



Empowered lives.
Resilient nations.

Final Report

Mid-Term Review of the Strengthening Climate Information and Early Warning System in Cambodia to Support Climate Resilient Development and Adaptation to Climate Change Project

**Final version, June 5th, 2019
MTR Evaluator: Hans van Noord**

Disclaimer:

The views and opinions expressed in this report are the sole responsibility of the evaluator and do not represent the official opinion of UNDP.

Acknowledgements

The evaluator wishes to express his acknowledgements to all the individuals and organisations he had the pleasure to engage with, offering their time and views, often on a very short notice and without restrictions. As this review is very much geared towards stocktaking and learning, the opinions shared and the suggestions and recommendations made were all received with appreciation, as they offered valuable information used for the narrative of this report.

Mr. Yusuke Taishi, Regional Technical Advisor with UNDP provided the broad context of the project, and further guidance before the start of the mission. Ms. Ratana Norng (Programme Analyst) and Mr. Muhibuddin Usamah (project manager/TA) managed the review and they are both thanked for their excellent support and facilitation, enabling a smooth mission in Cambodia. Mr. Nick Beresford, UNDP RR, gave further guidance at the start of the mission, sharing his experiences and views on the EWS project. Muhi ensured during the whole mission period that the evaluator was continuously provided with detailed information about the project execution process and made sure that the evaluator was introduced to all key stakeholders. Ratana and Muhi gave valuable feedback to a draft version of this report, which was very helpful.

HE Mao Hak, Deputy Secretary General Tonle Sap Authority and Focal Point of the EWS project for the Ministry of Water Resources and Meteorology(MOWRAM) shared his views and experiences with the project, from its initial design up to the present late phase of implementation. He facilitated consultation with his staff, Mr. Yin Savuth, Director Department of Hydrology and River Work and Mr. Ryna Oum, Director of the Department of Meteorology. They both provided more detailed information on their engagement with the project and the challenges faced and opportunities ahead. Mr. Tong Seng and Mr. Hun Sothy, both of the Department of Hydrology gave further background on the hardware, software and capacity building provided by the project. Mr. Lim Hak and Mr. Lyhon Ho, staff of the Department of Meteorology took the evaluator to one of the Automatic Weather Stations and shared their field experiences and challenges in operations and maintenance of the equipment provided by the project.

Other key stakeholders the evaluator could meet were Mr. Lam Hung Son, head of the Regional Flood management and Mitigation Centre of the Mekong River Commission (MRC) and HE Khun Sokha, Deputy Secretary General of the National Commission for Disaster Management (NDCM), both providing their views on regional collaboration and the linkage of climate and early warning information and effective disaster management.

Mr. Am Phirum, Deputy Director General, Directorate of Agriculture of the Ministry of Agriculture, Forestry and Fisheries, and Mr. Tan Chantara, also of DGA, shared their engagement with the project and their collaboration in a series of activities geared towards reducing vulnerability of farming communities related to climate induced hazards as droughts and floods.

Mr. Nop Polin and Ms. Amanda King of DCA accompanied the evaluator to Takeo province and explained their work on the Drought Info Hub at provincial level and their capacity building effort to train provincial and district staff and rural households united in agricultural cooperatives in awareness and techniques to be better placed to deal with the effects of the slow-onset of drought.

Mr. Lukáš Laube, Head of Programme and Mr. Jeppe Mariager-Lam, Technology for Development Manager of People in Need gave feedback on their collaboration with the project in rolling-out their flood warning system (EWS1294) in several of the pilot provinces. Finally, Dr. Chhin Nyda, lecturer at the Royal University (RUPP), shared his views on drought studies and spatial assessments and possible collaboration opportunities with the project and in particular MAFF. All stakeholders are thanked for sharing their views and opinions on the progress of the projects and their recommendations for enhancing lasting impact of the project. Phnom Penh-Heteren, May 2019

Table of Contents

Acknowledgements	3
Table of Contents	4
Executive Summary	6
1. Introduction.....	14
2. Project Description and Context	18
3. Findings.....	22
3.1 Project Strategy	22
3.2 Progress Towards Results.....	24
3.3 Project Implementation and Adaptive Management	35
3.4 Sustainability	40
4. Conclusions and Recommendations	43
4.1 Conclusions.....	43
4.2 Recommendations.....	44
Annexes	47
Annex 2 Documents for review during the MTR.....	50
Annex 3 Midterm Review Evaluation Matrix / Framework.....	52
Annex 4 Long List of Questions divided over the 4 evaluation categories.....	55
Annex 5 GEF tracking Tool AMAT	61
Annex 6 Terms of Reference	62
ANNEX 7 UNEG Code of Conduct for Evaluators/Midterm Review Consultants.....	76
Table 1. Project Overview Table	6
Table 2 MTR Ratings & Achievement Summary Table for EWS project	10
Table 3 Overview of recommendations	13
Table 4. Progress Towards Results Matrix (Achievement of outcomes against EoP Targets)	26
Table 5 Planned annual budgets and actual expenditure for the period 2015-2018	36
Table 6 Co-Financing Table for the UNDP Supported GEF Financed EWS project	37
Table 7 Overview of recommendations	45

Acronyms and Abbreviations

ADB	Asian Development Bank
AWS	Automatic Weather Station
AHS	Automatic Hydrological Stations
DCA	DanChurch Aid (NGO)
DCCDM	District Committee for Disaster Management
DHRW	Department of Hydrology and River Works
DIM	Direct Implementation Modality
DOM	Department of Meteorology
EWS	Early Warning System
FAO	Food & Agriculture Organization
GIS	Geographic Information System
IPCC	Intergovernmental Panel on Climate Change
ITC	Institute of Technology of Cambodia
IWRM	Integrated Water Resources Management
JICA	Japanese International Cooperation Agency
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
MAFF	Ministry of Agriculture, Forestry and Fisheries
MEF	Ministry of Economy and Finance
MOE	Ministry of Environment
MoU	Memorandum of Understanding
MOWA	Ministry of Women's Affairs
MOWRAM	Ministry of Water Resources and Meteorology
MRC	Mekong River Commission
NAPA	National Adaptation Programme of Action
NCCDM	National Committee for Disaster Management
NIM	National Implementation Modality
NGO	Non-governmental Organization
O&M	Operations and Maintenance
PCDM	Provincial Committee for Disaster Management
PDOWRAM	Provincial Department of Water Resources and Meteorology
PIN	People in Need (NGO)
RCT	Randomized Control Trial
RFMMC	Regional Flood Management and Mitigation Centre
RGC	Royal Government of Cambodia
RIMES	Regional Integrated Multi-Hazard Early Warning System
SOPs	Standard Operating Procedures
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VTDM	Village Team for Disaster Management
WB	World Bank
WMO	World Meteorological Organization

Executive Summary

Table 1 Project Overview Table

Project Title	Strengthening Climate Information and Early-Warning System in Cambodia to Support Climate Resilient development and Adaptation to Climate Change		
UNDP Project ID (PIMS #):	5235	PIF Approval Date:	Submitted February 19th 2013
GEF Project ID (PMIS #):	5318	CEO Endorsement Date:	October 2014
ATLAS Business Unit, Award # Proj. ID:	Award ID: 00082718 Output ID: 00091519	Project Document (ProDoc) Signature Date (date project began):	28 November 2014
Country(ies):	Cambodia	Date project manager hired:	November 2017
Region:	South-East Asia	Inception Workshop date:	28 May 2015
Focal Area:	Integrated Ecosystem Management	Midterm Review completion date:	May 2019
GEF Focal Area Strategic Objective:		Planned planed closing date:	28 November 2018
Trust Fund [indicate GEF TF, LDCF, SCCF, NPIF]:	LDCF	If revised, proposed op. closing date:	31 May 2020
Executing Agency/ Implementing Partner:	EA/IP: MOWRAM from November 2014-July 2017, UNDP from August 2017 to present		
Other execution partners:	DOM, DHRW, MAFF, NCDM, PDOWRAMs		
Project Financing	<i>at CEO endorsement (US\$)</i>	<i>at Midterm Review (US\$)*</i>	
[1] GEF financing:	4,910,285	2,760,759.04 (2015-2018)	
[2] UNDP contribution:	233,823	90,449.32	
[3] Government:	20,812,540	128,920.00	
[4] Other partners:	MRC: 390,000 JICA: 682,000	N/A	
[5] Total co-financing [2 + 3+ 4]:	22,118,363	219,369.32	
PROJECT TOTAL COSTS [1 + 5]	27,028,648	2,980,128.36	

In Chapter 1 of this Mid-Term Review (MTR) report purpose and objectives of the MTR are presented together with the evaluation methodology followed. UNDP Cambodia is implementing the GEF-LDCF¹ funded full sized project titled “Strengthening Climate Information and Early Warning System in Cambodia to Support Climate Resilient Development and Adaptation to Climate Change” (PIMS# 5235). The project started on the 28 November 2014 and was officially launched in May 2015 and is in its fourth year of implementation. **The primary objective** of the MTR is to assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document and assess early signs of project success or failure with the goal of identifying, if deemed necessary, changes to be made in order to set the project on-track to achieve its intended results. The MTR also reviews the project’s strategy and its risks to sustainability.

Scope

The temporal scope of the MTR is to review the results achieved by the Project from the time of its inception in November 2014 to the end of March 2019, the start of the MTR.

Methodology

The MTR is spread over three distinct phases. The three evaluation phases, spread out over a total of 22 working days are:

1. **A desk review phase:** in this initial stage of four days, the evaluator reviewed the documentation related to the Project. At the end of the desk review phase an inception report was submitted to ensure a common understanding of the evaluation approach during the mission.

¹ GEF=Global Environment Facility, LDCF= Least Developed Country Fund

2. **A field mission phase**, of eight days (April 1-8), to meet the Project team members in Phnom Penh, meet key stakeholders at national level, and to visit actual field implementation through a field trip to Takeo Province. In total 17 meetings with 21 key informants were held and at the end of the field mission period (April 8th) the evaluator presented preliminary findings to the Project team and discussed main findings and recommendations.
3. **Reporting phase**, a period of ten days, to compile the Draft and Final MTR Report.

The conceptual framework of the evaluation

The conceptual framework chosen for the evaluation is consistent with result-based management (RBM) as widely applied with the UN system, and addresses the five key evaluation criteria as proposed by OECD-DAC: relevance, efficiency, effectiveness, sustainability and impact.

The following **four categories of project progress**, as outlined in the ToR² and the template provided by the UNDP Guidance document³, are assessed for the EWS Project:

(A) Project Strategy, (B) Progress Towards Results, (C) Project Implementation and Adaptive Management, and (D) Sustainability.

The evaluation approach is reflected in the Evaluation Matrix, Annex 3, summarizing the evaluation questions, divided over the four evaluation categories and information recorded for indicators and sources of information.

In Chapter 2 the project description and strategy are presented together with the background context, the chosen project implementation arrangement and Project Board.

Background Context. Cambodia is facing mounting development challenges due to climate change. Longer dry seasons and shorter, more intense rainy seasons are resulting in increased frequency and severity of disasters, i.e. floods and droughts. The purpose of an early warning system is to monitor climate and environmental data on a real-time basis, detect adverse trends and make reliable predictions of possible impacts in the form of early warning information

The project “Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change” (henceforth “the EWS project⁴”) has been designed to help the Government overcome these gaps and challenges. Funding of approximately US\$4.9 million⁵ was approved by the Least Developed Countries Fund Council in October 2014 and the project was officially launched in May 2015.

The project **objective** is: “To strengthen climate observing infrastructure and increase national capacity to utilize climate and environmental information to respond to climate hazards and to support climate resilient development planning adaptation to climate change.” The project seeks to address the current barriers through **three complementary outcomes**:

Outcome 1. Increased institutional capacity to assimilate and forecast weather, hydrological, climate and environmental information.

Outcome 2. Climate and weather information available and utilized for national, sectoral and sub-national planning as well as for transboundary communication in the region.

Outcome 3. Strengthened institutional capacity to operate and maintain EWS and climate information infrastructure, both software and hardware, in order to monitor weather and climate change.

² See Annex 6, ToR

³ UNDP-GEF (2014), Guidance for conducting midterm reviews of UNDP-supported GEF-financed projects

⁴ The Project is in other documents also referred to as SCIANCE-WS Project

⁵ US\$ 4,910,285

Implementation Arrangements and Milestones

The initial duration of the project, as reflected in the ProDoc, was a 4 year period from 2014 to 2018. The project signing occurred on 25th and 28th of November 2014. The inception workshop was held on the 28th May 2015. Due to serious delay in implementation progress and inability to convene the PB, a redesign or refinement process was initiated in April 2017 resulting in the refinement report of August 2017, leading to the formal approval of the change of implementation modality (from NIM to DIM) in August 2018. The PB is the highest management body of the project. The first PB meeting was conducted on September 2018 and the second PB meeting followed on 26th of March 2019. The end of project and final evaluation are foreseen in end of May 2020.

Executing Agency (as of 2017) is UNDP. The implementing partner of the Project is the Ministry of Water Resources and Meteorology (MOWRAM). Responsible execution parties are: Department of Meteorology (DOM), Department of Hydrology and River Works (DHRW), National Committee for Disaster Management (NCDM, Ministry of Agriculture, Forestry and Fisheries (MAFF) and Provincial Departments of Water Resources and Meteorology (PDOWRAMSs).

In Chapter 3 the key findings of the MTR are presented. The findings are divided over the four evaluation categories as presented in the previous sections: i). Project Strategy, ii). Progress towards results, iii). Project implementation and adaptive management, and iv). Sustainability.

i) Project Strategy: Combined with the institutional and human resource capacity constraints, the project strategy intends to address the existing urgency to support the development of a fully functional and comprehensive EWS. The difficulties in the first implementation years (2015 and 2016) led to a redesign and refinement exercise, which ultimately resulted in a Project Refinement report (August, 2017). This project refinement tried to address the perceived risks of the inability of MOWRAM to establish a Project Board and the potential overlap with a new ADB supported hydro-meteorological project.

The Results framework or Logframe of the project is relatively straightforward, with a project objective with 2 indicators and 3 distinct outcomes with in total 8 indicators. It is to be noted that the results framework has no mid-term targets, just end-of-project (EoP) targets. Although the results framework is relatively simple, it is assessed that some outcomes seem ambitious.

Gender. It is noted that in the ProDoc relatively little attention is given to gender specific approaches to ensure a gender balanced implementation of the project. As the project is in its later phase of implementation and is progressing to implement more interventions at sub-national level, in districts and communities, attention to inclusiveness and gender balance in capacity building efforts is required.

ii) Progress Towards Results

In order to assess to what extent the project has been able to make progress towards its objective and each outcome, a summary is presented in Table 2, giving MTR ratings and achievement descriptions.

At objective level the project level is **assessed as on track** and with a **satisfactory rating**. For the **three outcomes** the project is also **assessed as on track** with a **satisfactory rating**.

In addition to the progress towards outcomes analysis the GEF Tracking Tool at the baseline can be compared and analysed with the situation right before the Midterm Review. The GEF Tracking Tool for Climate Change Adaptation, the Adaptation Monitoring and Assessment Tool or AMAT, is filled out as part of and annex to the ProDoc.

iii) Project Implementation and Adaptive Management

Based on the project documentation review and stakeholder consultation, it is evident that the project management team has been able to revive the project from its "stalled state" to present level of

activity. There is substantial learning in how to prevent such terrible slow start-up phases, which are unfortunately not unique to this project. Intensive consultations with the key stakeholders and with UNDP representatives from the regional hub, formed the basis for a redesign process, in which a refinement of the project was initiated in order to revive the stalled project. Key elements of the refinement process were the consensus to change the implementation arrangement from NIM to DIM and to ensure in its “business model” that overlap with emerging projects would be avoided and that engagement with the private sector and NGO’s would be actively pursued. No major issues were reported with regards to the financial management of the EWS project. The AWP/Bs for 2015 and 2016 were only about 10% of the budgets foreseen in the ProDoc, and reflect the limited progress in implementation. Expenditure increased in 2017 with a financial delivery of 59.7%, with a steady increase to 95.1% in 2018, an impressive achievement.

As the project now moves into its later phase of implementation, there is a stronger emphasis needed to record, document and share the lessons and experiences of the project, in collaboration with its key stakeholders. The project documentation and the stakeholder consultations confirm a functional and practical stakeholder engagement. Recently, a number of partnership have been established or are being discussed, as sign that the project is able to connect with and engage with key partners, both governmental as non-governmental, including discussions with private enterprises. The external communication of the project is since late 2017 based on a strong use of social media, creating direct media exposure and giving a “face” to the project.

iv) Sustainability

Assessment of sustainability at mid-term has to consider the risks that are likely to affect the continuation of project outcomes. This sustainability assessment regards the four GEF categories of sustainability: financial, socio-economic, institutional framework and governance and environmental risks to sustainability. The risk assessment of the ProDoc and the inception report present in total 6 key risks of which 2 were assessed as “high” level risks:

- inadequate maintenance of meteorology and hydrology stations, resulting in hardware falling into disrepair, and
- new equipment is not compatible or consistent with existing systems.

The project has focused attention on addressing these major risks through purchasing hydro- and meteorological equipment that is compatible with international standards and the existing national system and worked closely with MOWRAM to develop an adequate operational and maintenance plan. Critical elements here are sufficient budget to operate equipment and stations (including staff salaries/costs) and to maintain and replace hardware where and when needed. A needs assessment together with close collaborate with the equipment suppliers on TA, warranties and spare part, intends to ensure sustainability post-project.

Table 2. MTR Ratings & Achievement Summary Table for EWS project

Measure	MTR Rating	Achievement Description
---------	------------	-------------------------

Project Strategy	N/A ⁶	The project is assessed to have clear relevance , considering the description of the baseline situation in Cambodia as reflected in the ProDoc and reiterated in the refinement document, highlighting the lack of a comprehensive and functional meteorological and hydrological monitoring network and related early warning system infrastructure. Although the overall objective of the project is straightforward and the separate outcomes are well defined, the order or sequencing of the outcomes could have better reflected a logical chronological order. In practice, a logical sequence would start with upgrading hardware and institutional capacity (Outcome 3), followed by additional capacity training to analyse and make use of generated climate and hydrological information for forecasting (Outcome 1) in order to provide effective and timely information for a functional EWS at national and sub-national level (Outcome 2).
Progress Towards Results	Objective: Satisfactory ⁷	A sectoral plan for MOWRAM is being developed (indicator 1), including guidelines for O&M of AWS and AHS and the NAP for Agriculture is being updated for the 2019-2013 period. In addition, development of an updated NAP for DRR is supported and a SoP of EWS is defined in the DM Law. Related to indicator 2 are the development of a SMS flood warning system in 2 pilot provinces and to be replicated in 3 more provinces. This EWS1294 is developed by People in Need (PIN) and is foreseen to have national coverage within the coming 2 years. Additionally seasonal forecasting is under development and the Monsoon Forum, a national climate outlook forum is being revived and developed. Considering the progress so far and planned additional activities, the progress is assessed as satisfactory.
	Outcome 1 Satisfactory	Indicator 1: The 6 targeted forecasters from DoM and DoH are being trained (April-May 2019) and additional capacity training is being planned. Next step is needed for functional use of data base information generated by the monitoring network and additional information sources for actual forecasting. Indicator 2: In total 5 specific courses have been developed (target: 3): 2 hydrology courses o hydrological analysis and forecasting and an advanced course in hydrology. There are 3 meteorology courses developed with related curriculum: specialized seasonal forecast training, advanced meteorology and generic meteorology. This is a follow-up of the training specification recommendation of the refinement report and more than the set target of 3 courses. The GIS data course as specified in the EoP target will not be given, but spatial specific information is integrated into the other trainings and not given as a separate subject. Indicator 3: The support to MAFF is focused by a series of products: a drought manual and related ToT in development, DRAT training to provincial staff, DRAT training to farming communities with a focus on the 5 pilot provinces in the S-SW, also supported by the DCA Drought Info-Hub activities in the pilot provinces. Outcome indicators have been or overachieved for indicators 1 and 2 and activities to achieve indicator 3 are planned for, leading to a “satisfactory” assessment.
	Outcome 2 Satisfactory	This outcome is assessed as rather ambitious considering it partly transboundary nature and the related complexities of developing a functional data sharing set-up. Indicator 1: There have been issues on data sharing consent with MRC countries, hampering the initial expected information exchange. A

⁶ Ratings are given to assess progress per outcome. The Project Strategy is assessed as relevant and well defined.

⁷ The 6 point Progress Towards Results Rating Scale is used: HS, S, MS, MU, U, HU. Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), or Highly Unsatisfactory (HU).

		<p>collaboration agreement has been initiated with SERVIR-Mekong, together with development of the SoP of MOWRAM and the linkage to NCDM.</p> <p>Indicator 2: As the positive % change in agriculture productivity indicator is recommended to be revised as no baseline has been set and actual productivity change, to be attributed to the project, are not seen as an appropriate indicator. This outcome is considered mostly complex and challenging, but a series of activities are being developed with tangible impact foreseen, leading to assess the progress for this outcome as satisfactory.</p>
	Outcome 3 Satisfactory	<p>Indicator 1: 24 AWS and 29AHS have been purchased, installed and are functional, together with 4 additional groundwater stations (in total 57 compared to the EoP target of 55), the support to the PIN network in the pilot provinces (EWS1294) and the intention to install an additional 100 automatic rain gauges.</p> <p>Indicator 2: More than 15 staff members of both DoM and DoH have been trained, compared to the target of 5 of each department. O+M training manuals have been developed, a training curriculum and a maintenance guide for O+M. An established dialogue with the suppliers serves for quick QA and problem solving.</p> <p>Indicator 3: An ongoing calculation of expected needs to assess realistic O+M budget per station per year. Based on the official hand-over document from UNDP to MOWRAM internal O+M budget are being requested and planned for, in consultation with MEF. Additional resource mobilization is being explored for additional O+M budget from private sector parties (insurance companies, telcom providers).</p> <p>Set indicators are mostly overachieved and with the planned activities for indicator 3 being developed, the progress assessment is satisfactory, certainly taking into account the very efficient catch-up the project team was able to carry out in the last 18 months.</p>
Project Implementation & Adaptive Management	Satisfactory	<p>The project management team has to be commended for the way they have been able to turn around the project, adapt to challenging conditions and find an implementation modality, in close consultation with all key stakeholders, to make tangible progress. Whereas in 2015 and 2016 less than the 10% of initial foreseen annual work plans and budgets could be executed, as indication of the difficulties faced, in 2017 this increased to about 60% and in 2018 an impressive 95% of budget delivery could be achieved, as illustration of a real turn around.</p>
Sustainability	Moderately Likely	<p>It is concluded that the two key risk identified in the initial risk assessment have been adequately addressed. The equipment purchased is compatible and consistent with existent systems and international standards. The O&M plan is being developed in close consultation with the stakeholders and related work on sustainability includes a longer-term warranty of the supplier, including extended technical assistance and an extra investment in spare parts. The risk level therefore is lowered, but there are still moderate risks, especially with regards to O&M and overall human resource capacity. Based on the assessment of the categories above the overall sustainability rating is moderately likely.</p>

In Chapter 4 a series of conclusions are presented, based on the key findings discussed in Chapter 3. After the conclusions follows a series of recommendations directed to the project management and relevant stakeholders in order to enhance implementation progress and optimize sustained impact of the project outcomes post-project.

Conclusions

1. The EW project is assessed as very relevant. Although the overall objective of the project and the separate outcomes are well defined, in its design the order or sequencing of the outcomes could have been more explicit. The Theory of Change of the refinement report presented an improved sequencing of interventions. The results framework of the project is straightforward, with a limited number of indicators and targets.
2. The initial start-up of the project has been very slow and problematic. The inability of the Royal Government of Cambodia to convene the Project Board together with confusion over management arrangements resulted in an almost frozen condition of the project in 2015 and 2016. The redesign and refinement approach and proposed changes in arrangements (a.o. NIM-DIM transition, a project manager with required technical expertise and experience) have enabled the project management team to revive the project, with a sharp increase in delivery in 2017 and especially 2018.
3. The present project team is considered understaffed, considering the ambitious work load going into the final project phase (until May 2020), caused by the need to compensate for the considerable implementation delay in the initial years, and the related shift of focus on proper documentation, extracting lessons and emerging good practices and knowledge management.
4. The feedback of the stakeholders is reflecting their general appreciation for the support provided by project to enhance their capacity in monitoring (hardware), analysis (software), capacity building (HR-institutional) and generation of tailored climate and EW information, linked to the low – and fast on-set of climate-induced natural hazards (droughts and floods).
5. The project is recently expanding its initial reach through a series of additional partnerships with national and international organisations (PIN (EWS1294), DCA (drought Info Hubs), SERVIR and RIMES etc.), which are considered strategic, time-efficient considering the limited remaining implementation period and partly aimed at replicating approaches that have been piloted and have proven value for enhancing EWS development.
6. As a result, combined with additional activities identified per component, the output of the project has markedly increased, which will support attaining the original set outcomes with more confidence (e.g. establishment of rating curves for the AHSs, MAFF NAP support etc.).
7. The progress of the project is assessed as satisfactory and on track to achieve the set outcomes. Key remaining areas of focus for the project in the remaining implementation period are related to activities aimed at drought assessment and related capacity building, application of hydro-meteo data in actual EWS (forecasting, info flow reflected in SOPs, training-testing) and enhancement of sustainability (HR, financial etc.).
8. The Project Implementation & Adaptive Management rating is assessed as satisfactory.
9. Based on the assessment of the categories above the overall sustainability rating is moderately likely. There are still moderate risks, especially with regards to O+M and overall human resource capacity.
10. Absence of a dedicated academic curriculum on hydrology and meteorology in Cambodia remains a longer-term constraint to safeguard scientific support and HR capacity, and will require a medium- to longer-term approach in capacity building.
11. An effective and cost-efficient procurement process has allowed the project to purchase hydro-meteorological equipment at competitive pricing, as compared to other comparable projects in the country, without having to compromise quality. This is reflected in a considerable cost savings up to \$600,000, allowing the project to invest in, e.g., additional monitoring hardware (e.g. an estimated 100 automatic rain gauges), extended warranty of stations, additional technical support by the suppliers and extra spare parts and additional training activities for those outcome areas where specific focus is needed.
12. It is noted that in the ProDoc relatively little attention is given to gender specific approaches to ensure a gender balanced implementation of the project. As the project is in its later phase of implementation and is progressing to implement more interventions at sub-national level, in districts and communities, attention to inclusiveness and gender balance in capacity building

efforts is required. Suggested AMAT indicators could support monitoring a gender balanced approach.

Table 3 Overview of recommendations⁸

Rec. #	Recommendation	By when	By whom
1	Slightly revise and adjust some of the project logframe indicators and set targets	June 2019	PMT
2	Update and make use of the GEF Tracking Tool	June 2019	PMT, RTA
3	Add staff to the project management team	May 2019	PMT, UNDP, PB
4	Compile an exit strategy/phasing out plan,	August 2019	PMT, MOWRAM, MAFF, NCDM
5	Be pragmatic with private sector engagement	August-December 2019	PMT, PIN, NCDM, MOWRAM
6	Plan for a Review Workshop	Q4 2019	PMT, MOWRAM, MAFF, PIN, DCA
7	Explore opportunities to infuse experiences/knowledge on drought into MAFF	Q2 2019-Q1 2020	PMT, MAFF, RUPP, DCA, DoM, NCDM

⁸ For the full narrative on recommendation, please refer to Chapter 4, section 4.2

1. Introduction

Purpose and objectives

UNDP Cambodia is implementing the GEF-LDCF⁹ funded full sized project titled “Strengthening Climate Information and Early Warning System in Cambodia to Support Climate Resilient Development and Adaptation to Climate Change” (PIMS# 5235). The project started on the 28 November 2014 and was officially launched in May 2015 and is in its fourth year of implementation.

In line with UNDP-GEF guidance, a Mid-Term Review (MTR) is required for a full sized project UNDP. A Terms of Reference¹⁰ (ToR) for this assignment forms the basis of the MTR process, as presented in this report and with full guidance as reflected in the UNDP document for MTRs of UNDP-Supported GEF-Financed Projects¹¹.

The primary objective of the MTR is to assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document and assess early signs of project success or failure with the goal of identifying, if deemed necessary, changes to be made in order to set the project on-track to achieve its intended results. The MTR also reviews the project’s strategy and its risks to sustainability.

The MTR covers and focuses and in its assessment intends to:

- i. critically **examine** ‘the Project’s objectives and arrangements for its implementation;
- ii. **assess and report** an account of the **progress** achieved to date towards the production of outputs, emergent achievements of stated objectives and its contribution toward achieving the overall objectives of its key partners;
- iii. **identify and analyse** major technical, management and operational **issues and impediments** encountered in the Project’s implementation, if any;
- iv. **assess** the **monitoring and evaluation system** in place;
- v. **formulate** a set of specific **recommendations** for actions necessary to ensure resolution of the issues and impediments identified so that the Project has a greater prospect of achieving its objectives; and
- vi. **present the recommendations** to UNDP and its key partners.

The MTR has thus a **dual emphasis** on **stocktaking of progress** (and challenges and constraints) so far and **identifying and formulating recommendations to adjust**, where deemed necessary, project strategies or interventions to optimize lasting positive impact. The independent review follows a participatory and collaborative approach, opening opportunities for frank discussion and change in project, as needed.

Scope

The temporal scope of the MTR is to review the results achieved by the Project from the time of its inception in November 2014 to the end of March 2019, the start of the MTR. The review encompasses **the activities and geographical scope** of the Project in Cambodia as a whole, including emerging regional cross-border collaboration.

The **primary audience** for the MTR is the UNDP Cambodia office, the Ministry of Water Resources and Meteorology, the Ministry of Agriculture, Forestry and Fisheries (MAFF), the National Committee for Disaster Management (NCDM), the UNDP RTA, the GEF OFP, the Project Management Unit, the Project

⁹ GEF=Global Environment Facility, LDCF= Least Developed Country Fund

¹⁰ The ToR for an International Consultant to Conduct Midterm Review is Annexed as Annex 6

¹¹ UNDP (2014). Guidance for Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects, 69 pages. (http://web.undp.org/evaluation/documents/guidance/GEF/mid-term/Guidance_Midterm%20Review%20_EN_2014.pdf)

Board and other key stakeholders from NGOs, Academia, governmental institutions and international organisations.

Guidance and adherence

The evaluation complies with evaluation norms and standards and follow ethical safeguards, with overall guidance and adherence to Norms and Standards as defined by UNEG (2016). The MTR is also conducted in accordance with principles outlined in the GEF and UNDP M&E policies. A tentative Table of Content, as outlined in the Guidance for Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects (UNDP, 2014, Annex B), is followed and adapted for this Draft and Final MTR Report.

Independent nature and learning focus

The evaluator, independent from UNDP, has an adequate technical and professional background to allow him to judge the project objectively and unbiased. The evaluator acknowledges the demonstration nature of the Project and focuses on identifying and capturing emerging good/best practices and lessons learned to be used potentially for replication and scaling-up opportunities. The MTR is intended to serve and support the learning process of the Project, with the understanding that reporting constraints, challenges and failures is often as important as presenting emerging best practices.

Focus of the MTR is put on learning lessons and trying to obtain a deeper understanding why the Project performance developed as is observed, identifying, where possible key processes and drivers that have affected the Project emerging outcomes. Documenting key lessons and emerging good practices as well as describing critical constraints and barriers provide a basis for such an analytical exercise. Beyond stocktaking of results and particular processes (what worked, what did not and why?) an important element of the MTR is the sustainability perspective Post-Project, especially as there is just another year of implementation ahead. How can future implementation be further strengthened, what are still gaps in capacity, coordination and governance? What are interventions or areas to replicate or scale up / roll out? Findings of this review are incorporated as recommendations for enhanced implementation towards the end of the Project. Overall, the evaluation focuses on benefits – from what has been done to what has been achieved.

Methodology

The MTR makes use of several data collection methods, to capture primary and secondary data, spread over three distinct phases. Primary data is collected by interviews (face-to-face, telephone and computer-assisted) direct on-site observation, focus group discussions and key informant interviews by the evaluator. Secondary data is collected by review of existing project documentation and relevant literature and policy documents. The three evaluation phases, spread out over a total of 22 working days are:

- 1. A desk review phase:** in this initial stage of four days, the evaluator reviewed the documentation related to the Project, including the background literature of relevant policy documents, the Project document, the inception report, project monitoring and evaluation reports (quarterly and financial reports), communication materials and various additional reports made available by the Project management team. At the end of the desk review phase an inception report was submitted to ensure a common understanding of the evaluation approach during the mission, detailing the MTR evaluator's understanding of what is being reviewed and why, showing how each MTR question will be answered (which methodologies will be used) and a proposed schedule of tasks. The Inception Report was shared with the UNDP CO and the Project staff before it was finalized.
- 2. A field mission phase,** of eight days (April 1-8), to meet the Project team members in Phnom Penh, meet key stakeholders at national level, and to visit actual field implementation through a field

trip to Takeo Province. The site selection of the areas to visit was done in close consultation with the PMU, considering representative communities, landscape setting, activity range implemented and accessibility. During the site visit a focus group discussions was held with a selection of community members and other local stakeholders ensuring participation by gender. For the meetings with the Project team members and key stakeholders, a combination of focus group discussions and interviews was used. In total 17 meetings with 21 key informants were held (representatives of UNDP, MOWRAM, DOM, DOH, MAFF, RUPP, NCDM, MRC, PIN, DCA, AC), 1 community meeting in Takeo Province (with 14 persons) and 1 field trip to an AWS (Makara Dam AWS). See Annex 1 for a detailed overview of persons consulted and the review itinerary.

At the end of the field mission period (April 8th) the evaluator presented preliminary findings to the Project team and discussed main findings and recommendations to receive further feedback and guidance on particular areas of attention in the further development of the draft MTR report.

3. Reporting phase, a period of ten days, to compile the Draft MTR Report, based on the data collected during the desk phase and the field mission and guided by the feedback and comments of UNDP members, key stakeholders and informants. The Draft MTR Report will be shared with the relevant stakeholders of the MTR and the Final MTR Report will be compiled taking into account the comments and feedback received. An audit trail will be annexed to the Final Report to reflect the incorporation of suggested changes or edits and additions.

The conceptual framework of the evaluation

The conceptual framework chosen for the evaluation is consistent with result-based management (RBM) as widely applied with the UN system, and addresses the five key evaluation criteria as proposed by OECD-DAC: relevance, efficiency, effectiveness, sustainability and impact. The evaluation assesses the logical framework of the Project, with defined development and immediate objectives and related outputs, indicators and targets of the Project's Monitoring & Evaluation mechanism, as a source of information to weigh the achievements made. Additional attention is given to the cross-cutting criteria/themes of gender equality promotion, monitoring and evaluation, and knowledge sharing and learning environment. The evaluation follows a participatory and consultative approach with the intention to have meetings with all key national and local stakeholders.

The following **four categories of project progress**, as outlined in the ToR and the template provided by the UNDP Guidance document, are assessed for the EWS Project:

- (A) Project Strategy**, with focus on the project design, its relevance and the Results Framework/Logframe,
- (B) Progress Towards Results**, with attention for a progress towards Outcomes analysis, assessment of the GEF tracking Tool and identification of potential barriers/impediments,
- (C) Project Implementation and Adaptive Management**, divided over management arrangements, work planning, finance and co-finance, project-level monitoring and evaluation systems, stakeholder engagement, reporting and communications, and finally,
- (D) Sustainability**, with assessment of financial risks to sustainability, socio-economic risks to stability, institutional framework and governance risks to sustainability and lastly, environmental risk to sustainability

Questions

The ToR (Annex 6) presents for each evaluation category a first series of questions as a starting point and to these questions have been added a number of additional questions, grouped per criteria in the following section. These questions guided the evaluation process and were used in the planned targeted interviews with key informants and focus group discussions. All together they form a long list of questions from which the evaluator compiled questionnaire formats/short lists for interviews and focus group discussions.

Use was made of these questions and, in dependence of the target audience, questions were selected for a focus-group discussions and key informant interviews. The key questions were intended for the evaluator to have a systematic set of queries, clustered according to evaluation criteria, to guide the data collection. During interviews and focus group discussions other questions arose and were recorded by the evaluator accordingly.

The evaluation approach is reflected in the Evaluation Matrix, Annex 3, summarizing the evaluation questions, divided over the four evaluation categories and information recorded for indicators and sources of information.

Constraints

The evaluator acknowledges the constraint that he is new to Cambodia and its context for the project. The short time period available for consultations with the project team and the main project stakeholders has been used efficiently, but provided limited opportunity to see implementation in the pilot provinces and to consult provincial, district and community representatives. Although most stakeholders interviewed are proficient in English, language proved sometimes to be a limiting factor in more detailed discussions.

Structure of the MTR Report

After this initial introduction, attention will be given to a description of the EWS project and the problems it intends to address. The development context is presented in **Chapter 2** and the chosen strategy of the project and its implementation arrangements, together with a short introduction of the main stakeholders. In **Chapter 3**, the focus will be laid on the progress of the project, with an assessment of the overall performance since its inception, making use of four distinct evaluation categories, namely i). project strategy (design, relevance) and results framework; ii) Progress Towards Results; iii). Project Implementation and Adaptive Management, and iv). Sustainability. Conclusions are presented in **Chapter 4** and the report ends with a series of recommendations, complemented with a series of Annexes.

2. Project Description and Context

Development context

Cambodia is facing mounting development challenges due to climate change. Damage related to the October 2013 flooding alone, caused by heavy rain and the seasonal swell of the Mekong River, is estimated at \$356 million, having affected 20 out of 25 provinces and 1.7 million people; 297,600 hectares of rice paddies were inundated and more than 28,100 hectares of rice were immediately destroyed¹². Climate change is resulting in longer dry seasons and shorter, more intense rainy seasons. This impacts both the frequency and severity of natural hazards such as floods and droughts, as well as agricultural production which is dependent on seasonal rainfall. Recovery from such events puts strain on the least developed countries (LDC's) limited resources and forces shifts in development priorities - hindering Cambodia's ability to progress and to achieve its development goals.

The Royal Government of Cambodia's (RGC) preferred situation is to implement an effective early warning system (EWS). The purpose of an EWS is to monitor climate and environmental data on a real-time basis, detect adverse trends and make reliable predictions of possible impacts in the form of early warning information. An early warning therefore refers not only to advisories in emergency situations, but also to information related to the changing climatic trends revealed after tracking and analysing climate and weather data over time. An effective EWS would thus enable timely response to natural hazards and extreme weather events, as well as informed planning in light of changing climate trends.

Problems the project intends to address

The RGC faces several challenges in realizing its preferred situation. With few working climate and weather observation stations, there is insufficient data to refine predictions and forecasts based on sector, geographic areas, or vulnerability. Further, limited human resources and high staff turnover make it difficult for institutions such as the Ministry of Water Resources and Meteorology (MOWRAM) to develop capacity and maintain qualified forecasters and modelers. Appropriate dissemination of information is also a challenge. MOWRAM is responsible for providing climate and weather information to the planning, line ministries to inform climate resilient planning, and for the communication of natural hazards and extreme weather events for disaster risk reduction. However, the information is often not presented in manner that can be easily understood or applied and standard operating procedures (SOPs) defining roles, responsibilities, and accountability are lacking. MOWRAM is also responsible for maintaining the EWS infrastructure such as automated weather stations and water gauge stations. Urgent needs to improve the national EWS infrastructure in light of imminent climate risks has prompted some donors to assist the Government in rehabilitating old or installing new weather stations. However, there is a significant risk of unsustainability of the newly built infrastructure due to limited financial resources to cover all the O&M requirements. The National Committee for Disaster Management (NCDM) is responsible for disaster risk management and communicating disaster related information, yet there is still room for improvement so that NCDM can fulfil all its mandate.

Project Description and Strategy

The project "Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change" (henceforth "the EWS project"¹³) has been designed to help the Government overcome these gaps and challenges. Funding of

¹² <http://www.undp.org/content/cambodia/en/home/presscenter/articles/2013/10/18/cambodias-first-disaster-database-system-unveiled/>

¹³ The Project is in other documents also referred to as SCIANCE-WS Project

approximately US\$4.9 million¹⁴ was approved by the Least Developed Countries Fund Council in October 2014 and the project was officially launched in May 2015.

The project **objective** is: “To strengthen climate observing infrastructure and increase national capacity to utilize climate and environmental information to respond to climate hazards and to support climate resilient development planning adaptation to climate change.” The project seeks to address the current barriers through **three complementary outcomes**:

Outcome 1. Increased institutional capacity to assimilate and forecast weather, hydrological, climate and environmental information.

Outcome 2. Climate and weather information available and utilized for national, sectoral and sub-national planning as well as for transboundary communication in the region.

Outcome 3. Strengthened institutional capacity to operate and maintain EWS and climate information infrastructure, both software and hardware, in order to monitor weather and climate change.

To meet the above three outcomes, the approach (strategy) adopted by the project is to:

- 1) Invest in early warning infrastructure – hydro and meteorology stations nationwide;
- 2) Mobilize technical expertise to enhance capacity of national entities (namely MOWRAM, NCDM, and MAFF) in making use of the information; and,
- 3) Ensure the smooth flow of information sharing both at national level and between national and provincial level.

Project Implementation Arrangements

The initial project document, design and implementation structure took up the UNDP’s National Implementation Modality (NIM), which was active until the refinement process was completed. The minutes of meeting between UNDP and MOWRAM of 14 July 2016 decided the change in project management arrangement reflecting modality from NIM to a more UNDP’s Direct Implementation Modality (DIM). The reason indicated for this shift of arrangement was the delay in establishment of the Project Board (PB) at that time.

The PB is the highest management body of the project. The project board oversees the performance of the project in delivering its expected outputs and to ensure that the project is moving in the right strategic direction to achieve its ultimate objective and impact as stated in the Project Document. In practice, while the daily implementation authority is delegated by the board to the Project Manager and the assurance function is delegated to the Programme Analyst, it is necessary to have frequent board meetings at least twice a year to get strategic guidance and advice from the board. It is necessary that the proposed annual work plan and budget need to be approved by the board. The board decision is made normally by consensus with all the board members. To ensure that the board is fully informed in their decision making, it is necessary that the project team presents to the board the project progress, proposed work plan and the approach to implement the project, with highlight of the specific risk and issue if any during each of the project board meeting. The first PB meeting was conducted on 26th September 2018 and the second PB meeting followed on 26th of March 2019.

Project Timing and Milestones

The initial duration of the project, as reflected in the ProDoc, was a 4 year period from 2014 to 2018. The project signing occurred on 25th and 28th of November 2014. The inception workshop was held on the 28th May 2015. Due to serious delay in progress progress and inability to convene the PB, a redesign or refinement process was initiated in April 2017 resulting in the refinement report of August 2017. The Project Implementation Strategy was revised through this redesign and refinement process

¹⁴ US\$ 4,910,285

without material change to the original Project Results Resources Framework of the EWS Project as defined in the Project Document. In the refinement process it was decided to focus installation of the hydro-meteorological monitoring network, together with related interventions in 5 pilot provinces: Koh Kong, Kampot, Takeo and Kampong Speu. The formal approval of the change of implementation modality (from NIM to DIM) in August 2018 and an extension of the project implementation period was decided until May 2020. The first PB meeting was conducted on September 2018 and the second PB meeting followed on 26th of March 2019. The end of project and final evaluation are foreseen in end of May 2020.

With close collaboration with national stakeholders, the project has been in its implementation stage and, after the a very difficult start-up phase with very little implementation progress in 2015 and 2016, the project has made steady progress in line with the agreed project work plan since late 2017. Executing Agency (as of 2017) is UNDP. The implementing partner of the Project is the Ministry of Water Resources and Meteorology (MOWRAM). Responsible execution parties are: Department of Meteorology (DOM), Department of Hydrology and River Works (DHRW), National Committee for Disaster Management (NCDM), Ministry of Agriculture, Forestry and Fisheries (MAFF) and Provincial Departments of Water Resources and Meteorology (PDOWRAMSs).

Main stakeholders

Ministry of Water Resources and Meteorology (MOWRAM). MOWRAM serves as the Implementing Partner/Executing Partner in this project. It will also provide strategic steering for the project, oversee the accomplishment of project objectives and tasks, lead co-funding requirements, facilitate the process of bringing other stakeholders on board, and will be responsible for the timely and accurate provision of hydro-meteorological information generated by its departments. As the ministry mandated with the collection and analysis of climate and weather information MOWRAM plays a vital role in an effective EWS. MOWRAM must have the capacity and tools necessary to confidently fulfil its mandate. These include the software and skills to generate forecasts and models, as well as the management of meteorological and hydrological monitoring stations infrastructure to collect and archive the data necessary to enhance their work with greater accuracy.

Department of Meteorology (DOM). Department of Hydrology and River Works (DHRW). DOM and DHRW are the departments under MOWRAM responsible for the collection of hydrological and meteorological data (respectively), as well as O&M of the stations. Given their responsibilities under MOWRAM, DOM and DHRW play a critical role in the procurement and O&M training outcome of the project, to ensure long term functionality of the monitoring stations (Outcome 3). The Departments are also responsible for data analysis and generating forecasts and models, and are recipients of the related training under Outcome 1. They contribute to designing the training programme to ensure the long term retention of skills. Under the direction of MOWRAM, the departments are indirectly engaged in Outcome 2 regarding dissemination.

National Committee for Disaster Management (NCDM). NCDM is responsible for disaster preparedness and response interventions, as well as effectiveness and efficiency of early warning message dissemination. Given its expertise, NCDM is engaged during the design of tailored weather and climate products especially for flood-prone areas (Outcome 1), as well as during the definition and implementation of SOPs for the dissemination of early warning messages (Outcome 2).

Ministry of Agriculture, Forestry and Fisheries (MAFF). MAFF is a key stakeholder in the LDCF project and a primary beneficiary, as agriculture is the targeted sector for tailored climate information and for strengthening ministerial capacities to integrate climate information into planning. MAFF is a Responsible Party under Outcomes 1 and 2.

Ministry of Women's Affairs (MOWA). MOWA is a stakeholder in the LDCF project and a representative for the beneficiaries on the Project Board. MOWA's input is critical given the role and special needs of women in the agriculture sector.

Ministry of Environment (MOE). MOE maintains the role of GEF operational focal point for LDCF projects in Cambodia. MOE is a main stakeholder of the LDCF project, and is one of the representatives for the beneficiaries on the Project Board. MOE is also the chair of the NCCC whose mandate is to oversee and coordinate all climate change related activities in Cambodia. Thus, the role of MOE at the project board level is key to ensuring that progress of the project is being reported and updated to the NCCC. MOE, in particular the Climate Change Department, provides advisory services during project implementation, and will be engaged in the design of tailored weather products (Outcome 1).

Mekong River Commission (MRC). MRC provides regional and transboundary perspectives for basin development planning, opportunities and risks associated with its development. MRC plays a key role to cater common countries' needs and increased communication between countries in the context of transboundary issues. Project implementation is done in close collaboration with MRC to ensure complementarity and synergy in related work.

DanChurchAid (DCA). DCA is an international NGO and a grant partner, developing a tailor-made Drought Info-Hub in Takeo Province, aimed at providing provincial, district and community representatives information over the development of drought. Through capacity building to sub-national staff and rural communities (organized in agricultural cooperatives) DCA supports awareness on drought and provided training on drought resistant agricultural techniques (DRAT).

People in Need (PIN). PIN is an international NGO and a grant partner, developing an independently developed flood early warning system (EWS1294) that provides early warning messages via SMS to subscribers. It is being rolled out to presently 15 provinces of the country and is replicated in some of the pilot provinces of the project.

For a complete overview of all key stakeholders the reader is kindly referred to the ProDoc and the overview provided in Table 4 (page 19-22).

3. Findings

In this Chapter the key findings of the MTR are presented, based upon the review of the project documentation, interaction with the project management team and the consultations with the main stakeholders during the review mission. The findings are divided over the four evaluation categories as presented in the previous sections: i). Project Strategy, ii). Progress towards results, iii). Project implementation and adaptive management, and iv). Sustainability.

3.1 Project Strategy

The project is assessed to have clear **relevance**, considering the description of the baseline situation in Cambodia as reflected in the ProDoc and reiterated in the refinement document, highlighting the lack of a comprehensive and functional meteorological and hydrological monitoring network and related early warning system infrastructure. Combined with the institutional and human resource capacity constraints, the project strategy intends to address the existing urgency to support the development of a fully functional and comprehensive EWS. The relevance is underlined by recent catastrophic flood events, combined with recurrent droughts, as expression of the relatively high vulnerability of Cambodia for these climatic induced natural hazards. From a precautionary principle and from a cost-effectiveness perspective, investments in preparation and awareness are highly relevant in attempting to mitigate much higher costs in the absence of a functional warning and evacuation mechanism to prevent material and human impact. The project is also aligned with development policies of the Royal Government of Cambodia (e.g. priorities identified in Cambodia's National Adaptation Programme of Action (NAPA)) and with the country programme of UNDP in Cambodia (UNDAF and Country Action Plan). The ProDoc incorporates lessons of a series of other relevant past, ongoing and emerging projects and puts emphasis on sustainability issues and identifies a series of related risks, as noted in other projects. In its design the Project envisaged to address through its strategy the existing barriers with three interrelated and complementary components. Although the overall objective of the project is straightforward and the separate outcomes are well defined, the order or sequencing of the outcomes could have been more explicit. In practice, a logical sequence would start with upgrading hardware and institutional capacity (Outcome 3), followed by additional capacity training to analyse and make use of generated climate and hydrological information for forecasting (Outcome 1) in order to provide effective and timely information for a functional EWS at national and sub-national level (Outcome 2).

In retrospect, the first two years of project implementation were very problematic with very little progress. Although the apparent frozen state of the project was predominantly related to internal political issues, reflected in the inability of the RGC to appoint and establish a Project Board to review and endorse annual work plans and budgets and provide overall guidance to the project management team, one could question if the problematic start-up phase is partly related to design flaws. The difficulties in the first implementation years (2015 and 2016) led to a redesign and refinement exercise, which ultimately resulted in a Project Refinement report (August 2017). This project refinement tried to address the perceived risks of the inability of MOWRAM to establish a Project Board and the potential overlap with a new ADB supported hydro-meteorological project. In the project refinement 4 aspects were considered in a redesign of the project strategy: 1) Public-private partnerships in EWS development, 2) Engagement of and collaboration with NGO's, 3) Demonstration of End-to-End multi-hazard EWS, differentiating between rapid- and slow-onset hazards, and 4) A service-based approach to EWS. Incorporating these 4 aspects, the refinement report recommended 4 specific adjustments to the project design:

1. A refined business model, with engagement of NGO's and attention for opportunities for public-private sector collaboration, reflected in an adjusted flow diagram and definition of a Theory of Change for the project;
2. An adjustment of project timing and duration, as result of the initial start-up delay an extension with 2 years (to May 2020) was recommended;

3. A change in project arrangements modality, with transition from the initial National Implementation Modality (NIM) to Direct Implementation Modality (DIM), and
4. Flexibility in implementation through dynamic engagement with partners (NGO's, private sector, multi-lateral donors).

The refinement process did not change the existing result framework and related set indicators and targets, but focused on improving the implementation modalities and arrangements. The Theory of Change of the refinement report presents an improved sequencing of the project elements, with the outputs of Outcome 3 supporting the institutional capacity building under Outcome 1, needed and feeding the rapid and slow onset forecasting and EWS development under Outcome 3.

In retrospect, and based upon stakeholder feedback, the initial design did not explicitly define the technical assistance to the project to have a solid background in hydro-meteorology and EWS/DRR. With the existing capacity limitations in Cambodia, with no academic curriculum on hydrology/meteorology and a related lack of technically trained governmental staff, the technical support and advice of an expert with appropriate academic and professional experience is considered essential. The present TA to the project certainly fits this profile, in contrast to the initial project manager.

Project Result framework / Logframe

The Results framework or Logframe of the project, ProDoc pages 55-58, is relatively straightforward, with a project objective with 2 indicators and 3 distinct outcomes with in total 8 indicators. It is to be noted that the results framework has no mid-term targets, just end-of-project (EoP) targets.¹⁵ As indicated above, the logframe has not been adjusted during the project refinement process in 2017.

Although the results framework is relatively simple, it is assessed that some outcomes seem ambitious. Especially the regional and transboundary elements as defined under Outcome 2 (e.g. communication plans to regularly share transboundary information) are often complex and time-consuming to establish. The same accounts to some degree for the ambition to establish a functional end-to-end EWS (Outcome 3), which is also complex and demanding and generally requiring an iterative process of adjustment and improvement. That said, it is also assessed as appropriate to set ambitious goals, as long as constraints are recognized and targets are set with realism.

Although no MTR targets are set, it is thought that some of the indicators and targets need slight revision/adjustment.

- Project Objective, Indicator 1, Number of national, sectoral and sub-national plans informed by accurate and up-to-date climate information (AMAT 1.1.1.3): target is now set at 2 plans for MOWRAM and MAFF, but should be increased to 3 and include NCDM with the definition of a SoP for EWS as part of the DM Law and element of the NAP for DRR.
- Outcome 2, indicator 2, % change in agriculture productivity in select communities (data disaggregated by gender): EoP target is now defined as positive % change in agriculture productivity, particularly by female headed households, resulting from behaviour changes informed by climate information. This change in agriculture productivity was intended to be quantified by Randomized Control Trials (Annex F of the ProDoc) and to be compared with an established baseline. This baseline was foreseen to be provided by the Capacity Building Programme of the Economics of Climate Change Adaptation (ECCA) with at least 300 household level surveys in 3 agro-ecological zones in Cambodia. This baseline has not been compiled and is not known to the project team. Randomized control trials comparing treated and non-treated communities to quantify change from a baseline, as developed for the project

¹⁵ It is not obligatory to have MTR targets, in particular for a project set-up with limited indicators, as this Project. MTR targets however make it easier to assess progress at Mid-Term for both project team and evaluators.

and detailed in Annex F, are therefore not possible. Also, it is unlikely that the present project activities, with still limited actual interventions at community-level will result in quantifiable changes in agricultural productivity to be linked and attributed to project interventions. The ongoing activities at community level by DCA and the planned curriculum development and trainings on Drought Resistant Agricultural Techniques (DRAT) by MAFF will contribute to household level awareness and adaptation opportunities to enhance their resilience. It is proposed to define an indicator to track this change in awareness and their capability to use specific agricultural techniques (crop selection, cropping calendar adjustments, irrigation techniques, water-saving practices etc.).

- Outcome 1, Indicator 3, Number and type of targeted institutions with increased capacity to reduce risk and response to climate variability (AMAT 2.2.1): EoP target, Products developed for various agro-ecological zones of the 7 priority provinces and provided to MAFF. As the project now focuses on 5 pilot provinces, it seems appropriate to target these 5 for this indicator (although additional provinces are targeted through additional activities). The differentiation into products for specific agro-ecological zones has not been evident to the evaluator and it is suggested to drop this target, unless specific products are still being developed in the last year of implementation.

Gender

It is noted that in the ProDoc relatively little attention is given to gender specific approaches to ensure a gender balanced implementation of the project. During consultations stakeholders did not consider this to be a serious constraint at national level. However, as the project is in its later phase of implementation and is progressing to implement more interventions at sub-national level, in districts and communities, attention to inclusiveness and gender balance in capacity building efforts is required. The recommendations to this notion during the latest PB meeting in March 2019 made by the representative of the Ministry of Women Affairs do stress this needed focus. The gender specific indicators from the AMAT Tracking Tool could offer a proactive approach to monitor a gender balanced implementation approach, especially for interventions at sub-national level (Province, district, community).

3.2 Progress Towards Results

In order to assess to what extent the project has been able to make progress towards its objective and each outcome, Table 4 has been used to summarize progress towards the end-of-project targets. In this Progress Towards Results Matrix information is presented based on the stakeholder interviews, progress reports and the results framework. To be noted is that there are no defined MTR targets in the results framework (5th column). EoP targets are therefore used to assess progress for the different outcomes and related indicators. The self-reported assessment level of the first PIR is from the 2016 PIR (4th column). Midterm Level and Assessment of the 7th column are given according to the provided color scheme, with green if targets are achieved, yellow if the project is on target to achieve the target and red if the project is not on track to achieve the set target. Achievement ratings are given in the 8th column, using a 6 point Progress Towards Results Rating Scale (HS, S, MS, MU, U, HU). The last and 9th column gives further justification for the given rating.

At objective level the project level is assessed as on track and with a satisfactory rating. A sectoral plan for MOWRAM is being developed (indicator 1), including guidelines for O&M of AWS and AHS and the NAP for Agriculture is being updated for the 2019-2023 period. In addition, development of an updated NAP for DRR is supported and a SoP of EWS is defined in the DM Law. The existing EoP target of 2 plans of indicator 1 is therefore suggested to be increased to 3 plans, including NCDM as targeted institution. Related to indicator 2 are the development of a SMS flood warning system in 2 pilot provinces and to be replicated in 3 more provinces. This EWS1294 is developed by People in Need (PIN) and is foreseen

to have national coverage within the coming 2 years. Additionally seasonal forecasting is under development and the Monsoon Forum, a national climate outlook forum is being revived and developed.

Table 4. Progress Towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Project Strategy	Indicator ¹⁶	Baseline Level ¹⁷	Level in 1 st PIR (self-reported) PIR 2016	Midterm Target ¹⁸	End-of-project Target	Midterm Level & Assessment ¹⁹	Achievement Rating ²⁰	Justification for Rating
Objective: To strengthen climate observing infrastructure and increase national capacity to utilize climate and environmental information to respond to climate hazards and to support climate resilient development planning adaptation to climate change	Indicator 1: Number of national, sectoral and sub-national plans informed by accurate and up-to-date climate information	Climate and weather information currently provided by MOWRAM, but information is not sufficiently tailored to adequately inform planning	MU	n.a.	2 (MOWRAM and MAFF)		S	MOWRAM being developed, MAFF: National Action Plan for Agriculture being updated (2019-2023?) NCDM: NAP for DRR with definition of SoP of EWS (in DM Law) 1. SMS system (EWS1294 PIN) replicated to 2 provinces (3 more planned) 2. Seasonal forecasting under development 3. National climate outlook forum development / Monsoon Forum Considering the progress so far and planned additional activities, the progress is assessed as satisfactory.
	Indicator 2: Effective and timely EW/climate information dissemination mechanism established and functioning (AMAT 2.1.2.1)	Early warning messages are disseminated, but roles, responsibilities and accountability not clear. No SOP in place.		n.a.	SOP for the dissemination of early warnings designed and successfully tested			

¹⁶ Populate with data from the Logframe and scorecards

⁶ Populate with data from the Project Document

⁷ If available

⁸ Colour code this column only

⁹ Use the 6 point Progress Towards Results Rating Scale: HS, S, MS, MU, U, HU

Project Strategy	Indicator ¹⁶	Baseline Level ¹⁷	Level in 1 st PIR (self-reported) PIR 2016	Midterm Target ¹⁸	End-of-project Target	Midterm Level & Assessment ¹⁹	Achievement Rating ²⁰	Justification for Rating
Outcome 1: Increased institutional capacity to assimilate and forecast weather, hydrological, climate and environmental information	Indicator 1: Number and type of targeted institutions/individuals with increased capacity to assimilate and forecast climate and environmental information	9 forecasters at DOM (Staff do not currently serve as formal trainers, do not provide tailored products)	MU	n.a.	6 forecasters [(3 from DOM and 3 from DHRW) trained, which can also serve as trainers, to use information from monitoring stations in modeling, data quality control and forecasting climate information (on daily to seasonal, as well as medium to long term time scales)]		S	Ongoing training of staff (April-May 2019), additional capacity training planned for. Next step needed for functional use of data base info for forecasting. Outcome indicators have been or overachieved for indicators 1 and 2 and activities to achieve indicator 3 are planned for, leading to a “satisfactory” assessment.
	Indicator 2: Number and type of training/learning tools on forecasting/modelling available for new hires or for continued learning of staff	Training is generally provided by outside parties and is short term in nature.			3 courses (1 hydrology, 1 meteorology, 1 applying risk maps and GIS data) developed and available to staff (i.e. online, at local learning institution and training programme within MOWRAM) –course content and level should depend on MOWRAM staff needs			2 hydrology courses: a. hydrologic analysis and forecasting, b. advanced course hydrology 3 meteo courses: a. specialised seasonal forecast training, b. advanced meteorology, c. generic meteorology

Project Strategy	Indicator ¹⁶	Baseline Level ¹⁷	Level in 1 st PIR (self-reported) PIR 2016	Midterm Target ¹⁸	End-of-project Target	Midterm Level & Assessment ¹⁹	Achievement Rating ²⁰	Justification for Rating
	Indicator 3 Number and type of targeted institutions with increased capacity to reduce risks of and response to climate variability	Forecast information is currently provided, but not tailored.			Products developed for various agro-ecological zones of the 7 priority provinces and provided to MAFF			MAFF drought manual and related ToT in development DRAT training to provincial staff DRAT training to
								farmers DCA Info-Hub Focus on 5 pilot provinces in S-SW
Outcome 2: Climate and weather information available for national, sectoral and sub-national planning as well as for transboundary	Indicator 1: Receipt of transboundary climate and weather related data	Information sharing not systematized.	MU	n.a.	Communications plan to regularly share transboundary information (combined with ADB-supported SOP, or separate)		S	Issues on sharing consent: MRC collaboration SERVIR-Mekong agreement MOWRAM SOP, linkage to NCDM

Project Strategy	Indicator ¹⁶	Baseline Level ¹⁷	Level in 1 st PIR (self-reported) PIR 2016	Midterm Target ¹⁸	End-of-project Target	Midterm Level & Assessment ¹⁹	Achievement Rating ²⁰	Justification for Rating
communication in the region.	Indicator 2: % change in agriculture productivity in select communities (data disaggregated by gender)	Early warnings provided are not tailored sufficiently to inform planning at agriculture household level			Positive % change in agriculture, productivity , particularly by female headed households, resulting from behavior changes informed by climate information (see Annex F- Randomized Trials)			<p>DRAT Training DCA Info-Hub development Sub-national / local-level SOP development for drought. Nexus between DOM and MAFF needs to be improved. Quantification difficult as baseline not established. Revision of indicator 2 suggested.</p> <p>This outcome is considered mostly complex and challenging, but a series of activities are being developed with tangible impact foreseen, leading to assess the progress for this outcome as satisfactory.</p>

Project Strategy	Indicator ¹⁶	Baseline Level ¹⁷	Level in 1 st PIR (self-reported) PIR 2016	Midterm Target ¹⁸	End-of-project Target	Midterm Level & Assessment ¹⁹	Achievement Rating ²⁰	Justification for Rating
Outcome 3 Strengthened institutional capacity to operate and maintain EWS and climate information infrastructure, both software and hardware, in order to monitor weather and climate change	Indicator 1 Number (national coverage) of automatic weather and climate monitoring network in Cambodia (AMAT 2.1.2.1)	12 fully functional hydrological stations 0 fully functional meteorological stations	MU	n.a	67 functional hydrological stations (the 12 currently functional, plus the 55 as part of this project) Up to 25 functional meteorological stations		S	24 AWS 29 AHS 4 GWS PIN network (34 ADB) Additional Automatic rain gauges (ca. 100).
	Indicator 2 Number and type of targeted individuals with increased capacity to provide O&M training for EWS related infrastructure (AMAT 3.2.1.1s)	Unclear as brand of equipment and related supplies that need to be procured			10 key staff from DOM (5) and DHRW (5) trained, and can serve as trainers, in the operations and maintenance of equipment			Manuals, Training curriculum, Maintenance guide for O+M Established dialogue with supplier on QA/problem solving

Project Strategy	Indicator ¹⁶	Baseline Level ¹⁷	Level in 1 st PIR (self-reported) PIR 2016	Midterm Target ¹⁸	End-of-project Target	Midterm Level & Assessment ¹⁹	Achievement Rating ²⁰	Justification for Rating
	Indicator 3 % of financing plan funded for hardware and software operations and maintenance	Currently O&M is funded by the MOWRAM budget, this is however insufficient. A financing plan is needed for the longer term sustainability of the network. This does not currently exist.			Financing plan with committed resources sufficient to operate and maintain equipment for at least 5 years (including 2 years after the completion of project)			<p>Ongoing need assessment Increased budgets from MEF Additional resource mobilization being explored with private sector (insurance/TelCom)</p> <p>Set indicators are mostly met or overachieved and with the planned activities for indicator 3 being developed, the progress assessment is satisfactory, certainly taking into account the very efficient catch-up the project team was able to carry out in the last 18 months.</p>

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved
-----------------	----------------------------------	-----------------------------------

Per outcome area progress towards results is assessed making use of the set targets and the actual achievements the project has been able to make, or has made credible steps towards achieving these targets.

Outcome 1

Indicator 1: The 6 targeted forecasters from DoM and DoH are being trained (April-May 2019) and additional capacity training is being planned. Next step is needed for functional use of data base information generated by the monitoring network and additional information sources for actual forecasting. Tailor-made trainings are geared at specific requirements and demands of the forecasters

Indicator 2: In total 5 specific courses have been developed and rolled out: 2 hydrology courses on hydrological analysis and forecasting and an advanced course in hydrology. There are 3 meteorology courses developed with related curriculum: specialized seasonal forecast training, advanced meteorology and generic meteorology. This is a follow-up of the training specification recommendation of the refinement report and more than the set target of 3 courses. The GIS data course as specified in the EoP target will not be given, but spatial specific information is integrated into the other trainings and not given as a separate subject. Also for this indicator, course content is closely tuned to the needs and wishes of the trainees.

Indicator 3: The support to MAFF is focused by a series of products: a drought manual and related ToT in development, DRAT training to provincial staff, DRAT training to farming communities with a focus on the 5 pilot provinces in the S-SW, also supported by the DCA Drought Info-Hub activities in the pilot provinces. Although most of the products related to this indicator are still in progress, the project is making credible progress to achieve the set target for this indicator, not targeting alone the 5 focus provinces, but extending its reach partly more broadly with the development of national manual and training package with a broader application scope.

Overall the outcome is assessed to be on track to meet set targets by EoP and with a satisfactory rating.

Outcome 2

This outcome is assessed as rather ambitious considering its partly transboundary nature and the related complexities of developing a functional data sharing set-up. The activities in progress are expected to result in tangible progress, albeit towards the end of project.

Indicator 1: There have been issues on data sharing consent with MRC countries, hampering the initial expected information exchange. A collaboration agreement has been initiated with SERVIR-Mekong, together with development of the SoP of MOWRAM and the linkage to NCDM. The data sharing issue is now not any more a barrier and the pro-active outreach of the project team to collaborate with regional knowledge partners enables regional collaboration and information exchange.

Indicator 2: As discussed above, the positive % change in agriculture productivity is recommended to be revised as no baseline has been set and actual productivity change, to be attributed to the project, are not seen as an appropriate indicator. A revision of this indicator is suggested, capturing level of awareness of communities in the pilot provinces (e.g. the Drought Info-Hubs) and their capacity to reduce their vulnerability through diversification and use of drought resilient agricultural practices (such as DRAT). This all requires the linkage between DOM and MAFF to be improved for the proper and timely generation of agro-meteorological bulletins. Ultimately, the initial goal of tailoring early warnings sufficiently to inform planning at household level, is being targeted by the initiatives described in the collaboration with MAFF/DCA and the training of provincial and district staff.

Overall the outcome is assessed to be on track to meet set targets by EoP and with a satisfactory rating, with the notion that the original indicator 2 needs to be replaced with an indicator that tracks household/community level awareness.

Outcome 3

Indicator 1: 24 AWS and 29AHS have been purchased, installed and are functional, together with 4 additional groundwater stations (in total 57 compared to the EoP target of 55), the support to the PIN network in the pilot provinces (EWS1294) and the intention to install an additional 100 automatic rain gauges. EoP targets have therefore already been met by the project.

Indicator 2: More than 15 staff members of both DoM and DoH have been trained, compared to the target of 5 of each department. O+M training manuals have been developed, a training curriculum and a maintenance guide for O+M. An established dialogue with the suppliers serves for quick QA and problem solving. The training programmes and the communication set-up with the suppliers are clearly appreciated by the receiving Departments and staff.

Indicator 3: An ongoing calculation of expected needs to assess realistic O+M budget per station per year. Based on the official hand-over document from UNDP to MOWRAM internal O+M budget are being requested and planned for, in consultation with MEF. Additional resource mobilization is being explored for additional O+M budget from private sector parties (insurance companies, telcom providers). Considerable progress has been made for this indicator, but it requires continued attention and collaboration to ensure post-project sustainability through efficient maintenance and adequate operation procedures and related budgets.

Overall the outcome is well on track to achieve the set targets and partly has achieved more than originally set. Progress is also assessed as satisfactory.

GEF Tracking Tool: AMAT

In addition to the progress towards outcomes analysis the GEF Tracking Tool at the baseline can be compared and analysed with the situation right before the Midterm Review. The GEF Tracking Tool for Climate Change Adaptation, the Adaptation Monitoring and Assessment Tool or AMAT, is filled out as part of and annex to the ProDoc. Some of the indicators of the results framework originate from the AMAT, e.g. Outcome 3, indicator 1 (AMAT 2.1.2.1) and indicator 2 (AMAT 3.2.1.1) as well as the Objective indicator 2 (AMAT 2.1.2.1). Absence of the use of the tracking tool has not hampered the project in its implementation progress or made the project less effective. It does however provide a standardized approach to document and monitor progress and to quantify and disaggregate progress (also supporting documenting gender specific approaches) and is seen as supporting tool for project teams.

At present, the project team does not make use of the tracking tool as a method to take stock of progress. In fact, they are not aware of its existence (and its linkage to some of the logframe indicators), although it is mandatory to complete the tracking tool at MTR and EoP. It is suggested to “revive” the tracking tool and to record progress toward EoP. In practice, it should not be too complicated to fill out the tracking tool, as some of the indicators are similar to the logframe indicators as discussed above. Indicators suggested to make use of for tracking progress for the EWS project are:

- Indicator 1.2.2 *innovative insurance mechanisms*: if further collaboration with private sector insurers is established, this indicator could be used to reflect innovative insurance schemes.
- Indicator 1.2.13: *% of cropland area covered by a monitoring and early warning and response action scheme for climate sensitive plants pests and diseases*. Can be used for the pilot provinces with established drought info-hub and communities/farmers trained in DRAT.
- Indicator 1.2.14: *Vulnerability and risk perception index (Score) - Disaggregated by gender*. A possible survey to establish risk perception in pilot communities and non-treated communities (as potential replacement of % of agricultural productivity change).
- Indicator 1.2.1.3: *Climate resilient agricultural practices introduced to promote food security*. As a measure to track the number of communities/farmers/Provincial and District staff trained in DRAT.

- Indicator 1.2.1.8: *Type and level of integrated disaster response measures to extreme climate events introduced to increase number of lives saved.* E.g. Drought info hubs and people reached/trained; people with subscription to PIN for flood EWS.
- Indicator 2.1.1: *Relevant risk information disseminated to stakeholders (yes/no).*
- Indicator 2.1.2.1: *Type and No. of monitoring systems in place to disseminate timely risk information.* Same as logframe Outcome 3, indicator 1.
- Indicator 2.2.1.1: *No. of staff trained on technical adaptation themes (disaggregated by gender). Themes: - Monitoring/Forecasting capacity (Early Warning System (EWS), Vulnerability mapping system), Agriculture diversification, Improved resilience of agricultural systems, Information and communication technologies (ICT) and information dissemination.*
- Indicator 2.3.1: *% of targeted population awareness of predicted adverse impacts of climate.*
- Indicator 3.2.1.1: *No. of individuals trained in adaptation-related technologies.* Same as logframe Outcome 3, indicator 2, here linked to staff trained in O&M of AWS/AHS.

The GEF Tracking Tool AMAT is attached to this report separately as an EXCEL file as Annex 5

3.3 Project Implementation and Adaptive Management

In this section the project implementation arrangements of the project are reviewed together with how the project team has been able to adapt to changing conditions and emerging challenges and constraints in their management of the project. Work planning and financial management are discussed, combined with the project level M&E systems. Finally stakeholder engagement is assessed, and the reporting and communication, as part of the overall knowledge management of the project are reviewed.

Management arrangements

A very difficult start-up phase

Based on the project documentation review and stakeholder consultation, it is evident that the project management team has been able to revive the project from its “stalled state” to present level of activity. There is substantial learning in how to prevent such terrible slow start-up phases, which are unfortunately not unique to this project, but are more widespread, posing a more general question to (UNDP-GEF) projects. Could the initial dead-lock of the first two years of implementation (2015-2016) have been avoided? Would a project designed under DIM have had a more fluid start? For the evaluator this is complex to assess in retrospect. What is clear, is that apparent political inability to establish a Project Board has had a very negative impact on the performance of the project in its first years. Such an internal governmental constraint seems difficult to mitigate in the design of a specific project. As such challenges arise, as they certainly did for the EWS project, it is a complex task for a project management team to adapt to these difficulties faced and to try to find solutions to improve project performance over time. The engagement of the present project manager/TA, with an appropriate technical background in disaster management and EWS combined with international project management experience has been instrumental in the turnaround of the project, together with the refinement/redesign approach, enabling the project stakeholders to reposition the project in such a manner that the initial objectives are still within clear reach.

Adaptive strategies

To overcome the initial difficult start-up phase the project team had to invest time in identifying alternative strategies to enable a smoother implementation process. A key intervention was the decision to start intensive consultations with the main stakeholders and with UNDP representatives from the regional hub, forming the basis for a redesign process, in which a refinement of the project was initiated in order to revive the stalled project. Key elements of the refinement process were the

consensus to change the implementation arrangement from NIM to DIM and to ensure in its “business model” that overlap with emerging projects would be avoided and that engagement with the private sector and NGO’s would be actively pursued.

It has to be stated that the project has seen a marked increase in progress, activity and achievements since the refinement process had been concluded in August 2017. The project management team therefore has to be commended for the way they have been able to turn around the project, adapt to challenging conditions and find an implementation modality, in close consultation with all key stakeholders, to make tangible progress. The engagement of a project manager with appropriate technical background in disaster management, EWS and extensive project management experience has been another management decision that has facilitated the turnaround and contributed to a marked uptick in project progress. The close working relation of the team, with an office within MOWRAM, has clearly helped to improve communication and coordination and has eased delivery. Whereas in 2015 and 2016 less than the 10% of initial foreseen annual work plans and budgets could be executed, as indication of the difficulties faced, in 2017 this increased to about 60% and in 2018 an impressive 95% of budget delivery could be achieved, as illustration of a real turn around.

Project management team

Considering the present work load and range of activities of the project management team it seems that the team is currently understaffed. This is partly due to the fact that, even after the two year extension was granted, a lot of activities needed to be implemented in a relatively short span of time. As discussed before, the nature of the project and the existing human resource constraints of MOWRAM, require technical assistance with a solid background in hydro-meteorology and disaster management/EWS. The initial team composition did not include this specific technical background and expertise as requirement for the project manager/TA, which would have been supporting in the start-up phase of the project.

As the project is now progressing into a late phase of implementation, with a wide range of interventions and collaborations being established, there is a need for targeted focus on monitoring and evaluation and broader knowledge management, in an effort to document emerging good practices, extract lessons and learning and produce and disseminate knowledge products of good quality for all relevant stakeholders. The work space of the present TA within MOWRAM facilitates an informal and efficient working arrangement, with short lines to key stakeholders and direct and quick communication.

Work planning

The first years of project implementation saw limited action, with no formal annual work plan and budget in the absence of the Project Board to review and formally endorse AWP/Bs. Apart from site selection work and preliminary definition of hardware specifications for the AWS and AHS equipment very few activities were implemented. This resulted in a very limited UNDP “footprint” of the project management during initial years, leading to ultimate need for refinement of the Project strategy and change of implementation modality. As of late 2017, with the arrival of the new TA to the project, a sharp increase of activities can be noticed, resulting into a heavy work load in 2018 and 2019. Although the project has been able to implement an impressive percentage of its planned activities in 2018 (95%), balancing the amount of activities with the implementation capacity becomes a challenge. This is especially evident for the work planning in the last year, extending to May 2020, in which period a large number of activities remain to be implemented, partly to compensate for earlier delays, but also linked to additional activities identified and added to the annual work plan.

The Project Board, that finally convened in September 2018 and recently in March 2019, act as both a governing body, reviewing and endorsing annual work plan and budgets, but also providing technical and quality assurance. The Minutes of both Project Board meetings indicate that the stakeholders have

been actively engaged in their support to the project and have provided guidance to the project team for specific focus (e.g. the comments made by the representative of the Ministry of Women Affairs (MOWA) on gender balance). The active participation of key stakeholders during the refinement process seems to be reflected and continued in the present functioning of the Project Board.

Financial management

No major issues were reported with regards to the financial management of the EWS project, as executed by project management staff, and as reflected in the quarterly and annual reports. So far no independent audits have been carried out, but the project has been selected for an independent audit for UNDP for the 2018 financial year.

Table 5 gives an overview of the annual work plans and budget for the period 2015 to 2020 and actual expenditure for the period 2015-2018. The AWP/Bs for 2015 and 2016 were only about 10% of the budgets foreseen in the ProDoc, and reflect the limited progress in implementation. Expenditure increased in 2017 with a financial delivery of 59.7%, with a steady increase to 95.1% in 2018, an impressive achievement.

Table 5. Planned annual budgets and actual expenditure for the period 2015-2018

	AWP/B	Actual Expenditure	Delivery [%]
2015	164,629	106,232	64.5
2016	86,000	83,194	96.7
2017	2,000,000	1,194,664.49	59.7
2018	2,104,347	2,001,747	95.1
2019	1,550,454		
2020	599,071		

Source: APR2015, 2016, 2017 and 2018

The overall financial efficiency is hard to assess, as the project execution has been phased, with a clear improvement of financial delivery from 2017, culminating in a very high delivery in 2018, representative for a project in its later phase of execution.

The project has invested, as planned, relatively heavy in the procurement of hard ware for hydro-meteorological monitoring stations. UNDP has made use of its procurement centre in Copenhagen to assist in the procurement process, definition and finalization of equipment specifications in the related tender documents and the selection of a preferred supplier. This procurement process has allowed the project to purchase the desired equipment at competitive pricing, as compared to other comparable projects in the country, without having to compromise quality. This is reflected in a considerable cost saving in comparison to budget estimates of the ProDoc. The project team estimates cost savings up to \$600,000, allowing the project to invest in, e.g., additional monitoring hardware (e.g. an estimated 100 automatic rain gauges), extra spare parts, extended warranty of stations and technical support by the supplier for O&M and additional training activities.

The co-financing, Table 6, gives an overview of co-financing sources, types, confirmed amounts at CEO endorsement and actual amounts contributed at MTR. The actual amount of the RGC in-kind contribution is at MTR less than 1% of what was confirmed at CEO endorsement. Actual amounts contributed by other co-financing sources (MRC and JICA) were not available for the project management team at MTR, but are relatively limited compared to the RGC co-financing. The actual %

of the expected amount is so limited (less than 1%), that it is suggested to review the calculation of the co-financing amount for realism. The evaluator has not seen the co-financing letters and is therefore not in the position to give any further assessment, other than that the present percentage of expenditure is very limited compared to the planned amount at CEO endorsement. It is not believed that lack of co-financing has affected project delivery.

Table 6. Co-Financing Table for the UNDP Supported GEF Financed EWS Project

Sources of Co-financing ⁵⁴	Name of Co-financer	Type of Co-financing ⁵⁵	Amount Confirmed at CEO endorsement (US\$)	Actual Amount Contributed at stage of Midterm Review (US\$)	Actual % of Expected Amount
National Government	Royal Government of Cambodia (RGC)	In-Kind	20,812,540	128,920.00 ¹	0.86%
Other Multilateral Agency	Mekong River Commission (MRC)	In-Kind	390,000	N/A	N/A
Bilateral Aid Agency	JICA	In-Kind	682,00	N/A	N/A
TOTAL			21,884,540	128,920.00	0.86%

¹ Based on cumulative cost for the period 2015-2018 for allowance for National Project Director, National Project Manager, counterpart staff (15FTE), admin staff (2FTE), electricity, water and rental of office space. Monthly costs amount to US\$2930 (*44 = 128,920).

Project-level M&E Systems

In line with the Monitoring and Evaluation Plan of the ProDoc and as presented in the inception report, M&E activities are reflected in quarterly and annual progress reports (APRs), together with the annual project implementation reports (PIRs). These reports were highlighting the serious challenges the project was facing in initial years and the related risks were described in detail, with potential mitigation options. The reports of the last years, 2017 and 2018, are more descriptive and reflecting the increase in activities being implemented.

One of the M&E activities included in the M&E plan are the randomized control trials to quantify change in agricultural productivity, to be conducted in collaboration with MAFF. As discussed earlier, these surveys and the related indicator are suggested to be revised, also as no baseline has been established, as originally intended. The M&E plan does not indicate the use of the GEF tracking tool, AMAT, although this is a mandatory element for MTR and terminal evaluation.

The evaluator noted a relatively limited use of the present M&E system as a learning and reporting tool, including the reporting of grant partners. It is evident that the project team has put a lot of emphasis and energy in revitalizing the stalled project. This has required a lot of attention in ensuring implementation of a broad range of activities. As the delivery rate for 2018 has shown, with about 95% of planned activities actually implemented, attention needs to shift partly to proper documentation and learning. This includes capturing lessons and evaluating the collaboration with grant partners as PIN and DCA, and new collaborations with SERVIR-Mekong and RIMES. As the project now moves into its later phase of implementation, there is a stronger emphasis needed to record, document and share the lessons and experiences of the project, in collaboration with its key stakeholders. The M&E system should assist the team in the remaining implementation period to document and generate essential learning. In this respect it is suggested to organize a review workshop with all key stakeholders to focus on lesson learning, identify emerging good practices and evaluate interventions to enhance lasting impact of the project interventions. The organization of a review workshop is intended to facilitate an

effective knowledge management/M&E system of the project through a coordinated effort to identify, document and share key learning emanating from the project interventions.

Stakeholder engagement

The project documentation and the stakeholder consultations confirm a functional and practical stakeholder engagement. The initial start-up challenges were handled and discussed through a broad-based participatory consultation process in the refinement/redesign exercise. All key stakeholders are represented in the Project Board, which acts, besides being a formal body to review and endorse annual work plans and budgets, as a technical forum to give guidance and advice to the project management team. Relation with stakeholders are informal and pragmatic, also facilitated through the office in-house at MOWRAM. Recently, a number of partnerships have been established or are being discussed, as sign that the project is able to connect with and engage with key partners, both governmental as non-governmental, including discussions with private enterprises. Public awareness is mainly being raised through the use of social media by the project. The last year has seen a stream of twitter messages, videos, news articles and the use of the UNDP website to share news and activities. At provincial, district and community-level stakeholder engagement is mostly taken care of by grant partners as DCA (Drought Info-Hubs) and PIN and their activities in the pilot provinces.

The stakeholder engagement plan, as updated during the refinement process and reflected in the refinement report of August 2017, gives a comprehensive overview of key stakeholders for the respective project outcome areas and specific activities, with notably more attention given to NGO/CSO and private sector engagement.

As additional stakeholder engagement activity the project has given attention to awareness raising of youth. Ten schools in the storm-prone coastal provinces of Sihanoukville and Koh Kong have been trained on disaster preparedness through school drills. School disaster management committees of those schools were established and school contingency plans were developed and tested over school drills. Over 2,500 students were reached through these drills, equipping them with school-level preparedness measures and reducing their vulnerability to climate-related risk, in the period July 2018 – May 2019, see. ²¹

Communications

Internal project communication with the key stakeholders is mostly informal, regular and effective, based on the stakeholder consultations. As the key stakeholders are part of the Project Board they are kept up-to-date with the more formal review and endorsement of activities and budgets.

The external communication of the project is since late 2017 based on a strong use of social media, creating direct media exposure and giving a “face” to the project. The combination of videos (the climate hero series), tweets, website and news articles are seen as an effective mixture of communicating the activities, objectives and learning of the project.

See:

Official project website:

<http://www.kh.undp.org/content/cambodia/en/home/operations/projects/build-resilience/early-warning-systems.html>

21

<http://www.kh.undp.org/content/cambodia/en/home/stories/UNDPTTrainsTeacherstoLeadEmergencyEvacuationsDuringDisastersinCambodia.html>

<https://www.adaptation-undp.org/node/5147>

Regional Adaptation platform:

<http://www.adaptation-undp.org/resources/videos/strengthening-climate-information-and-early-warning-systems-cambodia>

The project Twitter timeline:

<https://twitter.com/i/moments/962517019592503297>

Flickr photo

: <https://www.flickr.com/photos/undpclimatechangeadaptation/sets/72157698388535814>

Videos:

<https://www.adaptation-undp.org/projects/ldcf-ews-cambodia>, amongst others the series of “climate heroes”.

Based on the above findings, overcoming the initial difficult start-up phase by a series of adaptive strategies (amongst other: NIM-DIM transition, project redesign, new project manager, activation of the Project Board) together with an improved delivery rate, no issues with financial management, a functional stakeholder set-up and effective communication system, the Project Implementation & Adaptive Management rating is assessed as: **Satisfactory (S)**.

3.4 Sustainability

Sustainability is the likelihood of continued, lasting benefits and impact post-project. Assessment of sustainability at mid-term has to consider the risks that are likely to affect the continuation of project outcomes. This sustainability assessment regards the four GEF categories of sustainability: financial, socio-economic, institutional framework and governance and environmental risks to sustainability.

The risk assessment of the ProDoc and the inception report present in total 6 key risks of which 2 were assessed as “high” level risks:

- inadequate maintenance of meteorology and hydrology stations, resulting in hardware falling into disrepair, and
- new equipment is not compatible or consistent with existing systems.

Financial risk to sustainability

Based on lessons from the past, when installed hardware become obsolete soon after project support ended, hardware falling into disrepair is regarded, since the beginning of the project inception, as a key risk. The substantial investment of the project in hardware to support the functional hydro-meteorological network requires a proportional and regular operation and maintenance (O&M) budget. Governmental budgets for O&M of MOWRAM have been so far too limited. The project has supported MOWRAM in carrying out a needs assessment for the actual budget required for adequate O&M annually and post-project. Based on this assessment, MOWRAM has requested the Ministry of Economy and Finance (MEF) to substantially increase the annual O&M budget. As this budget rise is far more than the annual threshold of 10% increase, further discussions are required to ensure the required budget increase. The intended O&M budget is about USD45,000 to USD50,000, which is still considerably less than the budget foreseen in the inception report, which states USD150,000 as needed commitment. The project is actively supporting MOWRAM to find practical ways to safeguard a post-project O&M routine through additional equipment warranties, extended technical assistance by the supplier and an extra investment in spare parts.

The refinement report suggested the project to explore opportunities for private sector engagement to mobilize additional funding resources for O&M. The project is looking at opportunities to collaborate with telecom providers (such as SMART) in their role as service provider and early warning information and agro-meteorological information is considered as valid content that could be distributed to subscribers of telecom services. Another option being explored by the project is collaboration with insurance companies (such as FORTE), active in the rural sector, in covering risk of asset loss through flood and drought. They are actively using and interested in seasonal forecasting and risk assessment with relation to the asset portfolio they cover.

Although the private sector engagement is certainly important and worth exploring, the main emphasis should be kept on the regular governmental budget lines for O&M of critical monitoring infrastructure. In the O&M budget, incentives for sub-national staff, responsible for operating and maintaining the station and the direct surroundings of the monitoring equipment, are an important element. Especially for the remote stations, requiring more effort and time of the local staff, these contributions are essential.

The two key risk identified in the initial risk assessment have been adequately addressed. The equipment purchased is compatible and consistent with existent systems and international standards. The O&M plan is being developed in close consultation with the stakeholders and related work on sustainability includes a longer-term warranty of the supplier, including extended technical assistance and an extra investment in spare parts. The risk level therefore is lowered, but overall O&M budget availability remains a certain risk.

Socio-economic risks to sustainability

The consultations with stakeholders have confirmed the interest shown by the different stakeholders and their interest in pursuing the overall objective of the project. In this respect it is important that the project team puts focus on lesson learning and documenting emerging best practices to further build public awareness, including outreach to and collaboration with NGOs/CSOs, private sector players and ultimately beneficiaries and schools. The collaborations that the project has started with e.g. DCA and PIN support the further development and replication of successful initiatives and are considered strategic to enable further replication and roll-out of project outputs. In line with this, it would be advisable for the project to identify potential partners and donors to potentially replicate and scale-up project outputs post-project.

Institutional Framework and Governance risks to sustainability

In the inception report effectiveness of management arrangements and coordination issues were identified as a medium level risk. They certainly materialized in the first 2 years of the project when confusion over the management arrangement and inability to convene the Project Board resulted in a very poor performance of the project and with a considerable risk of project failure. The redesign and refinement process has addressed these key issues, and in light of the present implementation progress, with impressive steps towards achieving set targets, these institutional and governance risks seem to have been mitigated. Another key risk identified, and rated as a medium level risk, is the limited institutional knowledge. The project is actively addressing this human resource constraint by providing targeted capacity building through tailor-made training programmes for hydrologists and meteorologists. Although this effort is certainly supportive, it will not address the more fundamental constraint that there is no dedicated academic curriculum in Cambodia for hydrologists and meteorologist. Most of the present staff of MOWRAM have been trained on-the-job, but lack specific and general academic backgrounds, a constraint which requires longer-term capacity building. The risk of high turn-over over MOWRAM staff has not been confirmed during the consultations, as most trained staff have remained in their positions and the risk is not assessed as high.

Environmental risks to sustainability

Based on the interviews with stakeholders no environmental risks to sustainability of the project have been identified. The potential issues flagged in the UNDP Environmental and Social Screening of the ProDoc were limited and referred to possible monitoring sites in fragile protected areas. In practice, no environmental risks were identified during the MTR process. Most of the project interventions are geared towards producing timely information to reduce the vulnerability to adverse climatic induced events as floods and droughts.

Based on the findings and the discussion above on sustainability it is concluded that the two key risk identified in the initial risk assessment have been adequately addressed. The equipment purchased is compatible and consistent with existent systems and international standards. The O&M plan is being developed in close consultation with the stakeholders and related work on sustainability includes a longer-term warranty of the supplier, including extended technical assistance and an extra investment in spare parts. The risk level therefore is lowered, but there are still moderate risks, especially with regards to O&M and overall human resource capacity. It is suggested to work out a concise exit strategy as phasing out plan for the project, identifying interventions to enhance lasting impact of the project and improve overall sustainability of the investments and interventions. Based on the assessment of the categories above the **overall sustainability rating is moderately likely**.

4. Conclusions and Recommendations

In this Chapter a series of conclusions is presented, based on the key findings discussed in Chapter 3. After the conclusions follows a series of recommendations directed to the project management and relevant stakeholders in order to enhance implementation progress and optimize sustained impact of the project outcomes post-project.

4.1 Conclusions

1. The EW project is assessed as very relevant. Although the overall objective of the project and the separate outcomes are well defined, in its design the order or sequencing of the outcomes could have better reflected a logical chronological order. The Theory of Change of the refinement report presented an improved sequencing of interventions. The results framework of the project is straightforward, with a limited number of indicators and targets.
2. The initial start-up of the project has been very slow and problematic. The inability of the Royal Government of Cambodia to convene the Project Board together with confusion over management arrangements resulted in an almost frozen condition of the project in 2015 and 2016. The redesign and refinement approach and proposed changes in arrangements (a.o. NIM-DIM transition, a project manager with required technical expertise and experience) have enabled the project management team to revive the project, with a sharp increase in delivery in 2017 and especially 2018.
3. The present project team is considered understaffed, considering the ambitious work load going into the final project phase (until May 2020), caused by the need to compensate for the considerable implementation delay in the initial years, and the related shift of focus on proper documentation, extracting lessons and emerging good practices and knowledge management.
4. The feedback of the stakeholders is reflecting their general appreciation for the support provided by project to enhance their capacity in monitoring (hardware), analysis (software), capacity building (HR-institutional) and generation of tailored climate and EW information, linked to the low – and fast on-set of climate-induced natural hazards (droughts and floods).
5. The project is recently expanding its initial reach through a series of additional partnerships with national and international organisations (PIN (EWS1294), DCA (drought Info Hubs), SERVIR and RIMES etc.), which are considered strategic, time-efficient considering the limited remaining implementation period and partly aimed at replicating approaches that have been piloted and have proven value for enhancing EWS development.
6. As a result, combined with additional activities identified per component, the output of the project has markedly increased, which will support attaining the original set outcomes with more confidence (e.g. establishment of rating curves for the AHSs, MAFF NAP support etc.).
7. The progress of the project is assessed as satisfactory and on track to achieve the set outcomes. Key remaining areas of focus for the project in the remaining implementation period are related to activities aimed at drought assessment and related capacity building, application of hydro-meteo data in actual EWS (forecasting, info flow reflected in SOPs, training-testing) and enhancement of sustainability (HR, financial etc.).
8. The Project Implementation & Adaptive Management rating is assessed as satisfactory.

9. Based on the assessment of the categories above the overall sustainability rating is moderately likely. There are still moderate risks, especially with regards to O&M and overall human resource capacity. It is suggested to work out a concise exit strategy as phasing out plan for the project, identifying interventions to enhance lasting impact of the project and improve overall sustainability of the investments and interventions. Sustainability has been regarded as an issue and risk since the design phase. The O&M plan should build more confidence in availability of (sufficient) resources and technical capability of staff. Private sector engagement is being explored to mobilize additional resources for O&M, but this should not distract from the need for core budgeting by RGC.
10. Absence of a dedicated academic curriculum on hydrology and meteorology in Cambodia remains a longer-term constraint to safeguard scientific support and HR capacity, and will require a medium- to longer-term approach in capacity building. Although outside of the shorter-term scope of this project, there is a clear need for additional support post-project to address this critical constraint.
11. An effective and cost-efficient procurement process has allowed the project to purchase hydro-meteorological equipment at competitive pricing, as compared to other comparable projects in the country, without having to compromise quality. This is reflected in a considerable cost savings up to \$600,000, allowing the project to invest in, e.g., additional monitoring hardware (e.g. an estimated 100 automatic rain gauges), extended warranty of stations, additional technical support by the suppliers and extra spare parts and additional training activities for those outcome areas where specific focus is needed.
12. It is noted that in the ProDoc relatively little attention is given to gender specific approaches to ensure a gender balanced implementation of the project. As the project is in its later phase of implementation and is progressing to implement more interventions at sub-national level, in districts and communities, attention to inclusiveness and gender balance in capacity building efforts is required. Suggested AMAT indicators could support monitoring a gender balanced approach.

4.2 Recommendations

Based on the findings and conclusions presented above a limited series of practical and actionable recommendations is directed to the project management team and relevant stakeholders. It is recommended to:

1. **Revise and adjust some of the project logframe indicators and set targets** (End-of-Project targets, as the logframe has no set MTR targets). Suggested revision of (see section 3.1 for details):

Outcome	ProDoc Indicator	Suggested Revision
Outcome 1	Indicator 1: (targeting only MOWRAM and MAFF).	include NCDM (SOP-DM Law, NAP for DRR) in target
Outcome 2	Indicator 2: [%change of agricultural productivity], through ECCA and Random Control Trials,	In absence of quantitative baseline assess possibility to conduct a survey in awareness level and knowledge of communities of climate/EW information and climate resilient agricultural practices.
	Indicator 3: 7 provinces and agro-ecological zones	Adjust to target 5 pilot provinces

It is suggested to include in the project logframe the series of additional activities of the project as reflected in the latest AWP/B. They do support intended outputs/outcomes, but are not all linked to the few existing indicators. In this late stage of implementation new indicators would not be needed, but it is important to reflect and document the impact of these additional activities.

2. **Update and make use of the GEF Tracking Tool (AMAT).** A list of recommended indicators for an update of the AMAT is included in a separate excel file and discussed in section 3.2. The tool is mandatory, in principle needed for the MTR process and an important tool for the terminal evaluation. It will help the project management team as a self-assessment instrument and is supporting the internal M&E system. It also includes gender-specific queries to evaluate the inclusiveness of the chosen project approaches, especially at sub-national level.
3. **Add staff to the project management team** to support documentation, communication and M&E/knowledge management. In light of the present work load, going into the latest phase of the project implementation with a wide range of activities to be implemented and completed, assistance is needed for quality assurance of the knowledge management and in order to be able to produce and share a series of documents, extracting, reporting and disseminating key learning, emerging good practices and overall outcomes of the project.
4. **Compile an exit strategy/phasing out plan**, defining a sustainability strategy. This concise document, of just a couple of pages, should contain clearly defined activities to enhance lasting impact and should be used as an internal guidance towards the end-of-project, and will facilitate dialogue with key partners in defining responsibilities, also post-project, and the related time frame. The O&M plan will be an essential element, including budget forecasts (equipment replacement costs, monitoring staff costs) and HR training needs and dialogue and information exchange procedures on droughts and floods between the key stakeholders.
5. **Take a pragmatic approach with private sector engagement** in finalizing the O&M Plan. Regard this as a medium-term development (and ambitious), but focus on robustness of primary RGC budget allocation. Work in partnership in collaborating with the private sector in exploring opportunities to mobilize additional resource for O&M:
 - PIN-MOWRAM-UNDP to link with SMART;
 - NCDM (WB), MAFF, UNDP with insurers etc.
6. **Plan for a Review Workshop**, with all key partners, highlighting/showcasing progress and achievements, including sustainability perspective / gaps. A review workshop is intended to document key learning, exchange information and helps focus on needed follow-up steps post-project. It will support targeted documentation of key emerging good practices and can be instrumental in sharing knowledge within the project and with outside partners.
7. **Explore opportunities to infuse experiences/knowledge on drought into MAFF** (e.g. from DCA and RUPP), with wherever possible, linkage to regional best practices (e.g. SERVIR-Mekong):
 1. Drought study, national level assessment, identification of spatial distribution, zones with highest vulnerability
 2. Redefinition of NAP for DRR in agriculture (2019-2023)
 3. Application in curriculum development of ToT on DRAT,
 4. Trainings at Provincial level (staff, farmers)
 5. Agro-meteorological needs and translation into seasonal forecasting
 6. Linkage between DOM database and MAFF drought information need

Table 7 Overview of recommendations

Rec. #	Recommendation	By when	By whom
1	Slightly revise and adjust some of the project logframe indicators and set targets	June 2019	PMT
2	Update and make use of the GEF Tracking Tool	June 2019	PMT, RTA
3	Add staff to the project management team	May 2019	PMT, UNDP, PB
4	Compile an exit strategy/phasing out plan,	August 2019	PMT, MOWRAM, MAFF, NCDM
5	Be pragmatic with private sector engagement	August-December 2019	PMT, PIN, NCDM, MOWRAM
6	Plan for a Review Workshop	Q4 2019	PMT, MOWRAM, MAFF, PIN, DCA etc.
7	Explore opportunities to infuse experiences/knowledge on drought into MAFF	Q2 2019-Q1 2020	PMT, MAFF, RUPP, DCA, DoM, NCDM

Annexes

Annex 1	MTR missions itinerary and list of persons interviewed
Annex 2	List of Documents reviewed
Annex 3	Evaluative Matrix
Annex 4	Long list of questions used for interviews
Annex 5	GEF Tracking Tool AMAT
Annex 6	ToR
Annex 7	Signed UNEG Code of Conduct for Evaluators

Annex 1 Mid-Term Review Mission Schedule

Strengthening Climate Information and Early Warning System in Cambodia Mid-Term Review Mission Schedule

Mid Term Reviewer: Mr. Hans van Noord

Programme Analyst: Ms. Ratana Norng

Project Assistant: Ms. Vanny Chea

Project Driver: Mr. Honghak Oun

Project Manager: Mr. Muhi Usamah

Date / Time	Activity	Person to meet	Location
March 29 th 2019			
08.00-08.45 12.00 start	Skype Call with Regional Hub Travel to AMS airport to board flight to BKK-PP	RTA, Yusuke Taishi	Home
Day 1. 1 April 2019			
09.00 – 10.00	Meeting with EWS Team	Muhi – Ratana - Vanny	UNDP
11.00 – 12.00	Meeting with UNDP Cambodia	Nick Beresford, RR UNDP CO Rany, Head of Programme Ratana - Muhi	UNDP
14.30 – 16.00	Meeting with MOWRAM	Mr. HE Mao Hak Deputy Secretary General Tonle Sap Authority, Focal point of EWS project	MOWRAM / MRC
16.00-17.00	Meeting with MRC	Dr. Lam Hung Son, Head of Regional Flood Management and Mitigation Centre, MRC	MOWRAM / MRC
Day 2. 2 April 2019			
09.00 – 10.00	Meeting with Ministry of Agriculture, Forestry and Fisheries (MAFF)	Mr. Am Phirum, Deputy Director, General Directorate of Agriculture (DGA) Mr. Tan Chantara, DGA	GDA – MAFF
11.00 – 12.00	Meeting with Director of Department of Hydrology and River Work (DoH)	Mr. Yin Savuth, Director Department of Hydrology and River Work	MOWRAM / MRC
14.00 – 15.00	Meeting with Royal University of Phnom Penh (RUPP)	Dr. Chhinn Nyda, Lecturer at RUPP	UNDP
Day 3. 3 April 2019			
08.00 – 09.00	Meeting with DCA	Mr. Nop Polin and Ms. Amanada King of DanChurchAid (DCA)	UNDP
09.00 – 16.00	Field visit (meeting with farmers from agriculture training) in Takeo	Representatives of Agricultural Cooperative in Takeo Province (AC Bhaksaei Rekrey (?))	Travel to Takeo
Day 4. 4 April 2019			
09.00 – 10.30	Meeting with Department of Meteorology (DoM) Director	Mr. Ryna Oum, Director of Department of Meteorology	MOWRAM / Radar Station

14:30 – 15:30	Meeting with hydrologists - DoH	Mr. Tong Seng, Deputy Director DoH, Mr. Hun Sothy, Chief Officer Flood forecasting, DoH	MOWRAM / MRC
16.00 – 17.00	Meeting with People in Need	Mr. Lukáš Laube, Head of Programme (PIN) Jeppe Mariager-Lam, Technology for Development Manager	UNDP
Day 5 – 5 April 2019			
09.00-13.00	Working out of meeting		
13.00-14.30	Meeting with Ratana	Ms. Ratana Norng	UNDP
15.00 – 16.30	Meeting with NCDM (after NAP-DRR meeting)	Mr. HE Khun Sokha, Deputy Secretary General NCDM	Phnom Penh Hotel
Day 6, 7. Weekend			
Day 8 – 8 April 2019			
08.00 – 11.30	Site visit to AWS at Makara Dam	Mr. Lim Hak, Mr. Lyhon Ho, staff of the Department of Meteorology	Makara Dam
15.30-17.00	De-briefing with UNDP / EWS team	Muhi – Ratana	UNDP
9th April 2019			
08.00 start of home travel	PP-BKK-AMS		

Annex 2 Documents for review during the MTR

Kingdom of Cambodia (2015). Law on Disaster Management.

UNDP (2014). Project Document. Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change. PIMS 5235, Signed, 25th November 2014. 139 pages.

UNDP Cambodia (2015). Inception Report. Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change Project, May 2015.

UNDP Cambodia (2017). Minutes of the Consultation Meeting on the Project Refined Strategy. SCIANCE-WS Project. August 10th 2017, Phnom Penh.

UNDP Cambodia (2017). Project Refinement Report. Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change Project, August 2017.

UNDP Cambodia (2017). Key Summary of the Refined Project Implementation Strategy. Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change Project, 2017.

UNDP Cambodia (2018). Minutes of Key Stakeholders Meeting. Strengthening Climate Information and Early Warning System, May 7th 2018, Phnom Penh.

UNDP Cambodia (2018). Minutes of Project Board Meeting. Strengthening Climate Information and Early Warning System (EWS) Project, 26 September 2018, Phnom Penh.

UNDP Cambodia (2018?). Refined Stakeholder Engagement Plan.

UNDP Cambodia (2018). Grant Agreement with People in Need.

UNDP Cambodia (2018). Grant Agreement with DCA.

UNDP Cambodia (2019). Project Brief. Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change Project. www.kh.undp.org <http://www.adaptation-undp.org/projects/ldcf-ews-cambodia>

UNDP Cambodia (2019). Annual Project Progress Report, UNDP Cambodia, Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change Project, January-December 2018.

UNDP Cambodia (2019). Transfer of title of assets from the UNDP to the Government of the Kingdom of Cambodia. March 22, 2019

Additionally: Quarterly reports for 2015 to 2018, APRs (2015-2018), PIRs (2015-2018)

Websites and social media

Project website: <https://www.adaptation-undp.org/projects/ldcf-ews-cambodia>

UNDP page: <http://www.kh.undp.org/content/cambodia/en/home/operations/projects/build-resilience/early-warning-systems.html>

Flickr photo album:

<https://www.flickr.com/photos/undpclimatechangeadaptation/sets/72157698388535814>

Twitter timeline: <https://twitter.com/i/moments/962517019592503297>

Some videos: <https://www.adaptation-undp.org/projects/ldcf-ews-cambodia>

Annex 3 Midterm Review Evaluation Matrix / Framework

Evaluative Questions	Indicators	Data sources
1. Project Strategy		
Design		
Is the project strategy relevant to the country priorities and aligned with development priorities?	Alignment with policies, new policy development	Project documents, (draft) policies, project staff and partners
Has the country taken full ownership?	Project Board meetings, replication of activities, budget lines reserved for post-project continuation.	Minutes, project documents, project staff and partners
Were planned monitoring and evaluation arrangement adequate?	M&E Plan use, need for change/adjustment of M&E	M&E plan, reports, staff
Are other strategies possible to achieve expected results? BAU?	Other projects/partners/initiatives	Project documents
Results Framework/Logframe		
Are the indicators and targets SMART and are amendments/revisions needed?	Logframe indicators, MT and EoP targets	Project reports, M&E
Are the objectives and outcomes clear and realistic? Are revisions needed?	Logframe objectives/outcomes	Project reports, M&E
Are there indicators reflecting beneficial development effects: e.g. income generation?	Agricultural production (ECCA survey for baseline and EoP)	Project reports, M&E, Survey format and results
2. Progress Towards Results		
To which extent progresses towards outputs or outcomes have been achieved?	% of outputs and outcomes achieved: See Progress Towards Results Matrix	M&E reports, Interviews (PMT)
	GEF TT: AMAT at baseline and MTR	AMAT1 and AMAT-MTR
What are remaining barriers to achieving the project objective in the remainder of the project?	Description of specific challenges/barriers/constraints	Project reports, risk table/assessment, interviews
Early signs of successful interventions?	Replication/adoption of approaches, methodologies, collaboration efforts etc.	Project reports, interviews
Inclusive gender approach?	UNDP Gender Marker, disaggregated beneficiaries/participants	Project reports, interviews
3. Project Implementation and Adaptive Management		
Management Arrangements		
Project management set-up effective?	Timely and accurate reporting,	
Effective coordination between partners/stakeholders?		Interviews of stakeholders/partners
Is the Project's governance effective?	Is the governance structure well designed?	Interviews, Minutes, reports.

	Do governance bodies (PB) function well?	
Is the Project's management efficient?	Are planning and budget activities carried out well? Are effective quality-assurance arrangements established?	
Is the programme well designed?	Does the project logical framework allow for good project management?	Logframe Interview (PMT)
	Has the programme been able to adapt successfully to changing circumstances?	Interviews
Is the quality of the outputs sufficient?	Stakeholders perception of the quality of outputs	Interviews
	Quality of expertise involved	Interviews, CV of main experts(?)
Work Planning		
Are work plans and implementation timely and of good quality?	Stakeholders perception, AWP-Bs review, timely delivery	Interviews, reports
Is work planning participatory?	Participation of stakeholders Gender sensitive	Interviews, reports
Finance and co-finance		
Is the project able to spend its budget on-time?	Rate of delivery against approved budget; evolution over time (Y to Y)	M&E reports
Are interventions cost-effective?	Procurement options for cost-effectiveness; Stakeholder perception.	Interviews, reports
Co-finance use/expenditure?	Co-financing table, reporting by co-financing partners, actual versus planned.	Reports, interviews
Is financial management effective?	Fund flow issues, audit objections etc.	Audit reports, project reports, interviews
Project-level M&E Systems		
Is the M&E system functioning and effective?	Are results well monitored and evaluated in terms of activities, outputs and outcomes?	M&E reports, interviews
How is M&E information used?	Partners involvement, management decisions, M&E missions-field visits?	Reports, interviews
Stakeholder engagement		
Has the project developed appropriate partnerships with key stakeholders?	Stakeholder perception, stakeholder plan,	Reports, interviews
Are stakeholder engaged and involved in planning and decision-making?	Stakeholder perception, reports	Reports, interviews
Reporting		
Has the Project produced timely and quality reports?	Stakeholder perception, QA of UNDP-RTAs	Quarterly, annual reports, GEF TTs etc.

Communications		
Is internal project communication with stakeholders regular and effective?	Stakeholder perception,	Interviews, reports
How does the public reach the general public?	Social media, web site, brochures, video's, newspapers, manuals etc.	Reports, interviews
4. Sustainability		
Are the risks identified in the ProDoc still valid? Have they changed over time?	Risk Table, changes?	Reports, Interviews
How have these risks affected the Project? How have they been mitigated?	Delays, failure, strategy changes etc.	Reports, Interviews
Availability of resources Post-Project?	Budgets internalized in government budget (e.g. O&M budget, training, staffing etc.)	Reports, Interviews
Technical knowledge and human resource capacity secured?	Staffing, budget, built awareness, knowledge, curriculum developed.	Reports, Interviews

Annex 4 Long List of Questions divided over the 4 evaluation categories

A Project Strategy

Project design:

- Does the project address the underlying problem and are the underlying assumptions valid?
- Have changes to the context or incorrect assumptions affected to achieving the project results as outlined in the Project Document?
- Is the project strategy relevant and does it provides the most effective route towards expected/intended results?
- Were lessons from other relevant projects properly incorporated into the project design?
- Does the project address country priorities? How can we prove this?
- Has Cambodia taken full ownership. Was the project concept in line with the national sector development priorities and plans of the country?
- Has the project been able to be responsive and respond flexibly to the needs of the RGC?
- Was the project design adequate to meet its objective?
- Looking back: was the formulation process participatory with involvement of key stakeholders and beneficiaries?
- To what extent were gender issues raised and integrated in the project design? (See Annex 9 of Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects for further guidelines.)
- To what extent was the project design adequate and effective for strengthening capacities (technical and administration)?
- Were the planned monitoring and evaluation arrangements adequate?
 - How appropriate and useful were the project's M&E framework, including targets and indicators, in assessing progress?
 - Were the targeted indicator values realistic and can they be tracked?
 - Has the M&E framework been adapted (have indicators or targets been adjusted?)?

Results Framework/Logframe:

- Are the project's logframe indicators and targets, at the midterm and end-of-project SMART? (Specific, Measurable, Attainable, Relevant, Time-bound), and are specific amendments or revisions needed to the targets and indicators?
- Are the project's objectives and outcomes or components clear, practical, and feasible within its time frame? Is there any need for adjustment or redefinition?
- Has progress so far led to, or could in the future, catalyse beneficial development effects (i.e. income generation, gender equality and women's empowerment, improved governance etc...) that should be included in the project results framework and monitored on an annual basis? E.g. the indicator used for increased agricultural production and the ECCA baseline?
- Are broader development and gender aspects of the project being monitored effectively? Does the project have 'development' indicators, including sex-disaggregated indicators and indicators that capture development benefits?

B Progress Towards Results

Progress Towards Outcomes Analysis:

- The logframe indicators will be reviewed against progress made towards the end-of-project targets using the Progress Towards Results Matrix and following the Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects; colour code progress in a “traffic light system” based on the level of progress achieved; assign a rating on progress for each outcome; make recommendations from the areas marked as “Not on target to be achieved” (red).

Table. X Progress Towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Project Strategy	Indicator ²²	Baseline Level ²³	Level in 1 st PIR (self-reported)	Midterm Target ²⁴	End-of-project Target	Midterm Level & Assessment ²⁵	Achievement Rating ²⁶	Justification for Rating
Objective:	Indicator (if applicable):							
Outcome 1:	Indicator 1:							
	Indicator 2:							
Outcome 2:	Indicator 3:							
	Indicator 4:							
	Etc.							
Etc.								

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved
-----------------	----------------------------------	-----------------------------------

In addition to the progress towards outcomes analysis:

- The GEF Tracking Tool at the Baseline will be compared and analysed with the one completed right before the Midterm Review (*the EWS Project makes use of the Tracking Tool for Climate Change Adaptation, the AMAT, the Adaptation Monitoring and Assessment Tool*).
- What are remaining barriers to achieving the project objective in the remainder of the project?
- Building on the aspects of the project that have already been successful (which?), in what manner could the project further expand these benefits?

²² Populate with data from the Logframe and scorecards

⁶ Populate with data from the Project Document

⁷ If available

⁸ Colour code this column only

⁹ Use the 6 point Progress Towards Results Rating Scale: HS, S, MS, MU, U, HU

- What is the performance of the project in achieving the results stipulated in the UNDP Gender Marker (i.e. “GEN2”)?

C Project Implementation and Adaptive Management

Management Arrangements:

- Is the of project management set-up of the project effective?
- Have changes been made and are they effective?
- Are responsibilities and reporting lines clear?
- Is decision-making transparent and undertaken in a timely manner?
- Have the project implementation arrangements contributed to the enhanced capacity of the key implementation partners?
- How is the quality of support provided by the GEF Partner Agency (UNDP) assessed by the key stakeholders? Are these areas for improvement?
- In which areas does the project have the greatest achievements? Why is this and what have been supporting factors?
- In which areas does the project have least achievements? What have been the constraining factors and how have these been mitigated?

Work Planning:

- What have been the main reasons for the initial implementation delay after project approval?
- What was the reason for a project strategy refinement and how has this affected or improved the effectiveness of the project implementation?
- Are work-planning processes results-based?
- Is the results framework/ logframe effectively used as a management tool and have any changes made to it since project start (and why)?
- Has relevant gender expertise been sought? Have available gender mainstreaming tools been adapted and mainstreamed?
- Have the quantity and quality of the outputs been satisfactory?
 - Are the project partners using the outputs?
 - Have they transformed into outcomes?
 - To what extent are the project implemented activities/outputs having impact and how have these been coordinated with other stakeholders in Cambodia and abroad?

Finance and co-finance:

- Has the financial management of the project been efficient, with specific reference to the cost-effectiveness of interventions?
- Have there been changes in fund allocations as a result of budget revisions (what and why)?
- Does the project have the appropriate financial controls, including reporting and planning, that allow management to make informed decisions regarding the budget and allow for timely flow of funds? Has fund flow been timely?
- Have the audits been without major issues?
- What have been yearly expenditure rates as indication of financial delivery (spent versus planned ratio)?
- Is co-financing being used strategically to help the objectives of the project? Is the Project Team meeting with all co-financing partners regularly in order to align financing priorities and annual work plans? **(Co-financing monitoring table to be filled-out).**

Project-level Monitoring and Evaluation Systems:

- Are the monitoring tools currently being used providing the necessary information?
- Do they involve key partners? Who is monitoring?
- Are they aligned or mainstreamed with national systems?
- Do they use existing information? Are they efficient? Are they cost-effective?
- Are additional tools required? How could they be made more participatory and inclusive?
- Are sufficient resources being allocated to monitoring and evaluation? Are these resources being allocated effectively?
- Has relevant information and data systematically been collected? Was reporting satisfactory. Was data disaggregated by sex?
- Has information been regularly analysed to feed into management decisions?

Stakeholder Engagement:

- Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders? E.g., see the refined stakeholder plan in their involvement over time.
- Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?
- To what extent has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?

Reporting:

- Have adaptive management changes been reported by the project management and shared with the Project Board.
- How well have the Project Team and partners undertaken and fulfilled GEF reporting requirements?
- Have lessons derived from the adaptive management process been documented, shared with key partners and internalized by partners?

Communications:

- Is internal project communication with stakeholders regular and effective? Are there key stakeholders left out of communication? Are there feedback mechanisms when communication is received? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and investment in the sustainability of project results?
- Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, has the project used social media for Knowledge Management/Outreach? Did the project implement appropriate outreach and public awareness campaigns?)?
- How has the project been able to reach illiterate or vulnerable households as beneficiaries or in building public awareness?

D Sustainability

- Are the risks identified in the Project Document, Annual Project Review/PIRs and the ATLAS Risk Management Module still the most important and are the risk ratings applied still appropriate and up to date. Have they changed over time?
- Which risks and assumptions were identified and managed? To what extent have they affected the project?
 - What were these main risks and have they been mitigated adequately?
 - What were main assumptions so that the project could be achieved? Are these assumptions still valid?
 - Have new or unforeseen challenges and/or risks come up during the implementation period?

Financial risks to sustainability:

- What is the likelihood of financial and economic resources not being available once the GEF assistance ends (consider potential resources can be from multiple sources, such as the public and private sectors, income generating activities, and other funding that will be adequate financial resources for sustaining project's outcomes)?
- Are O&M budgets now planned for sufficient for adequate maintenance and operation and for what period?
- Is the private sector able to contribute or are other funding sources being explored?

Socio-economic risks to sustainability:

- Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project? Are lessons learned being documented by the Project Team on a continual basis and shared/ transferred to appropriate parties who could learn from the project and potentially replicate and/or scale it in the future?

Institutional Framework and Governance risks to sustainability:

- Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize sustenance of project benefits? Are the required systems/ mechanisms for accountability, transparency, and technical knowledge transfer are in place.

Environmental risks to sustainability:

- Are there any environmental risks that may jeopardize sustenance of project outcomes?

Likelihood of Impact (social and environmental)

Questions related to what extent the Project has contributed to, or is likely to contribute towards impact, such as changes in the governance systems and stakeholder behaviour, and to impact on the environment and how it affects human well-being.

- What have been the impacts of the Project, both in social and environmental dimension? What

are the future likely impacts?

- What is the Project 's impact in terms of initial objectives?
- What are the emerging impacts of the Project and the changes that can be causally linked to the Project interventions?
- What are the arrangements to measure the Project 's impact during and at the end of the Project? Are these arrangements adequate and will they deliver reliable findings?
- In how far has the Project made a contribution to the broader, longer-term climate change adaptation and sustainable development strategy?
- What has changed in the life of beneficiaries? (e.g ECCA baseline and EoP Survey, other quantitative sources of evidence).
- Has the Project identified opportunities for it to be scaled up? If so, how should in future the programme objectives and strategies be adjusted?

Sustainability of Impact

Questions geared at analysing the likelihood of sustainable outcomes at termination of the Project's mandate, with attention to sustainability of financial resources, the socio-political environment, catalytic or replication effects, institutional and governance factors, and environmental risks.

- Is there an effective and realistic exit strategy for the Project?
 - Are local governments and implementing partners able, willing and committed to continue with similar interventions? How effectively has the project built national ownership and capacity?
 - Has the project successfully built or strengthened an enabling environment (laws, policies, technical capacities, local knowledge, people's attitudes, etc.)?
 - Are the impacts of the project's sustainable and what have been key factors to ensure sustainability of impact?
- Are apparent impacts of the project's actions likely to be lasting after the completion of the project, or is there a need for future additional support?

Questions related to the Project's performance in terms of gender mainstreaming, integration of social and environmental safeguards at design and during implementation, and contributions to broader organisational learning of the participating agencies.

The project progress in gender equality and promotion

- To what extent has the Project progress/achievement contributed to address gender issues identified and to promote gender justice?
- What strategies have been developed and what explicit actions have been taken to ensure women participation in the programme implementation?
- Has the Project identified/strengthened skills by gender?

Environmental and social safeguards

- What kind of environmental and social safeguard mechanisms have been applied by the Project to identify potentially negative impacts of activities and how to mitigate these?

Organisational learning and knowledge management

- How has the Project promoted organisational learning and how has it enhanced knowledge sharing with its beneficiaries and partners within and outside of the UN System?
- What are emerging key lessons and best practices from the Project and how have these been documented and shared with a wider audience?

Annex 5 GEF tracking Tool AMAT

Attached as separate EXCEL file

Annex 6 Terms of Reference

International Consultant to Conduct Midterm Review

Project Information

Assignment Title	International Consultant – Project Midterm Review in Cambodia
Organization	UNDP Cambodia
Post Level	International Consultant, Individual Contract
Cluster/Project	Programme Unit
Duty Station	Home based with mission to Provinces
Duration	22 working days total from 15 th March to 15 th May 2019, with travelling to provinces, including 8 days mission to Cambodia

Background and Project Description

This is the Terms of Reference (ToR) for the UNDP-GEF Midterm Review (MTR) of the full sized project titled Strengthening Climate Information and Early Warning System in Cambodia to Support Climate Resilient Development and Adaptation to Climate Change (PIMS# 5235) implemented through the UNDP Cambodia, which is to be undertaken in 2019. The project started on the 28 November 2014 and is in its fourth year of implementation. In line with the UNDP-GEF Guidance on MTRs, this MTR process was initiated before the submission of the fourth Project Implementation Report (PIR). This ToR sets out the expectations for this MTR. The MTR process must follow the guidance outlined in the document [Guidance for Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects](http://web.undp.org/evaluation/documents/guidance/GEF/mid-term/Guidance_Midterm%20Review%20EN_2014.pdf).

([http://web.undp.org/evaluation/documents/guidance/GEF/mid-term/Guidance_Midterm%20Review%20 EN_2014.pdf](http://web.undp.org/evaluation/documents/guidance/GEF/mid-term/Guidance_Midterm%20Review%20EN_2014.pdf))

Cambodia is facing mounting development challenges due to climate change. Damage related to the October 2013 flooding alone, caused by heavy rain and the seasonal swell of the Mekong River, is estimated at \$356 million, having affected 20 out of 24 provinces²⁷ and 1.7 million people; 297,600 hectares of rice paddies were inundated and more than 28,100 hectares of rice were immediately destroyed²⁸. Climate change is resulting in longer dry seasons and shorter,

²⁷ As of 31 December 2013, the total number of provinces in Cambodia changed from 24 to 25.

²⁸ http://www.undp.org/content/cambodia/en/home/presscenter/articles/2013/10/18/cambodia_s-first-disaster-database-system-unveiled/

more intense rainy seasons. This impacts both the frequency and severity of natural hazards such as floods and droughts, as well as agricultural production which is dependent on seasonal rainfall. Recovery from such events puts strain on the least developed country's (LDC's) limited resources and forces shifts in development priorities - hindering Cambodia's ability to progress and to achieve its development goals.

The Royal Government of Cambodia's (RGC) preferred situation is to implement an effective early warning system (EWS). The purpose of an EWS is to monitor climate and environmental data on a real-time basis, detect adverse trends and make reliable predictions of possible impacts in the form of early warning information. An early warning therefore refers not only to advisories in emergency situations, but also to information related to the changing climatic trends revealed after tracking and analysing climate and weather data over time. An effective EWS would thus enable timely response to natural hazards and extreme weather events, as well as informed planning in light of changing climate trends.

The RGC faces several challenges in realizing its preferred situation. With few working climate and weather observation stations, there is insufficient data to refine predictions and forecasts based on sector, geographic areas, or vulnerability. Further, limited human resources and high staff turnover make it difficult for institutions such as the Ministry of Water Resources and Meteorology (MOWRAM) to develop capacity and maintain qualified forecasters and modelers. Appropriate dissemination of information is also a challenge. MOWRAM is responsible for providing climate and weather information to the planning, line ministries to inform climate resilient planning, and for the communication of natural hazards and extreme weather events for disaster risk reduction. However, the information is often not presented in manner that can be easily understood or applied and standard operating procedures (SOPs) defining roles, responsibilities, and accountability are lacking. MOWRAM is also responsible for maintaining the EWS infrastructure such as automated weather stations and water gauge stations. Urgent needs to improve the national EWS infrastructure in light of imminent climate risks has prompted some donors to assist the Government in rehabilitating old or installing new weather stations. However, there is a significant risk of unsustainability of the newly built infrastructure due to limited financial resources to cover all the O&M requirements. The National Committee for Disaster Management (NCDM) is responsible for disaster risk management and communicating disaster related information, yet there is still room for improvement so that NCDM can fulfil all its mandate.

The project "Strengthening climate information and early warning systems in Cambodia to support climate resilient development and adaptation to climate change" (henceforth "the EWS project") has been designed to help the Government overcome these gaps and challenges. Funding of approximately US\$4.9 million was approved by the Least Developed Countries Fund

Council in October 2014 and the project was officially launched in May 2015. The project seeks to address the current barriers through three complementary outcomes:

1. Increased institutional capacity to assimilate and forecast weather, hydrological, climate and environmental information.
2. Climate and weather information available and utilized for national, sectoral and sub-national planning as well as for transboundary communication in the region.
3. Strengthened institutional capacity to operate and maintain EWS and climate information infrastructure, both software and hardware, in order to monitor weather and climate change.

To meet the above three outcomes, the approach adopted by the project is to 1) invest in early warning infrastructure – hydro and meteorology stations nationwide; 2) mobilize technical expertise to enhance capacity of national entities (namely MOWRAM, NCDM, and MAFF) in making use of the information; and 3) ensure the smooth flow of information sharing both at national level and between national and provincial level.

With close collaboration with national stakeholders, the project has been in its implementation stage and made steady progress in line with the agreed project work plan. The project is going to end in May 2020; putting this in perspective, the project is currently looking for an International Consultant to conduct Mid Term Review for the project.

Objectives of the MTR

The MTR will assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document and assess early signs of project success or failure with the goal of identifying the necessary changes to be made in order to set the project on-track to achieve its intended results. The MTR will also review the project's strategy and its risks to sustainability.

MTR Approach & Methodology

The MTR must provide evidence-based information that is credible, reliable and useful. The MTR Consultant will review all relevant sources of information including documents prepared during the preparation phase (i.e. PIF, UNDP Initiation Plan, UNDP Environmental & Social Safeguard Policy, the Project Document, project reports including Annual Project Review/PIRs, project budget revisions, lesson learned reports, national strategic and legal documents, and any other materials considered useful for this evidence-based review). The MTR Consultant will review the baseline GEF focal area Tracking Tool submitted to the GEF at CEO endorsement,

and the midterm GEF focal area Tracking Tool that must be completed before the MTR field mission begins.

The MTR Consultant is expected to follow a collaborative and participatory approach²⁹ ensuring close engagement with the Project Team, government counterparts (the GEF Operational Focal Point), the UNDP Country Office(s), UNDP-GEF Regional Technical Advisers, and other key stakeholders.

Engagement of stakeholders is vital to a successful MTR³⁰. Stakeholder involvement should include interviews with stakeholders who have project responsibilities, including but not limited to executing agencies, senior officials and task team/ component leaders, key experts and consultants in the subject area, Project Board, project stakeholders (particularly Ministry of Water Resources and Meteorology (MOWRAM), Ministry of Agriculture, Forestry and Fisheries (MAFF), National Committee for Disaster Management (NCDM)), academia, local government and CSOs, etc. Consultation with international / regional actors would be included as well. Additionally, the MTR Consultant is expected to conduct field missions to Cambodia, including the project sites in Koh Kong, Kampot, Takeo and Kampong Speu.

The final MTR report should describe the full MTR approach taken and the rationale for the approach making explicit the underlying assumptions, challenges, strengths and weaknesses about the methods and approach of the review.

❖ **Detail Scope of the MTR**

The MTR Consultant will assess the following four categories of project progress. See the Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects for extended descriptions.

i. Project Strategy

Project design:

- Review the problem addressed by the project and the underlying assumptions. Review the effect of any incorrect assumptions or changes to the context to achieving the project results as outlined in the Project Document.
- Review the relevance of the project strategy and assess whether it provides the most effective route towards expected/intended results. Were lessons from other relevant projects properly incorporated into the project design?

²⁹ For ideas on innovative and participatory Monitoring and Evaluation strategies and techniques, see [UNDP Discussion Paper: Innovations in Monitoring & Evaluating Results](#), 05 Nov 2013.

³⁰ For more stakeholder engagement in the M&E process, see the [UNDP Handbook on Planning, Monitoring and Evaluating for Development Results](#), Chapter 3, pg. 93.

- Review how the project addresses country priorities. Review country ownership. Was the project concept in line with the national sector development priorities and plans of the country (or of participating countries in the case of multi-country projects)?
- Review decision-making processes: were perspectives of those who would be affected by project decisions, those who could affect the outcomes, and those who could contribute information or other resources to the process, taken into account during project design processes?
- Review the extent to which relevant gender issues were raised and integrated in the project design. See Annex 9 of Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects for further guidelines.
- If there are major areas of concern, recommend areas for improvement.

Results Framework/Logframe:

- Undertake a critical analysis of the project's logframe indicators and targets, assess how "SMART" the midterm and end-of-project targets are (Specific, Measurable, Attainable, Relevant, Time-bound), and suggest specific amendments/revisions to the targets and indicators as necessary.
- Are the project's objectives and outcomes or components clear, practical, and feasible within its time frame?
- Examine if progress so far has led to, or could in the future catalyse beneficial development effects (i.e. income generation, gender equality and women's empowerment, improved governance etc...) that should be included in the project results framework and monitored on an annual basis.
- Ensure broader development and gender aspects of the project are being monitored effectively. Develop and recommend SMART 'development' indicators, including sex-disaggregated indicators and indicators that capture development benefits.

ii. Progress Towards Results

Progress Towards Outcomes Analysis:

- Review the logframe indicators against progress made towards the end-of-project targets using the Progress Towards Results Matrix and following the Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects; colour code progress in a "traffic light system" based on the level of progress achieved; assign a rating on progress for each outcome; make recommendations from the areas marked as "Not on target to be achieved" (red).

Table. Progress Towards Results Matrix (Achievement of outcomes against End-of-project Targets)

Project Strategy	Indicator ³¹	Baseline Level ³²	Level in 1 st PIR (self-reported)	Midterm Target ³³	End-of-project Target	Midterm Level & Assessment ³⁴	Achievement Rating ³⁵	Justification for Rating
Objective:	Indicator (if applicable):							
Outcome 1:	Indicator 1:							
	Indicator 2:							
Outcome 2:	Indicator 3:							
	Indicator 4:							
	Etc.							
Etc.								

Indicator Assessment Key

Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved
-----------------	----------------------------------	-----------------------------------

In addition to the progress towards outcomes analysis:

- Compare and analyse the GEF Tracking Tool at the Baseline with the one completed right before the Midterm Review.
- Identify remaining barriers to achieving the project objective in the remainder of the project.
- By reviewing the aspects of the project that have already been successful, identify ways in which the project can further expand these benefits.
- Review the performance of the project in achieving the results stipulated in the UNDP Gender Marker (i.e. "GEN2"). Present the analysis in a sub-section of the MTR report dedicated to this analysis.

iii. Project Implementation and Adaptive Management

Management Arrangements:

³¹ Populate with data from the Logframe and scorecards

⁶ Populate with data from the Project Document

⁷ If available

⁸ Colour code this column only

⁹ Use the 6 point Progress Towards Results Rating Scale: HS, S, MS, MU, U, HU

- Review overall effectiveness of project management as outlined in the Project Document. Have changes been made and are they effective? Are responsibilities and reporting lines clear? Is decision-making transparent and undertaken in a timely manner? Recommend areas for improvement.
- Review the quality of execution of the Executing Agency/Implementing Partner(s) and recommend areas for improvement.
- Review the quality of support provided by the GEF Partner Agency (UNDP) and recommend areas for improvement.

Work Planning:

- Review any delays in project start-up and implementation, identify the causes and examine if they have been resolved.
- Are work-planning processes results-based? If not, suggest ways to re-orientate work planning to focus on results?
- Examine the use of the project's results framework/ logframe as a management tool and review any changes made to it since project start.

Finance and co-finance:

- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions.
- Review the changes to fund allocations as a result of budget revisions and assess the appropriateness and relevance of such revisions.
- Does the project have the appropriate financial controls, including reporting and planning, that allow management to make informed decisions regarding the budget and allow for timely flow of funds?
- Informed by the co-financing monitoring table to be filled out, provide commentary on co-financing: is co-financing being used strategically to help the objectives of the project? Is the Project Team meeting with all co-financing partners regularly in order to align financing priorities and annual work plans?

Project-level Monitoring and Evaluation Systems:

- Review the monitoring tools currently being used: Do they provide the necessary information? Do they involve key partners? Are they aligned or mainstreamed with national systems? Do they use existing information? Are they efficient? Are they cost-effective? Are additional tools required? How could they be made more participatory and inclusive?

- Examine the financial management of the project monitoring and evaluation budget. Are sufficient resources being allocated to monitoring and evaluation? Are these resources being allocated effectively?

Stakeholder Engagement:

- Project management: Has the project developed and leveraged the necessary and appropriate partnerships with direct and tangential stakeholders?
- Participation and country-driven processes: Do local and national government stakeholders support the objectives of the project? Do they continue to have an active role in project decision-making that supports efficient and effective project implementation?
- Participation and public awareness: To what extent has stakeholder involvement and public awareness contributed to the progress towards achievement of project objectives?

Reporting:

- Assess how adaptive management changes have been reported by the project management and shared with the Project Board.
- Assess how well the Project Team and partners undertake and fulfil GEF reporting requirements (i.e. how have they addressed poorly-rated PIRs, if applicable?)
- Assess how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.

Communications:

- Review internal project communication with stakeholders: Is communication regular and effective? Are there key stakeholders left out of communication? Are there feedback mechanisms when communication is received? Does this communication with stakeholders contribute to their awareness of project outcomes and activities and investment in the sustainability of project results?
- Review external project communication: Are proper means of communication established or being established to express the project progress and intended impact to the public (is there a web presence, for example? Or did the project implement appropriate outreach and public awareness campaigns?)
- For reporting purposes, write one half-page paragraph that summarizes the project's progress towards results in terms of contribution to sustainable development benefits, as well as global environmental benefits.

iv. Sustainability

- Validate whether the risks identified in the Project Document, Annual Project Review/PIRs and the ATLAS Risk Management Module are the most important and whether the risk ratings applied are appropriate and up to date. If not, explain why.
- In addition, assess the following risks to sustainability:

Financial risks to sustainability:

- What is the likelihood of financial and economic resources not being available once the GEF assistance ends (consider potential resources can be from multiple sources, such as the public and private sectors, income generating activities, and other funding that will be adequate financial resources for sustaining project's outcomes)?

Socio-economic risks to sustainability:

- Are there any social or political risks that may jeopardize sustainability of project outcomes? What is the risk that the level of stakeholder ownership (including ownership by governments and other key stakeholders) will be insufficient to allow for the project outcomes/benefits to be sustained? Do the various key stakeholders see that it is in their interest that the project benefits continue to flow? Is there sufficient public / stakeholder awareness in support of the long term objectives of the project? Are lessons learned being documented by the Project Team on a continual basis and shared/ transferred to appropriate parties who could learn from the project and potentially replicate and/or scale it in the future?

Institutional Framework and Governance risks to sustainability:

- Do the legal frameworks, policies, governance structures and processes pose risks that may jeopardize sustenance of project benefits? While assessing this parameter, also consider if the required systems/ mechanisms for accountability, transparency, and technical knowledge transfer are in place.

Environmental risks to sustainability:

- Are there any environmental risks that may jeopardize sustenance of project outcomes?

Conclusions & Recommendations

The MTR Consultant will include a section of the report setting out the MTR's evidence-based conclusions, in light of the findings.³⁶

³⁶ Alternatively, MTR conclusions may be integrated into the body of the report

Recommendations should be succinct suggestions for critical intervention that are specific, measurable, achievable, and relevant. A recommendation table should be put in the report's executive summary. See the Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects for guidance on a recommendation table.

The MTR Consultant should make no more than 15 recommendations total.

Ratings

The MTR Consultant will include its ratings of the project's results and brief descriptions of the associated achievements in MTR Ratings & Achievement Summary Table in the Executive Summary of the MTR report. See Annex E for ratings scales. No rating on Project Strategy and no overall project rating is required.

Table. MTR Ratings & Achievement Summary Table for Strengthening Climate Information and Early Warning Systems in Cambodia to Support Climate Resilient Development and Adaptation to Climate Change

Measure	MTR Rating	Achievement Description
Project Strategy	N/A	
Progress Towards Results	Objective Achievement Rating: (rate 6 pt. scale)	
	Outcome 1 Achievement Rating: (rate 6 pt. scale)	
	Outcome 2 Achievement Rating: (rate 6 pt. scale)	
	Outcome 3 Achievement Rating: (rate 6 pt. scale)	
	Etc.	
Project Implementation & Adaptive Management	(rate 6 pt. scale)	
Sustainability	(rate 4 pt. scale)	

Deliverables and Timeline

The total duration of the MTR will be approximately 22 working days over a time period of 9 weeks and shall not exceed five months from when the Consultant is hired. The tentative MTR timeframe is as follows:

ACTIVITY	NUMBER OF WORKING DAYS	COMPLETION DATE
Document review and preparing MTR Inception Report (MTR Inception Report due no later than 2 weeks before the MTR mission)	4 days	3 rd week of March 2019
MTR mission: stakeholder meetings, interviews, field visits	7 days	4 th week of March 2019
Presentation of initial findings- last day of the MTR mission	1 day	1 st week of April 2019

Preparing draft report (due within 3 weeks of the MTR mission)	7 days	3 rd week of April 2019
Finalization of MTR report/ Incorporating audit trail from feedback on draft report (due within 1 week of receiving UNDP comments on the draft)	3 days	1 st week of May 2019

Options for site visits should be provided in the Inception Report.

#	Deliverable	Description	Timing	Responsibilities
1	MTR Inception Report	MTR Consultant clarifies objectives and methods of Midterm Review	No later than 2 weeks before the MTR mission	MTR Consultant submits to the Commissioning Unit and project management
2	Presentation	Initial Findings	End of MTR mission	MTR Consultant presents to project management and the Commissioning Unit
3	Draft Final Report	Full report (using guidelines on content outlined in Annex B) with annexes	Within 3 weeks of the MTR mission	Sent to the Commissioning Unit, reviewed by RTA, Project Coordinating Unit, GEF OFF
4	Final Report*	Revised report with audit trail detailing how all received comments have (and have not) been addressed in the final MTR report	Within 1 week of receiving UNDP comments on draft	Sent to the Commissioning Unit

*The final MTR report must be in English. If applicable, the Commissioning Unit may choose to arrange for a translation of the report into a language more widely shared by national stakeholders.

The principal responsibility for managing this MTR resides with the Commissioning Unit. The Commissioning Unit for this project's MTR is UNDP Cambodia office.

The commissioning unit will contract the consultant and ensure the timely provision of per diems and travel arrangements within Cambodia for the MTR Consultant. The Project Team will be responsible for liaising with the MTR Consultant to provide all relevant documents, set up stakeholder interviews, and arrange field visits.

MTR Consultant:

The consultant cannot have participated in the project preparation, formulation, and/or implementation (including the writing of the Project Document) and should not have a conflict of interest with project's related activities.

The selection of consultant will be aimed at maximizing the overall qualities in the following areas: (give a weight to all these qualifications so applicants know what is the max amount of points they can earn for the technical evaluation)

Duty Station

The duration of this assignment is **22 working days** spread over the period of **March to May 2019**. The duty station for this assignment is home country and Cambodia (one trip in country mission). It is estimated that the reviewer needs to spend **8 working days** in Cambodia, with travel to the province 4 days.

During the mission in Cambodia, the transportation costs within Phnom Penh will be covered by the consultant, while the transportation cost to the province will be covered by the project.

The selected individual contractor who is expected to travel to the Country Office (CO) to undertake the assignment in the country (Cambodia) is required to undertake the BSAFE training (<https://trip.dss.un.org/dssweb/bsafe.aspx>) prior to travelling.

Minimum Qualifications of the Individual Consultant

Education:	A Master's degree in natural resource management, agricultural development, climatology/meteorology, water resources management, environmental sciences, disaster management or related field, or other closely related field.
Experience:	<ul style="list-style-type: none"> • Minimum 7 years of experience in conducting evaluation for development projects and GEF funded project. Experience working in the UN system is a strong asset • Minimum of 7 years of relevant professional experience in relevant technical areas of Early Warning System. • Demonstrated understanding of issues related to gender and climate resilient development and adaption to climate change; experience in gender sensitive evaluation and analysis • Experience working for development projects, with multi stakeholders including government agencies, development agencies, and UN agencies • Knowledge of UNDP and GEF monitoring and evaluation policies • Previous experience with results-based monitoring and evaluation methodologies, application of SMART indicators and reconstructing or validating baseline scenarios
Competencies:	<ul style="list-style-type: none"> • Competence in adaptive management, as applied to climate resilient development and adaption to climate change; • Excellent communication skills;
Language requirement	<ul style="list-style-type: none"> • High proficient in English

Criteria for Evaluation of Level of Technical Compliance of Individual Contractor.

Technical Evaluation Criteria	Obtainable Score
Minimum 7 years of experience in conducting evaluation for development projects and GEF funded project. Experience working in the UN system is a strong asset;	30
Minimum of 7 years of relevant professional experience in relevant technical areas of Early Warning System.	15
Demonstrated understanding of issues related to gender and climate resilient development and adaption to climate change; experience in gender sensitive evaluation and analysis	10
Experience working for development projects, with multi stakeholders including government agencies, development agencies, and UN agencies	10
Knowledge of UNDP and GEF monitoring and evaluation policies	15
Previous experience with results-based monitoring and evaluation methodologies, application of SMART indicators and reconstructing or validating baseline scenarios	20
Total Obtainable Score:	100

Criteria for Evaluation of Proposal: Only those applications which are responsive and compliant will be evaluated. Offers will be evaluated according to the Combined Scoring method – where the educational background and experience on similar assignments will be weighted at 70% and the price proposal will weigh as 30% of the total scoring. The applicant receiving the Highest Combined Score that has also accepted UNDP’s General Terms and Conditions will be awarded the contract.

Payment Milestone

The consultant will be paid on a lump sum basis (all-inclusive of expense relate to the above assignment including travels outside and inside the duty station and any tax obligation) under the following instalments.

No	Outputs/Deliveries	Payment Schedule	Payment Amount
1	Upon satisfactory completion of Deliverable 1	3 rd week of March 2019	10%

2	Upon satisfactory completion of Deliverable on of Deliverable 2	1 st week of April 2019	30%
3	Upon satisfactory completion of Deliverable 3 and 44	1 st week of May 2019	60%

ANNEX 7 UNEG Code of Conduct for Evaluators/Midterm Review Consultants

Evaluators/Consultants:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study limitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

MTR Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Consultant: Hans van Noord

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at Heteren (Place) on June 4 2019 (Date)

Signature: _____





Empowered lives.
Resilient nations.

**Strengthening Climate Information and Early Warning System in Cambodia to Support
Climate Resilient Development and Adaptation to Climate Change**

Mid-Term Review Report Clearance Form

Mid Term Review Report Reviewed and Cleared by:

UNDP Country Office

Name: Rany Pen

Signature: [Signature] Date: 12 Sept. 2019

UNDP-GEF Regional Technical Advisor

Name: Yusuke Taishi

Signature: [Signature] Date: 12 September 2019

[Signature]