irrigation zones; Technical analysis of power and water limitations, including climate change information; Installation and operation of the drip irrigation system; and adoption of integrated technologies to optimize soil-crop moisture use.

(ii) **Post harvesting facilities:** Post-harvest losses due to lack of climate-resilient agricultural infrastructure are very high in Cambodia. Rehabilitation of existing post-harvest infrastructure and creation of new climate-resilient post-harvest facilities ensures proper storage and preservation of food and increase resilience of local communities to flood and drought hazards. Improved engineering design and construction protocols for climate proofing of post harvest infrastructure could reduce structural and crop damages. More efficient post-harvest technologies and practices that are applicable in a wide range of climatic conditions, if applicable, will be supported.

(iii) **Pilot testing crop insurance using the weather-based index**: Smallholders farmers are challenged with high yield variability due to weather/climate-related hazards such as droughts and floods. Their dilemma is compounded by their inability to access high yielding, disease resistant seed varieties and other required inputs such as fertilizer. Weather index insurance does not measure changes in yields instead it measures changes in rainfall assuming that if rainfall is bad, farmer's yields will be low. It is important therefore to establish upfront the relationship between yield and rainfall. The main activity is the design, development and implementation of an appropriate micro-level weather index insurance scheme. Micro-insurance and microfinance options and modalities for addressing climate change risks will be explored. Establishment of the data and information systems needed for the design and rating of crop insurance policies will also be a priority. An awareness raising campaign on benefits of having crop insurance and the options available to vulnerable farmers will be launched.

(iv) **Learning and Knowledge Management activities** including dissemination of best practices on post-harvest facility management and crop insurance

Institutional Arrangements for Implementation

186. The Key implementing agency will be the Ministry of Agriculture, Forestry and Fisheries (MAFF). However, cooperation with Ministry of Public Works and Transport (MPWT) and Ministry of Rural Development (MRD) will be sought in effective implementation of the project. In addition, the necessary regulatory and legal frameworks to enhance the effectiveness of adaptation interventions will be identified during project design.

Risks

187. Various risks involved in project implementation and some interventions to overcome such risks are in Table 17.

Table 17: Key Risks and Countermeasures

Risks	Management of Risks
Data availability (historic data and a good network of weather stations; Climate change scenarios for the locations of insured)	If data is available but has some gaps, these can be extrapolated from the available data.
Identification of stakeholders	Early planning and coordination between participants; Selection and participation of stakeholders who are organizationally and managerially strong
Misunderstanding of insurance product concepts by stakeholders.	Training and education of stakeholders
Limited capacity to handle climate change components at provincial level	Targeted capacity building and training

Investment Costs and Co-Financing

188. The total estimated costs of the proposed climate change adaptation activities for PPCR funding amount to $ 15 million ($5 million as grant for crop insurance pilots, and $10 million as concessional credit for the provision of technologies for water efficiency and post harvest facilities). Additional costs for surveys and preparatory assistance of $0.60 million, civil works, and capacity building are also included. Expected co-financing for this project is $60 million. Co-financing will cover both policy development and the investment component on rural SME development and productivity-enhancing infrastructure.

Table 18: Financing Plan

Category	Amount[b] (Million $)
PPCR Grant[a]	5.00
PPCR Concessional Credit	10.00
Co-financing from ADB and others	60.00
Total	**75.00**

[a] *Including preparatory phase grant*
[b] *Source: ADB staff estimates – to be confirmed during fact finding*

Results and Performance Framework

189. Table 19 below provides only an indicative results and performance framework. A detailed framework will be developed during the project design based on the scoping study and baseline data.

Table 19: Results and success indicators

Results	Success Indicators
(a) Enhanced demand-side water efficiency (b) Improved design, construction, rehabilitation and maintenance of post harvesting facilities to withstand climate risks (c) Improved institutional structures to respond to climate change (e.g. weather-based insurance) (d) New and additional resources for resilience in the agriculture and related infrastructure, and in coastal areas	• Area of farms equipped with water saving technologies increased • Area of crop farms equipped with all-weather post harvesting facilities increased • Access to credit to transform farm practices increased • Insurance mechanism against climate risk successfully piloted and ready to be adopted at a larger scale • Leverage factor of PPCR funding in agriculture sector

Linkages to NAPA

190. Among the 20 high priority projects in NAPA, the following high priority projects are identified to be closely linked with this proposed SPCR investments on agriculture and natural resource conservation. The investment proposal gives the opportunity to start, to continue or to complement the implementation of NAPA projects in selected provinces in Cambodia.

Table 20: High Priority NAPA Projects with Links to PPCR investments

Title	Locations
Community and Household Water Supply in Coastal Provinces	Kampot, Kep and Koh Kong*
Development and Rehabilitation of Flood Protection Dikes	Banteay Meanchey*, Kampong Cham, Kampong Speu, Kampot, Kandal, Prey Veng, Svay Rieng and Takeo
Safer Water Supply for Rural Communities	Battambang, Kampong Cham*, Kampong Speu, Kampong Thom*, Kandal, Kratie, Prey Veng, Ratanak Kiri andTakeo
Development and Improvement of Small-Scale Aquaculture Ponds	Kampong Cham, Kampong Speu Kandal, Kratie, Sihanoukville and Svay Rieng
Community Mangrove Restoration and Sustainable Use of Natural Resources	Kampot, Kep and Koh Kong*
Community Based Agricultural Soil Conservation in Srae Ambel District, Koh Kong Province	Koh Kong*

*Areas being covered by proposed PPCR Phase 2 Investment Project II

Linkages to PPCR Phase 1

191. There are opportunities to continue implementation of activities in PPCR Phase 1 to Phase 2 exist, such as in science-based adaptation planning (for example, use of climate change scenarios in planning and design of component details during the preparation phase, vulnerability

and adaptation assessments). Lessons learned in Phase I could be used by Phase 2 to carry forward projects by following good practices and lessons learned. Phase 2 could build up on the knowledge products that Phase 1 projects have implemented.

Adaptation and Mitigation Linkages

192. Agriculture and natural resources sector, despite its high vulnerability to the impacts of climate change, offers several opportunities for GHG mitigation. These include reductions in methane and nitrous oxide emissions from paddy fields through improved fertilizer, water and crop residue management, and enhanced carbon sequestration, and by soils and plants through practices such as conservation tillage. However, the agriculture sector in Cambodia did not benefit from the global carbon market, largely because of high transaction costs and low technical capacities. The prospects for accessing carbon financing will be explored in this investment component in conjunction with other ADB-funded projects such as GMS climate-friendly bioenegy development.

Gender Mainstreaming

193. Preserving biodiversity is now widely recognized as essential to achieving food security.[51] To protect themselves against crop failure, subsistence women farmers have developed gender-differentiated local knowledge, which plays a decisive role in the conservation, management and improvement of genetic resources for food and agriculture. As food producers, rural women and men have a stake in the preservation of natural resources and in environmentally sustainable development. This stake depends on such factors as the division of labor between women and men in using and managing resources, and the access to and control over those resources. It is usual for men to do the large-scale, mechanized cropping of commercial crops, while women generally work on a smaller scale, more traditional ways of growing food for their families and the local market.

194. Both projects of the investment proposal on agriculture will involve women at various stages of project cycle including project design, construction, operation and maintenance (O&M), training, and monitoring and evaluation (M&E). Opportunities to consider women's concerns range from participation of women in the consultation process, and active participation in community-based activities.

195. Women will be trained for specific activities for livelihood such as the introduction of climate-resilient farming and irrigation practices, improved pest and disease management; and better access to credit for input and output marketing, and investments. The women will also be involved in disseminating knowledge and information on early warning of floods and droughts. Among the important justifications for carrying out the investment projects is the amount of energy, time, and money saved on water and water-related activities which women can then apply to generating income and becoming self-sufficient. Climate-resilient potable water supply system in households could be the answer.

[51] FAO, 2001: Gender and Development: Key to sustainability and food security

Engagement of Local Governments, Civil Society and the Private Sector

196. Effective participation and involvement of the local governments in implementation of SPCR investments is crucial. Likewise, civil society would be valuable partners in the generation and management of knowledge and information about agriculture and resources conservation, gender mainstreaming, and monitoring and evaluation of activities. Pilot testing of a weather-based crop insurance scheme would be a good demonstration for private sector engagement. In addition, the private sector may be involved in purchase and distribution of quality seeds for stress resilient varieties to heat, submergence and drought, high value crops, and high yielding varieties. Wherever possible, the private sector will be involved in capacity building activities on climate risk and resilience. Modalities of their involvement will be determined during project design.

Scalability and Replication Potential

197. Methods and procedures to include climate change risk factors in the planning, budgeting and implementation of activities to enhance agricultural productivity can be scaled up from the pilot sites to the national level in Cambodia. Since the investment component projects are also part of a regional loan or technical assistance project under ADB's administration, there is a high possibility of replicating good practices and lessons learned across the GMS region.

Knowledge management, dissemination of lessons learned and best practices

198. Appropriate toolkits and knowledge products focusing on mainstreaming climate change concerns into agriculture and natural resources planning and management will be developed and widely disseminated in Cambodia and the GMS. Guidelines on climate-proofing agricultural infrastructure, especially post-harvest infrastructure, will be prepared. Information on local strategies and indigenous knowledge to cope with floods, droughts and salinity, and on ways to fine tune them under various agro-ecological settings will be disseminated. The "knowledge generation, management and learning platform" of the technical assistance project will be effectively used to disseminate the lessons learned and best practices. The platform will have a dedicated project web site hosted at MOE and MAFF. In addition, the project will organize several information dissemination and workshops aimed at agricultural managers, businesses and other key stakeholders in collaboration with national academic institutions.

INVESTMENT COMPONENT – III: Improving Climate-Resilient Infrastructure

Introduction

199. The backbone of any country's sustainable development is physical infrastructure:[52] roads and bridges, railways, ports and inland waterways, airports, power generation and network, irrigation, telecommunications, etc. The improvements in infrastructure will have a positive impact on both economic and social development, including education, health, tourism, and trade, as well as on a nation's integration with the region and the world. Cambodia's physical infrastructure is still inadequate to promote such social and economic development. Climate change manifested in the form of floods and other extreme events such as tropical cyclones can destroy infrastructure. The PPCR is an opportunity for the Government to be able to meet such challenge. Under this investment proposal are three infrastructure projects, namely:

(a) Project 1: *Climate Proofing of Roads in Prey Vang, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces* (blended with ADB funded Provincial Roads Improvement Project)
(b) Project 2: *Climate Proofing of Infrastructure in the Southern Economic Corridor (SEC) towns* (blended with ADB funded GMS Corridor Towns Development Project)
(c) Project 3: *Flood-resilient Infrastructure Development in Sisopohon, Siem Riep, Kampong Thom, Battambang, Pursat and Kampong Cham* (blended with ADB funded Sustainable Urban Development in the Tonle Sap Basin Project)

Project 1: Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces[53]

Background

200. In the context of Sustainable Transport Initiative and commitment towards addressing climate change in its Strategy 2020, ADB has been developing a number of projects to develop knowledge and replicable models in developing member countries on how to climate proof transport projects and programs. The proposed road improvement project in Cambodia represents the second of such in Southeast Asia. The aim has been to incorporate concerns about climate change impacts into project design in order to reduce the damages caused to existing and future transport infrastructure and affected areas. Overall methodology and lessons learned are being incorporated into the development of guidelines, which can be replicated elsewhere.

201. In Cambodia, there is an overall increase in average total annual rainfall and, this increase is poorly distributed over seasons, resulting in increased floods during the rainy season as well as increased drought incidence during the dry season. Droughts are significant especially for unpaved roads as dust levels increase and reduce visibility and create poor local air quality. Flooding and soil moisture content is a primary concern for protecting investments in road works.

202. The roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces are susceptible to floods during many months of each year in the rainy season. With high likelihood of increasing intensity of rainfalls causing stronger floods than usual, the roads need to be

[52] RGC, 2009: National Strategic Development Plan: an update for 2009 to 2013

[53] Proposed for Tranche 1 PPCR Funding

strengthened structurally to withstand such unlikely climate events. The adaptation strategy in this investment project therefore, includes a combination of engineering, non-engineering and planning activities to manage the changes observed and predicted in the project area. The engineering changes have been mainstreamed in the project design itself as part of incorporating climate change adaptation into core development planning activities. These include, among others, elevation of the road in areas where major flooding is becoming increasingly common and changing the selection of sub-grade materials to withstand higher moisture contents.

203. Coordination with other donor funded adaptation activities will be important at the onset of this Project. It will coordinate with Nordic Development Fund financed climate change adaptation output for rural roads in the ADB project Loan 2670-CAM Rural Roads Improvement Project (Loan-2670) of the Ministry of Rural Development (MRD). Also, through other activities funded through the Global Environment Facility, such as the National Adaptation Program of Action (NAPA) and the National Communications, a significant amount of assessment work has already taken place. This climate resilience output will build on existing assessments, in some cases fill- in some gaps with the purpose of informing follow-up activities on the ground. The majority of the output would be focused on infrastructure changes, planning and ecosystem approaches, while the project will also provide updates to the National Climate Change Coordination Committee.

Development Objectives

204. The investment project aims to rehabilitate (a) 87 kilometers (km) of provincial roads in Prey Veng and Svay Rieng provinces, and (b) 117 km of provincial roads in Kampong Chhnang and Kampong Speu to paved condition. The key development objective of PPCR financing is to enhance climate resilience of infrastructure, so that these roads will be accessible and usable in all seasons. ADB approved the technical assistance for the preparation of the Provincial Roads Improvement Project in November 2010. Consultants commenced their work on 15 March 2011. The TA is therefore ongoing, and will complete the design of the loan project by September 2011.

Key Indicators and Baseline

205. Key performance indicators at the impact, outcome and output levels are as described in the design monitoring framework of PRIP. Baseline data collection, monitoring and evaluation will be done as part of the project management of the PRIP.

Table 21: Key Indicators

Intervention	Indicators	Outcomes and Impacts
Capacity building of MPWT staff in mainstreaming climate resilience into provincial and rural road planning and maintenance	At least 20 PMU3 staff members attend climate change adaptation seminars, of which at least 25% are female. Climate change becomes a part of curriculum in environmental engineering studies of Cambodian universities	MPWT staff will be able to use the acquired basic knowledge and understanding in the initial training in their work in the ministry. More graduates who enter the government work force will have increase awareness on climate change issues and more knowledge on how to include climate change concerns into engineering designs.

Intervention	Indicators	Outcomes and Impacts
Vulnerability mapping of roads selected for rehabilitation	Maps are used to identify priority road segments and longer term planning	Decision and planning processes will be guided more by scientific inputs and assessments.
Identification and prioritization of adaptation approaches	At least three adaptation measures are identified	If vulnerability and impacts are identified, appropriate adaptation measures can be applied within the scope of the project
Enhancing climate resilience of roads	Adoption of a "forward-looking" approach (use of climate change scenarios) for pavement design as contrasted to "backward looking" approach (historical data)	The project design that incorporates effects of climate change early on in its designs will be more resilient and cost effective than when retrofitting.
Enhancing socio-economic benefits	With the project, it is expected that these roads then will provide climate resilient, all-year access to markets and other social services for provincial centers.	The project will have substantial positive employment and gender impacts in the rural communities. Potentially negative social impacts of increased connectivity will be monitored and prevented through HIV/AIDS and human trafficking prevention programs. The project also includes a community-based road safety program to increase road user safety.

Anticipated Activities

206. There are two major outputs planned in the climate resilience output. First is the Grant-financed sub-output of ***Planning for Climate Change Adaptation*** while the other is Loan-financed ***Enhancing Climate Resilient Road Segments***. While the ongoing technical assistance will finalize the proposed climate change adaptation activities of this project, this output will seek to strengthen the overall objective of the project to improve mobility. It will do so by proper planning and capacity building in the sector to be prepared for climate change events. All these approaches are novel in Cambodia, or in the region, thus can be considered in the transformation stage for climate change adaptation.

207. **Planning for Climate Change Adaptation (Grant component) -** Activities fall under two outcomes.

- Outcome A: Improved planning for national and provincial road infrastructure development by Ministry of Public Works and Transport (MPWT) to cope with impacts of climate change. This outcome will include:
  - Preparing vulnerability maps for national and provincial roads due to climate change to improve planning for climate changes, including potential climate change downscaling;
  - Identifying potential adaptation options and prioritize them, using, for example, an economic analysis of climate-proofing measures, including engineering and non-engineering adjustments, to support the decision making process;

- Reviewing the sustainability and capacity of MPWT's current engineering designs, standards and guidelines to withstand climate changes, in coordination with MRD;
- Developing and implementing training and curricula for the MPWT in close collaboration with Ministry of Rural Development; and
- Helping MPWT to establish a climate change adaptation office with adequate staff, to be trained under this output.

- Outcome B**:** Green planning and emergency planning to include activities such as

  - *Green planning:* design and implement ecosystem-based adaptation strategies focusing on environmental/green planning for project roads to improve flood and drought management (i.e. increasing ground cover and infiltration of floods and water retention during droughts, which has the added co-benefits of improving rural livelihoods by improving the soil structure for agriculture). In this activity, it will plant climate change resilient trees along road embankments of all project roads with selected grass and biomaterials, which will be a labor intensive program supporting female based employment for gender mainstreaming in the project provinces. The activity should happen after the roads have been paved, thus not to obstruct such road works, during the rainy season. This activity will also establish a nursery for MPWT for green planning for their entire road network in Cambodia; and

  - *Emergency planning:* develop and test a pilot local early warning system and a pilot program for emergency management planning for national and provincial roads. In short, this will provide a fully equipped emergency management center (including a back up mobile unit), with early warning systems installed in key locations, and emergency management systems in place like appropriate communication, emergency and rescue equipment and vehicles, with trained personnel to manage the center (response teams, medical teams etc).

208. The Ministry of Environment in 2010 completed a detailed climate change downscaling exercise with support from Bogor Agricultural University in Indonesia. The results from this exercise are available since 2010 and will provide useful information for the development of vulnerability maps, for example. An assessment of any gaps will be made first to assess whether additional information needs to be generated in order to focus the implementation of subsequent activities. Some potential areas for further work include hydrological modelling and ecosystem modelling. A gap analysis will be used to first identify areas where further work is needed and capacity building.

209. Activities in support of early warning systems will also be developed following consultations with NGO Networks who have been active at the community level in implementing community disaster risk reduction and response plans. Some of these include the International Development Enterprise and the Center for Study and Development of Cambodian Agriculture. A National Committee for Disaster Management has also been established since 1995 but focuses primarily on disaster response and capacity is limited.

210. The emphasis of the proposed actions under this proposal is on implementing measures on the ground-which reduce the vulnerability of roads for rehabilitation as well as ensure that these new developments do not inadvertently increase vulnerability. The engineering design and standards will be influenced by this Project though implementation of engineering changes themselves may be beyond the scope of the budget. Instead the Project will work to improve understanding of how civil works may change, will adjust planned developments by MPWT and will pilot ecosystem based measures which reduce the vulnerability of the investment and surrounding area. Examples of these include bioengineering, land-cover increases, shade providing species,

switching plant species to droughts and heat tolerant species, erosion control measures and upstream water management.

211. **Enhancing Climate Resilient Road Segments (Loan component):** The major objective of this output is protecting the road infrastructure from the impacts of climate change. So far, Cambodia's road design standards have been adopting a "backward-looking" approach, using historical data of existing pavement strength and axle loads, to design the road structure. However, given the risk of climate change affecting the road structure, the project design adopts a "forward-looking" approach of a 100-year flood for pavement design. The Ministry of Transport in Vietnam too has adopted a similar approach in project designs since 2009, for climate change adaptation.

212. While the details will be finalized during project design, a 100-year flood design may need a 30-40 cm raising of embankments of the road and providing adequate cross drainage through pipe and box culverts. Further, the embankments will be strengthened for higher moisture content by using appropriate materials for embankments. Climate resilient improvements in provincial roads have two major activities:

(i) Improvements in flood-prone section of 52 km of National Road (NR) No. 13 from Komchay Mear and Prosot, and NR 314D from Prosot to the border of Vietnam at Prey Var-Mocva.
(ii) Improvement of NR 150 B from Ta Ches to Tek Phos 44 km, which starts from Tonle Sap river; NR 53 from Khlong Popok to Kampong Speu border 26 km; and NR 151B from Kampong Speu border to Aoral 47 km. Thus the total length of improvements is 117 km which is high priority road needing climate change resilience.

Institutional Arrangements for Implementation

213. The MPWT will be the executing agency, while the project management unit 3 (PMU3) in the General Department of Public Works of MPWT will be the implementing agency. MPWT will be responsible for establishing the baseline, collecting data for each indicator, and reporting regularly to ADB. These reporting will be baseline set-up during project design, mid-term review, and project completion review.

Risks

214. There are several risk factors, their possible consequences and measures to address them. Adaptation is a cross cutting issue and therefore the overlap between sectors and between adaptation and sector level activities needs to be monitored. Further, uncertainties on the nature and extent of climate change impacts are high, especially where data is sparse as in Cambodia. A decision-making framework to assist planners and decision makers decide on investments in the context of uncertainty and risk will be applied.

215. An important factor to consider in this kind of project is that the entire global community learns what adaptation means in practice. There are several methodologies in use but still much disagreement and uncertainty in their use. Because infrastructural changes can be expensive and can transfer risks inadvertently, the executing agency and other stakeholders will require technical support throughout the project. Moreover, wherever the adaptation assessment results in relevant changes to road designs, the environmental impact assessment regulations would apply.

216. The proposed climate resilience interventions are subject to economic analysis to be done during the project design. There are significant cost recovery contributions and social impacts that

justify the proposed grant and loan funding. The economic benefits of protecting the planned infrastructure will contribute to ensuring sustainable development in Cambodia. Moreover, by integrating adaptation into transport master planning, the project ensures results beyond the scope of this project.

Investment Costs and Co-Financing

217. The disbursements will follow ADB's guidelines and procedures. Disbursement schedule will be finalized during project design. Funding from ADB and other co-financing sources will be invested on road improvements, resettlements, capacity building on road assets management; road safety and safeguards; and, project management. Requested funds from PPCR will allow the project to add additional provincial roads for rehabilitation and the planning for climate change adaptation in the roads and transport sector.

Table 22: Financing Plan

Category	Amount (Million $)
PPCR Grant PPCR Concessional Credit	7.00 10.00
Co-financing from ADB and others	61.00
Total	**78.00**

Source: ADB staff estimates – to be confirmed during fact finding of loan project

Results and Performance Framework

218. The results and success indicators for this investment project component are as listed in Table 23.

Table 23: Results and Success Indicators

Results	Success Indicators
(a) Improved planning for national, provincial and rural road infrastructure development to cope with climate change impacts (b) Increased capacity to withstand climate change impacts in project-specific priority infrastructure (c) Ecosystem-based adaptation strategies adopted focusing on environmental/green planning for project roads to improve flood and drought management (d) Improved emergency management planning for national and provincial roads	• Continuity of services provided by road ensured • Coverage under local early warning systems and pilot program for emergency management for provincial roads increased • Number and value of climate-resilient investments in infrastructure increased • Year-round access to markets and other social services for communities improved • Emergency evacuation improved at the time of natural disasters

219. The proposed project provides an opportunity for the PPCR fund not only to provide direct support to climate change adaptation to a sector and a geographical area, which has been

identified as highly vulnerable, but also to have potential leverage on future investments and maintenance of infrastructure financed by the government of Cambodia, the ADB and other financing institutions. The level of engagement and involvement by all stakeholders during the ongoing design of the project suggests a positive start and a potentially successful project. The level of awareness of transport sector experts and senior management of the government will be well developed through this project. A desire was clearly expressed for developing climate change adaptation knowledge, methods and tools which match the Cambodian context.

Project 2: Climate proofing infrastructure in the Southern Economic Corridor (SEC) towns[54]

Background

220. The proposed GMS Corridor Towns Development Project will promote the transformation of transport corridors in GMS into full-fledged economic corridors by improving priority infrastructure and building institutional capacity in selected towns in Cambodia, Lao PDR and Vietnam located along the Southern Economic Corridor (SEC) and the East-West Economic Corridor (EWEC).

221. The focus on corridor town development is a new approach to maximize the economic benefits of increased trade and traffic flows along the major transport corridors in the GMS. Several corridor towns are located so strategically that they can boost investment and economic activity. With the necessary enabling environment in place such as proper strategic economic development plan, adequate infrastructure and public services, and institutional capacity to guide and manage future development and investment, corridor towns can also successfully attract private sector investments for economic infrastructure such as market centers, agro-business, agricultural processing zones, industrial parks, transport terminals, and logistics facilities. These corridor towns can play an important role for a cluster of settlements in their respective hinterland.

222. Priority subsectors for investments are the installation of environmental infrastructure (sanitation/sewerage treatment; solid waste facilities; drainage and flood control) and economic infrastructure (market centers, agro-business, agricultural processing zones, industrial parks, transport terminals, and logistics facilities). The portion being requested for PPCR funding is for the participation of urban and peri-urban areas on the Southern Economic Corridor (Poipet; Battambang; Neak Leung and Bavet. Relevant subsector for climate change-related adaptation measures are sewerage treatment, sanitary landfills; and drainage/flood control.

Developmental Objectives

223. The project development objective is to assist the Ministry of Public Works and Transport to enhance capacity, knowledge and incentives to improve resilience of water supply and sanitation infrastructure to floods. The specific objectives are to: (i) mainstream adaptation concerns into infrastructure planning; and, (ii) strengthen climate resilience of sanitation systems including drainage channels, sewerage, sanitary landfills to minimize the impacts of floods. The interventions will also have the co-benefit of reducing greenhouse gas emissions through effective waste management practices. Relevant infrastructure for enhancing climate resilience in various regions include: sanitary landfills in Poipet and Bavet, waste water treatment plant in Battambang, and flood management infrastructure in Neak Leung. This activity will also help to build the capacity of

[54] Proposed for Tranche 1 PPCR Funding

the Cambodian authorities to conduct climate change analysis as part of investment planning in the infrastructure sector.

Key Indicators and Baseline

224. A more comprehensive baseline study will be conducted prior to implementation of activities for this investment component. The anticipated indicators, outcomes and impacts of this component are outlined in Table 24.

Table 24: Key Indicators

Intervention	Indicators	Outcomes and Impacts
Capacity building of MPWT staff in mainstreaming climate resilience into urban and per-urban environmental infrastructure planning and maintenance	At least 20 staff members attend climate change adaptation seminars, of which at least 25% are female.	MPWT staff will be able to use the acquired basic knowledge and understanding in the initial training in their work in the ministry. Increase awareness on climate change issues and more knowledge on how to include climate change concerns into engineering designs.
Vulnerability mapping of infrastructure selected for rehabilitation	Maps are used to identify priority infrastructure and longer term planning	Decision and planning processes will be guided more by scientific inputs and assessments.
Identification and prioritization of adaptation approaches	At least three adaptation measures are identified	If vulnerability and impacts are identified, appropriate adaptation measures can be applied within the scope of the project
Enhancing climate resilience of infrastructure	A “forward-looking” approach (use of climate change scenarios) for infrastructure design as contrasted to “backward looking” approach (historical data) Number of flood-resilient environmental infrastructure facilities (e.g. sanitation, drainage and flood control)	The project design that incorporates effects of climate change early on in its designs will be more resilient and cost effective than when retrofitting.
Enhancing socio-economic benefits	With the project, it is expected to provide climate resilient, all-year access to markets and other social services for provincial centers	The project will have substantial positive employment and gender impacts in the rural communities. Potentially negative social impacts of increased connectivity will be monitored and prevented through HIV/AIDS and human trafficking prevention programs. The project also includes a community-based road safety program to increase road user safety.

Anticipated Activities

225. The activities for this component fall under two groups: (i) implementation of the proposed investment program; and, (ii) strengthening of institutional capacities. Details are listed below:

- Investment Program
  - Construction of climate-resilient urban-environmental infrastructure
  - Climate-resilient Infrastructure constructed, commissioned, and made operational in phases between month 12 and month 72 (e.g. 2013–2018)
- Institutional Capacities for mainstreaming climate resilience in infrastructure planning
  - Organizing public awareness campaigns on climate change adaptation
  - Conduct of training programs on climate resilience by 2016
  - Development of well-trained and qualified (in terms of mainstreaming climate resilience) project management units at local levels by 2018
- Learning and Knowledge Management activities

Institutional Arrangements for Implementation

226. The Project will be implemented by the Ministry of Public Works and Transport – in collaboration with the newly created Provincial Councils. The implementing agencies (IAs) will be the participating towns which will establish project implementation units in their public works departments, and particularly the formulation of Strategic Local Economic Development Plans will be participatory in nature and include public and private sector stakeholders. In addition, the necessary regulatory and legal frameworks to enhance the effectiveness of adaptation interventions will be identified during project design.

Risks

227. Key issue which the Project may face will be the Executing Agency's capacity to manage large works. Careful assessment has to be made of the required number of staff and their level of skill and experience. If there is a shortfall in implementation capacity, the EAs will have to hire additional staff with suitable skills. Also the availability of current and future climate information at such a small spatial scale may also need to be addressed.

Investment Costs and Co-Financing

228. The total cost of the proposed project in Cambodia is estimated at $35 million, including the PPPCR financing of $15 million ($5 million as Grant, and $10 million as concessional credit). The total cost for the entire Greater Mekong Sub-region is about $305.20.

Table 25: Financing Plan

Category	Amount[b] (Million $)
PPCR Grant[a]	5.00
PPCR Concessional Credit	10.00
Co-financing from ADB and others	20.00
Co-financing for the entire GMS	290.20
Total for Cambodia	**35.00**
Total for GMS region	305.20

[a] *Including preparatory grant*
[b] *Source: ADB staff estimates – to be confirmed during fact finding*

Results and Performance Framework

229. The results and success indicators for this investment project component are as listed in Table 26:

Table 26: Results and Success Indicators

Result	Indicators
(a) Climate resilient improvements in provincial roads and urban environmental infrastructure (b) Institutional capacities on technical and financial management of climate risks strengthened (c) New and additional resources for climate resilience in priority infrastructure (e.g. roads, water supply and sanitation)	• Liveability of urban and peri-urban areas, and public health improved- incidence of environment related diseases reduced • Percentage of women in climate resilience-related economic opportunities increased • Number of population served by improved solid waste management and safe water supply during periods of extreme climate events increased

Project 3: Flood-resilient infrastructure development in Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Chhnang[55]

Background

230. The ADB **Sustainable Urban Development in the Tonle Sap Basin Project** will promote sustainability through provision of flood-resilient infrastructure and the building of institutional capacity of local authorities. Participating urban and peri-urban areas, all located within the flood-prone Tonle Sap Basin, are as follows: Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Chhnang. These areas serve an important role as service centers for surrounding agriculture and industrial value chain development and contribute to the proliferation of the rural economy and trade.

231. Priority infrastructure subsectors for enhancing flood-resilience are sanitation, solid waste management, flood control, urban roads, and public markets. Enhancing resilience of solid waste management and sewerage treatment facilities will generate multiple local co-benefits of clean air, water and soil from methane pollution..

[55] Proposed for Tranche 2 PPCR Financing

Development Objectives

232. The proposed development objective of this component is improved resilience of urban infrastructure to floods, particularly from climate change. The specific objectives are: (i) to mainstream adaptation concerns into infrastructure planning; and (ii) to enhance climate resilience of urban and peri-urban regions by strengthening river banks, elevated peri-urban roads for improved flood control, solid waste disposal and other sanitation systems, to minimize the impacts of floods.

Key Indicators and Baseline

233. A more comprehensive baseline study will be conducted prior to implementation of activities for this investment component. The anticipated indicators, outcomes and impacts of this component are outlined in Table 27.

Table 27: Key Indicators

Intervention	Indicators	Outcomes and Impacts
Capacity building of MPWT staff in mainstreaming climate resilience into urban and per-urban environmental infrastructure planning and maintenance	At least 20 staff members attend climate change adaptation seminars, of which at least 25% are female.	MPWT staff will be able to use the acquired basic knowledge and understanding in the initial training in their work in the ministry. Increase awareness on climate change issues and more knowledge on how to include climate change concerns into engineering designs.
Vulnerability mapping of infrastructure selected for rehabilitation	Maps are used to identify priority infrastructure and longer term planning	Decision and planning processes will be guided more by scientific inputs and assessments.
Identification and prioritization of adaptation approaches	At least three adaptation measures are identified	If vulnerability and impacts are identified, appropriate adaptation measures can be applied within the scope of the project
Enhancing climate resilience of infrastructure	A “forward-looking” approach (use of climate change scenarios) for infrastructure design as contrasted to “backward looking” approach (historical data) Number of flood-resilient solid waste management, drainage, and other sanitation facilities	The project design that incorporates effects of climate change early on in its designs will be more resilient and cost effective than when retrofitting.

Intervention	Indicators	Outcomes and Impacts
Enhancing socio-economic benefits	With the project, it is expected to provide climate resilient, all-year access to markets and other social services for provincial centers Number of women participating in community decision making on waste management and other related activities	The project will have substantial positive employment and gender impacts in the rural communities.

Anticipated activities

234. The activities for this component fall under three groups: Details are listed below:

- Investment Program
  - Construction of climate-resilient solid waste management facilities and other sanitation
  - Upgrading existing land fill to withstand flood impacts
  - Improvement of resilience of drainage facilities and protection of river banks
  - Climate-resilient Infrastructure constructed, commissioned, and made operational in phases between month 12 and month 72 (e.g. 2013–2018)
- Institutional capacities for mainstreaming climate resilience in infrastructure planning
  - Conduct of training programs by 2016
  - Development of well-trained and qualified (in terms of mainstreaming climate resilience) project management units at local levels by 2018
- Learning and Knowledge Management activities

Institutional Arrangements for Implementation

235. The Project will be implemented by the Ministry of Public Works and Transport – in collaboration with the newly created Provincial Councils. The implementing agencies (IAs) will be the participating towns which will establish project implementation units in their public works departments, and particularly the formulation of Strategic Local Economic Development Plans will be participatory in nature and include public and private sector stakeholders. In addition, the necessary regulatory and legal frameworks to enhance the effectiveness of adaptation interventions will be identified during project design.

Risks

236. Key issue which the Project may face will be the Executing Agency's capacity to manage large works. Careful assessment has to be made of the required number of staff and their level of skill and experience. If there is a shortfall in implementation capacity, the EA will have to hire additional staff with suitable skills. Also the availability of current and future climate information at such a small spatial scale may also need to be addressed.

Investment Costs and Co-Financing

237. The total cost of the proposed project in Cambodia is estimated at $50 million, including the PPPCR financing of $10 million ($5 million as Grant, and $5 million as concessional credit). The grant component includes project preparatory assistance of $0.6 million.

Table 28: Financing Plan

Category	Amount[b] (Million $)
PPCR Grant[a]	5.00
PPCR Concessional Credit	5.00
Co-financing from ADB and others	40.00
Total	**50.00**

[a] *Including preparatory grant*
[b] *Source: ADB staff estimates – to be confirmed during fact finding*

Results and Performance Framework

238. The results for this component and the indicators for performance are shown in Table 29.

Table 29: Key results and success indicators

Results	Success Indicators
(a) Incidence of seasonal flooding reduced (b) Number of households with supply of potable water and sanitation services increased (c) Leverage factor of PPCR funding in infrastructure	• Percentage of women in climate resilience-related economic opportunities increased • Number of population served by improved solid waste management and safe water supply during periods of extreme climate events increased • Incidence of seasonal flooding reduced • Number of households with supply of potable water and sanitation services increased • Leverage factor of PPCR funding in infrastructure

Linkages to NAPA

239. Among the 20 high priority projects in NAPA, the following high priority projects are identified to be closely linked with this proposed SPCR investments on infrastructure, mainly with regard to flood resilience, water supply and sanitation. Improving drainage and providing sewerage facilities in area where mosquitoes normally breed could lead to reduction or eradication of malaria and improvement of health. Likewise, provision of clean and safe water supply will contribute to good health, thereby increasing the adaptive capacity in general. The investment proposal thus gives the opportunity to start, to continue and to complement the implementation of NAPA projects in selected provinces.

Table 30: High Priority NAPA Projects with similar goals

Title	Locations
Community and Household Water Supply in Coastal Provinces - Safe and clean water supply - Reduction of incidence of water-related diseases	Kampot Kep and Koh Kong
Development and Rehabilitation of Flood Protection Dikes - Flood protection	Battambang*, Kampong Cham, Kandal, Kratie Pursat*, Sihanoukville and Svay Rieng*
Safer Water Supply for Rural Communities - Safe and clean water supply - Reduction of incidence of water-related diseases	Battambang,* Kampong Cham*, Kampong Speu*, Kampong Thom*, Kandal, Kratie, Prey Veng*, Ratanak Kiri and Takeo

*Areas being covered by proposed PPCR Phase 2 Investment Project III

Linkages to PPCR Phase 1

240. Opportunities to continue implementation of activities in PPCR Phase 1 to Phase 2 exist, such as in the mainstreaming of climate resilience in infrastructure-related ministries at the national level and the local government units at the provincial and community levels; strengthening civil society and private sector engagement and gender considerations in climate change adaptation; science-based adaptation planning (for example, use of climate change scenarios in planning and budgeting activities in key government agencies, and in the design of infrastructure projects). Lessons learned in Phase I could be used by Phase 2 to carry forward projects by following good practices and lessons learned. Phase 2 could build up on the knowledge products that Phase 1 projects have implemented.

Gender Mainstreaming

241. Improved connectivity can bring great benefits for women. Transport services increase, travel is faster and more convenient, and women and girls can travel safely further from home or return back home safely before dark. The quality of rural health, education and other services improve with better accessibility. Girls have a better chance of attending secondary school. Markets are easier to reach and trading opportunities for both men and women increase. Better roads bring more customers to the area, improving opportunities to expand women's small enterprises. Road construction and maintenance can generate jobs for women and provide cash income for the poor.

242. Women and children are most vulnerable and exposed to the lack of hygiene, sanitation, and other urban environmental facilities. For specific projects, their needs will be reflected and opportunities will be provided for them to participate in making decisions related to physical designs of infrastructure, particularly sanitation system, parks, urban roads (with safe sidewalks for pedestrians), and garbage collection equipment at the community/household level. During construction women can be employed in civil works. Gender action plan includes actions related to equal pay for both men and women for equal work. Project 1, which is already approved by the ADB, has already a gender assessment plan. For projects 2 and 3, similar gender analyses will be prepared as part of the project preparatory phase.

Engagement of Local Governments, Civil Society and the Private Sector

243. The local governments, civil society and the private sector are identified among the important stakeholders for this investment project. Modalities of their involvement will be determined during project design. Consultation of communities regarding specific services which have direct impact on their lives (water supply, sanitation, solid waste, etc.) will be undertaken during project preparation. This will focus on technical issues and their willingness and ability to pay for these services. Beneficiaries, local private sector representatives, non-government organizations, and local government authorities will be involved in all stages of program implementation to ensure its sustainability. It will be necessary to demonstrate the capacity and interest of participation by the private sector. The private sector, specifically the business sector, could come in to the project as co-investors, particularly when the environmental infrastructure is under consideration.

244. Both civil society and the private sector will be engaged in the capacity building processes, either as trainers or participants. Civil society, particularly, NGOs, are key partners in mobilizing community activities, generating and managing knowledge and information about infrastructure development, gender mainstreaming and in monitoring and impact evaluation of activities.

Scalability and Replication Potential

245. Methods and procedures to include climate change risks in design and construction of the environmental infrastructure (roads, drainage water treatment, sewerage systems and others) may be replicated in other provinces in Cambodia. Some of the components are part of ADB regional projects. Therefore, the adaptation interventions can be scaled up from the provincial level to national level and across the GMS region.

Knowledge management, dissemination of lessons learned and best practices

246. Appropriate toolkits and knowledge products focusing on mainstreaming climate change concerns into agriculture and natural resources planning and management will be developed and widely disseminated in Cambodia and the GMS. Guidelines on climate-proofing of water supply and sanitation infrastructure will be prepared. Information on local strategies and indigenous knowledge to cope with floods and droughts, and on ways to fine tune them under various ecological settings will be disseminated. The “knowledge generation, management and learning platform” of the technical assistance project will be effectively used to disseminate the lessons learned and best practices. The platform will have a dedicated project web site hosted at MOE and MAFF. In addition, the project will organize several information dissemination and workshops aimed at agricultural managers, businesses and other key stakeholders in collaboration with national academic institutions.

COMPONENT IV: Cluster Technical Assistance for Strengthening Capacity to Mainstream Climate Resilience into Development Planning[56]

Background

247. Climate change is a threat to sustainable development of Cambodia and achievement of the Millennium Development Goals, given its high vulnerability to climate change impacts from its vulnerable geographic location in a low deltaic flood plain, due to changing monsoon rainfall and other extreme climate events. Projections based on an analysis of 14 GCMs suggested that, under the high emissions scenario, the rainy season will start later, wet season rainfall will increase (bringing more flooding) but dry season rainfall will decrease. Under a low emissions scenario, the probability is lower but the trends are similar. Rainfall is expected to increase more in the lowlands than in the highlands. Climate change will bring more extreme weather events such as storms, heat waves, droughts and floods. Damage from intense cyclones has increased significantly in Cambodia in recent decades and may worsen. As projected, sea level rise will make more areas of the country extremely vulnerable to floods, salinity intrusion, and coastal inundation with serious implications for the physical and natural environment.

248. The National Adaptation Program of Action (NAPA) and the National Strategic Development Plan (NSDP: 2009 – 2013) provide an adequate basis for establishing linkages between sectors and inter-sector planning, thus facilitating the mainstreaming climate change in development planning processes. Integration of climate change funding in development planning strategies and programs reinforces mainstream thinking in climate change adaptation. Obviously, capacity building strategies and programs that recognize the need for change in the mindset of decision makers for mainstreaming climate change in the development policies and practices are needed for a meaningful transformational change. On the other hand, Pilot Program for Climate Resilience (PPCR) will ensure that Cambodia is able to integrate climate risk management into its development planning and to develop the capacity to prioritize and implement climate resilient investments in vulnerable sectors.

249. It is noted that the concern for climate change in Cambodia is currently limited due to other pressing development priorities related to natural resource management, governance and livelihoods. Ideally, these development topics will contribute to development effectiveness and ability to address environmental change including future climate change risks. Effectiveness of various institutions and agencies in climate change adaptation is constrained on account of their limited ability to understand the processes of information generation, analysis, and knowledge management, and the ability to convey the potential impacts of climate variability and change across different sectors and institutions. These constraints are manifest in the absence of the processes necessary for capturing and sharing information and knowledge driven by the needs and priorities of the stakeholders, the generation and sharing of information and knowledge as a continuous process, beginning with programming into project design and implementation, and the development and adoption of innovative and creative approaches to knowledge management. Appropriate institutional design and capacity is therefore necessary to address these constraints and establish systems, processes and procedures for cost-effective ways of sharing knowledge among stakeholders and increasing impact on the ground.

250. There is a low level of awareness in Cambodia about climate change, its causes, impacts and responses. Increased public awareness and access to information on climate change,

[56] Proposed for Tranche 1 PPCR funding

vulnerability and adaptation options will therefore be very important. As mentioned earlier, knowledge management will be critical to sustaining the impact and effectiveness of the climate resilience investments in Cambodia. Even at the outset, it will shape the ongoing investment planning through 'learning-by-doing' for all stakeholders.

251. There is significant potential for 'good practices' in climate financing to emerge from Cambodia through the implementation of the SPCR. Adequate allotment of funding has been made in each investment project for a range of information and awareness-building activities specific to that project. Furthermore, awareness-raising will be a focus of the support to be provided to Civil Society Organizations. The intention is to ensure that stakeholders have learned from the experience gained through project development and implementation, that the information is captured and shared and knowledge from international experience is also incorporated into the Cambodia program.

252. The importance of civil society in contributing to the response to climate change in Cambodia and the need for civil society to play a meaningful role in the Pilot Program for Climate Resilience (PPCR) are core principles enshrined in the founding documents of the program. As stated in the Royal Government of Cambodia (RGC) proposal for PPCR Phase I:

"Civil society… are key stakeholders already engaged with communities and are helping in the response to climate change through practical actions. Many service delivery and advocacy NGOs are leaders in CC adaptation at the local level, but many need support to adapt planning and programs, and many will need support to engage in new functions such as conflict resolution. Enhancing partnerships between civil society and the government at national and sub-national levels are a vital but challenging aspect of the integration of climate resilience in planning and programming."[57]

Developmental Objectives

253. The following are the objectives of this proposed cluster technical assistance (TA):
   (a) Strengthen institutional capacity for mainstreaming climate change concerns into planning, budgeting and development
   (b) Establish PPCR Coordinating and Technical Backstopping Unit at MOE
   (c) Conduct feasibility studies for selected NAPA projects
   (d) Provide support to civil society organizations to galvanize adaptation efforts at commune level, and
   (e) Disseminate knowledge products on climate change within Cambodia, and across the GMS and Southeast Asia

Key Indicators and Baseline

254. Base line data will be collected during the feasibility study. Key indicators will be based on measurable, reportable and verifiable improvements in institutional and human capacity building, civil society involvement, application of programmatic approaches to addressing climate change, knowledge products, etc.

[57] Pilot Program for Climate Resilience, Proposal for Phase 1, Royal Government of Cambodia, May 17, 2010, page 35.

255. The TA's main impact is a climate-resilient development in Cambodia leading to improved livelihoods, especially for vulnerable groups including women. The TA will take a holistic view of adaptation, including strengthening the country's access to financial instruments available under the United Nations Framework Convention on Climate Change and the Kyoto Protocol, such as the Least Developed Countries Fund and Adaptation Fund.

256. The expected outcome of the TA will be a sustained institutional and technical capacity to integrate adaptation concerns into development. The TA will enhance the climate resilience of programs, plans, and/or policies by building institutional capacity for planning, budgeting, and implementing climate change actions; applying a learning-by-doing approach; and strengthening the information base for decision making, such as through economic assessments and the development of methodologies for scaling up climate change actions. Capacity-building activities will be targeted at technical staff members and senior decision makers within the government. Feasibility studies on high priority but un-funded NAPA projects will allow the TA methodologies and outcomes to be replicated elsewhere and the TA project benefits to be disseminated throughout Cambodia, across the Greater Mekong Sub-region and Southeast Asia.

Anticipated Activities

257. The proposed cluster TA project will involve four distinct activities: (i) capacity development, coordination and technical support; (ii) NAPA Feasibility studies; (iii) civil society support; and, (iv) information and knowledge management.

258. **Capacity Development, Coordination and Technical Support:** This component has two objectives: to strengthen institutional capacity for mainstreaming climate change concerns into national and sub-national planning, budgeting and development, and to establish a PPCR Coordinating and Technical Backstopping Unit at the MOE. The actual details on composition of the unit will be determined during project design. However, it is expected that representatives of all key ministries and agencies would be invited to be the members of the steering committee for overseeing the activities of the unit. Integrating climate resilience in core development planning requires the involvement of a wide range of ministries. Building on findings of phase 1 activities, the activities under this component will be directed to encourage all ministries to take proactive leadership in mainstreaming climate resilience into sectoral development planning. To this effect, the unit will prepare climate risk management manuals, guidelines and design standards for key infrastructure sectors, and implement a comprehensive program of capacity building for climate change adaptation at the national, sectoral, provincial and commune levels, targeting students, public sector and civil society. Capacity of selected policy makers at various levels of government will be strengthened in using an array of vulnerability and adaptation assessment tools developed in phase 1. The unit will also monitor and evaluate the entire SPCR in Cambodia by developing a monitoring and evaluation framework, which is consistent with the PPCR Results Framework. The monitoring will also include key issues such as gender mainstreaming, civil society participation and private sector engagement. The PPCR technical backstopping would involve support to all seven investment components, and enable dissemination of finings from all projects over a wide area nationally. For example, the unit will assist in compiling the latest information on various issues such as i) improved water resource management; ii) improved irrigation and riverbank protection systems; iii) flood protection; iv) ecosystem-based adaptation planning with key focus on agriculture and food security; v) business-focused adaptation, vi) design standards for climate resilient infrastructure; and vii) resilient urban infrastructure planning and design.

259. **Support to NAPA Feasibility studies:** Even though NAPA was prepared in 2006, very few projects received funding. This was mainly because feasibility studies could not be undertaken. This component aims to fill this gap by supporting the preparation of feasibility studies for selected NAPA priority projects, particularly those which are related to the investments proposed for SPCR. Initial examination of the list of unfunded NAPA projects showed that there are potential for synergies with the investments proposed in the SPCR. Feasibility studies could lead to some of the proposed activities in the NAPA projects leverage new funds such as the LDC Fund, Adaptation Fund, and Green Climate Fund, and others. The feasibility studies supported through NAPA support mechanism will be conducted in cooperation with academic institutions.

260. **Civil Society Support Mechanism:** PPCR aims to create clear and deliberate strategies for engaging civil society. As noted earlier and in Part 1, civil society has an important role to play in furthering climate change adaptation, especially at provincial and local levels.[58] However, some CSOs are yet to mainstream climate change adaptation concerns into their operations. Therefore, capacity strengthening of CSOs to mainstream adaptation into their operations is one of the key priorities. Secondly, a grant mechanism to support CSOs is also envisioned, mainly to encourage a wider dissemination of adaptation technologies and initiatives, especially those at the local community level. In order to promote a learning community on climate change, and to strengthen the impact and sustainability of civil society initiatives under PPCR, the grants provided to CSOs under this TA will support efforts to conduct research and generate knowledge on the impact of climate change in Cambodia and potential civil society approaches to address this challenge. The grants may also be used to implement adaptation activities with communities. Third, support will also be provided to encourage CSOs and NGOs to ensure that lessons learned from community-based adaptation initiatives are captured and feed back into the development of subsequent projects for replication. Such knowledge will serve as a useful resource for the government and development partners to help inform policy development and decision-making. Fourth, CSOs and NGOs will be encouraged to participate as providers of services and goods in various investment projects.

261. **Knowledge generation, management and learning platform:** “Learning by doing” is at the heart of PPCR mission. The knowledge generation, management and learning platform component will support the generation, dissemination and sharing of climate change information, knowledge products and lessons learned with PPCR’s broad stakeholder community and to support national, regional and global replication of PPCR activities. The Cambodia Climate Change Alliance (CCCA) funded by the European Union, UNDP, SIDA and DANIDA, also plans to engage in such knowledge dissemination activities. Therefore, special efforts will be made to promote synergies between CCCA and PPCR in implementing activities under this component. The objectives of the platform are twofold: i) to address the knowledge management needs and objectives at a national level in Cambodia, and ii) to contribute to the wider CIF program-wide sharing of valuable experiences and lessons learned across countries. An interactive web-based tool for communications and learning will be a key mechanism through which this component would operate. National academic institutions will be proactively involved in developing this platform, especially to generate new knowledge on country-specific impact assessments and adaptation strategies, and to disseminate such knowledge at national and provincial levels.

262. For effective dissemination of knowledge gained from PPCR investments in Cambodia, a wide range of activities including awareness building, development of knowledge products and

[58] Consultancy Report on Civil Society Engagement, Pilot Program on Climate Resilience Cambodia, August to September 2010, World Bank, page 1.

multi-stakeholder workshops will be promoted. For example, basic training at the project level will be given to farmers and rural communities on climate impacts on agriculture, on communities, on women; and ways to enhance climate resilience. Where possible, local schools curricula will be supplemented and strengthened by climate change adaptation materials, especially those in the immediate vicinity of the projects. This may be extended to a national level program in collaboration with previous curriculum initiatives (EU, UNDP and the Asian Disaster Preparedness Centre). Appropriate media and content will also be developed with the assistance of CSO and NGO organizations to deliver and communicate effectively. Raising awareness and disseminating knowledge will be accomplished through a variety of media including seminars and workshops, and effective use of information and communication technologies. The prospects for establishing provincial resource centers on adaptation will be explored in collaboration with other development organizations. Once the program is underway, there will be deliberate and systematic project management activities that will allow implementers to assess the knowledge needs, and to capture and share with other stakeholders, lessons emerging from their on-going operations in a timely manner. Knowledge products on climate change would be disseminated within Cambodia and across the GMS region.

Institutional Arrangements for Implementation

263. The proposed cluster TA project will be executed by ADB in accordance with its internal policies, procedures and guidelines and implemented by the Ministry of Environment in close cooperation with the National Steering Committee on Climate Change and its TWGs. The National Steering Committee on Climate Change will serve as the cluster TA steering committee. Relevant national agencies and CSOs will be the implementing agencies (IAs). However, details regarding implementing agencies for specific components will be determined during the design phase following approval of the SPCR. Other line ministries and agencies, provincial water resources and environment offices, and provincial agriculture and forestry offices will be involved through workshops and forums, direct consultations, and pilot implementation. The established PPCR Coordinating Unit (PCU) will monitor and guide implementation. PCU will keep ADB informed of any significant deviations from the agreed project implementation schedule and targets.

Investment Costs and Financing

264. The total cost of the proposed cluster TA is estimated at $7 million over a period of 5 years. The approximate budget allocation for various components is given below.

Table 31: Financing Plan

Cluster TA Component	Amount[a] (Million $)
PPCR Coordination and Technical Backstopping Unit	3.00
CSO Support Mechanism	2.00
Knowledge Generation, Management and Learning Platform	1.00
Support to conduct NAPA Feasibility Studies	1.00
Total	**7.00**

[a] *Including preparatory grant*

Results and Performance Framework

265. The success indicators that will be monitored for various key results of the TA are given below in Table 32.

Table 32: Key Results and Success Indicators

Results	Success Indicators
Cluster Technical Assistance for Strengthening Capacity to Mainstream Climate Resilience into Development Planning (a) Improved integration of resilience into national development strategies, plans and policies (b) Strengthened information base for decision making among government agencies (c) Improved resilience and livelihoods, especially for vulnerable groups including women (d) Increased knowledge and awareness of climate change among civil society and private sector (e) Enhanced integration of learning/knowledge into climate-resilient development in Cambodia (f) Increased involvement of vulnerable rural communities, civil society organizations and the private sector in adaptation efforts (g) Replication of PPCR learning throughout Cambodia, across the GMS sub-region and Southeast Asia	• Degree to which development plans integrate resilience into planning increased • Extent to which decision making is based on Cambodia-specific climate risks and vulnerability • Number of line ministries updating country strategies for resilience increased • Budget allocations to address climate vulnerability at commune level increased • Evidence of a working mechanism to coordinate investments and knowledge on climate resilience • Coverage of climate risk analysis and vulnerability assessments increased through studies on high priority but un-funded NAPA projects with replicability potential • Quality of participatory planning process as assessed by vulnerable communities • Relevance and quality of knowledge assets on climate resilience in Cambodia increased • Extension of climate resilience principles beyond three priority sectors within Cambodia, and to non-PPCR countries in GMS and Southeast Asia

PART III: REQUEST FOR PROJECT PREPARATION FUNDING

266. The SPCR proposes a comprehensive package of soft and hard intervention projects and capacity development activities to be financed under the PPCR.

267. The Royal Government of Cambodia is requesting for US $50 million for PPCR Grant funding, (including $ 3.80 million for project preparation), and $55 million PPCR in credit. This Part 3 provides the request for 7 project preparation grants. A summary of the project costs, financing plan and specific requests for grants and concessional credits from the PPCR are summarized in Table 33.

Table 33: Cost Summary

Investment Components	Preparatory Costs for Feasibility Studies (US $ millions)	Proposed Project / Cluster TA Costs (US $ millions)	MDB Lead	Financing/Co-financing for Investment Projects (US $ millions)		
				PPCR		MDB & others
				Grant	Credit	
Investment Component-I/ Project 1	0.6	19	ADB	7 (0.6 of which is PPG)	12.00	63.00
Investment Component-I/ Project 2	0.6	14	ADB	6 (0.6 of which is PPG)	8.00	35.00 (80.00)*
Investment Component -II/ Project 1	0.6	8	ADB	8 (0.6 of which is PPG)	0.00	20.40 (76.77)*
Investment Component-II/ Project 2	0.6	15	ADB	5 (0.6 of which is PPG)	10.00	60.00
Investment Component-III/ Project 1	---	17	ADB	7	10.0	61.00
Investment Component-III/ Project 2	0.6	15	ADB	5 (0.6 of which is PPG)	10.00	20.00 (290.20)*
Investment Component-III/ Project 3	0.6	10	ADB	5 (0.6 of which is PPG)	5.00	40.00
Investment Component -IV/ Cluster TA project	0.2	7	ADB	7 (0.2 of which is PPG)		TBD
Total	**3.8**	**105**		**45.80**	**55.00**	**299.40 (446.97)***

*Total for GMS

Project Preparation Grant

Investment Component I: Promoting Climate-Resilience of Water Resources and Related Infrastructure

Project 1: Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin

PILOT PROGRAM FOR CLIMATE RESILIENCE **Project/Program Preparation Grant Request**			
1. **Country/Region**:	**Cambodia**	2. **CIF Project ID**#:	(Trustee will assign ID)
3. **Project Name:**	Climate Risk Management and Rehabilitation of Small- and Medium-scale Irrigation Schemes in the Tonle Sap Basin		
4. **Tentative Funding Request (in USD million total) for Project[59] at the time of SPCR submission (concept stage):**	*Grant: $7 million*	*Loan: $12 million*	
5. **Preparation Grant Request (in USD million):**	*$600,000*	*MDB: ADB*	
6. **National Project Focal Point**:	*Ministry of Water Resources and Meteorology (MOWRAM*		
7. **National Implementing Agency (project/program):**	*Ministry of Water Resources and Meteorology (MOWRAM)*		
8. **MDB PPCR Focal Point and Project/Program Task Team Leader (TTL)**:	*Headquarters-PPCR Focal Point: Ancha Srinivasan, Principal Climate Change Specialist*	*TTL: Christopher Wensley Lead Water Resources Specialist*	

9. **Description of activities covered by the preparation grant:**

- Review existing information and analyze future impacts of climate change on hydro-meteorological parameters using downscaled global circulation model (GCM) projections to assess flow regime of the Mekong River Basin and its sub-basins for the WRMSDP project area (Kampong Thom, Banteay Meanchey, and Siem Reap Provinces);
- Assess the impact on dry and wet season precipitation, level of flooding, and dry season water stress in the Mekong River Basin and its sub-basins.
- Assess implications of climate change on: (i) planned farming practices and cropping patterns for subprojects to be rehabilitated under Output C of Cambodia Water Resources Sector Development Program (WRMSDP), (ii) hydrologic/hydraulic operation of irrigation facilities, and (iii) engineering design parameters for irrigation systems and facilities.
- Assess institutional capacity and human resources development needs, and propose monitoring mechanisms for the effects of the proposed adaptation measures and measurement of key hydro-meteorological data.
- Undertake due diligence assessments (technical, economic, social, environmental, risk, etc.) for PPCR project financing proposal (including preparation of RRP, PAM and linked appendices) and any necessary surveys, consultation and refinement of WRMSDP safeguard documents to prepare the proposal for ADB Board consideration.

[59] Including the preparation grant request.

10. **Outputs:**	
Deliverable	**Timeline**
(a) Inception report	October 2011
(b) Draft Final Report	March 2012
(c) Final Report	April 2012
11. **Budget (indicative):**	
Expenditures	**Amount (USD) -** estimates
Consultants	350,000
Equipment	40,000
Workshops/seminars/surveys	90,000
Travel/transportation	50,000
Others (admin costs/operational costs)	40,000
Contingencies (max. 10%)	30,000
Total Cost	**600,000**
Other contributions:	
• Government	30,000 (in kind)
• MDB	Tbd
• Private Sector	
• Others (please specify)	
12. **Timeframe** (tentative) Submission of pre-appraisal document for PPCR Sub-Committee Approval: July 2011 Expected Board/MDB Management approval date: September 2011	
13. **Other Partners involved in project design and implementation**:	
14. **If applicable, explanation for why the grant is MDB executed:** The preparation grant will be executed by ADB for speed in recruitment and efficient management of consulting services and coordination with regional loan project processing schedule. Execution by ADB is also in conformity with ADB TA's procedures.	
15. **Implementation Arrangements** (incl. procurement of goods and services)**:** ADB will administer procurement of consulting services and goods from the Headquarters with support of the Cambodia Resident Mission.	

Project Preparation Grant
Investment Component I: Promoting Climate-Resilience of Water Resources and Related Infrastructure
Project 2: Enhancement of Flood and Drought Management in Pursat and Kratie Provinces

<table>
<tr><th colspan="5">PILOT PROGRAM FOR CLIMATE RESILIENCE
Project/Program Preparation Grant Request</th></tr>
<tr><td>1. Country/Region:</td><td>CAMBODIA</td><td>2. CIF Project ID#:</td><td colspan="2">(Trustee will assign ID)</td></tr>
<tr><td>3. Project Name:</td><td colspan="4">Enhanced Flood and Drought Management in Pursat and Kratie Provinces</td></tr>
<tr><td>4. Tentative Funding Request (in USD million total) for Project[60] at the time of SPCR submission (concept stage):</td><td colspan="2">Grant: 6.0 million</td><td colspan="2">Loan: 8.0 million</td></tr>
<tr><td>5. Preparation Grant Request (in USD million):</td><td colspan="2">0.6 million</td><td colspan="2">MDB: Asian Development Bank</td></tr>
<tr><td>6. National Project Focal Point:</td><td colspan="4">Ministry of Water Resources and Meteorology (MoWRAM)</td></tr>
<tr><td>7. National Implementing Agency (project/program):</td><td colspan="4">Ministry of Water Resources and Meteorology (MoWRAM)</td></tr>
<tr><td>8. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):</td><td colspan="2">Headquarters-PPCR Focal Point: Ancha Srinivasan, Principal Climate Change Specialist</td><td colspan="2">TTL: Ian W Makin Senior Water Resources Specialist</td></tr>
<tr><td colspan="5">9. Description of activities covered by the preparation grant:
The requested preparation grant will finance technical assistance to design additional actions to be focused on strengthening the climate resilience of the structural and non-structural investments for flood and drought risk mitigation and management in communities, nationally and regionally. This includes: (i) assessment of climate resilience of proposed infrastructure and management; (ii) guidelines to increase effectiveness of water management infrastructure in response to Climate Change, including detailed terms of reference (TOR) for development of design guidelines for climate resilient water management infrastructure in the Mekong delta and lower Mekong Basin; (iii) analyses of capacity building needs of civil society and organizations (including the Private Sector) to raise public awareness about climate change adaptation and to participate in the design and delivery of climate change adaptation measures aimed at increasing the resilience of communities; and (iv) an assessment of the gender differentiated aspects of climate change to ensure future structural and non-structural to reduce community vulnerability to climate change are appropriate and gender responsive and assist in equitable access to adaptation efforts supported by the Project. As part of the TA packages financed under the Preparation grant, the purchase of some equipment and data sets, training workshops and travel will be required, in addition to consultant services. (Consultants' TORs are attached). The TA will assist MoWRAM develop guidelines and manuals for use by staff and consultants during implementation of the project and for general use by MoWRAM to ensure investments adequately address climate change adaption. In addition, preparation activities would include additional social and environment assessments to revise the existing safeguards documents, financial and economic analysis prepared for the GMS Flood and Drought Management Project.</td></tr>
</table>

[60] Including the preparation grant request.

10. **Outputs:**	
Deliverable	**Timeline**
(a) Project document for PPCR Sub Committee review and approval	Q4 2011
(b) Six briefing papers on climate change and adaptation strategies for water management in Cambodia (subjects to be confirmed) - Climate change and natural resources management in Cambodia - Hydrological impacts - Implications for structural design of hydraulic structures and channels - Implications for civil society and community based disaster risk management in Cambodia - Management responses to climate change in Tonle Sap - Planning for climate change in agriculture	Q1 2012
(c) MoWRAM staff guidelines on climate change impact and adaptation assessments	Q1 2012

11. **Budget (indicative):**	
Expenditures	**Amount (USD) –** estimates
Consultants	335,000
Equipment	15,000
Workshops/seminars/surveys	120,000
Travel/transportation	45,000
Others (admin costs/operational costs)	35,000
Contingencies (8%)	50,000
Total Cost	**600,000**
Other contributions:	
• Government	25,000 (in kind staff and offices)
• MDB	20,000 (supervision and reviews)
• Private Sector	
• Others (please specify)	

12. **Timeframe** (tentative)
Submission of pre-appraisal document for PPCR Sub-Committee Approval: September 2011
Expected Board/MDB Management approval date: October 2011

13. **Other Partners involved in project design and implementation**: Mekong River Commission Secretariat, Mekong Regional Flood Management and Mitigation Center, Phnom Penh, academic institutions (Southern Institute for Water Resources, Ho Chi Minh City, NAHRIM - the APWF knowledge hub on climate change), international and national NGOs in Cambodia.

14. **If applicable, explanation for why the grant is MDB executed:** The preparation grant will be executed by ADB for speed in recruitment and efficient management of consulting services and coordination with regional loan project processing schedule. Execution by ADB is also in conformity with ADB TA's procedures.

15. **Implementation Arrangements** (incl. procurement of goods and services)**:** The preparation grant will be implemented by ADB in partnership with MoWRAM following Asian Development Bank procurement guidelines and technical assistance implementation handbook.

Project Preparation Grant

Investment Component II: Enhancing Climate-Resilient Agriculture and Food Security

Project 1: Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces[61]

PILOT PROGRAM FOR CLIMATE RESILIENCE Project/Program Preparation Grant Request			
1. Country/Region:	**Cambodia**	**2. CIF Project ID#**:	(Trustee will assign ID)
3. Project Name:	Promoting climate-resilient agriculture, forestry, water supply and coastal resources in Koh Kong and Mondulkiri provinces		
4. Tentative Funding Request (in USD million total) for Project[62] at the time of SPCR submission (concept stage):	*Grant: $ 8 million*	*Loan: None*	
5. Preparation Grant Request (in USD million):	*$600,000*	*MDB: ADB*	
6. National Project Focal Point:	*Ministry of Agriculture, Forestry, and Fisheries (MAFF)*		
7. National Implementing Agency (project/program):	*Ministry of Agriculture, Forestry, and Fisheries (MAFF)) and Ministry of Water Resources and Meteorology (MOWRAM)*		
8. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):	*Headquarters-PPCR Focal Point: Ancha Srinivasan, Principal Climate Change Specialist*	*TTL: Pavit Ramachandran Environment Specialist*	

9. Description of activities covered by the preparation grant:

The preparation grant will finance technical assistance and incremental costs required to inform the design of activities under the project component. This includes:

(i) preparing environmental and social assessments to meet the preparation standards and safeguards requirement of the ADB, including relevant consultations;

(ii) preparing detailed Terms of Reference for consultants to support project implementation of component 1 of the project (detailed design and costing);

(iii) downscaling climate change impact models and vulnerability assessments to storm-surges, flooding and drought in Koh Kong and Mondulkiri provinces;

(iv) undertaking appropriate due diligence assessments (technical, economic, social, environmental, risk, etc.) for PPCR project financing proposal (including preparation of RRP, PAM and linked appendices) and any necessary surveys and consultation to prepare the proposal for ADB Board consideration;

(v) conducting institutional needs assessment and associated capacity building and human resource requirements for adaptation interventions

(vi) preparing the detailed investment proposal, including feasibility studies of the activities/sub-projects to be covered under the Project;. As part of the TA packages financed under the Preparation grant, the purchase of some equipment and data sets, training workshops and travel may be required, in addition to consultant services.

[61] As part of ADB-funded GMS Biodiversity Conservation Corridors Project - Proposed for Tranche 1 PPCR Funding
[62] Including the preparation grant request.

10. Outputs:	
Deliverable	**Timeline**
(a) Inception Report, including ToRs for consultants, and environmental and social impact assessments	February/March 2012
(b) Draft Report, including detailed design, investment packages, and management plans	June 2012
(c) Final Report	July 2012
11. Budget (indicative):	
Expenditures	**Amount (USD) -** estimates
Consultants	360,000
Equipment	55,000
Workshops/seminars	40,000
Travel/transportation	70,000
Others (admin costs/operational costs)	40,000
Contingencies (max. 10%)	35,000
Total Cost	**600,000**
Other contributions:	
• Government	30,000 (in kind)
• MDB	
• Private Sector	
• Others (please specify)	
12. Timeframe (tentative) Submission of pre-appraisal document for PPCR Sub-Committee Approval: July 2011 Expected Board/MDB Management approval date: September 2011	
13. Other Partners involved in project design and implementation: Conservation International, Flora and Fauna International, Wildlife Alliance, World Wildlife Fund for Nature, Wildlife Conservation Society	
14. If applicable, explanation for why the grant is MDB executed: Execution by ADB will ensure an early implementation of PPG and facilitate the processing and approval of change in scope paper by the Government and ADB. Execution by ADB is also in conformity with ADB TA's procedures.	
15. Implementation Arrangements (incl. procurement of goods and services)**:** ADB will administer procurement of consulting services and goods from the Headquarters with support of the Cambodia Resident Mission.	

Project Preparation Grant

Investment Component II: Enhancing Climate-Resilient Agriculture and Food Security

Project 2: Climate proofing of agricultural infrastructure and business-focused adaptation[63]

PILOT PROGRAM FOR CLIMATE RESILIENCE **Project/Program Preparation Grant Request**			
1. Country/Region:	**Cambodia**	**2. CIF Project ID#**:	(Trustee will assign ID)
3. Project Name:	**Climate proofing of agricultural infrastructure and business-focused adaptation**		
4. Tentative Funding Request (in USD million total) for Project[64] **at the time of SPCR submission (concept stage):**	*Grant: $5 million*	*Loan: $10 million*	
5. Preparation Grant Request (in USD million):	*$600,000*	*MDB: ADB*	
6. National Project Focal Point:	*Ministry of Agriculture, Forestry, and Fisheries (MAFF)*		
7. National Implementing Agency (project/program):	*Ministry of Agriculture, Forestry, and Fisheries (MAFF) and Ministry of Rural Development (MRD)*		
8. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):	*Headquarters-PPCR Focal Point: Ancha Srinivasan, Principal Climate Change Specialist*	*TTL: Bui Minh Giap, Natural Resources and Agriculture Economist*	

9. Description of activities covered by the preparation grant:

The Preparation Grant is requested to conceptualize the project designs with specific regards to Irrigation Water Efficiency; Post harvesting Facilities; Crop Insurance. The scoping study will:

- Review existing information and analyze future impacts of climate change on hydro-meteorological parameters using downscaled global circulation model (GCM) projections to assess potential climate change impact on the rainfall, flooding, drought, in different agro-ecological zones;
- Assess the implications to the varieties that are traditionally grown by farmers and Identify varieties that can be more adopted to change in climate conditions;
- Assess current crops and cropping systems and diversify the cropping patterns or crops grown by taking into account the local conditions (trend) that are predicted in the modelling analysis;
- Review Improved agricultural practices that promote efficient utilization of land space, nutrients, and water;
- Explore opportunities for Capacity building of farmers (producer groups).
- Identify key climate induced risks and other productivity constraints faced by the farming communities in different regions and identify potential solutions where private sector can play a role.
- Take stock of the current level of stress, current agricultural practices, identify key constraints and opportunities with regards to farming particularly to the climate induced

[63] As part of the ADB-funded *Agricultural Commercialization and Resource Conservation Sector Development Program* - **Proposed for Tranche 2 Funding**

[64] Including the preparation grant request.

stresses.

- Identify key private sector players in the market and other developmental partners engaged in similar climate adaptation projects? or locations
- Identify climate change risks in agribusiness and prepare baselines on key interventions.
- Undertake appropriate due diligence assessments (technical, economic, social, environmental, risk, etc.) for PPCR project financing proposal (including preparation of RRP, PAM and linked appendices) and any necessary surveys, consultation and refinement of project's safeguard documents to prepare the proposal for ADB Board consideration.

10. Outputs:

Deliverable	**Timeline**
(a) Inception report	February/March 2012
(b) Draft Final Report	June 2012
(c) Final Report	July 2012

11. Budget (indicative):

Expenditures	**Amount (USD) –** estimates
Consultants	350,000
Equipment	50,000
Workshops/seminars/surveys	85,000
Travel/transportation	45,000
Others (admin costs/operational costs)	40,000
Contingencies (max. 10%)	30,000
Total Cost	**600,000**
Other contributions:	
• Government	30,000 (in kind)
• MDB	Tbd
• Private Sector	Tbd
• Others (please specify)	

12. Timeframe (tentative)

Submission of pre-appraisal document for PPCR Sub-Committee Approval: October 2011
Expected Board/MDB Management approval date: November 2011

13. Other Partners involved in project design and implementation: Potentially Agence Francaise de Development

14. If applicable, explanation for why the grant is MDB executed: Execution by ADB will ensure an early implementation of PPG and facilitate the processing and approval of change in scope paper by the Government and ADB. Execution by ADB is also in conformity with ADB TA's procedures.

15. Implementation Arrangements (incl. procurement of goods and services)**:** ADB will administer procurement of consulting services and goods from the Headquarters with support of the Cambodia Resident Mission.

Project Preparation Grant

Investment Component III: Improving Climate-Resilient Infrastructure

Project 2: Climate Proofing of Infrastructure in the Southern Economic Corridor (SEC) towns[65]

PILOT PROGRAM FOR CLIMATE RESILIENCE **Project/Program Preparation Grant Request**			
1. Country/Region:	**Cambodia**	**2. CIF Project ID#**:	(Trustee will assign ID)
3. Project Name:	Climate Proofing of Infrastructure in the Southern Economic Corridor (SEC) towns		
4. Tentative Funding Request (in USD million total) for Project[66] at the time of SPCR submission (concept stage):	*Grant: $5 million*	*Loan: $10 million*	
5. Preparation Grant Request (in USD million):	*$600,000*	*MDB: ADB*	
6. National Project Focal Point:	*Ministry of Public Works and Transport (MPWT)*		
7. National Implementing Agency (project/program):	*Ministry of Public Works and Transport (MPWT) and Ministry of Rural Development (MRD)*		
8. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):	*Headquarters-PPCR Focal Point: Ancha Srinivasan, Principal Climate Change Specialist*	*TTL: Florian Steinberg; Urban Development Specialist*	

9. Description of activities covered by the preparation grant:

(a) Develop rationale for climate change adaptation rational for priority investments in the prioritized SEC Corrdior Towns, taking into account other planning frameworks of the government, including Disaster Risk Management Plans.

(b) TA to determine optimum mix of hard and soft engineering solutions to secure vital infrastructure in the zone which is regularly affected by disasters, as well as to address chronic climate impacts and changes in precipitation patterns, such as fluxes in groundwater levels and relative salinity. Report with guidelines and decision support tools.

(c) Assessment of capacity of Ministry of Public Works and Transport to engage in and deliver elements of national Climate Change Adaptation Agenda in Cambodia. Recommendations for capacity building of the Ministry and for participation in the project

(d) Assess gender differentiated aspects of Climate Change in Cambodia in terms of vulnerability to impacts and capacity of men and women to adapt to CC.

(e) Undertake appropriate due diligence assessments (technical, economic, social, environmental, risk, etc.) for PPCR project financing proposal (including preparation of RRP, PAM and linked appendices) and any necessary surveys, consultation and refinement of project's safeguard documents to prepare the proposal for ADB Board consideration.

[65] As part of the ADB –funded GMS Corridor /owns Development Project) - Proposed for Tranche 1 Funding
[66] Including the preparation grant request.

10. Outputs:	
Deliverable	**Timeline**
(a) Inception report, including report on guidelines and decision support tools.	November 2011
(b) Capacity assessment report	December 2011.
(c) Due diligence assessment report	February 2012
(d) Final report	March 2012

11. Budget (indicative):	
Expenditures	**Amount (USD) -** estimates
Consultants	$350,000
Equipment	$ 55,000
Workshops/seminars/surveys	$ 80,000
Travel/transportation	$ 25,000
Others (admin costs/operational costs)	$ 40,000
Contingencies (max. 10%)	$ 50 ,000
Total Cost	**$ 600,000**
Other contributions:	
• Government	Tbd
• MDB	Project preparatory technical assistance, Cambodia part of the GMS Corridor Towns Development Project (base project) $700,000 Cities Development Initiative for Asia (CDIA) grant for Battambang City: $424,600 for base project
• Private Sector	n.a.
• Others (please specify)	n.a.

12. Timeframe (tentative)
Submission of pre-appraisal document for PPCR Sub-Committee Approval: December 2011
Expected Board/MDB Management approval date: April 2012

13. Other Partners involved in project design and implementation:
GMS National Secretariat.
National agencies dealing with Climate Change.

14. If applicable, explanation for why the grant is MDB executed: Execution by ADB will ensure an early implementation of PPG and facilitate the processing and approval of change in scope paper by the Government and ADB. Execution by ADB is also in conformity with ADB TA's procedures.

15. Implementation Arrangements (incl. procurement of goods and services)**:** ADB will administer procurement of consulting services and goods from the Headquarters with support of the Cambodia Resident Mission.

Project Preparation Grant

Investment Component III: Improving Climate-Resilient Infrastructure

Project 3: Flood-resilient Infrastructure Development in Sisopohon, Siem Reap, Kampong Thom, Battambang, Pursat and Kampong Cham [67]

PILOT PROGRAM FOR CLIMATE RESILIENCE **Project/Program Preparation Grant Request**			
1. Country/Region:	**Cambodia**	**2. CIF Project ID#**:	(Trustee will assign ID)
3. Project Name:	*Sustainable Urban Development in Tonle Sap Basin*		
4. Tentative Funding Request (in USD million total) for Project[68] at the time of SPCR submission (concept stage):	*Grant: $5 million*	*Loan: $10 million*	
5. Preparation Grant Request (in USD million):	*$600,000*	*MDB: ADB*	
6. National Project Focal Point:	*Ministry of Public Works and Transport (MPWT)*		
7. National Implementing Agency (project/program):	*Ministry of Public Works and Transport (MPWT)*		
8. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):	*Headquarters-PPCR Focal Point: Ancha Srinivasan, Principal Climate Change Specialist*	*TTL: Anupma Jain, Senior Social Sector Specialist; Alternate: Florian Steinberg, Senior Urban Development Specialist*	

9. Description of activities covered by the preparation grant:

The preparation grant will finance the:

(i) preparation of environmental and social assessments to meet the preparation standards and safeguards requirement of ADB, including relevant consultations;

(ii) preparation of detailed Terms of Reference for consultancies to support project implementation (detailed design and costing);

(iii) Determination of the optimum mix of hard and soft engineering solutions to secure vital infrastructure in the zone which is regularly affected by disasters, as well as to address chronic climate impacts and changes in precipitation patterns.

(iv) Assessment of capacity of relevant agencies, NGOs or private sector to engage in and deliver elements of national Climate Change Adaptation Agenda in Cambodia ny providing recommendations for capacity building of the Ministry staff for participation

(v) Assess gender-differentiated aspects of Climate Change in Cambodia in terms of vulnerability to impacts and capacity of men and women to adapt to CC.

As part of the TA packages financed under the Preparation grant, the purchase of some equipment and data sets, training workshops and travel may be required, in addition to consultant services.

[67] As part of the ADB-funded *Sustainable Urban Development in the Tonle Sap Basin Project* - **Proposed for Tranche 2 Funding**

[68] Including the preparation grant request.

10. Outputs:	
Deliverable	**Timeline**
(a) Inception report	February/March 2012
(b) Draft Final Report	June 2012
(c) Final Report	July 2012
11. Budget (indicative):	
Expenditures	**Amount (USD) -** estimates
Consultants	350,000
Equipment	50,000
Workshops/seminars	85,000
Travel/transportation	45,000
Others (admin costs/operational costs)	40,000
Contingencies (max. 10%)	30,000
Total Cost	**600,000**
Other contributions:	
• Government	30,000 (in kind)
• MDB	
• Private Sector	
• Others (please specify)	
12. Timeframe (tentative) Submission of pre-appraisal document for PPCR Sub-Committee Approval: July 2012 Expected Board/MDB Management approval date: September 2012	
13. Other Partners involved in project design and implementation:	
14. If applicable, explanation for why the grant is MDB executed: Execution by ADB will ensure an early implementation of PPG and facilitate the processing and approval of change in scope paper by the Government and ADB. Execution by ADB is also in conformity with ADB TA's procedures.	
15. Implementation Arrangements (incl. procurement of goods and services)**:** ADB will administer procurement of consulting services and goods from the Headquarters with support of the Cambodia Resident Mission.	

Project Preparation Grant

Investment Component IV: Cluster Technical Assistance for Strengthening Capacity to Mainstream Climate Change into Development Planning

PILOT PROGRAM FOR CLIMATE RESILIENCE **Project/Program Preparation Grant Request**			
1. Country/Region:	**Cambodia**	**2. CIF Project ID#**:	(Trustee will assign ID)
3. Project Name:	Cluster Technical Assistance: Strengthening capacity to mainstream climate change into development planning		
4. Tentative Funding Request (in USD million total) for Project[69] at the time of SPCR submission (concept stage):	*Grant: $7 million*		
5. Preparation Grant Request (in USD million):	*$200,000*	*MDB: ADB*	
6. National Project Focal Point:	*Ministry of Environment*		
7. National Implementing Agency (project/program):	*Ministry of Environment in association with other ministries and CSOs*		
8. MDB PPCR Focal Point and Project/Program Task Team Leader (TTL):	*Headquarters-PPCR Focal Point: ANCHA Srinivasan, Principal Climate Change Specialist*	*TTL: ANCHA Srinivasan Principal Climate Change Specialist*	

9. Description of activities covered by the preparation grant:

The preparation grant will finance technical assistance and incremental costs required to inform the design of activities under the four technical assistance components. This includes TA aimed at:

(i) consultations with relevant groups, implementing/coordinating agencies, CSOs and private sectors, and development partners;

(ii) prepare detailed Terms of Reference for consultancies to support cluster TA implementation (detailed work plans and costing).

As part of the TA packages financed under the Preparation grant, the purchase of some equipment and data sets, training workshops and travel may be required, in addition to consultant services.

10. Outputs:

Deliverable	**Timeline**
(a) Inception report/ Management Plans	February/March 2012
(b) Draft Final Report	June 2012
(c) Final Report	July 2012

11. Budget (indicative):

Expenditures[70]	**Amount (USD) -** estimates
Consultants	140,000
Equipment	10,000
Workshops/seminars	10,000

[69] Including the preparation grant request.

[70] These expenditure categories may be adjusted during project preparation according to emerging needs.

Travel/transportation	10,000
Others (admin costs/operational costs)	20,000
Contingencies (max. 10%)	10,000
Total Cost	**200,000**
Other contributions:	
• Government	10,000 (in kind)
• MDB	Tbd
• Private Sector	n.a.
• Others (please specify)	n.a.
12. Timeframe (tentative) Submission of pre-appraisal document for PPCR Sub-Committee Approval: December 2011 Expected Board/MDB Management approval date: February 2012	
13. Other Partners involved in project design and implementation: CCCA, CSOs	
14. If applicable, explanation for why the grant is MDB executed: Execution by ADB will ensure an early implementation of PPG and facilitate the processing and approval of change in scope paper by the Government and ADB. Execution by ADB is also in conformity with ADB TA's procedures.	
15. Implementation Arrangements (incl. procurement of goods and services)**:** ADB will administer procurement of consulting services and goods from the Headquarters with support of the Cambodia Resident Mission.	

Annex 1

Cambodia Risk Profile (natural hazards)

The risk is the combination of the probability of an event and its negative consequences. This risk profile is an analysis of the mortality and economic loss risk for three weather-related hazards: tropical cyclones, floods and landslides. In addition new insights have been gained into other hazards such as earthquakes, tsunami and drought.

Human Exposure

Modelled number of people present in hazard zones that are subject to potential losses.

Human Exposure

Modelled number of people present in hazard zones that are thereby subject to potential losses.

Hazard type	Population exposed	Percentage of population (0 5 10 20 40)	Country ranking
Cyclone	11		85th out of 89
Drought	5,266		153rd out of 184
Flood	1,765,674		5th out of 162
Landslide	530		81st out of 162
Earthquake	-		- out of 153
Tsunami	1,101		60th out of 76

Economic Exposure

Modelled amount of GDP (Gross Domestic Product) present in hazard zones that are thereby subject to potential losses.

Economic Exposure

Modelled amount of GDP (Gross Domestic Product) present in hazard zones that are thereby subject to potential losses.

Hazard type	GDP exposed (billions-US$)	Percentage of GDP (0 5 10 20 40)	Country ranking
Cyclone	0.00		85th out of 89
Flood	0.91		23rd out of 162
Landslide	0.00		95th out of 162
Earthquake	-		- out of 153
Tsunami	0.00		69th out of 76

Legend:
Tropical Cyclones (Saffir-Simpson categories)
Earthquake (modified Mercalli scale classes)

Vulnerability and Risk

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Legend:

Vulnerability Index:
Estimated number of people killed per year
(per million exposed)

Risk Absolute:
Average killed per year

Risk Relative:
Killed per million per year

Mortality Risk Index: Average of both indicators (RA+RR/2)

Source: http://www.preventionweb.net/english/countries/statistics/risk.php?iso=khm accessed 18 April 2011.

Annex 2: Stocktaking of past and ongoing climate change adaptation activities and main lessons learned

2.1 Climate change adaptation activities

Danida: A project entitled "Climate Change Capacity Strengthening and Awareness Raising Programme" was launched by MOE in January 2009, with financial support from Danish International Development Assistance (Danida). The project aims to strengthen national technical and institutional capacity to mitigate and adapt to climate change, as well as to contribute to the mainstreaming of climate change issues into national development efforts. The project activities focus on climate change education and awareness raising, climate change capacity building and institutional strengthening.[71]

European Union (EU)/Global Climate Change Alliance: The EU and RGC are currently preparing a program of cooperation through the Global Climate Change Alliance (GCCA) initiative to support the RGC in implementing the Cambodian Climate Change Strategy and Action Plan. The three-year program is over the period 2010-2012 and is financed through a multi-donor trust fund. Current pledges total US$8.9m, with contributions from the EU, Denmark, Sweden and UNDP. Component 1 of the program will focus on capacity building and institutional strengthening of the National Climate Change Committee and Climate Change Office in order for them to support Government, academia, and civil society in mainstreaming climate change considerations into policies, strategy, plans and programs. Component 2 will take the form of a demonstration project, focusing on increased resilience of coastal communities and ecosystems to climate change through adaptation planning, demonstrated targeted local interventions and provision of practical learning experience. This demonstration project is one of the projects identified in Cambodia's NAPA. The program is expected to result in:

- Enhanced national capacity to drive the climate change agenda and implement the forthcoming Climate Change Strategy and Action Plan
- The incorporation of climate change considerations in national policies, strategies, plans and programs
- The establishment of a Knowledge and Information Management facility to act as a centre of excellence for collection and dissemination of knowledge, best practices and experiences to the climate change community of professionals and practitioners
- The establishment of a multi-donor financial facility for funding climate change adaptation related projects and programs funding eligible projects (eventually to be substituted by country systems)
- The establishment of institutional mechanisms to fully engage civil society, including academia, non-government organizations and the private sector, in the national framework to address climate change challenges
- Pilot testing in the field of methodologies and tools for vulnerability mapping, identification of climate change hot spots, and engagement with local communities in community-based climate change adaptations practices and their acceptance for wider use, resulting in reduced vulnerability to climate change.
- The development and implementation of a plan to address the climate change needs of the most vulnerable locations and communities, contributing to increased resilience and reduced poverty. [72]

Mekong River Commission The Mekong River Commission (MRC) launched a Climate Change and Adaptation Initiative for its member countries, including Cambodia. The precise scope of this initiative is currently being finalized but the following activities were prioritized at stakeholder consultations:

- Implementation of NAPA priority activities

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[71] http://www.phnompenh.um.dk/NR/rdonlyres/0FAE2120-4479-440D-95C3-5578E8557565/0/PressreleaseCCCSARP12Jan09.doc

[72] EC, 2009. 'Action Fiche for Cambodia: Cambodia Climate Change Alliance (CCCA)'. DCI-ENV/2009/021-476. Phnom Penh: Delegation of the *European Commission* to Cambodia, October.

- Climate change awareness raising campaigns
- Mainstreaming of climate change adaptation into development
- Institutionalization of an inter-organizational climate change coordination mechanism
- Integration of climate change adaptation into the national budgetary process
- Formulation of climate change adaptation and climate change proofing legislation/policies
- Strengthening of climate change research
- Riparian country cooperation to address trans-boundary issues related to adaptation activities.[73]

The MRC also has an on-going Flood Management and Mitigation Programme (see below).

Sida Sida is working to integrate measures to adapt to the effects of climate change into its operations in Cambodia.

UNDP-GEF The United Nations Development Programme and Global Environment Facility (UNDP-GEF) have undertaken a series of climate change-related projects in Cambodia in support of the preparation of the First National Communication in response to the UNFCCC, the National Adaptation Programme of Action to Climate Change (NAPA) and the National Capacity Self-Assessment (NCSA).

UNDP-GEF has been implementing a project since 2006 on "Enabling Activities for the Preparation of the Kingdom of Cambodia's Second National Communication to the UNFCCC". The project is intended to help strengthen the country's technical and institutional capacity to implement the Convention by focusing on issues identified by the RGC as environmental and developmental priorities. The project will help improve national capacities for participation in the UNFCCC process. The project reports that it has made substantial progress with the completion of the update to the Inventory of GHGs, and the data collection and analysis for assessment of vulnerability. The preparation of programs containing measures to facilitate adequate adaptation to climate change and the mitigation of climate change are ongoing. Activities are also being undertaken to assist Cambodia in achieving the objectives required by the Convention and to identify constraints and gaps and related financial, technical and capacity needs. The scope of the project has been expanded to include:

- Expanded scope of analysis of the economic impacts of climate change.
- Cost-benefit analysis of adaptation and mitigation plan options.
- Recommendations for policy and mainstreaming in sectors.
- Preparation of a National Climate Change Strategy and Action Plan

UNDP-GEF has a further on-going project 'Promoting Climate-Resilient Water Management and Agricultural Practices in Rural Cambodia', based on priority interventions outlined in the NAPA and begun in January 2009. This project seeks to address limited existing institutional and individual capacity in both government agencies and community organizations to understand potential climate change impacts and to internalize a perspective of longer-term resilience into sectoral policy and development planning processes. Part of the LDCF funding will be used to increase the adaptive capacity of key national and sub-national institutions, especially provincial and district departments of agriculture and water resources and metorology, commune councils, and farmer water-use committees, and ensure that they are able to efficiently design, monitor and manage climate-resilient water resources and rural development projects. The project will develop expertise of district agricultural extension teams in the management of climate risks with respect to water management, and train Commune Councils and Planning and Budgeting Committes (PBCs) in two target districts in climate risk management techniques. In addition, key stakeholders at the community level (including religious leaders and indigenous elders) in both districts will be trained to support community-based adaptation planning processes. The project will also demonstrate various community-based

[73] Chea Chan Thou, 2009. 'Mainstreaming Climate Change Adaptations into Developmental Planning - Country Paper: Cambodia'. Presentation at Regional Workshop on Strategies and Options for Mainstreaming Climate Change Adaptation into Developmental Planning, ADBI, Tokyo, 14 - 17 April 2009.

adaptation options, including climate-resilient rainwater harvesting techniques, farming methods and design and management of reservoirs, irrigation channels, ponds and dams. The lessons learned will facilitate replication in other high risk areas, both within and outside Cambodia.[74]

In addition, under the GEF Small Grants Programme, UNDP-GEF is implementing a five-year program on 'Mekong and Asia Pacific Community-Based Adaptation' in 18 countries, including Cambodia, over the period 2009 to 2013, with Aus$6 million funding from AusAID. The program will implement community-based projects to enhance the resilience of communities to climate change. Lessons learned will be leveraged to promote replication of successful community practice and integrated into relevant national and sub-national policies and development programs that reduce vulnerability to climate change impacts, from the community level to the national level. Planned outcomes of the program include strengthened technical and leadership capacities of key financial and planning institutions at the national, sub-national and local levels to secure, expand and/or re-align funds to support climate change adaptation. The program includes Aus$960,000 for Country Programme grants in support of individual local level community based adaptation projects in Cambodia, Sri Lanka, Vietnam, and Laos.[75]

UNDP's 2010 National Human Development Report for Cambodia also focused on the theme of climate change.

UNEP-GEF The United Nations Environment Programme and Global Environment Facility (UNDP-GEF) has launched a US$ 4.62 million four-year 'Vulnerability Assessment and Adaptation Programme for Climate Change in the Coastal Zone of Cambodia considering Livelihood Improvement and Ecosystems'. The program has four components, focusing on:

- Strengthening national policy, regulatory and institutional coordination for managing climate change adaptation programs, including via awareness and capacity building for the NCCC and CCO. This strengthening is intended to ensure that climate change measures will be incorporated into the next national development plan via provision of a methodology for designing and implementing adaptation measures.
- Vulnerability assessment and adaptation planning for coastal zone adaptation, strengthening capacity for carrying out vulnerability and risk assessments, producing detailing vulnerability maps for climate change planning purposes in the coastal provinces and providing climate change scenario forecasts for identified hotspots. The climate chance impact scenarios will also be integrated into land use/coastal development plans.
- Demonstration projects to enhance existing flood control measures to take account of sea level rise and climatological changes and to adapt coastal agricultural practices to the changing climate.
- Demonstration projects on coastal ecosystem based resilience measures, working with local communities to maintain and rehabilitate mangroves, to establish a secondary forest line as an additional ecological buffer against storms and to derive sustainable livelihoods from these resources.[76]

WHO The UN World Health Organisation has undertaken a health vulnerability assessment, as part of the on-going program of work to prepare Cambodia's SNC. WHO is also supporting the country in integrating climate proofing into the university curriculum for water quality and water supply.

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[74] UNDP-GEF, 2008. 'Promoting Climate-Resilient Water Management and Agricultural Practices in Rural Cambodia'. PIMS no. 3867. UNDP Project Document. United Nations Development Programme, December

[75] UNDP-GEF, 2009. 'Mekong and Asia Pacific Community-Based Adaptation Programme (MAP-CBA). GEF Small Grants Programme - Project document. Environment and Energy Group, Bureau for Development Policy, United Nations Development Programme.

[76] UNEP-GEF, 2009. 'Vulnerability Assessment and Adaptation Programme for Climate Change in the Coastal Zone of Cambodia considering Livelihood Improvement and Ecosystems'. Project Identification Form. GEFSEC Project ID 3890. April

NGOs A number of NGOs are supporting local communities in enhancing their resilience to climatic variability in the agricultural sector, including the International Development Enterprise and the Center for Study and Development of Cambodian Agriculture (CEDAC). Some NGOs are also engaged in climate change awareness building and education, including the Groupe Energies Renouvelables, Environnement et Solidarités (GERES).

2.2 Lessons learned in climate change adaptation in Cambodia[77]

For effective mainstreaming of climate resilience, the PPCR can greatly benefit from key lessons learned from the past and ongoing initiatives on climate change in Cambodia. They include the following:

(a) Focus on strengthening and reform of existing institutions rather than aiming to create new institutions for adaptation.
(b) Strengthen national climate data collection and information dissemination systems, including monitoring and forecasting systems, and early warning systems for floods and droughts (e.g. installing a rain gauge in a school or community-owned establishment).
(c) Enhance country and community ownership through close consultations with key stakeholders at all stages of project development.
(d) Get the adaptation challenges and targets recognized by multiple agencies while pushing for the cause at the highest levels of decision making and influence.
(e) Create an enabling environment for climate risk management by focusing on inter-sectoral and institutional coordination.
(f) Build on indigenous knowledge and local strategies to cope with climate variability in developing commune-level, provincial and national adaptation plans. (Rural Cambodians have highly evolved livelihood strategies to cope with environmental changes.)
(g) Ensure that communities recognize the benefits of adaptation and see the value of investing their own resources in adaptive strategies.
(h) Promote synergies between climate change adaptation and disaster risk reduction (e.g. make use of the Cambodian disaster risk reduction forum by NGOs).
(i) Strengthen organizational and individual capacities to interpret and address climate change vulnerabilities prior to recommending adaptation options.
(j) Develop capacity building modules that use up-to-date information and are appropriate to local context and circumstances.
(k) Utilize "learning by doing" approaches for effective implementation of tools and methods.
(l) Increase resources available for community-based adaptation and disaster risk reduction (as communities are the first to face the climate change impacts at the local level).
(m) Recognize that a holistic approach to adaptation is crucial, as the main determinants of successful adaptation to climate change often lie outside a specific sector.
(n) Create mechanisms for scaling up of successful adaptation experiences (e.g. focus on decentralized small scale interventions instead of only large scale irrigation).
(o) Identify champions for adaptation who can influence the way we adapt, by recognizing that climate change is only an additional factor that exacerbates vulnerability.

2.3 Disaster risk reduction activities

Several development partners and civil society organizations are involved in the related field of disaster risk reduction.

ADB/ADPC The Asian Disaster Preparedness Center (ADPC) in partnership with MoWRAM completed an advisory technical assistance project in Cambodia on *Community Self-Reliance and Flood Risk Reduction* in

[77] These lessons learned are drawn from the collective experience of the Southeast Asia START Secretariat, Helsinki University of Technology, AusAID, World Fish Center and other donors working in Cambodia and from a civil society consultation that was held over the course of the October 2009 PPCR Joint Mission in Phnom Penh.

2007. The TA was funded through the Asian Development Bank's Poverty Reduction Cooperation Fund (TA 4574-CAM). The TA sought to enhance community participation in disaster risk reduction through a series of pilot projects in rural communities in Kandal, Prey Veng, Svay Rieng, and Takeo provinces; and to provide strategic guidance to MoWRAM, NDCM and other stakeholders on improving participatory community flood and drought risk management. [78]

Chinese Government MoWRAM, with US$30m financial support from the Chinese Government, is implementing a flood protection project in Kampong Trabek, Prey Veng over the period 2010 to 2012.

DIPEHCO and partner agencies The Disaster Preparedness Programme of the European Commission Humanitarian Aid Department (DIPECHO) has been providing support to Cambodia for disaster risk reduction and preparedness since 1998. Between 1998 and 2009, it has supported some 40 actions, together totaling €7.5 million, including the establishment of flood and drought early warning systems, promotion of small scale mitigation measures such as dykes and ponds, the establishment and training of village disaster management committees, the development of local disaster management plans and their integration at commune and district levels. All projects have been implemented through DIPECHO partner agencies in Cambodia, including Action Aid, the Danish Red Cross, DanChurchAid and ZOA and regional partners such as IFRC, UNDP, WHO and MRC.[79]

The Asian Disaster Preparedness Center (ADPC) and UNDP have also undertaken a regional program with financial support from DIPECHO to develop a disaster risk reduction module for incorporation into the secondary school curriculum and integrate disaster risk reduction concerns into the design of school buildings in three south-east Asian countries, including Cambodia. This project was completed in 2008.[80]

DIPECHO/UNISDR/ADPC The United Nations International Strategy for Disaster Reduction (UNISDR) and DIPECHO[81] have funded the development of a Strategic National Action Plan for Disaster Risk Reduction 2008 – 2013 (SNAP) for the RGC. The SNAP was prepared with technical assistance from ADPC. NCDM and the MoP established an inter-institutional task force to spearhead the preparation of the plan. The SNAP covers a number of themes that overlap with the CCA agenda, including mainstreaming of disaster risk reduction into national, sectoral and local development policies and plans; national and local risk assessments; improved flood forecasting and early warning capabilities; education and awareness raising; and the promotion of structural and non-structural measures to enhance resilience.[82]

JICA The Municipality of Phnom Penh, with US$20.23 m financial support from JICA, is undertaking a flood protection and drainage improvement project in Phnom Penh over the period 2006 to 2010.

Korean Government MoWRAM, with US$1.45m financial support from Korea, is undertaking a project to rehabilitate a flood protection dam in Bathay, Kampong Cham, over the period 2008 to 2009.

Mekong River Commission/ADPC/GTZ The MRC has an on-going Flood Management and Mitigation Program which was begun in 2005 and is funded to a total value of around US$20m (see below). The program has included the establishment of a Regional Flood Management and Mitigation Centre in Phnom Penh, providing technical and coordination services to the four countries in the Lower Mekong Basin. Other

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[78] ADB, 2007. *Kingdom of Cambodia: Community Self-Reliance and Flood Risk Reduction (Financed by the Poverty Reduction Cooperation Fund).* Technical Assistance Consultant's Report. Project Number: 37290
Report prepared by Asian Disaster Preparedness Center, Bangkok, Thailand for Ministry of Water Resources and Meteorology. Manila: Asian Development Bank, September 2007.

[79] ECHO, 2009. Humanitarian Aid in Cambodia. Brussels: European Community Humanitarian Aid, September.

[80] ADPC. 2008. *Mainstreaming of Disaster Risk Reduction in the Education Sector in Cambodia.* Bangkok: Asian Disaster Preparedness Centre, April.

[81] Using funding available under its regional program.

[82] NCDM and MoP, 2008. *Strategic National Action Plan for Disaster Risk Reduction, 2008-2013.* Phnom Penh: National Committee for Disaster Management and Ministry of Planning.

components of the program comprise structural measures and flood protection, mediation of transboundary flood issues, flood emergency management strengthening and land management. Forecasts, flood data, technical standards and training packages are key outputs of the program.[83]

The flood emergency management strengthening component is being undertaken with technical support from ADPC and financial support from GTZ. It has included a flood risk awareness campaign and an initiative to integrate flood risk reduction measures into formal local government development plans in two of the most flood-prone provinces in Cambodia, Prey Veng and Kandal.[84] [85]

USAID-OFDA The Office of US Foreign Disaster Assistance of the United States Agency for International Development (USAID-OFDA) is funding a US$2.6m Asia Flood Network (AFN) which covers Mekong River Basin countries, including Cambodia, and countries in the Ganges-Brahmaputra-Megna basin.[86] It also has a US$1.2m project on Drought Preparedness in Southeast Asia, covering Cambodia, East Timor and Vietnam. USAID-OFDA previously funded a Community-Based Flood Mitigation and Preparedness Project in Cambodia over the period 1995-2004, under ADPC's Asian Urban Disaster Mitigation Program.

WFP The UN World Food Programme (WFP) supports the RGC in the overlapping field of food security. Flood and drought maps produced as an output of a 2003 NCDM and WFP exercise to identify flood and drought prone communes in the country are widely cited in both the disaster risk reduction and CCA literature for Cambodia. WFP has also supported NCDM in the preparation of post-disaster damage and needs assessment (DANA) guidelines.

World Bank GFDRR The Global Facility for Disaster Reduction and Recovery has an indicative budget of US$5.35m for Cambodia over the period 2009-2011. This program of technical assistance has yet to be finalized but is anticipated to include support for the better coordination and implementation of the SNAP, the integration of disaster risk reduction into national development planning, implementation of the national Community-Based Disaster Risk Reduction strategy, the development of guidelines for the integration of disaster risk concerns into local development plans, initiation of the mainstreaming of disaster risk reduction into policies and programs of two line ministries, the development of provincial multi-hazard disaster risk reduction plans and the implementation of partnerships in at least two new provinces. [87]

A completed World Bank Flood Emergency Rehabilitation Project which was implemented in response to the 2000 floods also included technical assistance to help build capacity to manage and mitigate future water disasters in Cambodia more effectively.

NGOs A number of NGOs have been engaged in disaster risk reduction activities in Cambodia, including those listed above via DIPECHO funding. NGOs of particular relevance to the PPCR include the Church World Service, which is currently supporting communities in mainstreaming disaster risk reduction into commune investment plans; and Oxfam-America, which is supporting the NCDM in its submission to the RGC to ingrate disaster risk reduction and climate change adaptation concerns into the updated NSDP. Other NGOs involved in various aspects of disaster risk reduction in the country include Action Contra la Faim (ACF), Cambodian Red Cross, CARE International, Lutheran World Federation, Oxfam Australia, Oxfam GB and World Vision.

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[83] http://www.mrcmekong.org/

[84] ADPC and MRC, 2007. *Sustaining the Flood Preparedness and Emergency Management System in Cambodia: Creating the momentum for mainstreaming*. Safer Communities - Case Study 4. Bangkok and Vientiane: Asian Disaster Preparedness Center and Mekong River Commission, December.

[85] ADPC and MRC, 2007. *Reaching out to the Public: Raising Community Awareness to Flood Risk Reduction in Cambodia.* Safer Communities - Case Study 3. Bangkok and Vientiane: Asian Disaster Preparedness Center and Mekong River Commission, December.

[86] GFDRR, 2009. *Disaster Risk Management Programs for Priority Countries: Summary 200.* Washington, DC: Global Facility for Disaster Risk Reduction and Recovery.

[87] GFDRR, 2009. Op cit.

ANNEX 3
Summary assessment of Cambodian Civil Society capacity for adaptation[88]

	International NGOs	Local NGOs (larger, with multi-provincial programs)	Local NGOs (smaller, working in 1-2 provinces)	Community Based Organisations
Awareness of causes of climate change and strategies to address its impact	• Strong levels of awareness of the causes of climate change • Widespread recognition that CC is/could undermine their medium and longer term program effectiveness • Stronger INGOs are already mainstreaming CC considerations into their longer term planning • Most observe an acute lack of awareness and capacity amongst local partners and at community level in relation to CC • Most can detail examples of how CC is impacting in their program areas • Several well known INGOs view CC issues through a Disaster Risk Reduction lens • Many INGOs have a CC Policy in place or in the making	• Variable awareness of the major causes of climate change • Variable understanding of the potential impact of CC • Even those with higher levels of understanding who want to adapt their programs are constrained by their program strategy being significantly determined by donor priorities • Some stronger LNGOs are important innovators in adaptation and potentially important knowledge sources • Several LNGOs already implement high quality adaptation programs – yet are unaware that what they're doing constitutes adaptation!	• Generally limited awareness of causes of CC • Generally limited understanding of potential impact of CC on their Program objectives • Small LNGOs tend to be very locally focused – and often hold detailed knowledge of their areas of operation • Some smaller LNGOs have identified CC as a core issue in their area of operation and are implementing important, innovative and low cost adaptation activities • Many believe that small levels of support for adaptation could have significant (and quick) results • Smaller NGOs are often unaware that they're doing 'good adaptation' work	• Very limited awareness of causes of CC – sometimes having an animistic explanation for CC • Commonly have difficulty linking 'problems' experienced at community level with CC • Their strong local networks leave them well positioned to coordinate local level adaptation activities • Can play an important advocacy role at local level • Observe that climate events are often perceived at community level as the acts of evil spirits (which is difficult for CBOs to counteract given their own knowledge gaps)

[88] This 'summary assessment' details commonly observed characteristics of different civil society sub-sectors capacity to adapt their programs to climate change. A range of capacity and experience exists within each sub-sector, with the capacity of some organizations in each sub-sector being very high and others very weak. The observations documented in this table are indicative of the middle ground or majority of organizations.

	International NGOs	Local NGOs (larger, with multi-provincial programs)	Local NGOs (smaller, working in 1-2 provinces)	Community Based Organisations
Access to knowledge and participation in relevant networks	• Some INGOs have – or have access to - sophisticated, contemporary knowledge of CC science, decision-making, funding mechanisms and networks • Many INGO Head Offices are active in International CC networks, with information being systematically handed down to their Country Offices • Many INGOs participate in multiple CC related networks – NCCN, DRR Forum, Community Forestry, etc • INGOs are more likely to view networks as an advocacy and/or coordination tool than a capacity building opportunity	• Most LNGOs rely heavily on development partners or the internet to access higher level CC knowledge and understanding • The majority of LNGO staff join CC networks primarily to learn about CC – whereas INGOs are more likely to view networks as an advocacy and/or coordination tool. • It is often difficult for LNGOs to consistently dedicate ONE staff member to participate in networks, leading to stop-start participation and knowledge development • CC information is rarely available in Khmer, and therefore not accessible to the majority	• Smaller LNGOs are often restricted from participating in CC networks because they are provincially based or because meetings are conducted in English • It is very difficult for LNGOs to dedicate ONE staff member to participate in networks • CC information is rarely available in Khmer, and therefore not accessible to the majority • Smaller LNGOs will often rely on internet cafes for web access, and therefore have little chance to independently access information even when language capacity exists	• CBOs face great difficulties in accessing knowledge and participating in networks • When able to participate in networks, they are greatly valued by other members because of their on the ground experience • Commonly have limited or no internet (or electricity!) access, restricting information access • Language issues restrict access to information, even when access issues are resolved • CC information rarely available in Khmer
Capacity for implementing adaptation	• Majority acknowledge a lack of in-country technical capacity to mainstream CC and adaptation in their planning • Most leading INGOs deliver their programs through local partners – and therefore focus their adaptation	• Limited technical capacity amongst LNGOs to review their programs to assess adaptive potential • Few LNGOs have available financial resources to build their adaptive capacity or adapt their programs • LNGOs are therefore heavily	• Virtually no smaller LNGO has sufficient internal capacity or resources for high quality program adaptation • Smaller LNGOs live a project to project existence and are heavily reliant on donor priorities	• Virtually no CBO has sufficient internal capacity or resources for high quality program adaptation • CBOs are well positioned to mobilize community members to

	International NGOs	Local NGOs (larger, with multi-provincial programs)	Local NGOs (smaller, working in 1-2 provinces)	Community Based Organisations
	work at capacity building of partners • General acceptance that their capacity could/should be stronger	reliant on donors determining that developing adaptive capacity is a priority • Many believe that there is potential for significant (and quick) results if knowledge is improved and modest resources are made available	• Donor priorities determine whether or not a small LNGO can address CC issues and implement adaptation	initiate adaptation work, but this is rarely possible because of their own limited capacity
Observations of civil society capacity building and support opportunities and needs	• Observe low levels of CC awareness at community level, and even amongst program partners • Recognise functional networks and advocacy capacity as being important components of better addressing climate change • Believe it important for Government to better engage and recognize Civil Society's role in CC and adaptation • Observe a lot of 'hidden adaptation' ie. that many LNGOs are not aware that their programs actually constitute good adaptation practice • Believe an audit of current adaptation practice would raise awareness of breadth of current CS contribution to addressing climate	• Seek a more thorough understanding of climate change and adaptation strategies, seeing this knowledge potentially as a platform for action and program development • Believe informed technical assessment of existing LNGO programs would identify opportunities for quick impact adaption opportunities – which could be supported from PPCR CS Facility • The NCCN could be strengthened to take up the role of a 'meta-network' that coordinates capacity-building and advocacy, and overviews and disseminates work of other CC related networks	• Seek training opportunities to better understand CC and strategies for adaptation • Sense an opportunity to act, but lack capacity to take action • Seek opportunities for their programs to be assessed to determine adaptation options • Are surprised to learn that some of their existing initiatives already constitute adaptation • See access to Khmer language materials as a fundamental constraint	• Seek training opportunities to better understand CC and strategies for adaptation • CBOs seek support to raise awareness of CC within their communities as a means to building support for action • Stronger community understanding of changing climate could lead to commune investment plans being pushed to address root causes rather than consequences of CC • CBOs see an advocacy role for themselves in relating with local

	International NGOs	Local NGOs (larger, with multi-provincial programs)	Local NGOs (smaller, working in 1-2 provinces)	Community Based Organisations
	change, and their potential to further scale up efforts	• LNGOs emphasise the importance of raising CC awareness of regular community members in order to mobilize broad based support for action		authorities, and pushing for climate friendly approaches in their communities
Summary	• While INGOs generally have strong levels of awareness of CC, they often don't have technical skills available on the ground to mainstream adaptation in their programs • Through their funding, INGOs significantly influence LNGO programming and strategic direction • INGO experience of effective advocacy an important element in strengthening CS capacity to address CC issues • INGOs have a sophisticated and holistic understanding of civil society in Cambodia, and the challenges that it faces • Better INGOs have experience and are well placed to mentor LNGOs in effective advocacy for action on CC	• LNGOs recognize CC as an important emerging issue and have an enthusiasm to better understand it • Most LNGOs do not have resources available to be proactive in acquiring strong levels of CC knowledge and capacity • LNGO program directions are substantially donor-driven. If funding opportunities exist around CC, LNGOs will likely take up the issue • LNGOs suffer from the lack of Khmer language materials on CC and adaptation • LNGOs observe very low levels of awareness of CC amongst the general population	• Smaller LNGOs face even greater challenges than LNGOs in addressing climate change issues • The absence of Khmer language CC materials is felt even more acutely by smaller LNGOs • Smaller LNGOs are often provincially based making participation in CC networks difficult or impossible • LNGOs are often doing adaptation work without even knowing it • LNGOs are well positioned to act if sufficient capacity can be built	• CBOs generally have only limited understanding of climate change and adaptation • CBOs often have an intimate understanding of their geographic area of focus • CBOs are potentially key informants of the impact of CC, but are not able to view development challenges through a CC lens

ANNEX 4: List of Key Stakeholders Involved in Preparation of the Strategic Program for Climate Resilience for Cambodia

Government Representatives:

Ministry focal points and team compositions

Ministry	Focal Point	Team Composition
Economy and Finance (MEF)	Dr. Tauch Chan Kresna - chankresna_tauch@mef.gov.kh	Lun Mareth – Procurement Officer MEF Suon Len – Training Coordinator – EFI H.E. Vong Sondap – Deputy Secretary General Meas Sam An – Project Monitoring Officer Houl Bonnaroth – WBD Soan Sereivathanak – Representative LAD Chhan Somethea – Deputy Director Hav Ratanak – Budget Department Ros Borrom – Department DIC
Environment (MOE)	Mr. Meas Sophal - bpamp.moe@gmail.com	Sem Sundara – Director International Cooperation Department, Chhun Sophal – Office Chief, EIA Department, Pum Vicheth – MOE, Long Kheng – Wetlands and Coastal Zone Department, Ney Chanthy – Office Chief GDANCP, Sokha Sophorn – Deputy Director GDANCP, H.E. Son Sovouth – Director Dept of Education, Sum Thy – Director CCD, Thach Trin – Assistant to Focal Point MOE
Agriculture, Forestry and Fisheries (MAFF)	Mr. Vanna Samreth - samrethv@yahoo.com	Preap Visarto – Acting Director PPSPS/GDA, Pheav Sovuthy – Acting Director DALRM/GDA, Ouk Vibol – Acting Director Dept Conservation FIA, Pich Sereywath – Deputy Director FIA, Hoot Sothea – Officer FA, Thuch Phalla – Officer FA, Chea Nareth – Officer FA, Dr. Keo Omaliss – Deputy Director DWB FA
Rural Development (MRD)	Mr. Stong Kia, Assistant of H.E. Dr. Seng Lymeng, Under Secretary of State - kiastong@yahoo.com	Sao Chivoan – MRD H.E. Dr. Seng Lymeng Under Secretary of State Sek Muny - Deputy of Training Department Lach Samon - Gender Deputy Sum Bunnary - Deputy of Financial Department Kao Bour – Officer Srin Pouthy - Deputy Director of Rural Water Supplies Department Hy Say - Deputy Director of Road Department Ky Sophal - DD/DRHC
Water Resources and Meteorology (MoWRAM)	Mr. Oum Ryana - rynaoum@yahoo.com	Thach Sovanna – MOWRAM Tong Seng – MOWRAM Nuon Chamnap – MOWRAM Bin Chann Mony – MOWRAM Long Saravuth – MOWRAM Men Mech Bonn – MOWRAM Sarn Hengsong – MOWRAM
Planning (MoP)	Mr. Sin Setha - sin.setha@gmail.com	H.E. Nuth Chansokha - Under Secretary of State H.E. Hang Lina - Deputy Director General NIS Chou Putheany – Director of Social Planning Department

		Lun Kim Leang - Deputy Director General NIS Kong Mony Piseth – Vice Chief Office MOP Horn Den - Deputy Director MOP Sin Chestha - Deputy Director MOP
Interior (MOI)	Mr. Ny Kimsan - kimsandoc@hotmail.com	Sok Chamroeun – MOI Sok Sothy – MOI Loeung Vannak – MOI Long Viseth - MOI
Public Works and Transport (MPWT)	Mr. Bong Vuthy - vuthy.bong@yahoo.com	Chreang Phollak – PDD Hang Choeun – WD Duy Chan Dara – Land Transport Department Chao Sopheak Phibal – Road Department Mak Sideth – Merchant Marine Department

- **Government Ministries:** Ministry of Economy and Finance (MEF); Ministry of Environment (MOE); Ministry of Water Resources and Meteorology (MoWRAM); Ministry of Agriculture, Forestry and Fisheries (MAFF); Ministry of Public Works and Transport (MPWT)*;* Ministry of Rural Development (MRD); Ministry of Planning (MoP); Ministry of Interior (MOI); Ministry of Women Affairs; Ministry of Health (MOH); National Committee for Disaster Management

- **Civil Society Organizations and Non-Governmental Organizations:** Action Aid International Cambodia, Agronomes et Veterinaire sans Frontieres, Cambodia Development Research Institute (CDRI); CARE International, Catholic Relief Services (CRS), Concern Worldwide, Child Fund Cambodia (CF), Cambodian Organization for Research and Development (CORD), East West Management Institution Cambodia (EWMI), Development and Partnership in Action (DPA), Forum Syd, Gender and Development for Cambodia (GAD), HelpAge International, International Development Enterprises (IDE), NGO Forum, Oxfam America, Oxfam GB, PACT, Partnership for Development in Kampuchea (PADEK), Plan International, Save Cambodia's Wildlife (SCW), Save the Children Australia, The Asia Foundation (TAF), Wildlife Alliance, Wildlife Conservation Society (WCS), World Fish Center, World Wildlife Fund (WWF) Greater Mekong Programme

- **International organizations:** Asian Disaster Preparedness Center (ADPC); Food and Agriculture Organization of the United Nations (FAO); International Fund for Agricultural Development (IFAD); International Water Management Institute (IWMI); Mekong River Commission (MRC); United Nations Development Programme (UNDP); United Nations Environment Programme (UNEP); United Nations Agency for Human Settlements (UN-Habitat); World Fish; World Health Organization (WHO)

- **Bilateral Development Partners:** Australian Agency for International development (AusAID); Agence Française de Développement (AFD); Canadian International Development Agency (CIDA); Danish International Development Agency (DANIDA); Deutsche Gessellschaft fur Internationale Zusammernarbeit (GIZ); European Union; Japan International Co-operation Agency (JICA); Swedish International Development Agency (SIDA), UK Department for International Development (DFID); United States Agency for International Development (USAID)

- **Private Sector:** ANZ Royal Bank (Cambodia) Ltd., ANZ Royal, ACLEDA, AMK, CADTIS Consultant Co Ltd, Cambodia Fiber Optic Cable Network, Comin Khmere, EMI, Forte Insurance, GRET, Hwangds Bank, Kosan Engineering, Maruhan Japan Bank, Nagathom Fund, OSK, Royal Group, Siem Reap Chamber of Commerce

- **Academia:** University of Phnom Penh

- **MDBs:** ADB, IFC and World Bank

1. **Title of the investment plan:** **Strategic Program for Climate Resilience in Cambodia**
2. **Program under the SCF:** **Pilot Program for Climate Resilience (PPCR)**
3. **Name of the reviewer:** **Arivudai Nambi Appadurai, Ph.D.**
4. **Date of submission:** **26 May 2011**

5. **Part I: General Criteria:**

- ***Compliance with the principles, objectives and criteria of PPCR as specified in the design documents and programming modalities:*** The draft SPCR for Cambodia is well written, detail oriented and sets clear goals with timelines and budgets, and adapted to national context. It complies with key principles, objectives and criteria of PPCR as specified in the design documents and programming modalities. The objectives such as transformational impact and scaling up of investments for climate resilience are reflected well.
- ***Consideration of the country capacity to implement the plan:*** Part 1 of the draft SPCR includes a section on institutional analysis, and it duly considers Cambodia's technical and institutional capacities to implement the investment plan. In order to address such capacity gaps and to coordinate, support and monitor all PPCR investments at the national level, the investment plan includes a large technical assistance project, which will build on capacity strengthening activities initiated in Phase 1.
- ***Development of SPCR on the basis of sound technical assessments:*** The proposed investment projects and technical assistance measures have been developed based on a primary assessment of the implications of climate change on priority sectors and regional geography. SPCR document seems to be developed based on an extensive literature review, appropriate vulnerability assessments, and analysis of the country's risk profile. The SPCR also benefits from recent findings of the draft second national communications to UNFCCC.
- ***Demonstration on how it will initiate transformative impact:*** The document explicitly identifies relevant actions that would be new or scaled up as part of the response strategy to climate change**.** The 'Rationale for PPCR support' section in Part 1 of the draft provides adequate information on how SPCR will initiate transformative impact. The various components suggested in the investment plan, if implemented well, can serve as catalysts for achieving transformation at both national and sub-national levels.
- ***Provision for prioritization of SPCR investments, stakeholder consultation and engagement, adequate capturing and dissemination of lessons learned, and monitoring and evaluation and links to the PPCR results framework:*** SPCR document is cognizant of resource constraints, and prioritizes SPCR investments based on vulnerabilities of the key sectors such as water resources and agriculture. In terms of programming, it proposes five investment components and one technical assistance project for Tranche 1 funding ($80 million) and two investment components for Tranche 2 funding ($25 million). It documents extensive stakeholder consultations held with line ministries, development partners, civil society and the private sector. All investment projects and the technical assistance identify specific

opportunities for stakeholder engagement in implementation of the SPCR. However, there are a few gaps in the document in terms of spelling out the modalities of dissemination of lessons learnt at different levels and the outlay of a clear-cut monitoring mechanism, especially at the local level for respective investment projects. Links to the PPCR Results framework have been identified at both overall program level and at each investment project level.

- ***Due consideration of social and environmental issues, including gender:*** SPCR draft fully considers environmental and social issues including gender. Opportunities for gender mainstreaming have been highlighted in all proposed investments.
- ***Modality of SPCR support (supports new investments or funding is additional to on-going/planned MDB investments):*** SPCR funding for Cambodia is largely additional to ongoing and planned investments from the Asian Development Bank. Thus it enables good leverage of additional resources for climate resilience. The document states that every dollar invested by PPCR will enhance climate resilience of nearly four dollars in investments. One technical assistance project is however a new investment.
- ***Consideration of institutional arrangements and coordination:*** SPCR investments and technical assistance project clearly identify institutional arrangements for implementation. Arrangements for overall PPCR coordination are also explicit.
- ***Promotion of poverty reduction efforts:*** SPCR draft identifies poverty and climate change linkages in Cambodia. All seven investment components are aimed to assist the most vulnerable populations of the society, and complement poverty reduction efforts.
- ***Consideration of cost effectiveness of investments:*** As noted earlier, all PPCR investments except technical assistance project are blended with ongoing or planned MDB investments. Such blending approach makes these investments highly cost-effective.

6. **Part II: compliance with the investment criteria or business model of the PPCR**

(a) Climate Risk Assessment:

- The SPCR has reference to climate change projections characterized by spatial variability in rainfall, temperature and sea level rise trends for the country, which translates into spatial heterogeneity in drought and flood incidence in the projected project sites. The SPCR has given careful consideration to the choice of project sites based on the available assessment information, both present and the future scenarios.
- The document is very comprehensive in terms of the design of the framework, identification of performance indicators and performance targets. However, it is observed that emphasis is more on the articulation of socio-economic benefits than the ecological benefits of the proposed investment options.
- The proposed investment projects aim to provide transformational and scaled up support for implementing critical activities covering key sectors like water, agriculture and infrastructure across selected vulnerable zones of the country.

- ***Investment Project 1: Promoting Climate Resilient Water Resources and Related Infrastructure –*** The project has addressed most of the critical elements from the implementation point of view. It would add value to the project to build on the existing coping mechanisms in place and efforts have to be made to fine tune the appropriate strategies practiced by communities. For example, water use efficiency could be increased not only by retrofitting the reservoirs and upgrading of flood production systems, but also by reviving and revitalizing traditional water management structures to enhance flood and drought management in the respective areas.
- ***Investment project 2: Enhancing Climate Resilient Agriculture & Food Security:*** Though the outlay of activities are comprehensive**,** adequate attention has not been paid to the critical issue of livestock, which is part and parcel of agriculture and other imminent risks like migration and social displacement. In terms of the design of the activities though considerable emphasis has been provided to bring a balance between soft and hard interventions, the document is devoid of a plan to leverage the existing best practices. With reference to the flood protection mechanism, mangrove ecosystem restoration has been projected as a key activity. Instead of focusing on a single vegetative cover it is worth considering promotion of a mix of non-mangrove species (casuarinas, coconut trees etc.,) along with mangroves bioshields. Bioshields of this type was promoted in India and elsewhere post Tsunami and this has yielded good benefits.
- The choice of project sites Koh Kong and Mondulkiri provinces is commendable as it tries to bring contrasting elements (flood & drought affected scenarios) and intra variability in terms of understanding adaptation issues. This investment project demonstrates the need for defining different entry points for different areas depending on the perceived risks.
- ***Investment project 3: Improving Climate-Resilient Infrastructure.*** This investment project interweaves climate change and infrastructure development through a well defined priority process. Factoring of scientific inputs to the infrastructure development process need to be strengthened through appropriate skill development measures addressed to the relevant stakeholders.

(b) Institutions/ Coordination

- ***Investment projects 1, 2 & 3*** are well thought out in terms of bringing in appropriate institutional linkages. The success of the implementation strategies largely depend not only on the effective coordination between key ministries, departments and line staff but also largely on their ability to relate to the problems and their understanding of the implications of climate change. Though adequate outlines are provided to bring in the major institutional actors relevant to individual investment plans it is important to undertake an institutional mapping exercise to understand the cross linkages. Integration of local level institutions is critical to the success of the investment projects and the proposal need to revisit this particular strategy to take stock of the adequacy of representation of such institutions.
- The SPCR has visualized the network, but need to focus more on the functional aspects, especially, the roles and responsibilities of the involved institutions. The role of the government, civil society,

donors and business community has been adequately expressed but one of the missing links is the integration of the academic community. Good science, sound research, relevant data inputs and analysis and a good feedback system is important for effective adaptation. The academic community has much to contribute in this and hence their involvement is very crucial and calls for attention.

(c) Prioritization

- All the investment projects have clearly brought out the importance of catalyzing complementary forms of investment (not always financial) in communities, markets, communications, governmental institutions and physical infrastructure that together provide a foundation for adaptation.
- The Investment projects have stayed focused on bringing additionalities to the ongoing development efforts, more particularly, in proposing measures to climate proof the identified relevant development activities. In doing so, the investment projects have done a good job in assigning priorities not only to the relevant sectors but also to specific activities that are critical to the individual sectors. However, there are two areas that need attention (i) Appropriate regulatory/legal mechanisms to enhance the effectiveness of interventions in the investment projects and (ii) development of a dedicated communication and dissemination strategy for all three investment projects. Communication, knowledge sharing and education are key aspects and deserve to be pushed ahead in the agenda. It is important to spell out the modalities and provide a plan of action as to how the concerned agencies will be involved and in what capacity.
- Overall, the information provided in terms of the integration of the elements identified under the SPCR to the ongoing policy initiatives at the national level look very positive. However, a concerted effort is needed to take stock of policy implications for each of the proposed investment plans at regular intervals. The investment project document on climate resilience to agriculture is silent on the adaptation and mitigation linkages. This is certainly a priority area for consideration. There exists a huge economic opportunity for the farming community to leverage from the global incentive structures like the CDM and carbon trading.

(d) Stakeholder Engagement/ Participation

- One of the biggest strengths of Cambodia's SPCR lies in its visualization of the provision of an umbrella for a new partnership approach between government and all other actors and agencies. The proposed Civil Society Support Mechanism is really unique and deserves strong support. The document clearly reflects the measures put in place to consult with the respective stakeholders and outlines a clear plan on how this will continue during the implementation phase. Issues of equity, gender mainstreaming have been adequately emphasized in the proposal. The engagement with local governments/communities is critical and conscious efforts have to be made to consult with the local government units and the local communities to identify opportunities for cost effective, country-driven adaptation interventions. This approach has been given prominence in the document but needs to be monitored continuously to make the interventions more meaningful

7. **Part III. Recommendations**

- As noted earlier, the draft SPCR for Cambodia is a comprehensive program which is very likely to bring about transformative impact in terms of mainstreaming climate resilience into its development planning. Adoption of the following recommendations during implementation of the projects may enhance such impact.
- **Climate Risk Assessment:** There is a gamut of screening tools available that provide a broad overview to resource managers and development planners about the key climate risks that could affect implementation of development projects and related investments. ***The resource managers and planners at all levels should be exposed to such tools to assess the vulnerabilities and possible adaptation measures. A program exclusively designed to cater to this or as part of the proposed set of capacity building efforts would be very helpful.***
- **Knowledge Management:** One of the SPCR's key objectives is to enable learning and sharing of lessons at the country and regional level. Additional efforts to address this must be taken during SPCR implementation. There are huge uncertainties around climate science and the lack of information results in poor planning. Good information on climate variability and change is needed in more accessible formats.
- In recent times, the value of information and communication tools (ICT) has been amply demonstrated across the world in enhancing rural livelihoods. The information resource centers and village level knowledge centers have provided enormous value in providing quality information in a timely manner, more particularly in terms of sending out early warning messages related to climate induced calamities to the affected communities in Indian sub continent. ***It is recommended that the investment plans should have provisions under the communication activities to establish resource centers which would use ICT technologies to communicate mobilize and develop skills at the local level to manage climate risks effectively.***
- **Institutional Arrangement:** Though the value of integrating different institutions, agencies and their activities is crucial to achieve the desirable results, coordination becomes a major problem in mainstreaming adaptation. The priorities are different for different agencies and hence there is a ***need to provide a mechanism to appoint a point person from each ministry/department and agency to support execute and monitor the activities that fall in their institutional domains to manage climate risks. This would add value to not only to effective coordination but also ensure effective delivery of the proposed outcomes.***
- **Monitoring & Evaluation:** The investment plans have well thought frameworks with clearly spelt out objectives, activities, outcomes, indicators and target groups. Though references have been made to promote effective monitoring of the progress of the implementation activities through the establishment of steering committee at the national level the investment plans ***need to focus on establishing mechanisms to monitor the projects at the provincial/local level in order to bring synergy to the process.***

Response to Reviewer's Comments on the Strategic Program for Climate Resilience for Cambodia

Name of the Reviewer: Arivudai Nambi Appadurai, Ph.D.

Date of Submission of Review: 26 May 2011

Introduction

The Royal Government of Cambodia (RGC), the Asian Development Bank (ADB) and the World Bank Group (WBG) appreciate Dr. Appadurai's review of the draft SPCR for Cambodia. The review is comprehensive and provides many useful suggestions. This note summarizes our collective response on how various suggestions and recommendations have been considered in the final SPCR document submitted for consideration by the PPCR Sub-Committee.

Part I: General Criteria

1. We thank the reviewer for his appreciation of several strong points in Cambodia's SPCR, especially with regard to its (i) compliance with the principles, objectives and criteria of PPCR as specified in the design documents and programming modalities; (ii) consideration of national capacities to implement the investment plan; (iii) demonstration on how it will initiate transformative impact; (iv) prioritization of investments, stakeholder consultations and links to the PPCR results framework; and (v) consideration of environmental and social issues including gender, institutional arrangements and coordination, promotion of poverty reduction efforts, and cost effectiveness of investments.

2. The reviewer noted that there are a few gaps in terms of spelling out the modalities of dissemination of lessons learnt at different levels and the outlay of a clear-cut monitoring mechanism, especially at the local level for respective investment projects.

   Response: Dissemination of program and project findings is a key activity for all SPCR investment projects. However, to make it explicit, the final draft contains a separate section under each investment project on modalities of knowledge management, lessons learned and best practices. These modalities will be further clearly defined during the preparation phase of the investment projects. In addition, the Knowledge Management and Learning Platform, a component of the technical assistance project, will be extensively used to disseminate findings at the national, provincial and commune levels. In terms of monitoring mechanism, the overall performance of SPCR investments will be monitored on the basis of progress in selected indicators given in Table 3. Additional indicators, which are appropriate at the local level, will be identified during the detailed design of each investment project and component.

Part II. Specific Criteria

Climate risk assessment:

3. Comment: The reviewer observed that emphasis was more on the articulation of socio-economic benefits than the ecological benefits of the proposed investment options.

   Response: In line with RGC's and MDBs' goals of poverty alleviation and inclusive social and economic development, we consider that it is important to highlight socio-economic benefits of

SPCR investments. Improvement in socio-economic conditions will contribute to enhancement of adaptive capacity of vulnerable populations in Cambodia. We, however, recognize the importance of ecological benefits as a basis for resilience and sustainability. Therefore, ecosystem-based approaches for adaptation have been emphasized especially in investment projects 2 and 3, and references to ecosystem-based adaptation have been made in the results framework. In Investment project 2, for example, a range of local and landscape scale strategies will be used to (i) increase resilience and maintain essential ecosystem services in coastal and agro-ecosystems and (ii) reduce the vulnerability of people and their livelihoods. These aspects have been emphasized in the SPCR.

4. Comment: In Investment Project 1, the reviewer noted that it would add value to the project to build on the existing coping mechanisms and that effort has to be made to fine tune the appropriate strategies practiced by communities.

   Response: We agree with the above comment. All investment projects and their components will effectively utilize local coping strategies and mechanisms. Proactive involvement of local communities and civil society organizations in implementation of SPCR investments is expected to facilitate this. In all investment projects, efforts will be made to synthesize information on local coping strategies and on ways to fine tune them under different agro-ecological settings. Community-based disaster risk reduction and management approaches will be employed in all projects.

5. Comment: In Investment Project 2, the reviewer noted that adequate attention has not been paid to the critical issue of livestock, which is part and parcel of agriculture, and other imminent risks like migration and social displacement.

   Response: We concur with the reviewer's view that improvement of livestock resilience to climate change is also important. However, stakeholder consultations during preparation of SPCR and NAPA did not identify livestock as a priority area for PPCR investments. We recognize the fact that livelihoods of several vulnerable communities in Cambodia depend on fisheries, especially in provinces around the Tonle Sap Lake. Therefore, investment projects 1 and 2 will focus on enhancing climate resilience in provinces around the Tonle Sap and coastal provinces such as Koh Kong. The adaptation measures proposed in these projects will aim to enhance resilience of fishermen. Risks such as migration and social displacement due to floods and droughts, and potential countermeasures will be examined in all investment projects.

6. Comment: In terms of the design of the activities, though considerable emphasis has been provided to bring a balance between soft and hard interventions, the document is devoid of a plan to leverage the existing best practices.

   Response: We do not agree with the above comment. As noted earlier in point 4, adaptation measures in all investment projects will build on local knowledge, and efforts will be made to leverage the best practices. The plan is to synthesize information on existing best practices and examine the options for fine tuning them. The technical assistance project will facilitate this process through various feasibility studies on NAPA projects.

7. Comment: In Investment Project 2, the reviewer noted that instead of focusing on a single vegetative cover, it is worth considering promotion of a mix of non-mangrove species (casuarinas, coconut trees, etc.) along with mangroves bioshields.

   Response: We thank the reviewer for the above suggestion. Based on initial surveys, we felt that mangrove restoration would be critical in Koh Kong province. However, during project

preparation stage, we will examine the possibility of including non-mangrove species to enhance the overall resilience of coastal ecosystems.

8. Comment: In Investment Project 3, the reviewer noted that factoring of scientific inputs to the infrastructure development process need to be strengthened through appropriate skill development measures addressed to the relevant stakeholders.

   Response: We agree with the above comment. For example, component 1 of the investment project 3 will review Cambodia's road design standards, and suggest changes required to cope with future impacts of climate change. The proposed changes will be fully based on scientific inputs on climate change modeling, and engineering improvements. All components of the investment project 3 will strengthen capacities and skills of relevant stakeholders.

Institutions/Coordination:

9. Comment: Though adequate outlines are provided to bring in the major institutional actors relevant to individual investment plans, it is important to undertake an institutional mapping exercise to understand the cross linkages. Integration of local level institutions is critical to the success of the investment projects and the proposal needs to revisit this particular strategy to take stock of the adequacy of representation of such institutions. The SPCR has visualized the network, but need to focus more on the functional aspects, especially, the roles and responsibilities of the involved institutions.

   Response: We agree with the above comment. Institutional mapping will be conducted during the detailed design of each project component. Local institutions, depending on their comparative strengths, will be involved in implementing SPCR investments. The roles and responsibilities of various institutions will be determined during project design.

10. Comment: The role of the government, civil society, donors and business community has been adequately expressed but one of the missing links is the integration of the academic community. Good science, sound research, relevant data inputs and analysis and a good feedback system is important for effective adaptation. The academic community has much to contribute in this and hence their involvement is very crucial and calls for attention.

    Response: The comment is well taken. Appropriate changes have been made in the final draft to reinforce the role of academic community. For example, the University of Phnom Penh, which is part of a university network to conduct research on adaptation and sponsored by the International Development Research Center of Canada, will be involved in the technical assistance project. Through the TA project, efforts will also be made to strengthen capacities of academic community in Cambodia.

Prioritization:

11. Comment: The reviewer noted that the investment projects have done a good job in assigning priorities not only to the relevant sectors but also to specific activities that are critical to the individual sectors. However, he noted two areas that need attention (i) Appropriate regulatory/ legal mechanisms to enhance the effectiveness of interventions in the investment projects and (ii) development of a dedicated communication and dissemination strategy for all three investment projects. The reviewer noted that it is important to spell out the modalities and provide a plan of action as to how the concerned agencies will be involved and in what capacity.

Response: We incorporated suggestions in the revised version by stating that necessary regulatory and legal frameworks to enhance the effectiveness of adaptation interventions will be identified during project design, and that a dedicated communication and dissemination strategy will be developed for each project. The Knowledge Generation, Management and Learning Platform under the Technical Assistance project will catalyze such efforts.

12. Comment: The reviewer noted that a concerted effort is needed to take stock of policy implications for each of the proposed investment plans at regular intervals. The investment project document on climate resilience to agriculture is silent on the adaptation and mitigation linkages. This is certainly a priority area for consideration. There exists a huge economic opportunity for the farming community to leverage from the global incentive structures like the CDM and carbon trading.

    Response: We concur with the suggestion. Policy implications for each of the proposed investment will be examined during implementation of the project. The adaptation-mitigation linkages have been referred to in the revised draft. The possibilities for accessing carbon financing will be explored in conjunction with other projects such as GMS climate-friendly bio-energy.

13. Comment: The reviewer appreciated the civil society support mechanism of the technical assistance. He noted that the engagement with local governments/communities is critical and that conscious efforts have to be made to consult with the local government units and the local communities to identify opportunities for cost effective, country-driven adaptation interventions.

    Response: We thank the reviewer for his appreciation of SPCR's support to the civil society, equity, gender mainstreaming and other issues. We agree with the suggestion that effective participation and involvement of the local government units and communities is crucial to make the program successful. Therefore, all investment projects will emphasize these aspects. Additional details on modalities for engagement of local communities and local governments will be determined during project design.

Part III: Recommendations

14. Comment: With regard to climate risk management, the reviewer noted that there is a gamut of screening tools available that provide a broad overview to resource managers and development planners about the key climate risks that could affect implementation of development projects and related investments. The resource managers and planners at all levels should be exposed to such tools to assess the vulnerabilities and possible adaptation measures. A program exclusively designed to cater to this or as part of the proposed set of capacity building efforts would be very helpful.

    Response: We agree with the above comment. However, Phase 1 activities of the PPCR included the development of different screening tools for risk assessment. These would be available to all resource managers and planners. The PPCR Phase 1 aims to strengthen capacity of key stakeholders in assessment of vulnerabilities. SPCR Technical assistance project will build on those experiences.

15. Comment: With regard to knowledge management, the reviewer recommended that the investment plans should have provisions under the communication activities to establish resource centers which would use ICT technologies to communicate mobilize and develop skills at the local level to manage climate risks effectively.

Response: While we agree with the above comment, we need to assess resource needs for establishment and maintenance of such resource centers. The knowledge management component of the technical assistance project will examine possibilities for effective use of ICT in climate change adaptation. The final version of SPCR has been modified to reflect this. In addition, the possibilities for close collaboration with knowledge management platform of the Cambodia Climate Change Alliance will be fully explored during the implementation of project.

16. Comment: With regard to institutional arrangement, the reviewer noted the need to provide a mechanism to appoint a point person from each ministry/department and agency to support execute and monitor the activities that fall in their institutional domains to manage climate risks. This would add value to not only to effective coordination but also ensure effective delivery of the proposed outcomes.

    Response: The PPCR Coordination and Technical Backstopping Unit to be established at MOE as part of the technical assistance project will create such a mechanism recommended by the reviewer. While actual details of the mechanism will be finalized during the project design, it is expected that representatives of all key ministries and agencies would be members of the steering committee of the PPCR coordination unit and would support, execute and monitor the activities that fall in their institutional domains to manage climate risks.

17. Comment: With regard to Monitoring and Evaluation, the reviewer noted the need to focus on establishing mechanisms to monitor the projects at the provincial/local level in order to bring synergy to the process.

    Response: The monitoring and evaluation framework, which is fully consistent with the PPCR Results Framework, will focus on measuring progress in various indicators at the component, project and program levels. The effectiveness of various adaptation interventions will also be monitored at the provincial and other sub-national levels such as commune level in all investment projects. Appropriate mechanisms for monitoring and evaluation at sub-national levels will be determined during the project preparation stage.

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№ 3316 MEF/.....

Date: June 03 , 2011

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Subject: Cambodia's Proposal for the Strategic Program on Climate Resilience.

Dear Ms. Patricia Bliss-Guest,

The Royal Government of Cambodia (RGC) is pleased to submit the proposal for Strategic Program for Climate Resilience (SPCR) for consideration by the PPCR sub-committee. The proposal is based on extensive stakeholder consultations held by the PPCR Joint Missions from 12-22 October 2009, 21-26 April 2010 and 9-13 May 2011.

The PPCR support will add substantial value to the RGC's efforts in leading the country to a climate-resilient development path, consistent with its poverty reduction and sustainable development goals. In view of Cambodia's substantial financing needs for climate change adaptation, the RGC decided to apply for PPCR support to the extent of $50 million in grant and $55 million in concessional credit.

We are pleased to learn that the expert reviewer endorsed by PPCR Sub-committee has positively evaluated the SPCR for Cambodia. Please find attached the review and a note that describes how the suggestions and recommendations from the review have been considered in the final document.

The RGC will send two representatives to present the Cambodia SPCR proposal at the PPCR sub-committee meeting to be held in Cape Town, South Africa in June 2011. The representatives will be pleased to respond to any queries of the sub-committee members.

We sincerely hope that the PPCR sub-committee will favorably consider the RGC proposal.

Yours sincerely,

Keat Chhon
Deputy Prime Minister
Minister of Economy and Finance

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