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Review of Implementation Challenges Posed by the Climate Change Action Plan 2014-2018 in Cambodia: Case Studies of Three Ministries

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Abbreviations

AEZ	: Agriculture Expert Zone
CC	: Climate Change
CCAP	: Climate Change Action Plan
CINC	: Cambodia's Initial National Communication
CCCSP	: Cambodia Climate Change Strategic Plan
CNAPFFIP	: Cambodia National Adaptation Plan Financing Framework and Implementation Plan
CCTT	: Climate Change Technical Team
CPER	: Climate Public Expenditure Review
CSNC	: Cambodia's Second National Communication
CCCA	: Cambodia Climate Change Alliance
EWS	: Early Warning System
FWUC	: Farmer Water User Communities
GHG	: Greenhouse Gas
GEF	: Global Environment Facility
MoE	: Ministry of Environment
MAFF	: Ministry of Agriculture, Forestry and Fisheries
MoWRAM	: Ministry of Water Resources and Meteorology
M&A	: Mitigation and Adaptation
NCCC	: National Climate Change Committee
NCDM	: National Committee for Disaster Management
PD	: Provincial Department
PV	: Photovoltaic
RGC	: Royal Government of Cambodia
REDD	: Reduction of Emissions from Deforestation and Degradation
UNDP	: United Nations Development Programme
UNFCCC	: United Nation Framework Convention on Climate Change

Table of Contents

1. Introduction 1
1.1 Objectives 1
1.2 Methods 1
1.3 Limitation 2
2. Adaptation and Mitigation Projects in the Climate Change Action Plan 2014-2018 of MoE, MAFF and MoWRAM 2
2.1 Ministry of Environment 2
2.2 Ministry of Agriculture, Forestry and Fisheries 3
2.3 Ministry of Water Resources and Meteorology 3
3. Challenges in Implementing the Climate Change Projects in Cambodia 3
3.1 Financial constraints 3
3.2 Limited human capacity 4
3.3 Lack of reliable and comprehensive data sets and research 4
3.4 Lack of technology transfer capacity 5
3.5 Limited public awareness about climate change adaptation 6
4. Conclusion 6
References 7

List of Tables and Appendixes

Table 1: Climate Change Action Plan Projects 2014-2018 of the MoE, MAFF and MoWRAM 2
Table 2: Financing Gap for Implementing CCAP Projects by three Ministries (in USD) 4
Table 3: Limited human capacity across the MoE, MAFF and MoWRAM 4
Table 4: Lack of reliable and comprehensive data sets and research across the MoE, MAFF and MoWRAM 5
Table 5: Lack of technology transfer capacity in the MoE, MAFF and MoWRAM 6

Appendix 1: The Ministry of Environment Climate Change Action Projects 8
Appendix 2:The Ministry of Agriculture, Forestry and Fisheries Climate Change Action Projects 8
Appendix 3: The Ministry of Water Resources and Meteorology Climate Change Action Projects 9

1. Introduction

Cambodia took up the challenge of climate change with the launch of its first related project in 1994. This project was managed by the Ministry of Environment in collaboration with the United Nations Development Program (UNDP), the Global Environment Facility (GEF) and other Ministries. The project led Cambodia to participate actively in international forums on climate change such as the United Nations Framework Convention on Climate Change (UNFCCC).[1]

Cambodia ratified the UNFCCC on 18 December 1995 and signed the Kyoto Protocol in 2002. On 22 April 2016, Cambodia signed the Paris Agreement to contribute to maintaining the global temperature rise at below 2 degrees Celsius above pre-industrial levels and to strengthen its capacity to address the impact of climate change.[1, 2, 3] The participation of Cambodia in the international climate change agenda is essential to the country since the Cambodian economy remains predominantly rural and agriculture-based, hence the country is vulnerable to the adverse effects of climate change and natural disasters.[1] In August 2002, Cambodia submitted its Initial National Communication to the UNFCCC which, at the time, was the first and only study on climate change in Cambodia.[1]

Cambodia is one of the countries that has contributed the least to causing climate change, but its commitment to fulfilling the obligations to address this problem has been significant. This was made especially clear in 2013 when the country developed and endorsed the Cambodia Climate Change Strategic Plan (CCSP) 2014-2023, which has brought 15 Ministries and institutions in Cambodia together to develop the country's own Climate Change Action Plan (CCAP) with adaptation and mitigation projects to be implemented from 2014-2018.[4]

There has been a gap in understanding what challenges the Ministries have faced so far in implementing those CCAP projects in Cambodia. Therefore, this study aims to fill that gap by reviewing the challenges in implementing Climate Change Action Plans in Cambodia. The study focuses on three climate-sensitive Ministries as case studies: the Ministry of Environment (MoE); the Ministry of Agriculture, Forestry and Fisheries (MAFF); and the Ministry of Water Resources and Meteorology (MoWRAM). The specific objectives are set out below.

1.1 Objectives

- To describe the adaptation and mitigation projects as proposed in the Climate Change Action Plan 2014-2018 in the three Ministries; and
- To identify the challenges in implementing those projects by the three Ministries.

1.2 Methods

This paper reviews the existing documents of the government related to climate change activity, such as the Climate Change Action Plans 2014-2018 of the Ministry of Environment, the Ministry of Agriculture, Fisheries and Forestry, the Ministry of Water Resources and Meteorology, the Cambodia Climate Change Financing Framework, the Cambodia National Adaptation Plan Financing Framework and Implementation Plan in 2017, and other reports from collaborating partners who work on climate change related issue in Cambodia. This study also uses for its review existing data from Cambodia's Intended Nationally Determined Contribution (INDC) and its Second

National Communication submitted under the United Nations Framework Convention on Climate Change.

1.3 Limitation

Two major limitations were encountered in the writing of this paper. First, there were only a few studies that discussed CCAP project implementation activity conducted by the three Ministries as the phases of CCAP implementation were not yet finished. Therefore, this paper focuses mainly on the progress of CCAP project implementation up to 2016. Second, the researcher also recognized a lack of information in discussing the challenges of the project implementation, especially those related to finance, human capacity needs and technology transfer for the three Ministries. Future research with additional key informant interviews on CCAP implementation, is needed to complement the findings of this paper.

2. Adaptation and Mitigation Projects in the Climate Change Action Plan 2014-2018 of MoE, MAFF and MoWRAM

At total of 15 Ministries have developed their own Climate Change Action Plans, and these comprise 171 climate actions projects. Most of these projects relate to adaptation work (93 percent) and only 7 percent focus on mitigation. The MoE, MAFF and MoWRAM have, together, proposed 62 adaptation and mitigation projects (out of the overall total of 171), but only 12 of these (or 19.35 percent) were in operation by 2016 (Table 1).[5] Their projects are detailed in the sections below.

Table 1: The Climate Change Action Plan Projects 2014-2018 of the MoE, MAFF and MoWRAM

No.	Ministries	# of CCAP Projects	On-going Projects	Planned Project
1	MoE	17	12	5
2	MAFF	29	0	29
3	MoWRAM	16	0	16
	Total	62	12	50

(Source: Ricardo (2016); cited in Cambodia National Adaptation Plan Financing Framework and Implementation Plan, 2017)

2.1 Ministry of Environment

The Ministry of Environment (MoE) prepared the Climate Change Action Plan (CCAP) 2016-2018 based on guidance from the Council of Ministers and the National Council for Sustainable Development. It contained proposals for 17 projects, mostly combined mitigation and adaptation activities to be implemented from 2016-2018. The estimated costs for these 17 projects was USD 27,670,000. These projects could be grouped into eight sub- categories:

- Climate resilience through improving food, water and energy security;
- Sectoral, regional and gender and health risks presented by climate change;
- The climate resilience of critical ecosystems;
- Low carbon planning and technologies;
- Capacity and awareness in respect of responses to climate change;
- Adaptive social protection;
- Institutions and coordination frameworks for responses to national climate change; and
- Collaboration and active participation in regional and global climate change processes.[6]

The MoE was the only Ministry to have had most of its proposed projects funded and implemented so far. By 2016, 12 MoE projects had been started while five were still waiting for funding. However, only eight projects were fully funded (see Appendix 1).

2.2 Ministry of Agriculture, Forestry and Fisheries

The Ministry of Agriculture, Forestry and Fisheries (MAFF) had 29 projects proposals across the five strategic objectives of the CCCSP to be implemented between 2014-2018. Those projects focused more on adaptation than mitigation and targeted human and institutional capacity, the capacity of farmers to cope with new technology, greenhouse gas (GHG) emissions, fisheries management, and crop production. The 29 activities were grouped into six sub-sectors:[7]

- Agriculture and agro-industry;
- Rubber;
- Livestock;
- Forestry;
- Fisheries; and
- Cross-cutting issues.

MAFF had the third largest CCAP budget requirement at USD187,550,000 (or 22 percent of the total CCAP requirement). However, only one project had been partially funded by the CCCA by 2016, while the other 28 projects were non-funded and on hold (see Appendix 2).[5]

2.3 Ministry of Water Resources and Meteorology

In 2014, the Ministry of Water Resources and Meteorology (MoWRAM) had established the Climate Change Action Plan 2014-2018 based on the CCCSP 2014-2023. MoWRAM had proposed 16 projects to be implemented. In contrast to the MoE and MAFF, the projects proposed by MoWRAM mainly tackle adaptation. The 16 actions projects were grouped into five sub-majors categories:[8]

- Hydro-meteorology;
- Irrigation-related activity;
- Flood and drought management;
- Sea level rise/saline intrusion; and
- Gender.

MoWRAM had the largest CCAP budget requirement at USD 272,500,00 or 31 percent of the proposed aggregate CCAP budget. Almost all of its projects were for climate change adaptation. By 2016, only one MoWRAM project had been partially financed by a CCCA grant, while the others remained non-funded and were delayed (see Appendix 3).[5]

3. Challenges in Implementing the Climate Change Projects in Cambodia

MoE, MAFF and MoWRAM had faced similar challenges in implementing climate change projects in Cambodia. Those challenges include financial constraints; limited human capacity; a lack of reliable and comprehensive data sets and research; and a lack of technology transfer and awareness.[2]

3.1 Financial constraints

The budget for climate change related activity in Cambodia has been insufficient. Even though the total amount of public spending earmarked for climate change projects increased steadily from USD 91.7 million (or 0.9 percent of GDP) in 2009 to USD 211.7 million (or 1.3 percent of GDP) in 2014,[5] Cambodia has

remained a country with limited financial resources to implement the planned adaptation and mitigation work. International financial support is still needed to help with this implementation.[2] For example, it was found that the financing gap hampering the implementation of all CCAP projects was estimated at 92.7 percent in 2016. The Ministry of Environment had a narrower financing gap than the others, at >25 percent. This is in stark contrast to the gaps experienced by the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Water Resources and Meteorology, which were at almost 100 percent (Table 8).[5] Limited knowledge about the concept of climate change among some sectoral Ministries might have had an effect on budget negotiations conducted by each Ministry.[9]

Table 2: Financing Gap for Implementing CCAP Projects in the three Ministries (in USD)

No	Ministry	# of CCAP Projects	Funded Projects	Partially Funded	Non-Funded	Estimated cost	Financing Gap	Gap %
1	MoE	17	8	4	5	27,670,000	>6,940,000	>25%
2	MAFF	29	0	1	28	187,550,000	187,100,000	100%
3	MoWRAM	16	0	1	15	272,500,000	272,150,000	100%

(Source: Ricardo (2016); cited in Cambodia National Adaptation Plan Financing Framework and Implementation Plan, 2017)

3.2 Limited human capacity

The technical and institutional capacity of line Ministries both at the national and sub-national levels related to climate change is an important element in the effective implementation of climate change projects.[2, 9, 10, 11] However, the MoE, MAFF and MoWRAM have faced many challenges in this respect. For example, the MoE still has limited capacity in monitoring, reporting and evaluating climate change action plans and adaptation investment.[9] It also faced issues in coordinating the government's efforts to address climate change adaptation activities. The staff capacity of the MoE was also not fully available for program implementation because tasks other than CCCA were prioritized and; a delay in the recruitment of Climate Change Specialists was also reported.[12] In MAFF and the Provincial Departments of Agriculture (PD), some staff are still relatively young professionals with limited technical experience in climate change and this has proven to be a constraint to the effective implementation of climate change work in this Ministry[10] For MoWRAM, the capacity of staff to operate the climate forecast stations and collect data and keep records, and to fully utilize the information, is still limited[8]

Table 3: Limited human capacity across the MoE, MAFF and MoWRAM

MoE	MAFF	MoWRAM
• Limited capacity in monitoring, reporting and evaluating • Challenges in leading coordination • Staff unavailable for CC works • Delay in the recruitment of climate change specialists	• Young professionals • Limited technical CC experiences	• Limited staff to operate the climate forecast stations, data collection and records

3.3 Lack of reliable and comprehensive data sets and research

There was still a lack of reliable data sets and research in Cambodia related to an inventory on GHG emissions, mitigation analysis and vulnerability assessments. The country also faced a shortage of expertise in each relevant sector to implement climate change projects. Because of those challenges, assumptions were often made, and data obtained from secondary data in the region.[2]

For example, MAFF lacked reliable market and crop information and weather forecasting for the farming of certain crops.[13] The MoE also had limited data or inventories in relation to existing climate information and vulnerable assessments, or science-based adaptation and down-scaling modeling to provide data related to the commune, district and provincial levels[9, 11] For MoWRAM, systems for the management, processing and quality control of climate and hydrological data remained weak. No system existed to integrate climate and weather forecasting with hydrological features at the national, provincial or community level.[14, 15]

Table 4: Lack of reliable and comprehensive data sets and research across the MoE, MAFF and MoWRAM

MoE	MAFF	MoWRAM
• Limited data or inventories in respect of existing climate information • Limited data on vulnerability assessment • Limited modeling for down-scaling	• Lack of reliable markets and crop information • Lack of reliable weather forecasting for certain crops	• Weak systems for the management, processing and quality control of climate data • Weak hydrological data

In addition to the specific challenges above, other challenges that were shared by the three Ministries are as follows:[2]

- Lack of activity data and local emission factors;
- Data classifications that differed from the IPCC Guideline categories;
- Lack of a sustainable inventory system relating to GHG emissions;
- Lack of national experts for GHG inventory preparation;
- Limited climatic risk and climate modelling for national and sectoral plans;
- Insufficient relevant data and information to conduct and assess immediate action required for climate change adaptation;
- Limited research conducted for related sectoral impacts of climate change;
- Limited analysis of the wider impacts of disasters on the macro-economic situation;
- A shortage of capable technical experts and financial resources for running impact assessments and models for developing measures;
- Insufficient short-term and long-term planning information and data for all sectors to conduct mitigation analysis and projections in respect of national emissions;
- Lack of a national registry system for GHG mitigation; and
- Shortage of technical experts capable of conducting analysis in all sectors.

3.4 Lack of technology transfer capacity

Lack of technology transfer has been one of the key constraints for Cambodia in implementing climate change projects. It was found that advanced technology was often manufactured outside of Cambodia and was often expensive. For example, the MoE faced a barrier in promoting the use of solar energy as it currently had no facilities to test photovoltaic (PV) systems or PV panels for solar systems. MAFF faced barriers in implementing and promoting biomass gasification in rural areas due to the lack of technology and the fact that training is needed to increase capacity in operating and maintaining technical equipment.

Another barrier faced by MAFF was related to the promotion of investment in rice mills as technical assistance and low interest loans were needed to promote uptake[2]

Table 5: Lack of technology transfer capacity in the MoE, MAFF and MoWRAM

MoE	MAFF	MoWRAM
• Barriers to the use of solar energy • No facilities to test PV systems	• Lack of biomass gasification technology in rural areas • Limited assistance in rice mills technology	-

3.5 Limited public awareness about climate change adaptation

The three Ministries sometimes found it difficult to implement climate change adaptation projects on the ground, partly due to the limited public awareness surrounding the subject. For example, according to a survey conducted by the MoE and the BBC World Trust Service in 2011, even though the majority of rural Cambodians had heard of "climate change" (84 percent) or "global warming" (70 percent) through the broadcast media or through word-of-mouth, and they could link the terms to their own observations of change such as disease, farming difficulties, drought, increasing temperatures, decreased yields or water storage, a greater number of women in rural areas, poor people and those with the least education still lacked the information they needed to respond and adapt to climate change. The survey showed that more than 22 percent were also uncertain about whether or not the changes they had experienced would continue to affect them in the long-term. This implies that those people may not be able to prepare long-term coping strategies and were, therefore, interested in participating in climate change projects so that they could address its impacts.[16]

4. Conclusion

This paper has sought to describe projects and review challenges in implementing the Climate Change Action Plans in Cambodia from 2014-2018, with a specific focus on the Ministry of Environment, the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Water Resources and Meteorology. The findings have revealed that Cambodia has mainly focused on adaptation rather than mitigation projects related to climate change. The three Ministries are still making slow progress in implementing their adaptation and mitigation projects as proposed by CCAP. The main challenges that have been hindering progress in implementing CCAP projects were found to be similar among the three Ministries. The first challenge mainly rested on financial shortfalls, especially for MAFF and MoWRAM. Other challenges included: limited human capacity; lack of reliable and comprehensive data sets and research; and lack of technology transfer opportunities and awareness. The results of this paper have provided basic information about key challenges for stakeholders to consider in order to provide support for CCAP project implementation in Cambodia.

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Appendix 1: The Ministry of Environment Climate Change Action Projects

No.	Project	Project Status	Adaptation, Mitigation or both	Cost/budget demand	Financed	Gap
	Funded Projects			**5,930,00**		
1	Development of the national GHG inventory system	Ongoing	M	450,000	Yes	0%
2	Launch and Roll Out of the National and Sectoral M&E System	Ongoing	AM	215,000	Yes	0%
3	Strengthening of the legal regulatory framework for resilient low carbon development	Ongoing	AM	100,000	Yes	0%
4	Establishing a national climate change financing framework	Ongoing	AM	1,000,000	Yes	0%
5	Engaging and raising awareness among different target groups about CC and GHG/sustainable consumption and production	Ongoing	AM	600,000	Yes	0%
6	Establishment of a Knowledge Management System on CC and GHG	Ongoing	AM	615,000	Yes	0%
7	Promoting and improving the adaptive capacity of communities to respond to climate change	Ongoing	A	2,500,000	Yes	0%
8	Integrating CC and environment issues into the education curriculum at all levels	Ongoing	AM	450,000	Yes	0%
	Partially Funded			**18,300,000**		
9	Developing and testing low carbon approaches and options in urban areas	Ongoing	AM	3,800,000	300,000	92%
10	Institutionalizing UNFCCC reporting	Ongoing	AM	1,500,000	Partially	Partially
11	Capacity building of national institutions coordinating the implementation of climate change responses	Ongoing	AM	5,000,000	Partially	Partially
12	Support for line Ministries to mainstream climate change into development planning and budgeting	Ongoing	AM	8,000,000	Partially	Partially
	Non-Funded project			**3,440,000**		
13	Establishing a low carbon technology hub for food, water, and energy security	Planned	AM	635,000	No	100%
14	Developing preliminary studies for the establishment of natural capital accounting	Planned	AM	120,000	No	100%
15	Facilitating GHG emission reduction through project and program carbon finance crediting mechanisms	Planned	M	385,000	No	100%
16	Conducting national and sectoral vulnerability assessments	Planned	A	0	No	100%
17	Conducting an assessment of the impact of climate change on biodiversity and testing specific management options to cope with climate change	Planned	A	2,300,000	No	100%
Estimated total				**27,670,000**	**>6,940,000**	**>25%**

(Source: Ricardo (2016); cited in Cambodia National Adaptation Plan Financing Framework and Implementation Plan, 2017)

Appendix 2: The Ministry of Agriculture, Forestry and Fisheries Climate Change Action Projects

No.	Project	Project Status	Adaptation, Mitigation or both	Cost/budget demand	Financed	Gap
	Partially Funded Project			**13,470,000**		
1	Promoting and up-scaling sustainable farming systems that are resilient to climate change	Planned	A	13,470,000	Partially, 450000, CCCA	97%
	Non Funded Project			**174,080,000**		
2	Promoting an integrated approach in efficiency in the energy and inputs used in latex and rubber wood production	Planned	M	250,000	No	100%
3	Promoting sustainable forest management	Planned	AM	2,250,000	No	100%
4	Promoting reforestation and afforestation to increase carbon stock	Planned	AM	8,200,000	No	100%
5	Enhancing animal waste management and climate change emission mitigation	Planned	M	6,500,000	No	100%
6	Promoting and enhancing technology development on the improvement of animal breeding, animal feed, and animal health to adapt to climate change	Planned	A	11,000,000	No	100%
7	Mapping of agricultural productions and of land-use	Planned	A	19,400,000	No	100%
8	Developing and using integrated socio-economic and climate scenarios with climate, and land use models and the establishment	Planned	AM	7,850,000	No	100%

	of carbon accounting systems for agriculture, forestry and fisheries					
9	Developing and implementing regulations and mechanisms in relation to REDD+	Planned	AM	2,250,000	No	100%
10	Promoting post-harvest technology for cereal and tuber crops, and conducting research and appropriate post-harvest technology transfer	Planned	AM	3,500,000	No	100%
11	Promoting research work into appropriate climate-smart agricultural technology/techniques to adapt to and mitigate the effects of climate change	Planned	AM	18,770,000	No	100%
12	Developing crop varieties suitable for Agriculture Expert Zones that are resilient to CC (include in the coastal zone)	Planned	A	13,380,000	No	100%
13	Establishing experimental networking sites and develop growth, yield, biomass, and carbon stocks within existing rubber plantations in five AEZs	Planned	AM	1,520,000	No	100%
14	Developing knowledge and information systems related to climate change	Planned	A	2,600,000	No	100%
15	Strengthening the capacity of agricultural and agro-industry development entrepreneurs and the agricultural cooperatives in low carbon production	Planned	AM	1,550,000	No	100%
16	Institutional capacity development for natural disaster coordination and intervention	Planned	AM	700,000	No	100%
17	Mainstreaming institutional climate change adaptation by building capacity and scaling-up community resilience	Planned	A	30,990,000	No	100%
18	Conducting capacity development, research and awareness- raising on REDD+	Planned	AM	1,600,000	No	100%
19	Building climate resilience capacity in the forestry sector	Planned	A	2,100,000	No	100%
20	Promoting aquacultural production systems and practices that are more adaptive to climate change	Planned	A	3,400,000	No	100%
21	Promoting the climate resilience of wild fishery resources	Planned	A	1,300,000	No	100%
22	Enhancing the climate resilience of the fishery sector	Planned	A	3,000,000	No	100%
23	Enhancing fish and fisheries products in the entire value chain in response to climate change impacts	Planned	A	3,000,000	No	100%
24	Promoting resilience in animal production and adaptation to climate change	Planned	AM	8,000,000	No	100%
25	Enhancing knowledge management related to climate change adaptation and promoting innovation that is needs-based	Planned	A	10,000,000	No	100%
26	Modifying existing Agricultural Good Practice (AGP) through additional training for technical staff related to climate change	Planned	AM	350,000	No	100%
27	Promoting, piloting and scaling-up rubber clones from the IRRDB (International Rubber Research Development Board) member countries in responding to climate change	Planned	AM	1,970,000	No	100%
28	Promoting new rubber clone trials	Planned	A	2,900,000	No	100%
29	Promoting marginalized groups and women's participation in climate change adaptation and mitigation strategies	Planned	AM	5,750,000	No	100%
Total				**187,550,000**	**187,100,000**	**99.8%**

(Source: Ricardo (2016); cited in Cambodia National Adaptation Plan Financing Framework and Implementation Plan, 2017)

Appendix 3: The Ministry of Water Resources and Meteorology Climate Change Action Projects

No.	Project	Project Status	Adaptation, Mitigation or both	Cost/budget demand	Financed	Gap
	Partially Funded Project			**3,500,000**		
1	Capacity building for national and provincial departments of water resources for climatic data collection, recording etc.	Planned	A	3,500,000	350,000 Partially, CCCA	**90%**
	Non-Funded Project			**269,000,000**		
2	Strengthening climate information and Early Warning Systems (EWS) (2015-2017)	Planned	AM	5,500,000	No	100%
3	Improving institutional structures, networking with the mass media for public weather and climate forecasting dissemination	Planned	A	5,000,000	No	100%

4	Establishing a national hydrology forecasting center (Asian Development Bank)	Planned	A	2,000,000	No	100%
5	Promoting scientific and comprehensive methods in respect of ground water studies in responding to drought and climate risks	Planned	A	2,500,000	No	100%
6	Assessing the potential impact of sea level rise and salt water intrusion (Mekong delta and coastal areas)	Planned	A	1,500,000	No	100%
7	Capacity building and awareness-raising in respect of climate change and Disaster Risk Reduction for Farmer Water User Communities	Planned	A	2,000,000	No	100%
8	Capacity development for irrigation engineers on climate risk management	Planned	A	1,500,000	No	100%
9	Improving the capacity for flood and drought forecasting and modelling far technical offices at national and subnational level (ADB) Global Management System	Planned	A	2,000,000	No	100%
10	Promoting climate resilience of agriculture through building sea dikes in coastal areas	Planned	A	3,000,000	No	100%
11	Establishing and installing meteorology stations in the sea to monitor wind, sea wave and sea level rise in four provinces of the coastal zone	Planned	A	3,500,000	No	100%
12	Climate risk management and rehabilitation of small-, medium- and large-scale irrigation infrastructures	Planned	A	200,000,000	No	100%
13	Promoting innovative irrigation technology structures in areas affected by torrential rain (Mondulkiri, Pursat, Sihanouk)	Planned	A	15,000,000	No	100%
14	Upscaling mobile pumping stations (20) and permanent stations (10) in responding to mini-droughts	Planned	A	20,000,000	No	100%
15	Development and rehabilitation of flood protection dikes (Kampang, Trabek, Bateay) for agricultural/ urban development	Planned	A	4,000,000	No	100%
16	Promoting gender responsiveness in water management, and CC impact and adaptation	Planned	A	1,500,000	No	100%
Estimated total				**272,500,000**	**272,150,000**	**99.9%**

(Source: Ricardo (2016); cited in Cambodia National Adaptation Plan Financing Framework and Implementation Plan, 2017)