Climate Investment Funds

PPCR/SC.9/8
October 24, 2011

Meeting of the FIP Sub-Committee
Washington, D.C.
November 2, 2011

Agenda Item 8

CAMBODIA: PROVINCIAL ROADS IMPROVEMENT PROJECT - CLIMATE PROOFING OF ROADS IN PREY VENG, SVAY RIENG, KAMPONG CHHNANG AND KAMPONG SPEU PROVINCES

UNDER THE

STRATEGIC PROGRAM FOR CLIMATE RESILIENCE FOR CAMBODIA

Proposed Decision by PPCR Sub-Committee

The PPCR Sub-Committee approves an allocation of $ 7.0 million in PPCR grant resources and $ 10.0 million in PPCR credits for the project entitled: *Cambodia: Provincial Roads Improvement Project - Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces*, submitted by the Asian Development Bank on behalf of the Government of Cambodia.

The PPCR Sub-Committee takes note of the total budget of USD 750,000 for project support and supervision services and approves a final tranche of USD 375,000 for such services to be provided by the Asian Development Bank.

The Sub-Committee requests the Government of Cambodia and the Asian Development Bank to take into account written comments submitted by Sub-Committee by November 15, 2011 in the further development and implementation of the project.

PILOT PROGRAM FOR CLIMATE RESILIENCE

Summary – Project/Program Approval Request

1. **Country/Region**:	Cambodia	2. **CIF Project ID#**:	(Trustee will assign ID)
3. **Project/Program Title:**	SPCR Investment Component III (Project 1): ***Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces*** *as a part of ADB-funded* ***Provincial Roads Improvement Project***		
4. **Type of PPCR Investment**	*Private: No*	*Public:* ***YES***	*Mixed: NO*
5. **Funding Request (in USD million total) for Project/Program:**:	*Grant:* ***$7 million***	*Loan:* ***$10 million***	
6. **Approved Preparation Grant**	*Amount (USD):* **NONE Requested**	*Date:* ***NOT APPLICABLE***	
7. **Implementing MDB:**	***Asian Development Bank (ADB)***		
8. **Other MDB Involvement**	*MDB: --*	*Type of Involvement: --*	
9. **National Project Focal Point**:	*Mr. Peng Sovicheano* *Deputy Director General, Department of Public Works* *Ministry of Public Works and Transport (MPWT)*		
10. **National Implementing Agency[1] for project/program:**	*Ministry of Public Works and Transport (MPWT)*		
11. **MDB PPCR Focal Point and Project/Program Task Team Leader (TTL)**:	*Headquarters-PPCR Focal Point: Ancha Srinivasan, Principal Climate Change Specialist (ADB-Southeast Asia Department)*	*TTL: Shihiru Date, Senior Transport Specialist*	

[1] Can be Government agency or private sector firm

12. Project/Program Description:

- The project will support mainstreaming of climate risk and resilience in transport infrastructure planning at national and provincial levels. It will include an assessment of the vulnerability of project road network to climate change impacts with a view to improve adaptation planning. It will also develop emergency management planning for project roads.
- The project provides climate change adaptation support at both policy and operational levels to a sector and a geographical area, which has been identified as highly vulnerable to impacts of climate change.
- The adaptation strategy for the project includes a mixture of civil works design adjustments, hazard mapping, bioengineering and other ecosystem-based adaptation measures to cope with both observed and projected changes in climate in the project area.
- The engineering changes are mainstreamed in the project design itself. These include, but not limited to, elevation of roads in areas where major flooding is becoming increasingly common and changing the selection of sub-grade materials to withstand higher moisture content.
- Several low risk options and no-regrets adaptation measures such as piloting water capture and storage systems, and planting appropriate species to restore ecosystem functions will be undertaken.
- A community-based emergency management intervention will be piloted in Kampong Chhnang province, with participation of the Red Cross.

Sector: Infrastructure

Themes: Climate proofing of roads; Climate risk management; Flood and drought management; Disaster risk reduction; Ecosystem-based adaptation; Capacity strengthening for mainstreaming resilience into transport planning; Stakeholder participation

13. Objective

- To rehabilitate and upgrade 157 km of flood-vulnerable roads in Kampong Chhnang, Kampong Speu, Prey Vang, and Svay Rieng provinces to **climate change-resilient condition** thereby providing all-year access to markets, jobs, and social services in agricultural areas of project provinces

14. Expected Outcomes:

- Increased resilience of road infrastructure to climate variability and change in some of the most vulnerable provinces of Cambodia with large agricultural populations.
- Improved technical and financial planning capacity to mainstream climate change concerns into road infrastructure development at national, provincial and local levels.
- Enhanced quality of life of people living in four agricultural provinces most affected by climate variability and change through improved access to markets and other social services including early warning systems for disaster risk reduction

15. **Key Results and Indicators for Success (consistent with PPCR results framework):**	
Results	**Indicators**
(a) Ministry of Public Works and Transport (MPWT) mainstreams climate change risks and resilience in provincial road planning, maintenance and budgeting by 2017	(i) MPWT road transport policies adjusted to incorporate climate risks, and decision making appropriately reflects vulnerability (including gender dimension) studies (ii) Road maintenance works in MPWT are aligned with climate change trends and projections (iii) MPWT budget allocations consider climate change vulnerabilities of priority roads (iv) Number and value of climate-resilient investments in road infrastructure increased and continuity of services provided by road infrastructure ensured
(b) MPWT changes manuals to incorporate climate resilient design of roads by 2017	(i) Road rehabilitation and new road construction will follow 100-year flood design (ii) Hazard maps for national and provincial roads of MPWT completed and used routinely in prioritizing road maintenance operations
(c) MPWT strengthens climate change adaptation training and disseminates knowledge on climate resilience by 2017	(i) At least 20 staff members from MPWT including women participate in regional climate change adaptation forums and participate in PPCR knowledge dissemination (e.g., publications, studies, knowledge sharing platforms, learning briefs, communities of practice, etc.) (ii) MPWT organizes climate resilience related conferences annually in collaboration with the Ministry of Environment (MOE) and the Ministry of Rural Development (MRD) (iii) MPWT collaborates with Cambodian universities to integrate climate change in curriculum of environmental and transport engineering
(d) Capacity of provincial roads in southeastern and mid-west Cambodia to withstand climate change impacts enhanced through implementing ecosystem-based adaptation strategies by 2017	(i) 157 km of provincial roads rehabilitated and upgraded to paved condition, including117 km of road enhanced to climate resilient codes and standards for ensuring all-year access (ii) “Green planning” and planting implemented along at least 100 km of roads to improve flood and drought management (iii) Incidence of seasonal flooding of about 100 km roads reduced substantially (iv) Percentage of women in climate resilience-related economic opportunities increased (v) Access to markets and other social services for communities improved

(e) Number and size of water capture facilities in provincial areas increased by 2017	(i) Number of new water capture interventions in Kampong Chhnang province completed (ii) Dredging of irrigation lake in Kampong Chhnang province completed
(f) Emergency planning, management and disaster risk reduction in Kampong Chhnaang province to cope with extreme climate induced calamities strengthened by 2017	(i) Early warning systems established in Kampong Chhnang province and coverage under local early warning systems increased (ii) All residents are evacuated in a timely manner during a calamity in Kampong Chhnang province (iii) All livestock are moved to safe areas (with no shortage of feed) during a calamity in affected areas of Kampong Chhnang province

16. **Budget:**

Expenditures[2]	**Amount (USD) –** estimates	
Civil works of road improvements in contract packages A, B, and C road adjustments, framework agreement and borrow-pits	7.68	
Civil works for climate resilience including Water Capture and Storage, planting and equipment	2.77	
Consultants proportion of civil works related to climate resilience	2.27	
Consultants exclusively for climate resilience measures including training	2.58	
Contingencies (max. 10%)	1.70	
Total Cost (PPCR Finance)	**17.00**	
Co-Financing[3]:	*Amount (USD million):*	*Type of contribution:*
• Government	10.10	In-kind
• MDB	52.00	ADF Loan
• Private Sector	0.00	Not Applicable
• Others (please specify)	TBD	
Co-Financing Total	62.10	

[2] Expenditure categories should be provided by the MDBs based on own procedures.
[3] This includes: in-kind contributions (monetary value), MDB loan or grant, parallel financing, etc.

Investment Plan for the Entire Project ($ millions)

Item		Amount[a]
A.	**Base Cost**[b]	
	1. Civil Works	57.64
	a. Improvements of Provincial Roads and Cross-Border Facility	*48.08*
	b. Land Acquisition and Resettlement	*2.14*
	c. Detail Design and Implementation Supervision Consulting Services	*7.42*
	2. Improved Road Asset Management through Axle Load Control	1.44
	3. Increased Road Safety and Safeguards[c]	0.32
	4. Improved Climate Resilience	5.81
	5. Efficient Project Management	2.30
	Total Base Cost	**67.51**
B.	**Contingencies**[d]	
	1. Physical Contingencies	5.99
	2. Price Contingencies	4.48
	Total Contingencies	**10.47**
C.	**Financing Charges During Implementation**[e]	**1.12**
	Total (A+B+C)	**79.10**

[a] Includes taxes and duties of $7.59 million to be financed from government resources.
[b] In mid-2011 prices.
[c] Cost of road safety program is included in Detail Design and Implementation Supervision Consulting Services.
[d] Physical contingencies computed at 10% for civil works, field research and development, training, surveys, and studies. Price contingencies computed for foreign exchange costs and local currency costs based on the annual rates in the table below; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

Annual Rate	2011	2012	2013	2014	2015	2016	2017
Foreign Currency	4.9%	-3.2%	0.3%	0.5%	0.5%	0.5%	0.5%
Local Currency	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%

[e] Includes interest charges and service charges. Interest for ADB loan and service charge for Strategic Climate Fund loan during construction have been respectively computed at 1.0% per annum and 0.1% per annum during the grace period.
Source: Asian Development Bank.

17. **Project/Program Timeframe**

Expected Board/MDB Management[4] approval date: December 2011
Expected Mid-Term review date: October 2014
Expected Project/Program closure[5] date: March 2017

18. **Role of other Partners involved in project/program**[6]:

- Coordination with other activities such as **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).
- Coordination with other activities funded through the **Global Environment Facility**, such as the National Adaptation Program of Action (NAPA) and the Second National Communications;
- Local communities including **women and NGOs** will be involved in project implementation.

[4] In some cases activities will not require MDB Board approval
[5] Financial closure date
[6] Other local, national and international partners to be involved in implementation of the project/program.

19. **Implementation Arrangements** (incl. procurement of goods and services)**:**

- The MPWT will be the executing agency for the project. The project management unit (PMU) 3, as a part of the General Department of Public Works of MPWT, will be the implementing agency of the project.
- All civil works contracts for road and CBF rehabilitation will follow International Competitive Bidding as the mode of procurement.
- As for consulting services, it is planned to recruit firms. Advance action for recruitment of consultants will be considered.
- The project will be implemented over 5 years, from 2012 to 2017.
- Funding from ADB and other sources will be invested on road improvements, resettlements, capacity building on road assets management; road safety and safeguards; and, project management. PPCR Funds will be used to enhance climate resilience of selected road networks and to improve planning capacity for mainstreaming adaptation concerns in transport sector planning.

Table: Implementation Arrangements

Aspects	**Arrangements**		
Implementation period	April 2012–March 2017		
Estimated project completion date	31 March 2017		
Loan closing date	30 September 2017		
Project management			
(i) Oversight body	Ministry of Economy and Finance	Inter-ministerial Resettlement Committee	
(ii) Executing agency	Ministry of Public Works and Transport		
(iii) Key implementing agencies	Project Management Unit 3		
(iv) Project management unit 3	Phnom Penh	12 staff	
Procurement	International competitive bidding	4 contracts	$58.59 million
	International competitive bidding	1 contract	$0.80 million
Consulting services	Quality- and cost-based selection	1,305 person-months	$12.60 million
Retroactive financing and advance contracting	Advance action for consulting services for detailed design and implementation supervision	1 contract	$8.45 million
Disbursement	The ADB loan, PPCR loan, and PPCR grant proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2007, as amended from time to time) and the detailed arrangement agreed upon between the government and ADB.		

20. **Other Information:**

DRAFT
4 Oct 2011

Report and Recommendation of the President to the Board of Directors

Project Number: 43309
October 2011

Proposed Loan, Grant, and Technical Assistance and Administration of Loan and Grant Kingdom of Cambodia: Provincial Road Improvement Project

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 30 September 2011)

Currency Unit	–	riel/s (KR)
KR1.00	=	$0.00024
$1.00	=	KR4,078

ABBREVIATIONS

ADB	–	Asian Development Bank
CBF	–	cross-border facility
COBP	–	country operations business plan
DDIS	–	detailed design and implementation supervision
EMP	–	Environmental management plan
GGF	–	good-governance framework
GMS	–	Greater Mekong Subregion
HHTPP	–	HIV/AIDS and human trafficking prevention program
IEE	–	initial environmental examination
km	–	kilometer
MPWT	–	Ministry of Public Works and Transport
NR	–	national road
PAM	–	project administration manual
PAWS	–	Phnom Aural Wildlife Sanctuary
PDE	–	Provincial Department of Environment
PMU	–	project management unit
PPCR	–	pilot program for climate resilience
TA	–	technical assistance

NOTE

In this report, "$" refers to US dollars unless otherwise stated.

Vice-President	S. Groff, Operations 2
Director General	K. Senga, Southeast Asia Department (SERD)
Director	J. Lynch, Transport and Communications Division, SERD
Team leader	S. Date, Senior Transport Specialist, SERD
Team members	P. Broch, Senior Transport Economist, SERD
	C. Clark, Safeguards Specialist (Resettlement), SERD
	S. Kawazu, Senior Counsel, Office of the General Counsel
	K. Leung, Finance Specialist, SERD
	J. Nam, Safeguards Specialist (Environment), SERD
	T. Mella, Operations Officer, SERD
	N. Ouk, Senior Project Implementation Officer, SERD
	S. Ouk, Safeguards Officer, SERD
	K. Schelzig-Bloom, Senior Social Sector Specialist, SERD
	R. Shaheen, Procurement Specialist, Central Operations Services Office
	S. Sok, Senior Procurement Officer, SERD
	A. Srinivasan, Principal Climate Change Specialist, SERD
	A. Velasquez, Safeguards Specialist (Environment), SERD
	P. Villanueva, Operations Assistant, SERD
Peer reviewer	H. Koide, Principal Regional Cooperation Specialist, OREI

CONTENTS

PROJECT AT A GLANCE

1. Project Name: Provincial Roads Improvement Project **2. Project Number:** 43309-013

3. Country: Cambodia **4. Department/Division:** Southeast Asia Department/Transport and Communications Division

5. Sector Classification:

Sectors	Primary	Subsectors
Transport, and information and communication technology	√	Road transport

6. Thematic Classification:

Themes	Primary	Subthemes
Economic growth	√	Developing rural areas
Social development		Involuntary resettlement
Regional cooperation and integration		Other regional public goods
Capacity development		Organizational development

6a. Climate Change Impact

Adaptation	High
Mitigation	Low

6b. Gender Mainstreaming

Gender equity theme (GEN)	
Effective gender mainstreaming (EGM)	√
Some gender benefits (SGB)	
No gender elements (NGE)	

7. Targeting Classification:

General Intervention	Targeted Intervention		
	Geographic dimensions of inclusive growth	Millennium development goals	Income poverty at household level
√			

8. Location Impact:

National	Low
Regional	Low
Rural	High
Urban	Low

9. Project Risk Categorization: Complex

10. Safeguards Categorization:

Environment	B
Involuntary resettlement	B
Indigenous peoples	B

11. ADB Financing:

Sovereign/Nonsovereign	Modality	Source	Amount ($ Million)
Sovereign	Project loan	Asian Development Fund	52.0
Total			52.0

12. Cofinancing:

Financier	Category	Amount ($ Million)	Administration Type
Strategic Climate Fund - PPCR	Official-Loan	10.0	ADB Administered
Strategic Climate Fund - PPCR	Official-Grant	7.0	ADB Administered
Total		17.0	

13. Counterpart Financing:

Source	Amount ($ Million)
Government	10.1
Total	10.1

14. Aid Effectiveness:

No Aid Effectiveness available.

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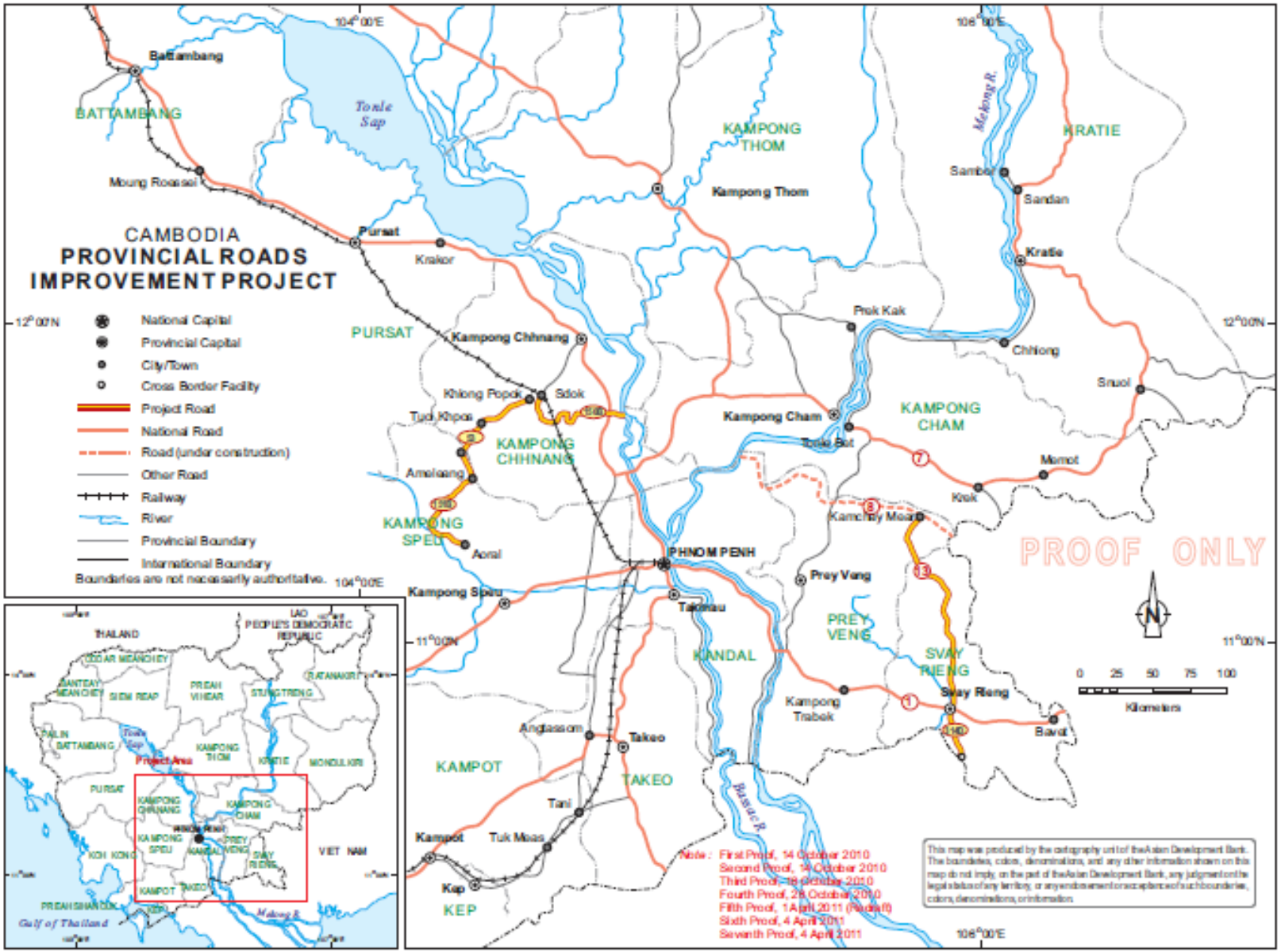
CAMBODIA
PROVINCIAL ROADS
IMPROVEMENT PROJECT
National Capital
Provincial Capital
City/Town
Cross Border Facility
Project Road
National Road
Road (under construction)
Other Road
Railway
River
Provincial Boundary
International Boundary
Boundaries are not necessarily authoritative.
Battambang
BATTAMBANG
Moung Roessei
Tonle Sap
Pursat
Krakor
PURSAT
Kampong Chhnang
KAMPONG CHHNANG
Khlong Popok
Sdok
Tuol Khpos
Ameleang
KAMPONG SPEU
Aoral
Kampong Speu
KAMPONG THOM
Kampong Thom
Mekong R.
KRATIE
Sambor
Sandan
Kratie
Prek Kak
Chhlong
Snuol
Kampong Cham
KAMPONG CHAM
Tonle Bet
Memot
Krek
Kamchay Mear
PHNOM PENH
Prey Veng
PREY VENG
Takhmau
KANDAL
SVAY RIENG
Svay Rieng
Kampong Trabek
Bavet
Angtassom
Takeo
TAKEO
KAMPOT
Tani
Kampot
Tuk Meas
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Note: First Proof, 14 October 2010
Second Proof, 19 October 2010
Third Proof, 18 October 2010
Fourth Proof, 28 October 2010
Fifth Proof, 1 April 2011 (Revised)
Sixth Proof, 4 April 2011
Seventh Proof, 4 April 2011
This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.
104°00'E
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11°00'N
THAILAND
LAO PEOPLE'S DEMOCRATIC REPUBLIC
VIET NAM
Gulf of Thailand
Project Area

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed loan, (ii) proposed administration of a loan to be provided by the Strategic Climate Fund[1]; and (iii) proposed administration of a grant to be provided by the Strategic Climate Fund to the Kingdom of Cambodia for the Provincial Roads Improvement Project[2]. The report also describes proposed technical assistance (TA) to be provided by the Asian Development Bank (ADB) for restructuring of the Ministry of Public Works and Transport (MPWT), and if the Board approves the proposed loan, I, acting under the authority delegated to me by the Board, will approve the administration of TA.

2. The project will improve Cambodia's provincial road network by paving 157 kilometers (km) of provincial roads in four provinces to climate resilient paved condition. The project also aims to improve MPWT's road asset management capacities through an enhanced axle load control program. Furthermore, the project will help MPWT establish a community-based road safety program for the project provinces. The project also supports road design and planning for climate resilience and for emergency preparedness, mitigation, and response. The feasibility study for the project was prepared through an ADB TA to the government.[3]

II. THE PROJECT

A. Rationale

3. The project aims to rehabilitate about 157 km of provincial roads in Kampong Chhnang, Kampong Speu, Prey Vang, and Svay Rieng provinces to climate resilient paved condition. The rehabilitation program will provide a safer, climate-resilient and cost-effective provincial road network with all-year access to markets and other social services for provincial centers of southeastern and mid-western Cambodia. A new cross border facility (CBF) will be constructed at Prey Var-Mocva to facilitate efficient cross border transport and trade between Cambodia and Vietnam. The project will support a sustainable road maintenance regime in MPWT, community-based road safety measures, an HIV/AIDS and human trafficking prevention program (HHTPP), climate resilient measures and efficient project management in MPWT.

4. Roads are the principal mode of transportation in Cambodia. The road network of approximately 39,600 km includes: (i) national roads (primary national highways) with a total length of about 2,100 km; (ii) provincial roads (secondary national highways) with a total length of about 9,500 km; and (iii) about 28,000 km of rural roads. Management of national and provincial roads is the responsibility of MPWT, whereas management of rural roads is the responsibility of the Ministry of Rural Development.

5. The remote rural economy is becoming increasingly dependent on an improved national road network, yet the provincial road network that connects remote areas, with a low paved ratio of 11%, continues to deteriorate because of the rapid growth in traffic, lack of maintenance financing, and poor road maintenance standards and practices. National Road (NR) 13 that links NRs 1 and 8 in north-south direction and NR 314D, linking NR 1 with the CBF at Prey Var-Mocva, are two such provincial roads[4]. Though vital for transport within Prey Vang and Svay

[1] Under the Pilot Program for Climate Resilience.
[2] The design and monitoring framework is in Appendix 1.
[3] ADB. 2010. *Technical Assistance to the Kingdom of Cambodia for the Provincial Roads Improvement Project*. Manila (TA 7665-CAM).
[4] As noted in para. 4, provincial roads (secondary national highways) in Cambodia are labeled as national roads with a 2- and 3-digit numbering system; the primary national highways are labeled using a single digit system.

Rieng provinces, and to cross-border transport and trade, these roads are unpaved and do not provide all-year accessibility.

6. To enhance regional transport and trade activities in Greater Mekong Subregion (GMS) corridors, Cambodia acceded to the GMS Cross-Border Transport Agreement (CBTA) in November 2001. One forward initiative to implement CBTA in Cambodia was the pilot implementation of a CBF at Bavet through a bilateral agreement between Cambodia and Viet Nam in 2003. The two Governments agreed on expanding the quota for vehicles for cross border transport from 40 to 150 on 17 March 2009. Since the current CBF at Prey Var-Mocva is insufficient in capacity, it is expected that the planned CBF will further supplement cross-border transport and trade with Viet Nam in southeastern Cambodia. In this respect, the project will also benefit from the ongoing transport and trade facilitation regional TA[5] through workshops for improving the CBF functional capacity.

7. As a consequence of relatively rapid economic development, overloading of cargo vehicles has become a severe cause of road damage in Cambodia in the past 5 years. This is a major issue on provincial roads as a result of overloaded trucks that haul agricultural products and carry quarry materials. While ADB is currently supporting an axle load control program for national roads, the project will extend similar support to provincial roads, expand current weigh station facilities and provide new facilities.

8. Cambodia has one of the highest incidences of road accidents in the world, with 10 fatalities per 10,000 vehicles in 2010. This is a 44% decrease from 2007, but still represents the highest accident rate in Southeast Asia. Thus, road safety continues to be a major sector concern, especially with the growth of traffic in provincial and rural areas. In line with the national umbrella programs for road safety and ADB's ongoing road safety support through MPWT, the project will assist MPWT in designing and managing a community-based road safety program for all project provinces.

9. Given the natural disasters that Cambodia has faced in recent years, particularly the frequent flooding during the wet season, the need to address climate change is essential. In response, the project will rehabilitate a provincial road section (NR150B, NR53 and NR151B) of 69.6 km in Kampong Chhnang and Kampong Speu provinces to climate resilient paved condition[6]. The road section is a priority in terms of rural access and flooding has been a persistent problem. The climate resilience measures include climate resilient road designs, hazard mapping, tree planting, and plans for water capture and storage, disaster preparedness, mitigation, and response.

10. The overarching objective of the ADB's Country Partnership Strategy (CPS) 2011–2013[7] for Cambodia is poverty reduction in line with the Government's socio-economic development priorities. The CPS focuses on two strategic objectives: (i) inclusive economic growth through provision of physical infrastructure as well as interventions in other development activities such as vocational training, agriculture and financial sector development; and (ii) social development and equity. Rehabilitation and enhanced climate resilience of the provincial roads under the project will improve the rural poor's access to markets and social services and is a core means of promoting inclusive economic growth and reducing poverty as well as enhancing social

[5] ADB. 2010. *Technical Assistance Support for Implementing the Action Plan for Transport and Trade Facilitation in the Greater Mekong Subregion.* Manila. (TA-7851).

[6] This road section comprises: (i) NR 150B starting from Tonle Sap River running west across NR 5 joining NR 53; (ii) NR 53 from Khlong Popok to Kampong Speu border; and (iii) NR 151B to Amleang. NRs 150B and 53 serve Kampong Chhnang while NR 151B serves Kampong Speu.

[7] ADB. 2011. Country Partnership Strategy: Cambodia, 2011–2013. Manila.

development and equity. The CPS includes four road sector projects in the program, all of which are consistent with the sector assistance program evaluation[8] recommendation to shift its focus towards rehabilitating provincial and rural roads, rather than national roads. ADB approved the first provincial road project in 2009[9] and this proposed project is the second. ADB also approved the first rural road project in 2010, which will improve the rural poor's access to markets and social services. A second rural road project is programmed for 2013 to supplement the first.[10]

11. The geographic focus of ADB's rural livelihood efforts has been the Tonle Sap Basin, which has a large proportion of Cambodia's rural poor. This project's geographical focus is on Kampong Chhnang and Kampong Speu in the mid-west and Prey Vang and Svay Rieng in the southeast. While mid-west provinces are in the Tonle Sap Basin, the other two southeastern provinces, with very high poverty levels of 37% and 36% respectively (national poverty level 35%), are just outside ADB's traditional geographic focus. Nevertheless, the southeastern project provinces fit well geographically with the southern economic corridor of the GMS as feeder routes. The roads and CBF also align well with the Government's rice and rubber production and export strategy for this area.

12. ADB's operational priorities on climate change include sustainable transport initiatives and promoting climate resilient development. The proposed project is in line with this priority and is also aligned with climate change implementation plan developed for Southeast Asia.[11] Also, the project's climate resilience measures significantly benefit the rural communities.

13. The government's poverty reduction strategy for 2009–2013 (the Rectangular Strategy for Growth, Employment, Equity and Efficiency, Phase II) emphasizes generating economic growth through the private sector, with rehabilitation and development of the country's physical infrastructure as a necessary precondition.[12] The project supports this strategy, particularly as it enhances connectivity, balanced economic development, and access to social services and cross-border transport, and trade in remote areas of southeastern and mid-western Cambodia.

B. Impact and Outcome

14. The impact of the project is improved access to markets, jobs, social services in four project provinces of Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng. This impact is consistent with the sector results framework of Cambodia Transport Sector Assessment, Strategy, and Roadmap.[13] The outcome of the project is a safe, climate-resilient and cost effective road network that provides all-year access in the agricultural areas of the project provinces.

C. Outputs

15. The project includes five outputs. The first output is civil works to: (i) rehabilitate 88 km of road to climate resilient paved condition NR 13 connecting NRs 8 and 1, between Komchay

[8] ADB. 2009. *Transport Sector in Cambodia-Focusing on Results*. Manila. (SAP: CAM2009-34).
[9] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Cambodia for the Greater Mekong Subregion: Cambodia Northwest Provincial Road Improvement Project*. Manila. (Loan 2539-CAM).
[10] The first project is: ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Cambodia for Rural Roads Improvement Project*. Manila (Loan 2670-CAM). It will be supplemented by a proposed *Second Rural Roads Improvement Project*, for approval in 2013.
[11] ADB. 2010. *Climate Change in Southeast Asia. Focused Actions on the Frontlines of Climate Change.* Manila.
[12] Samdech Akka Moha Sena Padei Techo Hun Sen, Prime Minister of the Kingdom of Cambodia. 2008. *Rectangular Strategy for Growth, Employment, Equity and Efficiency, Phase II*. Phnom Penh.
[13] ADB. 2011. *Cambodia Transport Sector Assessment, Strategy, and Roadmap*. Manila

Mear and Prosot, and NR 314D from Prosot to the border of Vietnam at Prey Var-Mocva; (ii) construct a new CBF at Prey Var-Mocva; and (iii) rehabilitate 69.6 km of road to climate resilient paved condition; NR 150B from Ta Ches to Tek Phos, NR 53 from Khlong Popok to Kampong Speu border, and from there to Amleang (NR 151B). This output includes detailed design and implementation supervision (DDIS) consulting services and land acquisition and resettlement required for the project roads and the CBF.

16. The second output is improved road asset management through axle load control at strategic locations of national and provincial roads, thereby expanding and improving MPWT's ongoing axle load control program. Recent interventions by ADB to install and operate permanent weighbridges at seven key locations in the country, as well as the establishment of a Permanent Axle Overload Control Committee in MPWT, have reduced overloading. The continued interventions, through expansion of existing weigh stations and provision of new weigh stations, are expected to contribute to further reduction in overloading.

17. The third output is increased road safety and implementation of social safeguards through: (i) a community-based road safety awareness program in line with the national program; (ii) an HHTPP; and (iii) a sex-disaggregated baseline socioeconomic survey of beneficiaries.

18. The fourth output is increased climate resilience of the project roads. [14] This output will include an assessment of the vulnerability of MPWT's road network to climate change impacts with a view to improve adaptation planning and introducing ecosystem-based adaptation strategies. The output will also develop emergency management planning for project roads and planning water capture and storage systems. A mixture of civil works design adjustments, hazard mapping, bioengineering and other ecosystem based measures, and policy and planning activities to ensure effective mainstreaming of climate change concerns in infrastructure planning are planned to cope with climate change impacts. In addition, a community-based emergency management intervention will be piloted in Kampong Chhnang province, with participation of Red Cross to sustain the emergency medical facilities.

19. The fifth output is efficient project management support to the entire MPWT. Under most of the outputs, the project will promote substantial positive employment and gender impacts in the rural communities. The labor and gender mainstreaming action plan (web-linked document) describes the labor and gender-mainstreaming aspects associated with the five project outputs.

D. Investment and Financing Plans

20. The project is estimated to cost $79.10 million (Table 1). Detailed cost estimates by expenditure category and by financier is included in the project administration manual (PAM). [15]

Table 1: Project Investment Plan
($ millions)

Item		Amount[a]
A.	**Base Cost**[b]	
	1. Civil Works	57.64
	a. Improvements of Provincial Roads and Cross-Border Facility	*48.08*
	b. Land Acquisition and Resettlement	*2.14*
	c. Detail Design and Implementation Supervision Consulting Services	*7.42*
	2. Improved Road Asset Management through Axle Load Control	1.44

[14] Output: Increased Climate Resilience (accessible from the list of linked documents in Appendix 2).
[15] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

Item		Amount[a]
	3. Increased Road Safety and Safeguards[c]	0.32
	4. Improved Climate Resilience	5.81
	5. Efficient Project Management	2.30
	Total Base Cost	**67.51**
B.	**Contingencies[d]**	
	1. Physical Contingencies	5.99
	2. Price Contingencies	4.48
	Total Contingencies	**10.47**
C.	**Financing Charges During Implementation[e]**	**1.12**
	Total (A+B+C)	**79.10**

[a] Includes taxes and duties of $7.59 million to be financed from government resources.
[b] In mid-2011 prices.
[c] Cost of road safety program is included in Detail Design and Implementation Supervision Consulting Services.
[d] Physical contingencies computed at 10% for civil works, field research and development, training, surveys, and studies. Price contingencies computed for foreign exchange costs and local currency costs based on the annual rates in the table below; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

Annual Rate	2011	2012	2013	2014	2015	2016	2017
Foreign Currency	4.9%	-3.2%	0.3%	0.5%	0.5%	0.5%	0.5%
Local Currency	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%

[e] Includes interest charges and service charges. Interest for ADB loan and service charge for Strategic Climate Fund loan during construction have been respectively computed at 1.0% per annum and 0.1% per annum during the grace period.
Source: Asian Development Bank.

21. **Tentative financing plan**. The borrower, the Kingdom of Cambodia, has requested a loan in various currencies equivalent to $52.0 million from ADB's Special Funds resources to help finance the project. For the ADB loan, the repayment period of the proposed loan will be 32 years, including a grace period of 8 years, with an interest charge of 1.0% per annum during the grace period and 1.5% per annum thereafter, and such other terms and conditions set forth in the draft loan agreement. The interest during construction will be financed by the ADB loan. The proceeds of the loan will be made available by the borrower to the MPWT through budgetary allocations. The ADB loan will finance civil works, equipment, related consulting services, project management, interest charge, and contingency totaling $52.0 million equivalent. The Strategic Climate Fund (see footnote 1), under the Pilot Program for Climate Resilience (PPCR), will finance civil works and related consulting services, project management, interest charge, and contingency through a $10.0 million loan, and a $7.0 million grant. The repayment period of the PPCR loan will be 40 years, including a grace period of 10 years, with a service charge of 0.1% per annum, and, together with the grant, will be administered by ADB. The government will finance the local taxes, duties, land acquisition and resettlement cost, and contingency amounting to $10.10 million. The financing plan is in Table 2.

Table 2: Financing Plan

Source	Amount ($ millions)	Share of Total (%)
Asian Development Bank	52.00	65.74
Strategic Climate Fund (Loan)	10.00	12.64
Strategic Climate Fund (Grant)	7.00	8.85
Government	10.10	12.77
Total	**79.10**	**100.00**

Source: Asian Development Bank.

III. TECHNICAL ASSISTANCE

22. The Land Transport Department of MPWT is tasked with planning, regulating and

administrating road traffic to ensure efficient and safe road transport. The department is presently not equipped to undertake these tasks effectively and needs to reform its organizational structure and procedures and strengthen its human resource base. A piggy-backed capacity development TA[16] is proposed to assist strengthening the department in the first of a three-staged process. The first stage is diagnostics of the department's need to restructure, develop staff capabilities, and modernize internal processes to increase efficiency. The diagnostic assessment will be followed by a separate TA for detailed planning of interventions that address issues of road safety, traffic regulation, vehicle registration, legislation and long term planning. These interventions will be designed to enable various development partners to provide assistance for implementation. Lastly, the early reform stage will include assistance to restructure the department, develop in-house staff capacities, support recruitment of staff with new skills and implement priority interventions as identified in the second stage.

23. The TA is estimated at $550,000 equivalent, to be implemented over a 12-month period, The TA will be financed by ADB's TA funding resources for $500,000 (from TASF-IV). The local currency cost, $50,000 equivalent, will be met by the Government in-kind to cover office accommodation and communications, counterpart staff support, and other administrative expenses. ADB will recruit an international firm in cooperation with national consultants using quality- and cost-based selection (80:20 ratio and simplified technical proposal) to provide approximately 15 international and 20 national person-months of consulting inputs.

A. Implementation Arrangements

24. The MPWT will be the executing agency for the project. The project management unit (PMU) 3, as a part of the General Department of Public Works of MPWT, will be the implementing agency of the project. All civil works contracts for road and CBF rehabilitation will follow International Competitive Bidding as the mode of procurement. As for consulting services, it is planned to recruit firms for activities of DDIS, road asset management, climate resilience, road safety, and HIV/AIDS and human trafficking prevention. Advance action for recruitment of DDIS and TA consultants will be considered. The project will be implemented over 5 years, from 2012 to 2017. The implementation arrangements are summarized in Table 3 and described in detail in the PAM.

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	April 2012–March 2017		
Estimated project completion date	31 March 2017		
Loan closing date	30 September 2017		
Project management			
(i) Oversight body	Ministry of Economy and Finance	Interministerial Resettlement Committee	
(ii) Executing agency	Ministry of Public Works and Transport		
(iii) Key implementing agencies	Project Management Unit 3		
(iv) Project management unit 3	Phnom Penh	12 staff	
Procurement	International competitive bidding	4 contracts	$58.59 million
	International competitive bidding	1 contract	$0.80 million
Consulting services	Quality- and cost-based selection	1,305	$12.60

[16] Supplementary Appendix 1: Capacity Development Technical Assistance (accessible from the list of linked documents in Appendix 2).

Aspects	Arrangements		
		person-months	million
Retroactive financing and advance contracting	Advance action for consulting services for detailed design and implementation supervision	1 contract	$8.45 million
Disbursement	The ADB loan, SCF loan, and SCF grant proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2007, as amended from time to time) and the detailed arrangement agreed upon between the government and ADB.		

ADB = Asian Development Bank, SCF = strategic climate fund.
Source: Asian Development Bank

IV. DUE DILIGENCE

A. Economic and Financial

25. The improvement of provincial roads under the project will serve about 700,000 project beneficiaries, the vast majority being the rural poor. The approach used to evaluate the project follows the standard practice of comparing the life-cycle costs of the road agency and road users, with and without the project. The economic internal rate of return of the proposed project is 15.5%, and for the returns for all individual road sections are above the 12% threshold.

B. Governance

26. ADB's *Anticorruption Policy* (1998, as amended to date) was explained to, and discussed with the Government of Cambodia and MPWT. This policy will be applied throughout project implementation. Apart from this, a web-linked good-governance framework (GGF) was developed, in coordination with the government. The specific policy requirements and supplementary measures to ensure good governance are described in the PAM. The GGF will be posted on the websites of MPWT and ADB. Review missions will closely monitor compliance with their provisions and requirements. A financial management assessment was carried out. The assessment confirms that the executing agency including the implement agency has adequate financial management capacity to implement the project.

C. Poverty and Social

27. The project will significantly benefit the rural poor, including women and children, living in the project provinces. Local economic development depends on improved connectivity, and paved provincial roads will reduce travel times, increase convenience, and make it safer for women and girls to travel further from home. Better accessibility will improve rural health and educational attainment. Girls will have a better chance of attending secondary school, markets will be easier to reach, and "buy and sell" job opportunities for women will increase. Road construction and maintenance will generate jobs for local men and women, and provide much-needed cash income. The project's labor and gender mainstreaming action plan will ensure that contractors give priority to local residents for construction and road maintenance jobs, and ensure that men and women benefit equally, with equal pay for equal work. From a health perspective, rural villages will benefit from a significant reduction in dust, which is linked to respiratory disease, a major cause of child mortality in Cambodia. Potentially negative social impacts of increased connectivity will be monitored and mitigated through HHTPP. The project

includes a community-based road safety program to increase safety of road users and residents of local communities.

D. Safeguards

28. The project is category B for involuntary resettlement. The project will require approximately 24.4 hectares (ha) of land within the existing right-of-way of the various roads, and the acquisition of 2.5 ha of privately-owned land for the Prey Var CBF. Land to be utilized within the road right-of-way will affect non-land assets of an estimated 936 households. Of the 566 households experiencing impacts on structures (houses and/or shops), all will be partially affected or will otherwise be able to move back on remaining unaffected land beyond the corridor of impact. No households are expected to otherwise require relocation. Privately-owned land to be acquired at the site of the CBF is farming land. A resettlement plan and a combined resettlement and ethnic minority development plan have been prepared in compliance with ADB's Safeguards Policy Statement (2009) to ensure full mitigation of all involuntary resettlement impacts.

29. The project is category B for indigenous peoples. The presence of and potential project activity impacts on indigenous peoples in the project areas have been screened. There are approximately 3,000 ethnic Cham households in the project areas. Consultations during project preparation reveal their unanimous support for the project with typical expected benefits in the form of improved access to services as well as livelihood opportunities. An estimated 49 ethnic Cham and 5 ethnic Vietnamese households will be affected by land acquisition within the road right of way. Most of the resettlement impacts will be temporary in nature and will require relocation to remaining unaffected land outside the corridor of impact. Other negative impacts are the generalized increased risks of HIV/AIDS transmission, human trafficking as well as road accidents associated with the construction and operation of the project. Specific interests of the indigenous peoples affected by involuntary resettlement as well as indigenous peoples communities in the project areas are addressed in the combined resettlement and ethnic minority development plan; HIV/AIDS and human trafficking prevention strategy; and Labor and Gender Action Plan to ensure their equitable participation in project benefits and decision making as well as ensure that adverse impacts are effectively mitigated.

30. The project has been classified as category B for environment. Results of the initial environmental examination (IEE) showed that only minor adverse environmental impacts are anticipated for the improvement of project roads and implementation of small-scale climate change adaptation measures [17] for surrounding communities. Such impacts, which are considered short-term and temporary in nature, will be largely experienced during construction mainly due to elevated levels of dust and noise, traffic disruption, and potential occupational and community health and safety risks, but can be mitigated. It has also been confirmed that none of the project roads are located near culturally protected areas and that no rare, threatened, or endangered species of flora and fauna are found in or close to the alignments.

31. Except for NR 53, none of the project roads are in close proximity to any protected areas of ecological significance. NR 53 runs alongside part of the eastern boundary of Phnom Aural Wildlife Sanctuary (PAWS) for a distance of approximately 6.5 km. The Provincial Department

[17] As part of the climate resilience of the project, MPWT has been requested by commune officials and residents to finance improvements to the following community resources and facilities: (i) water capture component through extension of water supply distribution pipes to houses and rehabilitation of water storage tanks; (ii) rehabilitation of irrigation dams, spillways, and canals; and (iii) dredging certain shallow areas of Boeung Skeat Lake in Chao Maong commune to enhance irrigation water supply source. Dredged materials, if suitable, will be used to widen the existing unpaved local road along the lake.

of Environment confirmed that NR 53 does not intrude into the PAWS. As in the other Project roads, there are no forested areas in the vicinity of NR 53. The PAWS zones close to NR 53 are the community and sustainable zones which are predominantly agricultural areas while its conservation and core zones, at the nearest points, are approximately 2 km and 5 km, respectively, from NR 53. As such, no adverse environmental impacts are anticipated for all Project roads on ecologically protected areas. To avoid or mitigate negative impacts arising from the Project, an environmental management plan (EMP) detailing mitigation measures, monitoring activities and implementation responsibilities has been prepared as part of the IEE. Public consultations involving affected people and local officials have been conducted during the preparation of the IEE in compliance with ADB information disclosure and consultation requirements through focus group discussions and individual interviews along all project roads. Environment was not seen as a major issue by those persons interviewed. To ensure that the project is carried out in accordance with the EMP requirements, MPWT will specify details of the implementation of the EMP in the bid and contract documents for consulting services and civil works. MPWT will be assisted by the DDIS consultant in monitoring the environmental performance of contractors. The DDIS consultant will also provide on-the-job training to the field personnel of the Environment Safeguards Office of MPWT to build their capacity in environmental management and monitoring.

E. Risks and Mitigating Measures

32. Given the procurement management problems that other development partners have had with MPWT in the past, there is a need to establish risk mitigation measures. The preliminary assessment during the TA identified MPWT's procurement, corruption, and due diligence as the greatest risks during project implementation. Major risks and mitigating measures are described in detail in the risk assessment and risk management plan.[18]

V. ASSURANCES AND CONDITIONS

33. Implementation of the project will conform to ADB's mandatory policies on anticorruption, procurement, consulting services, due diligence, safeguards, and disbursement as described in detail in the PAM. The Government and MPWT have given the following assurances, in addition to the standard assurances that are incorporated in the legal documents:

(i) Within one year of the loan effectiveness, the Government will approve the updates of National Comprehensive Axle Load Control Program in a form and substance acceptable to ADB. The Program will provide systematic policy, strategy and planning for nation-wide axle control, and complaint handling for axle load control activities.

(ii) Unless otherwise agreed by ADB, within two years of the loan effectiveness, the Government will have reorganized the existing National Axle Overload Control Committee to ensure a more inclusive environment for Cambodia's axle load control, provided, however, that the Road Law will have been promulgated in a timely manner.

(iii) The Government will ensure that within 1 year of the loan effectiveness, appropriate procedures for axle load control, acceptable to ADB, will have been in place, and that all axle control activities within the country including those using portable weigh scales will be carried out in accordance with such procedures. Such procedures will comprise (a) the existing technical procedures

[18] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

acceptable to ADB, (b) good governance system applicable to axle load control activities, and (c) technical guidance of such activities by PMU 3 within MPWT.

(iv) The GGF prepared during project processing will be acceptable to ADB and implemented effectively by MPWT during the entire project period.

34. In addition to the standard requirements of ADB's public disclosure policy, MPWT will publicly disclose on its website activities such as local procurement activities, in order to increase public awareness on its good governance practices.

35. The effectiveness of the loan is conditional upon (i) the agreement reached between the Ministry of Economy and Finance and MPWT regarding arrangements to finance operation cost of axle load control stations, and (ii) redefining functions of PMU3, acceptable to ADB, in its role for providing technical guidance and internal audit.

VI. RECOMMENDATION

36. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank and recommend that the Board approve: (i) the loan in various currencies equivalent to SDRXXX to the Kingdom of Cambodia for the Provincial Roads Improvement Project from ADB's Special Funds resources with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; for a term of 32 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan agreement presented to the Board; (ii) the administration by ADB of a loan not exceeding the equivalent of $10 million to the Kingdom of Cambodia for the Provincial Roads Improvement Project to be provided by the Strategic Climate Fund; and (iii) the administration by ADB of a grant not exceeding the equivalent of $7 million to the Kingdom of Cambodia for the Provincial Roads Improvement Project to be provided by the Strategic Climate Fund.

Haruhiko Kuroda
President

XX December 2011

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Improved access to markets, jobs, social services in four project provinces of Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng	Volume of agricultural products transported on project roads increases by 100% from 2012 to 2019. Volume of motorcycle and passenger car traffic on project roads increases by 50% from 2012 to 2019. Volume of cargo traffic at CBF increases by 30% from 2012 to 2019. By 2019, in Kampong Chhnang, Kampong Speu, Prey Vang, and Svay Rieng provinces: (i) economic activity rate of 80% (ages15–64, both sexes) increases to 83%; (ii) enrolment at primary school level increased from 90% to 95% in project districts of Kampong Chhnang: 94% to 98% in projects districts of Svay Rieng; 89% to 94% in Kampong Speu (Thpong district); and 91% to 96% in Prey Veng (Kamchay Mear district) (iii) neonatal mortality rate (child deaths per 1,000 live births) decreases from 25 to 15 in project districts of Svay Rieng; from 20 to 10 in project districts of Kampong Chhnang; from 15 to 5 in Kampong Speu (Thpong district); and from 42 to 32 in Prey Veng (Kamchay Mear district) (iv) maternal mortality rate (deaths within 1 month per 100,000 live births) decreases to 350 to 225 in project districts of Svay Rieng; from 500 to 375 in project districts of Kampong Chhnang, from 179 to 54 in Kampong Speu (Thpong) district); and 305 to 180 in Prey Vent (Kamchay Mear district) (v) net enrolment at lower secondary school level increases from 42% to 55% in Kampong Chhnang; 37% to 50% in Svay Rieng; 35% to 48% in Kampong Speu (Thpong district) and 39% to 52% in Prey Veng (Kamchay Mear district)	NIS National and Regional Statistics MPWT Annual Report Baseline traffic data General Department of Customs and Excise annual commodity trade database. Cambodia Demographic and Health Survey MOE Education Management Information System Cambodia Demographic and Health Survey Cambodia Demographic and Health Survey MOE Education Management Information System	**Assumptions** Increased availability and quality of transport services following the rehabilitation of project roads and CBF Agriculture-related and other industries increase in the project area. Improved CBF operates efficiently in line with bilateral agreements **Risks** Unexpected long-term new epidemic hits Cambodia. The project roads deteriorate because of insufficient funds for road maintenance programs.
Outcome Safe, climate-resilient and cost effective road network that provides all-year access in the agricultural	Road accidents in the project area decrease by 5% from 2009 to 2017; 919 in Kampong Chhnang; 586 in Kampong Speu; 717 in Prey Veng; and 752 in Svay Rieng in 2009. Average travel times on project roads decrease by 25% from 2012 to 2017. Average trip lengths on project roads increase by 30% from 2012 to 2017.	NRSC National Road Safety Action Plan Annual Report MPWT Field traffic surveys MPWT Field traffic surveys	**Assumptions** The government sustains its commitment to provincial infrastructure development. Cambodia and Vietnam

Design Summary	Performance Targets/Indicators	Data Sources and Reporting Mechanisms	Assumptions and Risks
areas of the project provinces	Share of the paved provincial road network increases from 11% in 2010 to 12% in 2017. Average number of days per year that the project roads are accessible increases from 200 days in 2012 to 365 days in 2017.	MPWT Provincial and National Trade Statistics, MPWT Annual Reports MPWT Annual Reports	governments agree to develop Prey Var-Mocva as a supplementary gateway for Bavet. **Risks** Project roads suffer severe damage from unexpectedly severe natural disasters.
Outputs 1. Project roads and CBF at Prey Var-Mocva rehabilitated	157 km of provincial roads and CBF rehabilitated and about 117 km road sections improved according to climate-resilient codes and standards by 2017 Average roughness of project roads in 2012 decreases from 6–14 to 2–3 in 2017.	MPWT Monthly and quarterly Project Progress Reports; MPWT Monitoring reports MPWT Road Roughness Test Results; ADB PCR and ADB Project review missions	**Assumptions** Continued government commitment to overloading control and cross-border transport and trade Targeted communities apply road safety principles Targeted communities apply HIV awareness and prevention education. **Risks** Recruitment of consultants and contractors is delayed by external factors. Increased construction costs reduce the scope of works The number of natural disasters exceeds predictions Trained personnel in the PMU3 leave MPWT or are replaced
2. Improved MPWT road asset management	Violations of overloaded trucks in the southeastern Cambodia are reduced by 60% from 2012 to 2017. Annual operation and maintenance budget for project roads increases from $350 per km in 2010 to $400 per km in 2017.	MPWT Annual Reports; JICA Axle Load Control Program Reports MPWT Annual Reports and ADB PCR	
3. Increased road safety, institutional efficiency, and awareness of potential social problems	40% of project beneficiaries in project districts in Svay Rieng, Kampong Chhnang, Kampong Speu (Thpong district) and Prey Veng (Kamchay Chay) and all contractors' personnel participate in an HIV awareness and human trafficking prevention program before and during civil works construction, by 2017. Sex-disaggregated baseline socioeconomic data established by 2013 At least 2 female facilitators will conduct road safety awareness program in communes. At least 50% of female households participate in community-based road safety awareness workshops. Women workers provide at least 30% of local unskilled labor for road upgrading and maintenance.	MPWT Quarterly Progress Reports and ADB PCR MPWT Quarterly Progress Reports and ADB PCR MPWT Quarterly Progress Reports and ADB PCR MPWT Quarterly Progress Reports and ADB PCR MPWT Quarterly Progress Reports and ADB PCR	
4. Increased resilience of project roads to climate change	All residents at risk are evacuated within 72hours after a typhoon occurs in the pilot province for emergency management, 2017 onwards. Capacity of at least 20 MPWT staff in mainstreaming adaptation into road infrastructure planning and maintenance will	MPWT Quarterly Progress Reports and ADB PCR; PPCR Reports MPWT Quarterly Progress Reports and ADB PCR; PPCR	

Design Summary	Performance Targets/Indicators	Data Sources and Reporting Mechanisms	Assumptions and Risks
	be strengthened.	Reports	
	Vulnerability mapping and ecosystem-based adaptation measures will integrate gender issues.	MPWT Quarterly Progress Reports and ADB PCR; PPCR Reports	
	At least 40% of the workers engaged in climate resilient measures including planting and green maintenance are women	MPWT Quarterly Progress Reports and ADB PCR; PPCR Reports	
	Emergency management plan will include women as agents and beneficiaries.	MPWT Quarterly Progress Reports and ADB PCR; PPCR Reports	
5. Efficient project management	PMU3 personnel increased from 12 (7 male, 5 female) in 2010 to 22 (14 male, 8 female) in 2017	MPWT Quarterly Progress Reports and ADB PCR	
	All PMU3 staff (current 7 male, 5 female) participates in training on social and gender issues, by 2017 (likely 22 with 14 male, 8 female).	MPWT Quarterly Progress Reports and ADB PCR	

Activities with Milestones

1. Civil works
1.1 MPWT selects detailed design and construction supervision consultants: by March 2012
1.2 MPWT prepares tender documents and selects contractors: by October 2012
1.3 MPWT completes the land acquisition and resettlement: by 2013
1.4 MPWT completes 157 km of road and CBF rehabilitation: by 2017
2. Road asset management
2.1 MPWT completes weigh station construction: by 2014
2.2 MPWT completes procurement of weigh station equipment and installation: by 2014
2.3 MPWT implements new weigh stations: by 2015
3. Road safety and safeguards
3.1. MPWT implements the community-based road safety program: by 2015
3.2 MPWT implements the HIV/AIDS awareness and human trafficking prevention program: by 2015
3.3 MPWT completes the baseline socioeconomic survey with sex-disaggregated data: by 2013
4. Climate resilience
4.1 MPWT completes the detailed vulnerability map for climate change for project provinces: by 2017
4.2 MPWT completes the ecosystem based climate change adaptation strategies: by 2017
4.3 MPWT completes a pilot climate monitoring system-based road maintenance and management program: by 2017
4.4 MPWT establishes a pilot emergency management system for Kampong Chhnang and operates it: by 2017
4.5 MPWT installs the pilot early warning system the project province (of 4.4): by 2017
4.6 Completion of the plan for water capture and storage systems for the project provinces: by 2017
5. Efficient project management
5.1 MPWT completes training on social and gender issues for all PMU3 staff: by 2014
5.2 PMU3 recruits 10 new staff to increase its efficiency: by 2017
5.3 MPWT manages the project efficiently: by 2017

Inputs

1. Civil works:
1.1 Improving 157 km of provincial roads and CBF – $48.08 million
1.2 Land acquisition and resettlement – $2.14 million
1.3 Consulting services for design and implementation supervision – $7.42 million
2. Road asset management – $1.44 million
3. Road safety and safeguards – $0.32 million
4. Climate resilience – $5.81 million
5. Contingencies – $10.47 million
6. Incremental Administration Cost – $2.30 million
7. Financial charges during implementation – $1.12 million

ADB (ADF): $52.0 million
Government: $10.10 million
PPCR Loan: $10.0 million
Grant: $7.0 million
Beneficiaries: 700,000 persons

ADB = Asian Development Bank, ADF = Asian Development Fund, CBF = cross-border facility, DLT = Department of Land Transport, JICA = Japan International Cooperation Agency, km = kilometer, MOE = Ministry of Education, MPWT = Ministry of Public Works and Transport, NIS = National Institute of Statistics, NRSC = National Road Safety Committee; PMU = project management unit, PPCR = pilot program for climate resilience.
Source: Asian Development Bank estimates, Cambodia Demographic and Health Survey.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=43309-XX-3

1. Loan Agreement
2. Grant Agreement
3. Sector Assessment (Summary): Transport Sector
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Economic Analysis
8. Country Economic Indicators
9. Summary Poverty Reduction and Social Strategy
10. Labor and Gender Action Plan
11. Initial Environmental Examination
12. Resettlement Plan (314D, Cross-Border Facility, NR13)
13. Resettlement and Ethnic Minority Development Plan (150B, NR53, 151B)
14. Good Governance Framework
15. Risk Assessment and Risk Management Plan
16. Output: Increased Climate Resilience

Supplementary Document:

1. Technical Assistance: CAM: Supporting Strengthening and Institutional Reform for the Department of Land Transport of the Ministry of Public Works and Transport

Output: Increased Climate Resilience

A. Overview

1. The Royal Government of Cambodia (RGC) is one of the pilot countries participating in the Pilot Program for Climate Resilience (PPCR) – one of the three sub-programs of the Strategic Climate Fund (SCF)[1]. The PPCR provides incentives for scaled-up action and transformational change in integrating consideration of climate risks and resilience in national development planning, consistent with poverty reduction and sustainable development goals. The priority sectors for PPCR in Cambodia include water resources, agriculture and infrastructure. In June 2011, the PPCR sub-committee endorsed Cambodia's Strategic Program for Climate Resilience (SPCR) with a funding envelope of up to $86 million ($50 million in grants and up to $36 million in concessional credit). Of this, an allocation of $17 million ($10 million loan and $7 million grant) was endorsed for "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". This document describes in detail the activities envisioned under one of the five outputs of the main project: Increased climate resilience. . The monitoring indicators of this output are shown in the Appendix.

2. The proposed activities contribute to a key output of the investment component III (Improving Climate-resilient Infrastructure) of SPCR for Cambodia. The activities under this output include piloting approaches to strengthen civil works design and planning, as well as to reduce risks of damages resulting from climate change impacts through implementing ecosystem-based adaptation measures and emergency management responses. Through such activities, the planning capacity for climate-resilient infrastructure by the executing agency - the Ministry of Public Works and Transport (MPWT) – and provincial organizations will be enhanced. While data and information on global and regional climate change impacts are improving, it is still challenging to inform the design of engineered structures with precision, especially in Cambodia, where the lack of available climate change impact assessments and data adds to this uncertainty. However, several low risk options and no-regrets resilience measures such as piloting water capture and storage systems, planting appropriate species to restore ecosystem functions, and emergency management systems may be undertaken.

3. The outcome of the proposed Provincial Roads Improvement Project is the safe, climate-resilient, cost-effective, all-year access road network in agricultural provinces of Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng. The project includes rehabilitation of a 157.6 km long road and the development of a cross border facility. The total project cost is $79.10 million.

4. The project has 5 major outputs: (i) civil works for provincial roads improvement; (ii) road asset management; (iii) road safety and safeguards; (iv) climate resilience, which includes mapping of vulnerability to climate change, adjustments to road design, implementation of adaptation measures and emergency management activities; and (v) efficient project management support to the MPWT. Adjustments in civil works based on climate risk assessment are integrated into output one and complementary soft measures fall under output four. This document describes output 4 in detail.

[1] The other two sub-programs of the Strategic Climate Fund are Forest Investment Program (FIP) and Scaling up Renewable Energy Program (SREP) for low income countries.

5. One of the requirements of the Climate Investment Funds (CIF) including PPCR is the inclusion of knowledge management component[2]. This will be supported out of the PPCR grant resources of this proposed project. While the learning objective is cross-cutting at a technical level, the focus will be to better understand how roads can be planned, designed, and maintained to cope with the negative impacts of climate change. A better understanding of how roads may inadvertently increase vulnerability to climate change should also be identified. As such, the state of the roads where climate adjustments have been made will be monitored through the road asset management database of MPWT. Lessons on institutional structuring for integrating climate resilience into infrastructure development projects and decision-making will also be examined. A team of consultants will be recruited to assist MPWT in implementing this output. Each consultant will be responsible for monitoring and assessing such learning mechanisms and include them in their final reports and recommendations. Technical monitoring of road assets protected will be specifically conducted through Activity 4.6 described below. The national adaptation specialist will be responsible for compiling these and feeding them into the country-wide and CIF-wide learning mechanism.

B. Climate Change Impacts on Cambodian Rural Roads

6. The most recent climate change projections, developed through Cambodia's Ministry of Environment, suggest that under a high emission scenario, wet season rainfall will decrease until 2025 and then increase again by 2050 and 2080. However, under a low emission scenario, wet season rainfall will increase in 2025 and then decrease again by 2050 and 2080. Probabilities are unavailable for these projections and the results are inconclusive in terms of informing the project other than to highlight the need to apply flexible and low-risk climate resilience approaches. All studies reviewed showed an average overall warming across Cambodia, and assumed warming of 0.79°C in average temperature by 2030, for the project design.

7. Given that detailed climate change impact assessments are not available for the project design, other sources of information were assessed in detail. These include: (i) a review of the literature, such as post disaster needs assessments and hydrological modeling reports; (ii) a review of current climatological records and trends from the Department of Meteorology of Cambodia; (iii) interviews with local government units; and (iv) community level field surveys of 700 respondents. A review of existing climate trends in the project area and current vulnerabilities of the infrastructure was also assessed from an engineering perspective. This data served as the basis for the proposed project design summarized below.

8. Flooding in Cambodia is a natural occurrence and the agro-ecosystems are adapted to seasonal floods. Most people are concerned when the intensity and occurrence changes. These events create the greatest damage to infrastructure, as seen during typhoon Ketzana in October 2009, which was estimated to cause approximately $15 million in direct damages to the transport sector and a further $11 million in indirect losses through loss of access to roads.

9. There are two major flood types in Cambodia: (i) flashfloods, resulting from heavy downpour upstream on the Mekong River, which affect provinces along the Mekong and the southeastern areas of the country (e.g. 2001); and (ii) central area large scale floods, resulting from a combination of runoff from the Mekong River and heavy rains around the Tonle Sap Lake, which affect the provinces around the lake and the southern provinces (e.g. 1996 and 2000).

[2] The proposed knowledge management activities will be closely coordinated with a separate $7 million technical assistance project endorsed as part of SPCR for Cambodia. If there is a need, there is also an opportunity of seeking an additional $250,000 from PPCR sub-committee to support knowledge management.

10. In the past, these annual floods produced more benefits than harm. Devastating floods affecting a significant population used to occur almost every five years (in 1961, 1966, 1978, 1984, 1991, and 1996). Recently, however, harmful floods have occurred every year since 1999, and the worst hit in 2000. Floods seem to be getting worse and more frequent, perhaps due to climate change and human activities including inappropriate land use planning that degrade the environment. Flooding patterns have significantly changed in several provinces, including Kampong Cham, Kampong Chhnang, Kampong Thom, Kandal and Takeo. It is this change that often causes concern because the population, as well as the built environment, is often not equipped to manage them.

11. Drought is not adequately monitored in Cambodia but has devastating effects for a country, which relies heavily on agriculture. There are four characteristics of agricultural drought in Cambodia: (i) unpredictable delays in rainfall onset in the early wet season, (ii) erratic variations in wet season rainfall onset, amount, and duration across different local areas, (iii) early ending of rains during the wet season, and (iv) common occurrence of mini-droughts of three weeks or more during the wet season which can damage or destroy rice crops without irrigation. Communities in the project area regularly run out of water during the dry season, and this project will also address this through small-scale piloting of adaptation measures.

12. Flooding and soil moisture content is a primary concern for protecting investments in road works and will be addressed as a priority in the adaptation strategy of this project. There is no strong evidence of major landslides damaging the road due to the relatively flat topography. However, when materials are extracted for construction of the embankments, borrow pits alongside the road are increasingly eroded and cause safety problems to people, livestock, and infrastructure. Side-slope erosion is frequent as well as damage to small bridges by fast flowing and rising water levels during the wet season. At the same time, communities identified that they often lack water during the dry seasons. Segments of the road are being encroached upon by rising lake levels, such as near Lake Vaico in the southeast where the road embankment will be raised and slope-slides re-enforced for higher lake levels. Further details on the civil works adjustments are given below.

1. Vulnerability in the Southeast (Prey Veng and Svey Rieng Provinces)

13. The southeast project roads fall between the Mekong and Tonle Sap catchment areas and the hydrology of the area is not yet well studied. Climate change impact assessments on local hydrology are, therefore, not available due to a lack of basic data. Current observations in rainfall trends and projections in the southeast show that average annual and peak monthly rainfall have increased by 20% between 1980 and 1999 but have not changed since. Despite Prey Veng being highlighted as a province that is highly vulnerable to flooding in Cambodia's National Adaptation Programme of Action (NAPA), the project road does not run through the highly flood-prone areas of the Province. The southern segment of the project road in Svey Rieng, however, does run through the Lake Vaico area, and the road is relatively low-lying through this area. Borrow-pits are close to the road and are deep, and easily erode during rainfall; the same is true for the road itself. The behavior of Lake Vaico in terms of changes in lake levels is unknown. Furthermore, a number of irrigation and water management projects have taken place in the region, including Viet Nam, just south of this area. These have created changes to water flows but are still not studied well.

14. Community level survey and interviews with local governments suggest that damage to the road or lack of access as a result of floods or drought is a concern. Approximately 52% of

respondents run out of water during the dry season and 30% would see the use for more borrow-pits for water capture and storage, primarily for livestock, fish ponds, and small-scale irrigation. Approximately 80% of respondents see the benefit of planting grasses, shrubs and trees to restore soil stability and to provide shade and fruits.

2. Vulnerability in the mid-west (Kampong Chhnang and Kampong Speu)

15. The environmental features in the mid-west provide for greater potential risks to the project roads. Segments of the road cross the Tonle Sap floodplain (Tonle Sap and Bassac River) and annual seasonal flooding benefits local rice production. Flooding is a more prominent feature in the area, as is evident by the drainage structures in the existing infrastructure. Observed rainfall data show that average annual rainfall has already increased 20% from 1960 to 1999 and is projected to increase another 30% up to 2020, including peak monthly rainfall. This signals a great concern for increased risks from flooding, due to more intense average monthly rainfall and overall increases in moisture levels. The challenge in this area is related to managing the distribution of water throughout the year and changes in water availability.

16. The community surveys show that up to 40% of those in the project provinces run out of water during the dry season. Borrow-pits are used primarily for irrigation, followed by fishponds and livestock. Government officials, likewise, expressed an interest for water capture and storage, primarily for irrigation and some drinking water, to conserve large amounts of excess water available during the rainy season. Hydrological studies in Kampong Chhnang show that water supply is sufficient to meet irrigation demands, yet communities consistently identify dry season water shortages as a challenge. The causes for water shortages appear to be a water management issue, including between upstream and downstream users, rather than an issue of lack of infrastructure. Commune water councils have been established to help regulate water sharing. Concern over road damage caused by excess water has been identified by government officials in the areas immediately west and east of National Road 5, on 150B and 151B, and in the western-most section of the road, where water flows off the Phnom Aoral Mountains towards the road across large plains.

17. The proposed adaptation strategy, 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 (through Output 1) in order to integrate climate risks and adaptation into core development planning activities. These include 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. Furthermore, 151B, which leads directly to the bank of the Tonle Sap River, will be paved with hand-laid concrete rather than raising levels. This means that the road may be inaccessible only for short periods during extreme floods but would be intact once the floods recede. In order to better manage the uncertainties related to future climate changes, support activities through Output 4 will focus on: (i) improving planning and understanding of climate change; (ii) implementing measures to better manage seasonal water distribution through water capture and storage; (iii) restoring ecosystem functions for flood and drought management; and (iv) piloting emergency management systems.

18. Coordination with other donor-funded adaptation activities will be important. In particular, many of the activities proposed in this project are similar to those financed by the Nordic Development Fund (NDF) and executed by the Ministry of Rural Development (MRD) for the rehabilitation of rural roads. In particular, both projects will be undertaking training, vulnerability mapping, review of engineering guidelines, and pilot adaptation measures such as ecosystem

restoration, water capture and storage, and emergency management systems. In particular, joint training would deliver high levels of efficiency and learning across projects. Furthermore, most of the type of information for vulnerability mapping will be the same for both projects, except for the roads' location. Therefore, the budget allocation under this output has been minimized for training and vulnerability mapping, recognizing the overlap between the two activities and opportunities for cost savings. To further support coordination in the country on climate change activities, the project will provide annual updates to the National Climate Change Coordination Committee.

19. Through other activities funded through the Global Environment Facility, such as the NAPA and National Communications, a significant amount of assessment work has taken place. More detailed and climate change assessments have taken place recently under the Second National Communications. This project will build on that body of work, which is expected to be made publicly available by the end of 2011. Some important gaps in data were identified during the project design, such as hydrologic information especially in the southeast. Very little is known about groundwater or integrated water resource management in Cambodia. Where there have been some hydrological modeling, for example by the Cambodian Development Resource Institute, climate change has not been incorporated in such studies.

C. Climate Resilience Output Activities

20. Overall, this output will seek to strengthen the outcome of the project to provide safe, cost effective, climate-resilient all-year access provided in the road network of agricultural provinces of Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng. It will do so by: (i) protecting the road infrastructure from the impacts of climate change and climate variability, and (ii) piloting adaptation measures to protect the road against long-term risks posed by climate change.

21. The climate resilience activities fall under two outputs of the project: Output 1: Project roads and Cross Border Facility at Prey Var-Mocva are rehabilitated and, Output 4: Increased resilience of project roads to climate change.

22. **Output 1:** Climate resilience related adjustments are made to civil works in Kampong Chhnang and Svey Rieng provinces through (i) the design of road embankments and roadside ditches which are susceptible to erosion, (ii) using less moisture susceptible materials or hydraulically-stabilized materials (usually with cement or lime) within the road structure so that structural layers do not lose significant strength upon flooding and soaking, and (iii) by using green engineering to improve the water conservation characteristics of the watershed and to divert run-off water away from the road (through activities of Output 4).

23. Factors considered in making engineering adjustments included cost-effectiveness, current climate variability and potential future risk. It is important to note that existing climate change impact assessments are insufficient to provide a scientific probability of future climate change and, therefore, the civil engineering adjustments based on expected future changes are difficult to calculate quantitatively. A margin of safety risk factor is therefore applied instead.

24. A number of studies have examined the types of risks to roads as a result of climate change. The Committee on Climate Change and United States Transportation (2008), advocate planning for: (i) damage to roads, subterranean tunnels and drainage system due to flooding; (ii) increase in scouring of roads, bridges, and support structures; (iii) damages to road infrastructure due to landslide and mudslide; and, (iv) deterioration of structural integrity of roads,

bridges and tunnels due to increase in soil moisture levels. Adaptation measures have also been suggested by the World Roads Association such as: (a) applying a safety factor; (b) considering a longer return period for exceptional events when designing hydraulic structures; (c) considering storm water volumes over a longer period; (d) reducing the gradients of slopes and taking into account the materials used; (e) protecting the base of fills and discharge structures; (f) enclosing the materials; (g) using waterproof materials or treat them to make them so; (h) checking the condition of slopes regularly; (i) regularly checking the condition and function of the drainage system and hydraulic structures; and, (j) improving the implementation of alternative routes in the event of a road closure.

25. **Output 2:** Reduce the vulnerability of the projects roads to climate change, as below:

4.1 MPWT completes and uses the detailed vulnerability map for climate change for project provinces:

The vulnerability map would comprise a number of layers, based on an agreed set of physical and socio-economic indicators. The following are proposed: (i) climate change trends and projections; (ii) impacts of climate changes on hydrology, ecology, and soil; (iii) natural environment including topography, geology, land use, and climate hazards; (iv) social environment including poverty levels and population density; (v) built environment, in particular MPWT's existing and planned transportation network; and (vi) hazards risk mapping. Integrated climate change and hydrological impact modeling will be done for Kampong Chhnang based on existing studies. This will be used for the vulnerability maps and to inform the water capture and storage activities that are part of Activity 4.5.

4.2 Review the sustainability and capacity of MPWT's current engineering designs, standards and guidelines to withstand climate change and propose amendments.

The Ministry currently uses a set of standards and guidelines for engineering design for its transport investments. Current standards do not consider long-term implications of changes to the integrity and sustainability of transport infrastructure. MPWT will review its geometry, bridge, drainage, and pavement guidelines and make adjustments based on learning from this project and expertise.

4.3 Design and implement training program for MPWT, including the Social and Environmental Office, in coordination with MRD activities being planned.

A series of trainings will be organized together with MRD to train Ministry staff on the science and implications of climate change on the countries' infrastructure, focusing on the transport sector.

4.4 Planting program engaging vulnerable communities including women is implemented to reduce flooding and water from damaging roads and surrounding areas.

The project will undertake a planting activity with three main purposes: (i) to extend road slope-side stabilization, (ii) to provide shading and fruit trees around borrow-pits, and (iii) to restore ecosystem functions for flood management. The objective is to improve ecosystem health and functions such as reducing the effects of erosion, landslides, and flash floods, and increasing water infiltration into the soil. These will help manage changes in rainfall brought about by climate change.

Services and materials will be procured through national competitive bidding together with the civil works for the water capture projects identified in activity 4.5 in Kampong Chhnang. The project would also identify women's groups to undertake the planting and maintenance, representing at least 40% of the paid workers. The project would also train and pay the women to plant, and maintain the grasses, shrubs and trees. At home, nursing of plants will be piloted for work from home initiatives.

The planting program will be supervised through the Commune Chiefs. A consultant will be recruited to design the contract, assist MPWT in bidding process, and supervise the work. The consultant will work closely with the detailed design team to identify locations and type of planting, and for procurement procedures. They will have expertise in ecosystem and natural resource management.

4.5 Completion and piloting of a plan for water capture and storage systems integrated in road construction features for the project province.

Most rural communities rely on wells, ponds, and canals for their water needs. The project area experiences both very wet and very dry periods throughout the year. Very little infrastructure has been built to conserve water and store it during the rainy season so that it can be available during extended dry periods. While water storage exists in some areas, it is often insufficient and water often runs out before the next rains. Rainwater harvesting to improve water supply for safe drinking water has been identified as an adaptation priority for the country (NAPA, 2006) and this project will contribute to the small-scale supply of water in the project area. At the same time, it will improve the road safety and stability where there are currently open borrow-pits close to the road structure.

Selected existing and new borrow-pits will be rehabilitated for improved water capture and storage based on the following criteria: (i) demand and use driven, (ii) safe distance from the roadway, (iii) safe slope in case of car accidents, for people and for livestock (1:3), (iv) increased water efficiency and storage volumes, (v) planting of wide canopy trees to increase shade and reduce evaporation, (vi) health and safety respected, (vii) fit for purpose, where borrow-pit materials are unfit for road construction, (viii) elevated safe areas can be created and planted for stability, (ix) water efficiency technologies applied, and (x) pit lining to reduce infiltration.

In addition, a number of small water capture activities have been identified in Kampong Chhnang Province: (i) repair of an abandoned railway water tank for low-cost water supply to Tuek Phos town, (ii) lake dredging for increased water supply during dry season, (iii) gate and dam repair, and (iv) small-scale water capture in Kbal Tuek Commune, Tuek Phos District. A hydraulic engineer will be engaged to undertake the detailed design for these activities. Furthermore, a climate change impact assessment on the local hydrology will be done by the consultants so that the design of the water capture activities are consistent with expected changes in water supply and consistent with integrated water resources management. Implementation of all activities will be coordinated with Ministry of Water Resources and Meteorology (MOWRAM).

Table 1. Cost Estimate of Civil Works Interventions by Contract Package ($)

Province	District	Civil Works Contract Package A, B, C	Borrow-pits	Water Capture Interventions
Svay Rieng	Kampong Rou	B (314D)	270,000	
	Svay Teab	B (314D)		
	Romeas Hek	A (NR13)	288,000	
	Rumduol	A (NR13)		
	Svay Rieng City	A (NR13)		
Prey Veng	Kamchay Mear	A (NR13)	100,000	
Kampong	Kampong Tralach	C (150B)	299,000	1,210,000
Chhnang	Tuek Phos	C (NR53)		
	Sameakki Mean Chey	C (150B)		
Total			**957,000**	**1,210,000**

NR = national road.
Source: Asian Development Bank.

4.6 MPWT contributes to strengthening national emergency management efforts by piloting an emergency management system in Kampong Chhnang Province and operate it. A knowledge development component is integrated into Task 2.

In preparing this activity, consultations were undertaken with the National Committee for Disaster Management (NCDM), with the Provincial and District Governor, Deputy Governor and Tuek Phos District Chief, the Provincial Red Cross, Oxfam Climate Change Advisor, SmartMobile company, and INSTEDD (a non-profit systems provider), and the Department of Meteorology. The activities were also based on responses from community level surveys and a review of post disaster needs assessments conducted in the country.

Task 1. Establish an MPWT focal point for coordination with NCDM and develop a memorandum of understanding (MOU) between the MPWT and the NCDM to outline Standard Operating Procedures (SOP) for MPWT in the case of disasters and emergencies.

Task 2. Strengthen the MPWT database and data collection system to record and monitor infrastructure damages and losses from climate stressors. Use data for forward planning of maintenance and future infrastructure upgrades. This data is also collected post emergencies by many donors to target emergency recovery efforts. In the context of the project, it will also be used to monitor the benefits (through avoided losses) of climate change adaptation adjustments applied to the civil works and green measures put in place to manage flooding. This component will provide a learning mechanism to monitor successful engineering adjustments made to increase the climate resilience of the roads.

Task 3. Strengthen emergency communication system with local cell phone network providers and public address systems to disseminate early warnings for extreme events including storms, extended droughts, and floods, to communities as well as seasonal forecasts. This will likely involve partnership with MOWRAM, which monitors and issues early warnings for weather events and for floods, and, with major cell phone network providers in the country with broad coverage in Kampong Chhnang. Smart Mobile Company has currently agreed with the NCDM to provide free information dissemination to disaster coordinators across the country for two years. They have agreed to work with this project in a similar fashion and an MOU between the cell phone company and MOWRAM for early warnings by text messaging will need to be brokered by MPWT. Further detailed work and agreement on institutional arrangements is needed for this

pilot activity. The consultants will design this activity and pilot its operations from a provisional sum in the consulting services package.

Task 4. Establish a framework agreement between MPWT and local contractors for emergency mobilization of equipment during extreme events in Kampong Chhnang. One of the major gaps for emergency response operators is a lack of access to equipment and transportation. A number of local contractors have heavy equipment and vehicles in the Province, which could be mobilized to assist in emergency response situations. Purchase of vehicles by the project for evacuations is not cost effective and would mostly be used for other purposes. They would also only contribute to the objectives of the project if there were an emergency. Instead, a Framework agreement will be established to mobilize local contractor's equipment to support local response efforts. They will respond to needs identified by the Provincial and District Red Cross and Disaster Management Committees.

Task 5. Establish emergency response protocols and train communities on emergency response and climate change adaptation, including land-use management issues such as prevention of deforestation and forest degradation. Existing post disaster assessments identify a lack of community level response plans and this is supported further by interviews with Provincial Red Cross members and through community level surveys, which overall highlights a lack of general awareness as well as strategies for community responses (i.e. where to go, what to do, how to avoid health risks). Training for NCDM and Red Cross focal points is also needed.

Task 6. Establish local safe areas and supporting safety measures, including public address systems. Community members in project areas indicated preference to stay at home in case of disasters, as well as with their livestock. However, in some cases of prolonged floods, this is not always a safe option. In the case of livestock, losses are due to diseases and insufficient food. Communities should be encouraged to store fodder, particularly in years where unusual droughts or floods are expected. Safe and elevated areas can be equipped with water tanks to ensure safe water supplies for designated safe areas such as schools, clinics, and pagodas.

D. Cost Estimate

26. Since the output is financed by PPCR as a mixed loan and grant, the cost estimate covers the consulting services and equipment purchase for the entire output. It is envisaged that 43 person-months of international consultants and 84 person-months of national consultants will be needed to complete the activities of the output.

Table 2: Climate Resilience Output Cost Estimate (PPCR-financed)

Item	Cost ($)[1]
A. Output 1: Civil works of road improvements in contract packages CW-A, CW-B, CW-C road adjustments, framework agreement and borrow-pits	**7,680,000**
B. Output 4: CW D: Civil works for climate resilience Water Capture and Storage, planting and equipment	**2,770,000**
C. Output 1: DDIS Consultants (CS1) proportion of climate resilience civil works of A and B supported by DDIS consulting services	**1,270,000**
D. Output 4: CS4: Consultants exclusively for climate resilience output	
1. Remuneration and Per Diem	
i. International Consultants	920,000
ii. National Consultants	350,000

2.	International and Local Travel	200,000
3.	Provisional sum for development and operations of early warning system	258,000
4.	Equipment (computers, GPS equipment, large scale printer)	100,000
5.	Training, Seminars, and Conferences	
	i. Facilitators	40,000
	ii. Training program for MPWT	120,000
6.	Surveys and data acquisition	120,000
Sub Total D		**2,280,000**
E.	Project management support	**1.300,000**
F.	Contingencies	**1,700,000**
Total A+B+C+D+E+F		**17,000,000**

CS = consulting services, CW = civil works, DDIS = detailed design implementation and supervision, GPS = global positioning system, MPWT = Ministry of Public Works and Transport, PPCR = pilot program for climate resilience.
[1] Not including taxes and duties, which are paid by the Government; includes contingencies

Table 3. Contracting Services 4 – Summary of Consultancy Services Requirements*
(length of consultancy services is 38 months)

Consultants team	Person-months
International	
Team Leader/Adaptation Specialist	12
Hydrologist/Impacts Modeler	6
Geographic Information System (GIS) Specialist	2
Emergency Management Specialist	6
Road Design Engineer	5
Ecosystems Specialist	4
Hydraulic engineer	4
Climate Modeling Specialist	4
Subtotal (International)	**43**
National	
Adaptation Specialist/Institutional Strengthening and Knowledge Management Specilaist	33
Hydrologist	12
GIS Specialist	4
Emergency Management Specialist	12
Road Design Engineer	1
Land Use and Natural Resource Management Specialist	6
Hydraulic Engineer	4
Social Specialist	1
Translator	3
Data Collection Assistant	8
Subtotal (National)	**84**
Total	**127**

* A summary of skills and qualifications for each expert is in Table 4.
Source: Asian Development Bank.

E. Implementation Arrangements

27. MPWT will implement this output through project management unit 3 (PMU3). A supervising adaptation manager will be hired through a consulting package and will work in the Detailed Design and Implementation Supervision (DDIS) Team to develop the bidding documents for the defined civil works. The sustainability of the project will be secured by providing output related trainings across MPWT, by integrating climate change adaptation into engineering tools and guidelines and by producing vulnerability mapping to assist with planning.

28. There will be two dedicated climate resilience packages, one for civil works and the other for consulting services. Some of the activities have also been integrated into Output 1 contract packages (civil works A, B, C). These are the improved borrow-pits and a Framework Agreement for emergency response by local contractors. The cost of borrow-pits is described in Table 1. Furthermore, the climate resilience engineering adjustments will be implemented under the aforementioned three civil works packages. The implementation of Output 4 will be led by a consulting team. A team leader will oversee the work of all experts hired under this consulting service. The team leader will work closely with PMU3 and the DDIS consultants for those activities financed under the PPCR. The civil works adjustments (Output 1) and detailed design and implementation of the improved borrow-pits will be led by the DDIS consultants, with inputs from the adaptation consultancy team. A national counterpart will be the deputy and will be engaged for the duration of the project. The deputy will lead the team during the absence of the team leader. They will lead the knowledge management and monitoring activities, coordination with other government departments and institutions and lead in the development of a training and learning program. The team leader will be responsible for coordination of all activities within the component and with other ADB- and PPCR-financed components, through PMU3.

29. Below is a description of the contracting packages for the proposed allocation of the PPCR funds, illustrated in Figure 1:

i. Output 1. Civil works contracting packages A, B, C that improve provincial roads will have an allocation of $12.4 million from the PPCR to increase the resilience of the road to climate change impacts. Also, $1.378 million will be allocated through small works for improved borrow-pits, as described above under activity 4.5. Further, $0.8 million provisional sum will be allocated to the Civil Works Package C in Kampong Chhnang to support the Framework Agreement for emergency response support by local contractors.

ii. Output 4. One civil works contracting package D will include the construction of the small scale water capture, the purchase and implementation of the planting program and maintenance, the establishment of local safe areas in Kampong Chhnang, and procurement and installation of emergency communications equipment (i.e. public address systems and early warning systems). These civil works will be supervised by the consultants in collaboration with the DDIS. The value of the civil works package D is $2.65 million and, therefore, will use international competitive bidding procedures.

iii. Output 4. Under one consultancy services package, all the experts identified for the implementation of this output will be recruited. In addition to the implementation of Output 4, the experts will be responsible for the detailed design of the civil works package D (planting, water capture, and equipment) and for preparing the associated bidding documents under the leadership of the procurement expert in the DDIS. Furthermore, the consultants will develop the institutional arrangements and budget for the system for early warnings through various communication systems.

Figure 1. Proposed Allocation of PPCR Funds

Civil Works Output: Output 1			Climate Resilience Output: Output 4	
CW-A: Road Improvement	**CW-B: Road Improvement**	**CW-C: Road Improvement**	**CW-D: Climate Resilience Civil Works**	**CS-4: Climate Resilience Consulting**
• Climate resilient roadworks • Borrow-pits	• Climate resilient roadworks • Borrow-pits	• Climate resilient roadworks • Borrow-pits • Framework Agreement with local contractors for floods	• Planting • Water capture works • Equipment for EMS • Building safe areas	• Vulnerability mapping • Training • Guidelines • Detail design for water capture • Detail design for planting • Design for EMS

CS = consulting services, CW = civil works, EMS = emergency management system, PPCR = pilot program for climate resilience.
Source: Asian Development Bank.

F. Outline Terms of Reference for Consultants

30. Consulting services will be necessary to implement Output 4. The selected consulting firm/individual consultant's team will execute, but not limited to, the tasks detailed in the terms of reference (TOR) below.

1. Team leader/Adaptation Specialist (International) and Deputy Team Leader/ Institutional Strengthening and Knowledge Management Specialist (National)

(i) Objective/Purpose of the Assignment: The objective of the assignment is to provide MPWT with: (i) vulnerability to climate change maps for the transport sector on a country-wide basis, (ii) a review and recommendation on adjustments to its engineering guidelines, and (iii) training and capacity building on climate change adaptation. The purpose of the maps is to inform planning and decision making by MPWT. The consultants should consider the lifetime of transport infrastructure including roads, bridges and drainage systems.

(ii) Scope of the Work: The organization will work with MPWT to define the climate related concerns for infrastructure planning. An assessment and collection of existing data will be undertaken together with a team of National Consultants. Data gaps will be filled through collection of raw data and research, within the scope of the budget. Particular attention will be given to improving the understanding the hydrology, and the impact of climate change on local hydrology where information is lacking and vulnerability is apparent. The vulnerability index should be composed of a variety of indicators, including the natural, built, and social environments. The work will be done in a way that builds national capacity to maintain the work. In addition, a review of the Ministry's engineering guidelines will be reviewed and recommendations made on how to integrate adaptation to climate change. Finally, on-going training will assist Ministry staff in utilizing the above as well as increase general understanding of climate change adaptation science, approaches, challenges and best-practices. Lessons learned will be collected throughout the project.

(iii) Detailed Tasks to be performed:

(a) confirm with the MPWT vulnerability indicators of interest to their planning, including time span;
(b) identify and collect existing data sources;
(c) identify data gaps and prepare a plan (to be approved by MPWT) for filling in data gaps, including through field research and data purchase; identify survey needs;
(d) validate the data as needed;
(e) review existing climate change projections and impact assessments, which have been conducted through the Ministry of Environment;
(f) digitize and map data;
(g) obtain and overlay maps with transport network provided by MPWT mapping department;
(h) analyze maps and provide recommendations and assessment to the Government;
(i) hold a workshop and training to present and discuss findings, together with the Social and Environment Office at MPWT;
(j) finalize maps and hand all data and databases over to the Government; and
(k) contribute to training and capacity building at MPWT, also cooperating with a similar project at MRD.
(l) while the national expert assists the team leader in team leading tasks as well as those listed above, the following are those he/she should complete:
(m) prepare a knowledge collection and monitoring plan, including objectives, roles and responsibilities and communication and dissemination plan;
(n) collect and analyze information and prepare yearly and final report; and
(o) distribute information during training sessions, and to SPCR and PPCR.
(p) While all the above tasks are the responsibility of the international specialist, the national specialist should assist the international specialist in all tasks and in leading the team and should undertake the following tasks as well:
(q) conduct a needs assessment and assess the current baseline knowledge of MPWT staff;
(r) identify with MPWT at least twenty staff to be trained on an ongoing basis, ensuring representation by women, senior and junior staff;
(s) develop a capacity building and training program using multiple educational tools such as workshops, case studies, presentations, short and long-session, field visits, and university seminars with local and regional experts. Experts from the region can be invited to present experiences in the region;
(t) implement the training program at key times during the project, including at inception, as part of the development of vulnerability maps and review of engineering guidelines;
(u) provide translation into Khmer of key documents and presentations; and

(v) assess capacity improvements at the closing of the training program.

(iv) Final Output:

(a) vulnerability Maps in digital and hard copy and all associated data;
(b) report with recommendations and analysis for the MPWT, including risks and assumptions.
(c) Training plan, final materials and final report on all activities undertaken and an assessment of baseline and final capacity developed through the training program.

(v) Skills required: International expertise needs a post-graduate degree in any of these fields: hydrology, climate change modeling, disaster and risk management, ecosystems and land-use. The expert must demonstrate knowledge in transport and geographic information system skills, and previous experience preparing vulnerability mapping. The expert should have a minimum of 10 years experience in related work with at least 3 years experience in leading a consulting team. Also required is knowledge of Southeast Asia and understanding of its ecology and hydrology, and of Cambodia in particular, is an asset. Strong analytical and communication skills, experience with monitoring and evaluation and good knowledge of climate change vulnerability and adaptation. The national specialist needs a postgraduate degree in environmental sciences or studies, climate change or natural resource management. He/she must have 7 years experience and knowledge working on climate change resilience/adaptation implementation projects; experience in managing capacity building and planning related projects, knowledge of basic financial procedures, project planning and budget management. Excellent written and spoke communication skills necessary.

2. Hydrologist/ Impact Modeler (International) and Hydrologist (National)

(i) Objective/Purpose of the Assignment: The objective of the assignment is to develop a climate change impact modeling in Kampong Chhnang province.

(ii) Scope of the Work: The scope of this work is to develop climate change impact modeling in Kampong Chhnang, with hydrological data layers for vulnerability maps, and recommendations for flood management through a variety of measures available.

(iii) Detailed Tasks to be performed:

(a) study in detail the existing climate models as applicable to Cambodia;
(b) select most appropriate modeling technique for the use of developing the climate impact model for Kampong Chhnang;
(c) develop hydrological data layers for vulnerability maps; and
(d) recommends measures for flood management such as planting.
(e) While all the above tasks are the responsibility of the international specialist, the national specialist should assist the international specialist in all tasks

(iv) Final Output: Computer based climate model for Kampong Chhnang province for the use by MPWT planners.

(v) **Skills required:** The international specialist must have a postgraduate degree related to hydrological modeling, hydrology or related fields. The specialist needs at least 10 years experience undertaking hydrologic modeling with climatology and climate change modeling. Knowledge of the hydrology of Southeast Asia and regional and national centers of excellence and sources of information in Cambodia. The national specialist needs a postgraduate degree related to flood management and hydrology with some training in hydrologic modeling for land management and water capture systems. He/she should have at least 8 years experience undertaking hydrologic modeling. English skills essential.

3. Geographic Information System (GIS) Specialist (International) and GIS Specialist (National)

(i) **Objective/Purpose of the Assignment:** The objective of the assignment is to visually represent the results of the climate change impacts, vulnerability and adaptation assessment.

(ii) **Scope of the Work:** The specialists together will produce the final visualization of the vulnerability maps and advise together with the climate modeler, impact and vulnerability specialists.

(iii) **Detailed Tasks to be performed:**

(a) undertake data collection, analysis, storage and retrieval through a variety of techniques, including use of available GIS, ensuring the full involvement of local stakeholders from the outset;
(b) support the development of the adaptation plan and early warning system by using GIS to include physical development issues such as land tenure, informal development, development suitability, topography, drainage, access to land, and location choices for rural development based on available information;
(c) prepare vulnerability maps and work with team members to verify and assess the results; and
(d) document methodologies, practices, results, and lessons learned for communication to other stakeholders in order to increase the likelihood of replication of project results in other local areas.
(e) While all the above tasks are the responsibility of the international specialist, the national specialist should assist the international specialist in all tasks.

(iv) **Final Output;** Vulnerability maps consolidating data and information to inform country wide vulnerability to climate changes and disasters (as appropriate), and visual representation of hot spots and areas for implementation of adaptation strategies to inform MPWT budgeting and prioritizing process.

(v) **Skills required:** The international specialist should have a bachelor degree in engineering with 6 years practical experience in GIS and its application to planning, have a strong and demonstrated understanding of civil society involvement in local government and planning (skills related to group facilitation would be an asset); and have some work experience in a local government unit

(whether full-time or through study placements) The national specialist should have a bachelor degree in engineering with training in GIS/Remote Sensing and data analysis for environmental management. 5 years experience producing multi-layer mapping using visual illustration tools, such as GIS is necessary. Experience producing vulnerability maps including defining its indicators. English skills essential.

4. Emergency Management Specialist (International) and Emergency Management Specialist (National)

(i) Objective/Purpose of the Assignment: The objective of the assignment is to establish a pilot emergency management/response system in Kampong Chhnang Province which has a pilot early warning system.

(ii) Scope of the Work: Change in the climate in most cases leads to disasters. In the case of Cambodia, this is mostly typhoons, heavy rainfall, floods, and induced earth slips. In any case, it is necessary to establish an early warning system to issue advance communications of warnings to the potentially affected residents, establishments, etc. and evacuate them. In this respect, this activity provides a pilot early warning system and a pilot emergency management system for Kampong Chhnang province. Multiple stakeholders are included in this activity, including the Cambodian Red Cross, NCDM, local mobile cell phone providers, MOWRAM, Provincial and District governments, local contractors and most importantly, local communities.

(iii) Detailed Tasks to be performed: There are 6 major tasks to be completed as below:

Task 1. An MPWT focal point for coordination with NCDR is established. The focal point will develop an MOU between the MPWT and the NCDM to outline SOP for MPWT in the case of disasters and emergencies.

Task 2. Strengthen the MPWT database and data collection system to record and monitor infrastructure damages and losses from climate stressors.

Task 3. Strengthen emergency communication system with local cell phone network providers to disseminate early warnings for extreme events including storms and lightening watches, extended droughts, and floods to communities, as well as seasonal forecasts. This includes registering users for receiving and responding to early warnings by cell phone text messages.

Task 4. Under civil works package C, establish Framework agreement with local contractors for emergency mobilization of equipment during extreme events in Kampong Chhnang.

Task 5. Establish emergency response protocols and train communities on emergency response and climate change adaptation, including land-use management issues such as deforestation. Training for NCDM and Red Cross focal points is also needed.

Task 6. Establishment of local safe areas and supporting safety measures,

including public address system.

(a) coordinate with other consultants and MPWT to collect data from vulnerability mapping in order to locate safe areas, and access routes;
(b) develop a computer-based map of the above data to present the vulnerability of the study area, location of houses and establishments, vulnerable river structures, irrigation structures etc, and identify special groups of vulnerable residents (like people with disabilities). Identify safe areas, and assist government officials in confirming land use for safe areas, including its management;
(c) work with local government units District offices and MPWT to use the above information to develop a framework agreement with local contractors for emergency mobilization of equipment. This should include a MOU with the Provincial Committee for Disaster Management and the Red Cross for mobilization of equipment for their needs during emergencies. Develop a real time emergency management system based on the golden 72-hour rule of response, and recovery phases; develop the entire structure of response team and responsibilities, with redundancies;
(d) based on the above identify evacuation paths and evacuation locations, with several redundancies, proposed locations of warnings systems, specifications, coverage, and operational procedures of early warnings;
(e) plan the system procedures for operation, training for all stakeholders for operation, maintenance, management, and improvement, and real case drills, that include residents as well; conduct several phases of drills; provide sufficient public information during drill phases and based on drills and training fine tune the system;
(f) develop plan and agreements for early warnings between the Department of Meteorology and of water resources for real-time early warning communication;
(g) after test runs of the systems, commission the systems;
(h) prepare necessary operation manuals for all stakeholders involved; prepare emergency procedure checklists and public information flyers (including emergency kit information, how to evacuate, etc) for all levels of stakeholders and disseminate through media and person-to-person public distribution. Such manuals and information materials should be in Khmer language;
(i) conduct targeted community level training of responses during specific climate related disasters, including lightening, heavy rains and, as much as possible, seasonal forecasts. Register users for receiving text messages early warnings and transfer this information to the mobile communication system;
(j) cooperate with Road Asset Management group at MPWT to monitor damages to road assets due to climate related events. Collect data from such system to report on lessons learned and results;
(k) prepare a financial management plan for operation and maintenance of the systems in a sustainable manner; and
(l) prepare MOU and financial plan between MOWRAM and mobile communication system etc for emergency communications.
(m) While all the above tasks are the responsibility of the international specialist, the national specialist should assist the international specialist

in all tasks.

(iv) **Final Output:** A pilot emergency management program is in place, based on need and identified gaps, including with appropriate training and institutional arrangements finalized. Final report and necessary manuals for each personnel involved in the emergency management process should be developed. The early warning communication and response system should be installed and functioning.

(v) **Skills required:** A postgraduate degree in civil engineering with specialization in urban development or transport planning. The international specialist with 10 years experience is expected to have developed previously emergency management systems in real-world cases and had them operational with assistance given to the respective government. He/she should be able to develop computer software system for early warning system and emergency management system that helps real time data retrieval of the disaster in progress, to trigger emergency management activities of multi-disciplinary nature. The national specialist should have a master's degree related to risk, disaster management and planning or related fields, with 5 years experience in disaster related planning or response, with a sound knowledge in emergency management principles.

5. Road Design Engineer (International) and Road Design Engineer (National)

(i) **Objective/Purpose of the Assignment:** The objective of the assignment is to revise the current engineering manuals of MPWT such that climate change aspects are incorporated in them.

(i) **Scope of the Work:** It is necessary to revise the current engineering manuals of MPWT such that climate change aspects are incorporated. Also, contributions to training should be provided here along with developing the road asset management database indicators.

(ii) **Detailed Tasks to be performed:**

(a) review and assess current engineering designs, standards and guidelines to withstand current and future climate change risks;
(b) drawing from international experiences, provide recommendations on adjustments that can be made to the above in order to better incorporate considerations of climate change risks and natural hazards in design manuals;
(c) review international experiences to indicate cost implications from existing case studies and models to follow, and
(d) contribute to training and capacity building activities.
(e) all these tasks will be the responsibility of the international specialist and the national specialist will assist the international specialist in all above tasks.

(iii) **Final Output:** Report with analysis, and brief and simplified recommendations on adaptation adjustments, including risks and assumptions. Adjustments and training for MPWT will be provided with the revised Bridge Design Standards, Road Design Standards: Drainage, Geometry and Pavement guidelines.

(iv) **Skills required:** The international expert should have a post graduate degree in road design, and highway pavement materials. 10 years experience in the development of engineering guidelines, particularly for road design, manuals and standards. Working experience in the Southeast Asian environmental conditions relevant to engineering specifications is necessary. For the national expert an 8 years experience developing and running road asset management systems, experience applying road works engineering guidelines in Cambodia. English skills essential.

6. Ecosystems Specialist (International) and Land Management Specialist (National)

(i) **Objective/Purpose of the Assignment:** As part of an adaptation strategy to reduce the vulnerability of roads in Cambodia to climate change, an ecosystem-based approach is being piloted in four provinces in Cambodia. The experts will prepare a climate resilience and ecosystem restoration plan and prepare bidding documents together with the Detailed Design Team.

(ii) **Scope of the Work:** Planting will be used to buffer against the uncertainties and risks associated to changing moisture levels, including floods and droughts. Plants include grasses, shrubs and trees. Planting will be used to restore greater ecosystem functions for slope-side stabilization, creating shading around water capture and storage pits, and flood management in selected areas. At the same time, species selection and location would need to be planted to avoid any damage to the roads. Consultations with the road engineers will, therefore, be necessary. This component is part of a gender-mainstreaming plan, where women's groups will be trained and employed to grow, plant, and maintain plants.

(iii) **Detailed Tasks to be performed by the consultant:**

(a) confirm assessment of appropriateness of species given changing temperature, flood, and drought patterns;
(b) identify and confirm land area to be planted for three objectives: slope stabilization, shading, and flood management;
(c) prepare gender-mainstreaming plan to identify how women will be trained and engaged for nurseries, planting, and maintenance;
(d) identify scope and opportunity for home-based training and nurseries for women;
(e) prepare national bidding documents and contribute to shortlist selection;
(f) conduct orientation and training with selected firm or organization;
(g) supervise planting programs and monitor gender aspects, including equal pay for equal work, and monitor effects of planting on road protection; and
(h) conduct final community level survey to monitor effects of planting for local communities.
(i) All these tasks will be the responsibility of the international specialist and the national specialist will assist the international specialist in all above tasks.

(iv) **Final Output**: Detailed ecosystem restoration plan and public bidding documents, final report with results identified.

(v) **Skills required**: For the international specialist a degree in environmental science, ecology, natural resource management, biological sciences or other related field is required. Experience of at least 5 years in implementing and overseeing planting and reforestation programs, particularly in Southeast Asia. The national expert needs a degree in a related field of study with a minimum of 5 years experience. English skills essential.

7. Hydraulic Engineer (International) and Hydraulic Engineer (National)

(i) **Objective/Purpose of the Assignment:** The purpose of the assignment is to work with the DDIS team to develop a small scale water capture and storage plan for the project area and to oversee the construction of small scale water capture and storage systems. The activity will be implemented in the context of a larger road reconstruction project through civil works. The consultants will be required to complete the water capture and storage plans and design of individual water capture interventions, which have been identified. They will also contribute to the preparation of bidding documents for their construction, and non-government organization planning water capture in Kampong Chhnang Province.

(ii) **Scope of the Work:** Communities in the project area regularly run out of water during the dry season. Borrow-pits, which are left behind when materials have been extracted for materials for road construction, are often left unmanaged for use by farmers. The primary purposes are for livestock, fishponds, and irrigation. The majority of these pits is too close to the road and poses road safety problems. They are also inefficient in water storage.

The existing and new borrow-pits should be rehabilitated for improved water capture and storage based on the following criteria:

- demand and use driven
- safe distance from the roadway
- safe slope in case of car accidents, for people and for livestock (1:3 gradient)
- increases water efficiency and storage volumes
- planting of wide canopy trees to increase shade and reduce evaporation
- safe in terms of health
- fit for purpose
- where materials are unfit for road construction, elevated safe areas can be created and planted for stability.

In addition, a number of small scale water capture and storage interventions have been identified by local administrations including lake dredging, rehabilitation of a gate and dam, water tower rehabilitation and small scale water capture, and distribution in a local community near the Phnom Aoral mountains.

(iii) **Detailed Tasks to be performed:**

(a) conduct detailed field survey to identify local needs and priorities for water

capture and storage. Consider climate and climate change trends to ensure sustainability of water sources. Apply agreed criteria for prioritization;

(b) work with Detailed Design Team to propose designs for individual water and capture systems, their location, best technology, and bill of quantities and costs;

(c) conduct all hydrological assessments necessary to ensure sustainable water consumption; and

(d) work with Team Leader to allocate budgets and designs into appropriate contract packages. The national specialist assists the international specialist in all the above tasks.

(iv) Final Output: Detailed water capture and storage plan and detail design.

(v) Skills required: For the international specialist, a degree in civil engineering with major as hydraulics. At least 8 years experience in projects dealing with hydrological engineering interventions, and at least 4 years working in developing countries. Experience in small-scale water and capture storage facilities. For the national specialist minimum of 8 years experience in working in projects related to water and capture systems, such as water tanks and small dams; English skills essential.

8. Climate Modeling Specialist (International)

(i) Objective/Purpose of the Assignment: The objective here is to have climate change projections as input into all aspects of the output.

(ii) Scope of the Work: Communities in the project area regularly run out of water during the dry season. Borrow-pits, which are left behind when materials have been extracted for materials for road construction, are often left unmanaged for use by farmers. The primary purposes of the works are enhancement for livestock, fishponds, and irrigation. The majority of these pits is too close to the road and poses road safety issues. They are also inefficient in water storage.

(iii) Detailed Tasks to be performed:

(j) conduct detailed field survey to identify local needs and priorities for water capture and storage. Consider climate and climate change trends to ensure sustainability of water sources. Apply agree criteria for prioritization;

(k) work with DDIS Team to propose designs for individual water and capture systems, their location, best technology, and bill of quantities and costs;

(l) conduct all hydrological assessments necessary to ensure sustainable water consumption; and

(m) work with Team Leader to allocate budgets and designs into appropriate contract packages.

(iv) Final Output: Detailed water capture and storage plan and detailed design.

(v) Skills required: A degree in climatology with specialty in climate change and climate change modeling. At least 5 five years experience undertaking complex climate

change modeling and exposure to implementing the results of modeling. Practical field based project implementation experience is necessary.

9. Social Sector Specialist (National)

(i) Objective/Purpose of the Assignment: To develop the socio-economic indicators for the entire output.

(ii) Scope of the Work: Climate resilience output requires monitoring during its implementation. Here such indicators will be developed. Baselines are those in the design and monitoring framework as well as in the Appendix of indicators of this output. however not limited to those.

(iii) Detailed Tasks to be performed:

(a) development of socio-economic vulnerability indicators;
(b) develop data for mapping
(c) contribution to all aspects of the project where social or gender issues are concerned;
(d) coordinate with all other experts and the DDIS consultants.

(iv) Skills required: A degree related to human vulnerability and 8 years experience in assessing socio-economic vulnerability and digitization of socio-economic data. English skills essential.

10. Translator (National)

(j) Objective/Purpose of the Assignment: All translations of documents required for the entire output.

(ii) Scope of the Work: The works require translation of learning materials from English into Khmer, particularly for community level trainings.

(iii) Detailed Tasks to be performed:

(a) development of training materials translated from English to Khmer for community training workshops;
(b) assist the international and national experts during training as an interpreter; and
(c) organize all training materials in formats that can be reused by MPWT.

(iv) Skills required: A graduate in English as major. Language training in English and Khmer necessary. English communications skills essential.

11. Data Collection and Office Assistant (National)

(i) Objective/Purpose of the Assignment: To support all data collection and office tasks related to the entire output.

(ii) Scope of the Work: This person has to support to all data and document

collection, editing and proofreading documents, preparing and developing communications and invitations. Support to training activities. Can be part time.

(iii) Detailed Tasks to be performed:

(e) support all experts in collecting data and information;
(f) data input and making electronic database and files;
(g) proofreading and editing documents for all purposes;
(h) support other experts' training activities; and
(i) arrange communications and logistics.

(iv) Skills required: Recent university graduate in environmental sciences/management or engineering. No previous experience necessary, bust should posses strong communication skills an fluency in English.

Table 4: Summary Skills and Experience Requirements for the CS4 Consulting Team and Final Outputs

Consultants team	Outputs	Academic Qualifications	Project Related Experience
International			
Team Leader/Adaptation Specialist	Overall team management, develops plan and criteria for vulnerability mapping, review of engineering guidelines, monitors progress against indicators, supervises field implementation, and coordinates with DDIS and MPWT.	Post graduate degree in environmental science or studies, climate change or related fields.	At least 10 years working on climate change resilience and adaptation in developing countries. Experience working in southeast Asia, preferably in Cambodia. Experience working with infrastructure projects and Ministries. Strong leadership, organizational and management skills. Project development and management experience.
Hydrologist/Impacts Modeler	Climate change impact modeling in Kampong Chhnang, hydrological data layers for vulnerability maps, recommendations for flood management through planting, training	Postgraduate degree related to hydrological modeling, hydrology or related fields.	At least 10 years experience undertaking hydrologic modeling with climatology and climate change modeling. Knowledge of the hydrology of southeast Asia and regional and national centers of excellence and sources of information in Cambodia.
GIS Specialist	Vulnerability maps	A bachelor degree in engineering.	6 years practical experience in GIS and its application to planning, have a strong and demonstrated understanding of civil society involvement in local government and planning (skills related to group facilitation would be an asset); and have some work experience in a local government unit (whether full-time or through study placements)

Consultants team	Outputs	Academic Qualifications	Project Related Experience
Disaster Management and Early Warning Specialist	Detailed pilot disaster management plan and operations, training, Recommendations for scale up and future work.	A postgraduate degree in civil engineering with specialization in urban development or transport planning.	10 years experience is expected to have developed previously emergency management systems in real-world cases and had them operational with assistance given to the respective government. He/she should be able to develop computer software system for early warning system and emergency management system that helps real time data retrieval of the disaster in progress, to trigger emergency management activities of multi-disciplinary nature.
Road Design Engineer	Revised engineering manuals, contributions to training, road asset management database indicators.	Post graduate degree in road design, and highway pavement materials.	10 years experience in the development of engineering guidelines, particularly for road design, manuals and standards. Knowledge of the Southeast Asian environmental conditions relevant to engineering specifications is necessary.
Ecosystems Specialist	Detailed planting program, procurement packages and supervision of implementation, monitoring of gender components, training and knowledge generation.	For the international specialist a degree in environmental science, ecology, natural resource management, biological sciences or other related field is required.	Experience of at least 5 years in implementing and overseeing planting and reforestation programs, particularly in Southeast Asia.
Hydraulic engineer	Detail design and contracting packages for water capture, including borrow pits, training and knowledge generation, lessons learned	A degree in civil engineering with hydraulics as the major.	At least 8 years experience in projects dealing with hydrological engineering interventions, and at least 4 years working in developing countries. Experience in small-scale water and capture storage facilities.
Climate Modeling specialist	Climate change projections as input into all aspects of the project, training and knowledge, early warning systems, input into EMS	Degree in climatology with specialty in climate change and climate change modeling.	At least 5 years experience undertaking complex climate change modeling and exposure to implementing the results of modeling. Practical field based project implementation experience is necessary.
National			
Adaptation Specialist/Institutional Strengthening	Assist team leader to lead the team, coordinating between	Postgraduate degree in environmental sciences or studies, climate	7 years experience and knowledge working on climate change resilience/adaptation

Consultants team	Outputs	Academic Qualifications	Project Related Experience
Expert and Knowledge Management	Ministries and developing interagency agreements and frameworks, developing and implementing a detailed training program. Development of lessons learned document.	change or natural resource management.	implementation projects; experience in managing capacity building and planning related projects, knowledge of basic financial procedures, project planning and budget management. Excellent written and spoke communication skills necessary.
Hydrologist	Climate change impact modeling in Kampong Chhnang, hydrological data layers for vulnerability maps, recommendations for flood management through planting, training, surveying and data collection	Postgraduate degree related to flood management and hydrology with some training in hydrologic modeling for land management and water capture systems.	At least 8 years experience undertaking hydrologic modeling. English skills essential.
GIS Specialist	Vulnerability maps and collection of all relevant data and its digitization where needed or compilation where existing	A bachelor degree in engineering with training in GIS/Remote Sensing and data analysis for environmental management.	5 years experience producing multi-layer mapping using visual illustration tools, such as GIS. Experience producing vulnerability maps including defining its indicators. English skills essential.
Emergency management specialist	Development of the emergency management pilot and supervision of its operations with a sustainability plan.	A master's degree related to risk, disaster management and planning or related fields.	The specialist should have a 5 years experience in disaster related planning or response, with a sound knowledge in emergency management principles. English skills essential.
Road Design Engineer	Road asset management system to monitor information on climate change resilience in project area, implementation plan and institutional structure in place. Collection and analysis of results during the project. Assistance to international expert.	Degree in highway engineering	8 years experience developing and running road asset management systems, experience applying roadworks engineering guidelines in Cambodia. English skills essential.
Land use and natural resource management specialist	Development of detailed planting and gender program, identification of local stakeholders and their roles and responsibilities, supervision of the implementation of the plan.	A degree in a related field of study of land use and natural resource management.	A minimum of 5 years experience in land use and natural resource management planning. English skills essential.

Consultants team	Outputs	Academic Qualifications	Project Related Experience
Hydraulic engineer	Detailed design and contracting packages for water capture, including borrow pits, training and knowledge generation, lessons learned	A degree in civil engineering.	A minimum of 8 years experience in working in projects related to water and capture systems, such as water tanks and small dams. English skills essential.
Social Specialist	Development of socio-economic vulnerability indicators and data for mapping, contribution to all aspects of the project where social or gender issues are concerned.	Degree related to human vulnerability, social and economic sciences.	8 years experience in assessing socio-economic vulnerability and digitization of socio-economic data. English skills essential.
Translator	Translation of lessons learned document into Khmer, written translation of training materials, particularly for community level trainings.	Graduate in English as major. Language training in English and Khmer necessary.	2 years experience in translation. Demonstrated ability for written and verbal translation from English to Khmer, including on the spot. Some experience working with communities, in workshops and with publication ready documents.
Data collection and office assistant	Support to all in data and document collection, editing and proofreading documents, preparing and developing communications and invitations. Support to training activities. Can be part time.	Recent university graduate in environmental sciences/management or engineering.	No previous working experience required but strong academic performance. Ability to meet deadlines and work under pressure. Must possess English skills.

DDIS = detail design implementation and supervision, EMS = emergency management system, GIS = geographic information system, MPWT = Ministry of Public Works and Transport.
Note: All experts will contribute to training and knowledge generation and management
Source: Asian Development Bank.

Appendix: Monitoring of Climate Resilience Output through Specific Indicators

Results	Indicators	Source of verification
(a) Ministry of Public Works and Transport (MPWT) mainstreams climate change risks and resilience in provincial road planning, maintenance and budgeting by 2017	(i) MPWT road transport policies adjusted to incorporate climate risks, and decision making appropriately reflects vulnerability (including gender dimension) studies (ii) Road maintenance works in MPWT are aligned with climate change trends and projections (iii) MPWT budget allocations consider climate change vulnerabilities of priority roads (iv) Number and value of climate-resilient investments in road infrastructure increased and continuity of services provided by road infrastructure ensured	MPWT Annual Report; MPWT website PPCR Progress Reports MPWT Annual Report; MPWT website PPCR Progress Reports
(b) MPWT changes manuals to incorporate climate resilient design of roads by 2017	(i) Road rehabilitation and new road construction will follow 100-year flood design (ii) Hazard maps for national and provincial roads of MPWT completed and used routinely in prioritizing road maintenance operations	MPWT Design Manual PPCR Progress Reports MPWT Annual Report; MPWT website; ADB Project Completion report PPCR Progress Reports
(c) MPWT strengthens climate change adaptation training and disseminates knowledge on climate resilience by 2017	(i) At least 20 staff members from MPWT including women participate in regional climate change adaptation forums and participate in PPCR knowledge dissemination (e.g., publications, studies, knowledge sharing platforms, learning briefs, communities of practice, etc.) (ii) MPWT organizes climate resilience related conferences annually in collaboration with the Ministry of Environment (MOE) and the Ministry of Rural Development (MRD) (iii) MPWT collaborates with Cambodian universities to integrate climate change in curriculum of environmental and transport engineering	MPWT Annual Report; MPWT website PPCR Progress Reports Annual Reports of MPWT, MOE and MRD; Websites of MPWT, MOE, and MRD PPCR Progress Reports Annual Reports and web sites of MPWT and universities; PPCR Progress Reports

(d) Capacity of provincial roads in southeastern and mid-west Cambodia to withstand climate change impacts enhanced through implementing ecosystem-based adaptation strategies by 2017	(i) 157 km of provincial roads rehabilitated and 117 km of road enhanced to climate resilient codes and standards for ensuring all-year access (ii) "Green planning" and planting implemented along at least 100 km of roads to improve flood and drought management (iii) Incidence of seasonal flooding of about 100 km roads reduced substantially (iv) Percentage of women in climate resilience-related economic opportunities increased (v) Access to markets and other social services for communities improved	MPWT Annual Report; MPWT website; ADB Project Completion Report PPCR Progress Reports MPWT Annual Report; MPWT website PPCR Progress Reports
(e) Number and size of water capture facilities in provincial areas increased by 2017	(i) Number of new water capture interventions in Kampong Chhnang province completed (ii) Dredging of irrigation lake in Kampong Chhnang province completed	MPWT Annual Report; MPWT website PPCR Progress Reports
(f) Emergency planning, management and disaster risk reduction in Kampong Chhnaang province to cope with extreme climate induced calamities strengthened by 2017	(i) Early warning systems established in Kampong Chhnang province and coverage under local early warning systems increased (ii) All residents are evacuated in a timely manner during a calamity in Kampong Chhnang province (iii) All livestock are moved to safe areas (with no shortage of feed) during a calamity in affected areas of Kampong Chhnang province	MPWT Annual Report; MPWT website; ADB Project Completion Report PPCR Progress Reports MPWT Annual Report; MPWT website; ADB Project Completion Report PPCR Progress Reports MPWT Annual Report; MPWT website; ADB Project Completion Report PPCR Progress Reports

Source: Asian Development Bank.

CAMBODIA: MACROECONOMIC AND DEBT SUSTAINABILITY ANALYSIS FOR ACCESS TO PPCR CREDITS FOR PUBLIC SECTOR PROJECTS
20 October 2011

A. ECONOMIC DEVELOPMENT: Phases of Growth, 1993-2008

1. The Cambodian economy has passed through three different phases of development; the rehabilitation phase, 1993-1998; the reconstruction phase, 1999-2003; and the economic take-off phase, 2004-2008. The economy under the rehabilitation phase centered on implementing market reforms to transform into a market-based economy. Under the reconstruction phase, the Government focused its efforts on the restoration of peace, economic integration into the region and the world, and promotion of socio-economic development. During this phase, growth of real gross domestic product (GDP) averaged 8.8% a year, driven by garments, construction and tourism besides the primary sector—agriculture.

2. Under the economic take-off phase 2004-2008, the Government commenced its second generation reforms, particularly the implementation of the public financial management reform program. Investments in social sectors and infrastructure were also increased to help reduce poverty, particularly in rural areas. Growth during this third phase averaged 10.3% a year, driven by the key four engines of growth.

3. With strong growth averaging 9.1% between 1998 and 2008, GDP per capita in current prices nearly tripled from $256 in 1998 to $738 in 2008 and the poverty incidence reduced from 35% in 2004 to an estimated 30% in 2007.

B. RECENT MACROECONOMIC PERFORMANCE IN 2010 AND PROSPECTS FOR 2011-2012

Key Economic Indicators

(i) Historical

Indicators (%)	2007	2008	2009	2010
Real GDP growth	10.2	6.7	0.1	6.3[a]
Current account balance/GDP[1]	-8.1	-13.4	-11.6	-12.3[a]
Fiscal balance/GDP	-3.1	-2.9	-6.4	-6.0
Inflation rate (year-average)	7.7	25.0	-0.7	4.0
Money Supply (M2) growth (% change y/y, eop)	62.9	4.8	36.9	20.0
External debt service[2] (exports of goods & services, accrual basis)	1.0	0.9	1.1	1.0
International reserves (gross, $ billions)	1.62	2.16	2.37	2.65

(ii) Projections, 2011-2012[b]

Indicators (%)	2011	2012
Real GDP growth	6.8	6.5
Current account balance/GDP	-11.6	-11.0
Inflation rate (year-average)	5.5	5.5

Sources: Cambodian authorities unless otherwise indicated
[a] ADB staff estimates; [b] ADB staff projections.
[1] excluding official transfers; [2] IMF latest country report

B.1. Economic Growth

4. Stronger-than-expected performance in agriculture, garments, and tourism led to a rapid economic recovery, with GDP growth estimated at 6.3% in 2010. Growth is expected to reach 6.8% in 2011, up from the Asian Development Outlook (ADO) April 2011 projection of 6.5%, and will ease somewhat to 6.5% in 2012 due to the ongoing volatility in the US and Europe markets.

5. The primary sector (agriculture), producing about a third of GDP, grew by an estimated 4.2% in 2010, mainly a result of favorable weather. The sector received a boost from high growth in crop harvest, primarily paddy rice. The sector is expected to expand by around 4.3% in 2011 and 2012.

6. The services sector grew by an estimated 4.3% in 2010, largely due to strong growth in the tourism sector. Tourism receipts rose 14.5% to $1.78 billion, from $1.56 billion in 2009 as global travel gradually recovered. The total number of tourist arrivals was fueled by arrivals from Asia. The services sector is expected to register stronger growth at 5.3% and 5.6% in 2011 and 2012 respectively.

7. Industry is the main contributor to GDP growth in 2010 and 2011. In 2010, the sector expanded by an estimated 11.6% (it had contracted in 2009) as external demand for Cambodian garments, primarily from the US and Europe rebounded. Construction activity remained sluggish, reflecting a fall in foreign investment in property during the global economic crisis and a slow pickup in residential buildings sector. In 2011, growth in the industry sector is anticipated to reach 12.2%, up from the ADO 2011 forecast of 10.8% in April, reflecting faster-than-expected garment exports in the first half of the year.

B.2. Price and Monetary Developments

8. Consistent with a modest recovery in domestic demand, inflation in 2010 averaged 4.0%, a turnaround from 2009 when the Consumer Price Index (CPI) fell slightly. The surge in global prices for food and fuel saw inflation rise from 3.3% y/y in January 2011 to 7.1% in July 2011. However, the recent drop in oil prices is expected to reduce pressure on consumer prices. The average inflation in 2011-12 is expected to be around 5.5%, assuming continuing lower oil prices and no sharp depreciation of the dollar against major currencies (the economy is highly dollarized).

9. Increased foreign currency deposits at banks drove 20% and 18.2% y/y increases in broad money supply (M2) in December 2010 and April 2011 respectively. Credit to the private sector y/y rose 6.5% at end-2009 to 27% at end-2010, and stood at 24.4% at end-April 2011, reflecting ongoing economic expansion. The bank non-performing loan ratio fell to 3.1% at end-2010, from 4.4% at end-2009 and remained relatively stable as of the end of June 2011.

B.3. Balance of Payments

10. In the 2010 external accounts, merchandise exports rose by an estimated 20.8% in dollar terms, largely reflecting the faster-than-expected growth in garment exports to the US. Imports rose by an estimated 16.3%, mainly a result of the increases in imports of oil, and in raw materials for garments. Overall, the 2010 current account deficit (excluding official transfers) widened to an estimated 12.3% of GDP, from 11.6% in 2009. In 2011 and 2012, the deficit is anticipated to narrow to 11.6% and 11.0%, respectively.

11. FDI, net inflows in 2010 expanded by an estimated 48% to $769 million, from $520 million in 2009. Donor inflows remained buoyant, and gross international reserves increased by 12% over the year to $2.65 billion, equivalent to about 4.7 months of imports of goods. In 2011, the reserves are forecast to rise to $2.84 billion, representing about 4.4 months of imports of goods.

B.4. Fiscal Developments

12. The 2010 overall budget deficit narrowed to an estimated 6.0% of GDP, from 6.4% of GDP in 2009. Domestic revenue bounced back to an estimated 13.4% of GDP, higher than the budget plan of 12.3% and the 2009 outturn of 11.9%. Though improving, revenue collection is still relatively low compared to the low-income country standard. The 2010 deficit was largely financed by grants and concessional loans, with the drawdown of government bank deposits estimated at 0.5% of GDP, less than the 2009 outturn of 2%.

13. With expenditure growing at a higher rate than revenue owing to increases in capital outlays, fiscal deficit is projected at 6.2% of GDP in 2011. The extent and timing of oil and gas production remains uncertain and the government is not expected to generate revenue from this source in the 2011-2012.

C. DEBT SUSTAINABILITY

C.1. Debt Sustainability Analysis in ADB

14. The ADB revised its Asian Development Fund (ADF) grant framework in September 2007. The revised ADF grant framework is substantially aligned with that of IDA.

15. Under the revised ADF grant framework, the risk of debt distress determines the proportion of grants in the country allocation. The debt distress classification is based on debt sustainability analyses (DSAs) using the joint International Monetary Fund (IMF)-World Bank debt sustainability framework (DSF) for low-income countries (or the debt data available at that time in the absence of a DSA). ADB collaborates with the IMF and the World Bank on DSAs.

16. Unlike the joint DSA by IDA and IMF, the ratings from ADB's country performance assessment (CPA)[1] are used to classify countries as having strong, medium, or weak policy performance. ADF resources under the revised framework are distributed according to the current performance-based allocation (PBA) formula. The proportion of grant assistance is then set based on the debt-distress classification. For countries eligible for grant assistance, the proportion of grants in the country program follows the same debt-distress classification used by IDA:

- No grants for low risk of debt distress,
- 50% grant for moderate risk of debt distress, and
- 100% grant for high risk of debt distress.

[1] Prepared by an in-country Cambodia-based ADB team with technical support from sector experts in ADB headquarters and rigorously screened by a technical group of specialists. It is prepared following the same structure as the World Banks CPIA. The latest CPA covered the period 1 July 2010 to 30 June 2011, six months following the latest World Bank CPIA.

C.2. Debt Sustainability Analysis for Cambodia

17. ADB's 2010 DSA for Cambodia is based on the DSF for low-income countries developed by the IMF and the World Bank. ADB sent a DSA mission to Cambodia in 30 August – 10 September 2010 to collaborate with IMF and IDA on the DSA. Cambodia was categorized as a "medium performer" in ADB's DSA (with 2007-2009 average CPA scores at 3.68), but a "weak performer" in the IMF/IDA DSA.[2] The relevant policy dependent thresholds under the DSF for low-income countries are as follows:

Debt Burden Thresholds under the DSF
(Applied to external public debt)

	PV of Debt in % of			Debt Service in % of	
	GDP	Exports	Revenue	Exports	Revenue
Weak Policy (CPA≤3.25)	30	100	200	15	25
Medium Policy (3.25<CPA<3.75)	40	150	250	20	30
Strong Policy (CPA≥3.75)	50	200	300	25	35

18. ADB's 2010 DSA showed that Cambodia was at low risk of debt distress, as all debt indicators were below the thresholds in the baseline case as well as stress testing scenarios, using the relevant policy dependent thresholds for "medium performer".[3] Therefore, Cambodia's ADF allocation from 2011 has been upgraded to 100% loans, compared to the 50-50 loan-grant mix previously. It is important to note that the result of the 2010 Cambodia CPA exercise indicated that the country would be rated as a "strong performer" with the latest three-year (2008-2010) average CPA score at 3.81, reflecting Cambodia's improving capacity to manage economic development and public debt, and indicating that the country, with improved policies and institution, can sustain higher level of external debt.

19. The total stock of external public debt and public-guaranteed debt in nominal terms as reported in the latest report of the IMF was $3,514 million at the end of 2010, or 29.9% of GDP, increased from $3,054 million at the end of 2009, or 28.1% of GDP. These include debts owed to the Russian Federation and to the United States.[4] The external public debt is projected to ease in 2011 and 2012 to 29.1% of GDP or $3,813 million and 28.6% of GDP or $4,176 million, respectively (see attached IMF Assessment Letter). The present value of the country's external debt in 2011 and 2012 was estimated at around 23% to 24% of GDP, well below the debt burden threshold under the DSF. If the $36 million highly concessional credit from the PPCR[5] is included, it is just over 1% of end-2010 external debt and is only about 0.3% of 2010 GDP, this is clearly not expected to change the DSA result of low risk of debt distress in ADB.

[2] Cambodia is categorized as a "medium performer" for its policies and institutions using the World Bank's Country Policy and Institutional Assessment (CPIA), since past three years average of CPIA scores was 3.29 and crossed the "medium performer" boundary of 3.25. However, under the revised DSF, the "weak-performer" thresholds would continue to apply in 2010 as the size of the breach is below 0.05.

[3] The results of the joint World Bank-IMF DSA show that Cambodia remains at moderate risk of debt distress.

[4] Debt owed to the Russian Federation is valued at 0.6 rubles per U.S. dollar with the standard 70% discount.

[5] The PPCR terms are somewhat more favorable than Cambodia's ADB ADF loan allocation, which amounts to almost $500 million from 2011-2013.

D. CONCLUSION

20. Given the above analysis and improvements in Cambodia's debt management capacities (as evidenced by the 2010 CPA), Cambodia's access to PPCR credits for the amount of $36 million for public sector investment projects should have no significant impact on the country's overall debt sustainability position. The additional $36 million highly concessional credit from the PPCR is clearly not expected to change the DSA result of low risk of debt distress in ADB.

Attachment:

- IMF Assessment Letter, 22 September 2011

INTERNATIONAL MONETARY FUND
OFFICE OF THE RESIDENT REPRESENTATIVE IN CAMBODIA
22-24, Preah Norodom Boulevard, Phnom Penh.

→ Poullaouec - pls send to Sam + Hoda.

Phnom Penh, September 22, 2011

cc - PJB

Mr. Putu Kamayana
Country Director
Asian Development Bank
Phnom Penh

Dear Mr. Kamayana,

Please find attached an assessment letter on Cambodia prepared by IMF staff. Kindly note the attached letter cannot be included in any documents intended for publication, unless the authorities consent to its publication.

Sincerely,

Faisal Ahmed
IMF Resident Representative

Cambodia—Assessment Letter for the Asian Development Bank

September 20, 2011

Cambodia's recovery remains robust and shows signs of broadening. Staff projects growth to rise to 6½–7 percent in 2011, from 6 percent in 2010. Garment exports and tourist arrivals have been strong since the beginning of 2011 while rising imports of construction materials point to a recovery of the battered real estate sector. Amid ample liquidity in the banking system, credit to the private sector grew at 29 percent in the year through June. Credit growth reinforced the effects of food and oil prices on inflation, which rose to 7.1 percent (y/y basis) in June. The fragility of the global recovery and unsettled security situation at the Thai border expose Cambodia's narrow export base to significant downside risks. Banking system weaknesses, exacerbated by the recent sharp downturn, further undercut the economy's resilience to shocks, and a high degree of dollarization constrains the authorities' ability to cushion such shocks. Staff recommendations set out in the 2010 Article IV staff report remain broadly appropriate.

A prudent fiscal stance remains the key anchor of macroeconomic stability. After easing fiscal policy to support aggregate demand during the global crisis, the government has pursued fiscal consolidation since 2010. The consolidation has focused on reductions in nonpriority spending and aims to eliminate domestic bank financing. The 2011 budget targets that envisage a reduction in the deficit to 2¼ percent of GDP appear achievable. Greater efforts at consolidation in 2012 will be required to eliminate the need for domestic financing, rebuild fiscal buffers, and safeguard medium-term fiscal sustainability. The main near-term fiscal risks include a reversal of past cutbacks in military spending if the border situation were to escalate, for which the authorities would seek savings in other nonsocial recurrent spending, and revenue losses from a global economic slowdown. As for the medium term, the authorities remain committed to further improving revenue administration and strengthening public financial management to protect debt sustainability and ensure adequate resources for development objectives.

Steps should be taken to normalize monetary conditions. In light of rising inflation, the authorities have stepped up surveillance and set up an inter-ministerial working group to monitor and analyze price-developments, but the National Bank of Cambodia so far has left the reserve requirements unchanged since 2009. While some caution is warranted in light of heightened global uncertainty, such monetary accommodation is inconsistent with the robust expansion underway in Cambodia and could also result in macro-financial risks from the sizable liquidity overhang. Over the medium term, a liquidity forecasting framework and an interbank market are needed for moving away from exchange rate-based stabilization. Greater monetary control will ultimately depend on de-dollarization, including by providing market incentives for the greater use the local currency.

Progress on 2010 FSAP recommendations is mixed. The National Bank of Cambodia has upgraded its banking supervision department and taken actions against a few small banks that do not meet the new minimum capital requirements, but legal gaps in the crisis resolution framework remain. The authorities are encouraged to make continued efforts at implementing key FSAP recommendations, including by enhancing financial system supervision and surveillance, and address new regulatory challenges from the inauguration of the stock market.

The 2011 Article IV discussions are scheduled to take place November 28–December 8, 2011.

Table 1. Cambodia: Selected Economic Indicators, 2006–12

	2006	2007	2008	2009	2010 Prel. Est.	2011 Proj.	2012 Proj.
Output and prices (annual percent change)							
GDP in constant prices	10.8	10.2	6.7	-2.0	6.0	6.7	6.5
(Excluding agriculture)	17.3	12.2	7.0	-4.4	6.6	7.7	7.3
Real agricultural output	5.5	5.0	5.7	4.9	4.4	4.3	4.3
GDP deflator	4.6	6.5	21.9	0.3	0.6	4.5	3.9
Inflation (end-year)	4.2	14.0	12.5	5.3	3.1	7.5	4.1
(Annual average)	6.1	7.7	25.0	-0.7	4.0	6.0	5.3
Saving and investment balance (in percent of GDP)							
Gross national saving	19.9	18.3	13.3	10.8	14.4	9.7	13.3
Government saving	1.8	2.9	2.6	-0.1	1.1	1.5	1.8
Private saving	18.1	15.5	10.7	10.9	13.3	8.3	11.5
Gross fixed investment	20.6	20.8	19.5	16.0	18.5	19.0	20.0
Government investment	9.7	10.3	8.8	10.8	11.2	8.0	6.7
Private investment	10.8	10.5	10.7	5.2	7.3	11.0	13.3
Money and credit (annual percent change, unless otherwise indicated)							
Broad money	38.2	62.9	4.8	36.8	20.0	22.5	...
Net credit to the government 1/	-10.1	-12.4	-10.4	6.2	0.8	0.5	...
Private sector credit	51.6	76.0	55.0	6.5	26.6	35.0	...
Velocity of money 2/	4.9	3.9	3.7	3.2	2.6	2.7	...
Public finance (in percent of GDP)							
Revenue 3/	12.8	13.7	14.6	15.2	16.6	15.3	15.4
Of which: Domestic revenue	10.2	11.6	11.5	11.1	11.8	12.1	12.3
Expenditure	13.0	14.5	14.5	19.3	19.6	17.4	17.8
Expense	8.5	8.7	9.0	11.2	10.7	10.6	10.5
Net acquisition of nonfinancial assets 4/	4.5	5.8	5.5	8.1	8.9	6.8	7.3
Net lending (+)/borrowing(-)	-0.2	-0.8	0.2	-4.1	-2.9	-2.2	-2.4
Net acquisition of financial assets	1.6	2.5	2.5	-1.6	-0.3	-0.6	-0.2
Net incurrence of liabilities 5/	1.8	3.3	2.3	2.4	2.7	1.6	2.2
Of which: Domestic financing	-2.0	-2.1	-2.4	1.8	1.0	0.6	0.2
Balance of payments (in millions of dollars, unless otherwise indicated)							
Exports, f.o.b.	3,694	4,083	4,708	4,137	4,988	5,584	6,345
(Annual percent change)	26.9	10.6	15.3	-12.1	20.6	12.0	13.6
Imports, f.o.b.	-4,727	-5,474	-6,509	-5,829	-6,876	-8,178	-8,716
(Annual percent change)	21.1	15.8	18.9	-10.4	18.0	18.9	6.6
Current account (including official transfers)	-47	-213	-700	-561	-481	-1,217	-979
(In percent of GDP)	-0.6	-2.5	-6.2	-5.2	-4.1	-9.3	-6.7
Gross official reserves 6/	1,097	1,616	2,164	2,367	2,653	3,002	3,675
(In months of prospective imports)	2.1	2.6	3.8	3.6	3.4	3.6	4.0
(In percent of foreign currency deposits)	85.7	70.8	95.2	77.4	67.9	61.9	106.1
External debt (in millions of dollars, unless otherwise indicated)							
Public external debt 7/	2,245	2,555	2,808	3,054	3,514	3,813	4,176
(In percent of GDP)	30.9	29.4	24.9	28.1	29.9	29.1	28.6
Public debt service	52	55	59	66	66	78	94
(In percent of exports of goods and services)	1.0	1.0	0.9	1.1	1.0	1.0	1.0
Memorandum items:							
Nominal GDP (in billions of riels)	29,849	35,042	45,583	44,841	47,805	53,330	58,984
(In millions of U.S. dollars)	7,264	8,691	11,277	10,871	11,629	...	...
Exchange rate (riels per dollar; period average)	4,109	4,032	4,042	4,125	4,111	...	...

Sources: Data provided by the Cambodian authorities; and IMF staff estimates and projections.

1/ Contribution to broad money growth.

2/ Ratio of nominal GDP to the average stock of broad money.

3/ In 2006, includes transfer from the IMF of Multilateral Debt Relief Initiative proceeds as capital revenue.

4/ In 2005, includes repayment of arrears.

5/ Includes funds in transit and payment orders in excess of cash released.

6/ Excludes unrestricted foreign currency deposits held as reserves at the National Bank of Cambodia; starting in 2009, includes the new SDR allocations made by the IMF of SDR 68.4 million.

7/ Debt owed to the Russian Federation is valued at 0.6 rubles per U.S. dollar with the standard 70 percent discount.

Asian Development Bank

Southeast Asia Department

10 October 2011

Ms. Patricia Bliss-Guest
Program Manager
Climate Investment Funds Administration Unit (CIF-AU)
World Bank

Subject: Project Appraisal Documents for Cambodia Pilot Program for Climate Resilience (PPCR) Component 3
— Project 1: Climate-Proofing of Roads in Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng Provinces *as a part of* ADB-funded Provincial Roads Improvement Project (proposed)

Dear Ms. Bliss-Guest:

Further to Pilot Program for Climate Resilience (PPCR) Sub-Committee's endorsement of the Strategic Program for Climate Resilience (SPCR) for Cambodia on 28 June 2011, ADB wishes to submit to you the following documents for review and approval of the PPCR grant ($7 million) and PPCR concessional credit ($10 million) proceeds for the captioned project:

1. **Draft Report and Recommendation of the President (RRP):** This document describes the overall project with an investment of $79.1 million (including co-financing of $52.0 million from the Asian Development Bank and $10.1 million from the Government). We expect to receive the ADB Board approval for the project in December 2011;

2. **Draft Project Administration Manual:** This document outlines all activities in implementing the project. It also includes the financing tables to show how PPCR financing is planned to be used in project activities; and

3. **Climate Resilience Output:** This document details all activities to be financed by PPCR. It also explains the rationale for the output and each activity, the scope of the works, financing allocations, and consultants' terms of reference. An appendix to this document illustrates the detailed monitoring indicators of the output, which are in line with PPCR Monitoring and Evaluation Framework.

We would appreciate if CIF AU can facilitate the prompt review of the documents by PPCR sub-committee members.

Transport & Communications Division
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org
Tel (632) 632 4444
Fax (632) 636 2015

Should you or PPCR Sub-committee members require any additional information regarding the project, please contact Mr. Shihiru Date (sdate@adb.org), project officer, with a copy to Mr. Ancha Srinivasan (asrinivasan@adb.org), department PPCR focal point, and Mr. Daniele Ponzi (dponzi@adb.org), ADB PPCR focal point.

Sincerely,

James P. Lynch
Director
Transport and Communications Division