

# Appropriate costing methods of climate change adaptation in infrastructure development: experimental studies for road and related infrastructure projects in Cambodia (CAMI)

Implemented by Royal University of Phnom Penh

Research Partnership - CCCA3



National Council for Sustainable Development  
General Secretariat  
Department of Climate Change



Ministry of Environment

# Background

The climate change impacts coupling with poor design and construction, and lack of climate resilient planning consideration like adaptation costing have severely damaged every year the road networks (61,000 km) in Cambodia, and sections of roads are cut off during the heavy rainfalls. 2019 flood caused road damage to about 500 km long, directly affected 488,611 households, and damaged agricultural crops of some 36,724 ha. And 2011 total flood damages accounted for 630 million USD. The national budget used for repair and maintenance of roads and related infrastructures has reportedly increased every year from 36 mil USD in 2010 to 90 mil USD in 2017. There is a lack of nationally accepted standard of adaptation



costing methods in Cambodia that can be applied by both public and private sectors to plan for the resilient infrastructures in the vulnerable provinces. Therefore, this research project is to explore and assess the appropriate costing methods for climate adaptation of roads and related infrastructure projects so that damages and losses caused by flood and other climate hazards can be properly incorporated into the design and construction from the economic and climate change standpoints.

## Overall Objective

# Enhance the climate resilience capacity of roads and related development sectors in Cambodia

## Specific Objectives

1. To analyse the damages and losses due to climate change on roads and related infrastructures (national and rural roads, bridges, culverts, small scale irrigation system, and related infrastructures);
2. To conduct the cost and benefit analysis on roads and related infrastructures (for two scenarios without and with climate change adaptation measures, including climate projections; and
3. To develop the practical tools and methods for MPWT and MRD officers for analyzing adaptation related financial costs in roads, small scale irrigation, and related infrastructures.

## Approach

Master of Science in Climate Change Program under the Royal University of Phnom Penh has formed a consortium with Asian Institute of Technology, and University of Freiburg in Germany to implement the project. The project will work closely with Ministry of Public Work and Transport, Ministry of Rural Development, and Ministry of Environment. We proposed to analyse the damages and losses (also historical data from government and donors funded projects), and various methods of costing of climate change adaptation measures for roads and related infrastructure projects with MRD, MPWT, sub-national authorities, and local

communities in proposed research sites of Kampong Thom, Pursat, Kratie, Prey Veng and Kampot provinces, including cost and benefit analysis of climate change for their road and infrastructure design, maintenance, and performance. This

will explore how much cost for two scenarios, without and with climate change costs incurred for their implementation.

## Outputs and Key Activities

Result	Key Activities
<ul style="list-style-type: none"> <li>• Damages and losses due to climate change on roads and related infrastructures analyzed (national and rural roads, bridges, culverts, small scale irrigation system, and related infrastructures)</li> <li>• Cost and benefit analysis on roads and related infrastructures utilized (for two scenarios without and with climate change adaptation measures, including climate projections)</li> <li>• Practical tools and methods for MPWT and MRD officers for analyzing adaptation related financial costs in roads, small scale irrigation, and related infrastructures developed</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct the desk review of tools and methods used to assess damages and losses from climate change for road and related infrastructure projects in Cambodia and region</li> <li>• Develop tools and methods to assess damages and losses from climate change for infrastructure projects in Cambodia based on survey and consultations with relevant stakeholders</li> <li>• Estimate current and future (projection) damages and losses from Climate Change impacts on roads and related infrastructures by analysing historical data on maintenance and performance of infrastructure projects carried out by government and multiple donors in targeted provinces (two scenarios: Business as usual and climate proofed)</li> <li>• Develop suitable adaptation strategies and options, for short- and long-term aspects for roads and related infrastructures</li> <li>• Develop tool and methods to estimate the adaptation costing and non-adapting costing of roads and related infrastructures (bridges, culverts, small scale irrigation system like canal, reservoir and sluice gates) in the flood and drought prone provinces of studied sites</li> <li>• Conduct studies in targeted provinces to analyze comparatively between adaptation costs and benefits, and cost effectiveness (reduced damages/losses) for national and rural roads, bridges, culverts, small scale irrigation system (canal, reservoir and sluice gates)</li> <li>• Conduct capacity need assessment of concerned government officers on estimating damages and losses of roads and related infrastructures from CC impacts, and their adaptation costing</li> <li>• Prepare guidelines on adaptation costing tools, and design standards for roads and related infrastructures highly resilient to impacts of climate change for MPWT and MRD</li> <li>• Develop communication materials and training materials (like TOT) for capacity building for related government officers and university curriculum, and research papers on damages and losses, and adaptation costing</li> </ul>

## Knowledge Products

• tools and methods for damage and loss assessment • tools and methods on adaptation costing analysis and experimental studies • guidelines on adaptation costing of transport and small-scale irrigation infrastructures (national and provincial roads, and rural roads and small scale irrigation infrastructures) • course materials to be included into MCC curriculum like Economics of Climate Change, and several training materials on damage and loss assessment, and adaptation costing analysis for capacity buildings for relevant stakeholders

Timeframe	May 2021 to Dec 2023	Partners	Asian Institute of Technology; University of Freiburg; Ministry of Public Work and Transport ; Ministry of Rural Development; Ministry of Environment
Total Budget	USD 206,415 (Total) CCCA (149,990)	Location	Kampong Thom and Pursat (Tonle Sap Lake), Kratie and Prey Veng (Mekong River), and Kampot (coastal zone)

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Funded by



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