Chapter 7

Roadmap of Climate Change Adaptation for Cambodia

Paris Chuop and Meach Yaddy

December 2019

This chapter should be cited as

Chuop, P. and M. Yaddy (2019), 'Roadmap of Climate Change Adaptation for Cambodia', in Anbumozhi, V., J. Gross and S. Wesiak (eds.), *Towards a Resilient ASEAN Volume 2: Advancing Disaster Resilience and Climate Change Adaptation: Roadmaps and Options for Implementation* Jakarta, Indonesia: Economic Research Institute for ASEAN and East Asia, pp. 188-196.

CHAPTER 7

Roadmap of Climate Change Adaptation for Cambodia

Paris Chuop
National Council for Sustainable Development, Cambodia

Meach Yaddy
Ministry of Agriculture, Forest and Fisheries, Cambodia

7.1 Background

Cambodia is situated in the tropical zone and has a coastline 435 kilometres long. Its topography resembles a bowl surrounded by hills with the Tonle Sap Great Lake in the middle. Due to the considerable size of its forested land area, Cambodia has a significant carbon sink capacity that could provide the country with benefits in the carbon market. However, the country is also prone to floods, droughts, tropical storms, and vector-borne diseases. Its coastal areas are exposed to rising sea levels and severe impacts from typhoons, while rising temperatures are leading to more frequent and intense extreme weather events within a fragile socioeconomic context. The country's climate vulnerability frequently results in loss and damage to human life, livelihoods, and the national economy.

Cambodia was ranked 13th in the Global Climate Risk Index (1995–2015), and 8th in the 2016 World Risk Index. In 2014, Standard & Poor's rating service ranked Cambodia's economy as the most vulnerable in the world to the effects of climate change. The Notre Dame Global Adaptation Index categorises Cambodia as *high-vulnerability* and *low-readiness*. In October 2013, heavy rainfall resulted in flash floods that impacted over half a million people and affected 50% of Cambodia's provinces. Loss and damage resulting from the floods was estimated at $356 million, including damage to and destruction of physical assets and loss of agricultural production and other economic activities. A year earlier, in 2012, severe drought had affected 11 of Cambodia's 24 provinces and tens of thousands of hectares of rice-growing land. Such periodic and ever-more intense climate shocks can rapidly compromise livelihoods and put food security at risk. According to the Climate Risk and Adaptation Country Profile elaborated by the World Bank Group in 2011, the average annual temperature in Cambodia has increased by 0.8°C since 1960. The frequency of warm days and nights has increased dramatically, while cold days and nights have significantly decreased.

Climate projections indicate that temperatures across the country will rise by 0.7°C–2.7°C by 2060 and 1.4°C–4.3°C by 2090. Rainfall trends and patterns are uncertain and difficult to predict. Although they are likely to vary between different geographical areas, an overall increase in rainfall is expected during the monsoon season. In addition to more frequent severe floods, as seen over the last decade, rainfall patterns will become progressively less predictable by 2050.

In 2014, vulnerability assessments indicated that 17.2% of Cambodia's communes (279 communes) were 'highly' vulnerable, and over 31.5% (512 communes) were 'quite' vulnerable to multiple climate hazards. The agriculture, water resources, infrastructure, forestry, health, and coastal development sectors are the most vulnerable to the impacts of climate change. Agriculture, which represented 26.5% of gross domestic product in 2015 according to the National Institute of Statistics, is highly dependent on rainfall and on the annual flooding and recession of the Tonle Sap Great Lake. In terms of water resources, the rural communities most affected by climate impacts are highly dependent on water resources for agricultural production. Sustainable irrigation systems and sound freshwater management are critical to build the country's resilience. Infrastructure has also been critically affected by the increasing occurrence and severity of floods, which result in high maintenance costs and the recurrent need to upgrade rural roads and irrigation infrastructure. By 2050, it is projected that over 4 million hectares of lowland forest, which currently experience a dry season lasting 4–6 months, will become exposed to water-deficit periods of 6–8 months or more. Climate change can also impact human health, both directly and indirectly. Some examples of these impacts include changes in the geographical range and incidence of vector- and water-borne diseases, infectious diseases, and malnutrition and hunger as a result of severe disturbances to food production systems and ecosystems. Finally, coastal resources already face a number of environmental pressures, including over-fishing and over-exploitation of forests and mangrove ecosystems, that lead to increased erosion. Climate change exacerbates existing challenges through sea-level rise, saline intrusion, and coastal erosion, which contribute to the shrinking of arable land, reduction of drinking water sources, and loss of coastal infrastructure.

7.2 Policy Responses to Climate Change

In response to these challenges, the Government of Cambodia ratified the National Framework Convention on Climate Change in 1996 and, in 2013, undertook a high-level national policy dialogue on climate change that led to the development of the Cambodia Climate Change Strategic Plan (CCCSP), 2014–2023.

This plan had eight key objectives, namely:

(i) to promote climate resilience by improving food, water, and energy security;
(ii) to reduce sectoral, regional, gender vulnerability, and health risks from climate change impacts;
(iii) to ensure climate resilience of critical ecosystems (e.g. Tonle Sap Lake, the Mekong River, coastal ecosystems, and highlands), biodiversity, protected areas, and cultural heritage sites;
(iv) to promote low-carbon planning and technologies to support sustainable development;
(v) to improve capacities, knowledge, and awareness for climate change responses;
(vi) to promote adaptive social protection and participatory approaches in reducing loss and damage due to climate change;
(vii) to strengthen institutions and coordination frameworks for national climate change responses; and
(viii) to strengthen collaboration and active participation in regional and global climate change processes.

The CCCSP is consistent with Cambodia's National Strategic Development Plans. For example, the 2014–2018 plan has a section dedicated to environmental protection, conservation, and climate change. Building institutional capacity and utilising science-based solutions to address climate risks are common themes running through these overarching national policy documents. Within this framework, line ministries have prepared Sectoral Climate Change Strategic Plans supported by actionable Climate Change Action Plans (CCAPs); these were prepared in 2013–2014 and lasted through 2018. So far, 15 ministries have developed CCAPs encompassing a total of 171 climate actions (7% of them are mitigation-oriented and 93% have an adaptation focus).

In addition to national government policies that respond to climate challenges, development partners are supporting a number of flagship climate change initiatives that are helping to shape climate action and build resilience in Cambodia. The most relevant of these national policies and supporting initiatives are as follows:

(i) The National Adaptation Plan process aims to strengthen ongoing climate adaptation policy responses through cross-sectoral programming, financing, and implementation; and provides an umbrella-framework to build resilience at the national level. The National Adaptation Plan process is supported by Deutsche Gesellschaft für Internationale Zusammenarbeit and the United States Agency for International Development;

(ii) The Cambodia Climate Change Alliance (CCCA) takes a comprehensive and innovative approach to address climate change in Cambodia. The CCCA programme was designed to strengthen and be fully aligned with the national institutional framework for climate change. It plays a unique role in strengthening the national institutional framework to coordinate the climate change response. The overall objective of the CCCA is to strengthen the capacity of the National Committee for Sustainable Development (NCSD) to fulfill its mandate to address climate change, and to enable line ministries and civil society organisations to implement priority climate actions. Phase 1 of the CCCA (2010–2014) was funded by the European Union, the United Nations Development Program, the Swedish International Development Cooperation Agency, and the Danish International Development Agency. Phase 2 (2014–2019) is funded by the European Union, United Nations Development Program, and Swedish International Development Cooperation Agency. The initiative is implemented by the Ministry of Environment and coordinated by its Department of Climate Change.

(iii) The Strategic Program for Climate Resilience (tentative timeframe 2012–2019) emphasises two streams to promote climate resilience: (a) developing knowledge of climate impacts in Cambodia and mainstreaming climate risk management into the agriculture, water resources, and transport and urban infrastructure sectors; and (b) applying new skills, techniques, technology, and engineering practices to climate-proof hard investments. Financial support is provided from the Climate Investment Funds via the Asian Development Bank (ADB).

7.3 Nationally Determined Contribution

Cambodia intends to sustain the delivery of its nationally determined contribution (NDC) mainly through the implementation of the CCCSP. The majority of the NDC's priority projects draw from the line ministries' CCAPs and target adaptation measures. Of these projects, 13 address adaptation, five address mitigation, and one involves recommendations from the Second National Communication. Table 7.1 summarises the priority actions in the NDC related to climate adaptation, and the link to planning and implementation processes. In 2018, these will form the basis of a stock-taking and progress-monitoring exercise within the United Nations Framework Convention on Climate Change.

Table 7.1: NDC's Priority Actions

Intended Nationally Determined Contribution Adaptation Priority Actions	Existing Climate Change Strategies and Plans
Promote and improve the adaptive capacity of communities, and restore the natural ecosystem to respond to climate change.	Implementation of Climate Change Action Plan for Environment and Protected Area (2014–2018)
Implement measures of management and protection of areas to adapt to climate change.	Implementation of Climate Change Action Plan for Environment and Protected Area (2014–2018)
Strengthen climate information and early warning systems.	Implementation of Climate Change Action Plan for Water Resources and Meteorology (2014–2018)
Develop and rehabilitate flood protection dykes for agricultural and urban development.	Implementation of Climate Change Action Plan for Water Resources and Meteorology (2014–2018)
Increase the use of mobile pumping stations and permanent stations in response to mini-droughts, and promote groundwater research in response to drought and climate risk.	Implementation of Climate Change Action Plan for Water Resources and Meteorology (2014–2018)
Develop climate-proof tertiary-community irrigation to enhance agricultural production yields from paddy fields.	Implementation of Climate Change Action Plan for Rural Development (2014–2018)
Promote the climate resilience of agriculture by building sea dykes in coastal areas and scaling-up climate-smart farming systems.	Implementation of Climate Change Action Plan for Water Resources and Meteorology (2014–2018); and Climate Change Action Plan for Agriculture, Forestry and Fisheries (2014–2018)
Develop crop varieties suitable to agro-ecological zones and resilient to climate change (include coastal zones).	Implementation of Climate Change Action Plan for Agriculture, Forestry and Fisheries (2014–2018)
Promote aquaculture production systems and practices that are adaptive to climate change.	Implementation of Climate Change Action Plan for Agriculture, Forestry and Fisheries (2014-2018)
Repair and rehabilitate existing road infrastructure and ensure its effective operation and maintenance, taking into account climate change impacts.	Implementation of Climate Change Action Plan for Public Works and Transport (2014–2018)
Upscale the Malaria Control Program towards achieving pre-elimination status for malaria.	Implementation of Climate Change Action Plan for Public Health (2014–2018)
Upscale the national programme on acute respiratory infection, diarrhoea, and cholera in disaster-prone areas, including conducting surveillance and research on water- and food-borne diseases associated with climate variables.	Implementation of Climate Change Action Plan for Public Health (2014–2018)
Strengthen technical and institutional capacity to conduct climate change impact assessments, climate change projections, and mainstreaming of climate change into sector and sub-sector development plans.	Implementation of recommendations from the draft Second National Communication

Source: Department of Climate Change (2018), *Cambodia National Adaptation Plan Financing Framework and Implementation Plan 2017*. http://camclimate.org.kh/en/ccd/dcc-news/423-new-released-cambodia-national-adaptation-plan-financing-framework-and-implementation-plan.html (accessed 4 April 2019).

7.4 Adaptation Priority Actions

To date, 148 of the 171 projects identified in the CCAPs have not been implemented and remain largely unfunded. Only 23 projects are fully or partly funded. The 40 priority actions for climate change adaptation identified by the 15 sectoral CCAPs are outlined in Table 7.2.

Table 7.2: Climate Change Adaptation Priority Actions

No.	Sector	Priority Action
1	Fisheries	Promote aquaculture production systems and practices that are more adaptive to climate change.
2	Forestry	Develop and implement regulations and mechanism for REDD+.
3	Agriculture	Promote climate resilience for agriculture by building and maintaining sea dykes in coastal areas.
4	Water and sanitation	Carry out risk assessment and management to improve the water supply and sanitation in the Tonle Sap Great Lake provinces.
5	DRR	Strengthen climate information and early warning systems.
6	Agriculture	Promote and upscale climate-smart farming systems that are resilient to climate change.
7	Infrastructure	Repair and rehabilitate existing road infrastructure and ensure an effective operation and maintenance system, taking into account climate change impacts.
8	Cross-cutting	Develop and rehabilitate flood protection dykes (Kampong Trabek, Bateay) for agricultural and urban development.
9	Water	Upscale 20 mobile pumping stations and 10 permanent stations in response to mini-droughts.
10	Fisheries	Promote the climate resilience of wild fishery resources.
11	Fisheries	Enhance climate resilience in the fisheries sector.
12	Livestock	Enhance animal waste management and climate change emission mitigation.
13	Cross-cutting	Develop institutional capacity for natural disaster coordination and intervention.
14	Cross-cutting	Build capacity on and raise awareness of climate change and DRR for the Farmer Water User Community.
15	Water and irrigation	Improve climate risk management and rehabilitate small-, medium-, and large-scale irrigation infrastructure.
16	Infrastructure	Promote climate-proofing and retrofitting of existing and planned schools and university infrastructure.
17	Forestry	Promote sustainable forest management.
18	Health	Upscale the national programme on acute respiratory infection, diarrhoeal disease, and cholera in disaster-prone areas, and conduct surveillance and research on water- and food-borne diseases associated with climate variables.
19	Agriculture	Develop climate change-resilient crop varieties suitable to agro-ecological zones (include coastal zones).

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Table 7.2: ***Continued***

No.	Sector	Priority Action
20	Agricultural infrastructure	Climate-proof tertiary-community irrigation development to enhance agricultural production of paddy fields in four communes in the Mekong Delta, District Kampong Ro, Svay Rieng Province.
21	Forestry	Promote reforestation and afforestation to increase carbon stocks.
22	DRR	Pilot community-based disaster reduction, preparedness, and response plans.
23	Agriculture	Promote post-harvest technology for cereal and tuber crops, and conduct research and transfer of appropriate post-harvest technology.
24	Knowledge management	Develop a knowledge and information system on climate change.
25	Cross-cutting	Promote gender responsiveness in water management, cross-cutting impact, and adaptation.
26	Cross-cutting	Build capacity on climate-proofing rural infrastructure design, construction, and maintenance for 250 civil engineers at the national and subnational levels.
27	Knowledge management	Enhance knowledge management related to climate change adaptation and promote need-based innovation.
28	Cross-cutting	Improve capacity for flood and drought forecasting and modelling for technical offices at the national and subnational levels.
29	Capacity building	Raise awareness of climate change for village development committees.
30	Tourism	Promote livelihood resilience through the development of community-based tourism and ecotourism.
31	Education	Develop educational policies, analyses, research, and planning for climate change adaptation and mitigation.
32	Capacity building	Build awareness and capacity at the national and subnational levels to mainstream climate change into rural development planning processes.
33	Cross-cutting	Strengthen the capacity of agricultural and agro-industry development entrepreneurs and agricultural cooperatives in low-carbon production.
34	Land use	Integrate climate change response measures with commune land use planning.
35	Housing	Promote resettlement and development to adapt to natural disasters at the urban and rural levels.
36	Livestock	Promote resilience in animal production and adaptation to climate change (technical package).
37	Rubber	Promote, pilot, and scale-up rubber clones from the International Rubber Research Development Board member countries in responding to climate change.
38	Forestry	Conduct capacity development, research, and awareness-raising on REDD+.
39	Cross-cutting	Support line ministries to mainstream climate change into development planning and budgeting.
40	Cross-cutting	Conduct national and sectoral vulnerability assessments.

DRR = disaster risk reduction, REDD+ = reducing emissions from deforestation and forest degradation.

Source: Department of Climate Change (2018), *Cambodia National Adaptation Plan Financing Framework and Implementation Plan 2017*. http://camclimate.org.kh/en/ccd/dcc-news/423-new-released-cambodia-national-adaptation-plan-financing-framework-and-implementation-plan.html (accessed 4 April 2019).

7.5 Financing Demand and Gap

The estimated climate change adaptation financing demand refers to the 15 sectoral CCAPs prepared during 2013 and 2014 by the climate-sensitive institutions (line ministries). These 15 CCAPs comprise 171 projects under 40 priority areas, requiring a total of $865.5 million to implement. This creates huge financing gaps, as outlined in Table 7.3.

Table 7.3: Climate Change Adaptation Financing Demand and Gap

No.	Ministry	No. of CCAP Projects	No. of Priority Actions	Funded projects	Partially Funded	Non-funded	Estimated Cost	Financing Gap	Gap (%)
1	MOE	17	2	8	4	5	27,670,000	6,940,000	25.0
2	MOWRAM	16	8	0	1	15	272,500,000	272,150,000	100.0
3	MRD	10	5	4	1	5	56,530,000	17,880,000	32.0
4	MAFF	29	17	0	1	28	187,550,000	187,100,000	100.0
5	MPWT	11	1	1	0	10	210,975,000	210,375,000	100.0
6	MOH	11	1	0	1	10	46,800,000	46,400,000	99.0
7	MIH	17	0	0	1	16	11,000,000	10,750,000	98.0
8	MLMUPC	8	2	0	1	7	9,120,000	8,870,000	97.0
9	MME	9	0	0	1	8	5,020,000	4,820,000	96.0
10	MOEYS	7	2	0	1	6	10,600,000	10,250,000	97.0
11	MOINFO	5	0	0	1	4	4,330,000	4,205,000	97.0
12	MOT	8	1	0	1	7	3,400,000	3,275,000	96.0
13	MOWA	6	0	1	1	4	3,620,000	3,360,000	93.0
14	NCDM	11	1	0	1	10	11,750,000	11,650,000	99.0
15	MPTC	6	0	0	0	6	4,605,000	4,605,000	100.0
	Total	**171**	**40**	**14**	**16**	**141**	**865,470,000**	**802,630,000**	**92.7**

CCAP = climate change action plan; MAFF = Ministry of Agriculture, Forestry and Fisheries; MIH = Ministry of Industry and Handicraft; MLMUPC = Ministry of Land Management, Urban Planning and Construction; MME = Ministry of Mines and Energy; MOE = Ministry of Environment; MOEYS = Ministry of Education, Youth and Sport; MOH = Ministry of Health; MOINFO = Ministry of Information; MOT = Ministry of Tourism; MOWA = Ministry of Women's Affairs; MOWRAM = Ministry of Water Resources and Metrology; MPTC = Ministry of Posts and Telecommunications; MPWT = Ministry of Public Works and Transport; MRD = Ministry of Rural Development; No. = number; NCDM = National Committee for Disaster Management.

Source: Department of Climate Change (2018), *Cambodia National Adaptation Plan Financing Framework and Implementation Plan 2017*. http://camclimate.org.kh/en/ccd/dcc-news/423-new-released-cambodia-national-adaptation-plan-financing-framework-and-implementation-plan.html (accessed 4 April 2019).

7.6 Institutional Arrangement

The NCSD was established by the Royal Decree No. 0515/403 (dated 9 May 2015), and its main mandates are (i) mainstreaming sustainable development into national policies, strategies, plans, programmes, and legislations; (ii) coordinating the implementation and evaluation of national policies, strategies, plans, programmes, and legislations; and (iii) leading actions related to the green economy, climate change, biodiversity, and biosafety. The NCSD is honourably presided over by the Prime Minister and chaired by the minister of environment. Its members comprise 27 secretaries of state from relevant ministries, 25 governors from all provinces, and 7 secretaries general from relevant general secretariats.

The NCSC General Secretariat situated in the Ministry of Environment consists of five departments: (i) the Department of Administration, Planning and Finance; (ii) the Department of Climate Change; (iii) the Department of Green Economy; (iv) the Department of Science and Technology; and (v) the Department of Biodiversity.

The main roles of the Department of Climate Change are that of focal point to the United Nations Framework Convention on Climate Change, and of coordinator to mainstream climate change-related actions, both mitigation and adaptation, into all national policies and strategies, as well as the sectoral plans and programmes of line ministries and institutions.

Furthermore, Ministerial Decree No. 2 (dated 5 May 2017) created the Climate Change Technical Working Group to support the NCSD by focusing on coordinating climate change-related actions in the country, including both mitigation and adaptation. It has 25 members from relevant ministries and institutions.

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World Bank Group (2011), *Climate Change Knowledge Portal—Cambodia.* https://climateknowledgeportal.worldbank.org/country/cambodia (accessed 4 April 2019).