iied

Cost and Values Analysis of TAMD in Cambodia

Sam Barrett

Working Paper
March 2015

Climate change

Keywords:
TAMD, cost and values, Cambodia

About the authors

Sam Barrett is a consultant for the Climate Change Group, International Institute for Environment and Development
barretsa@tcd.ie

Produced by IIED's Climate Change Group

The Climate Change Group works with partners to help secure fair and equitable solutions to climate change by combining appropriate support for adaptation by the poor in low- and middle-income countries, with ambitious and practical mitigation targets.

The work of the Climate Change Group focuses on achieving the following objectives:

- Supporting public planning processes in delivering climate resilient development outcomes for the poorest.
- Supporting climate change negotiators from poor and vulnerable countries for equitable, balanced and multilateral solutions to climate change.
- Building capacity to act on the implications of changing ecology and economics for equitable and climate resilient development in the drylands.

Acknowledgements

The author would like to thank H.E Tin Ponlok (National Council on Green Growth), Mr. Chreang Phollak (Ministry of Public Works and Transport) and Yem Sokha and Julien Chevillard (Cambodia Climate Change Alliance) for their time and patience with this research.

Published by IIED, March 2015

Sam Barrett. 2015. *Cost and Values Analysis of TAMD in Cambodia.* IIED Working Paper. IIED, London.

http://pubs.iied.org/10130IIED

ISBN 978-1-78431-164-3

Printed on recycled paper with vegetable-based inks.

International Institute for Environment and Development
80-86 Gray's Inn Road, London WC1X 8NH, UK
Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
email: info@iied.org
www.iied.org

@iied
www.facebook.com/theIIED

Download more publications at www.iied.org/pubs

The Tracking Adaptation and Measuring Development (TAMD) Monitoring and Evaluation (M&E) framework enables public authorities to assess climate risk management processes and contributions from adaptation/climate resilient development policy. In Cambodia, TAMD is used to guide the climate M&E framework in assessing these processes at national and sectoral levels. Yet little is known about costs and benefits of applying TAMD in Cambodia, and how implementing the framework improves the effectiveness of investments. This study documents the additional costs and benefits of implementing the climate M&E framework. What follows first provides a complete account of additional costs; and second, estimates likely contributions of a climate M&E framework to policy effectiveness, and corresponding monetary returns from future climate finance inflows in Cambodia.

Contents

Summary

Background

Cambodia is one of the most climate vulnerable countries in the world. High climate risk results in significant welfare losses from climate variability and change. As the value of vulnerable assets increases and climate hazards intensify, such losses are forecast to grow over time.

Effective implementation of policy – securing climate risk management, climate resilient development and vulnerability reduction – lessens adverse climate effects. However, policy effectiveness requires evidence-based learning and risk management specific to the changing impacts of climate on development practices. Climate-focused Monitoring and Evaluation (M&E) provides the specialist knowledge-building that enables public authorities to manage climate risk.

The Tracking Adaptation and Measuring Development (TAMD) M&E framework is being applied in Cambodia to guide the climate M&E framework in national and sector level government institutions. TAMD is a 'twin track' approach to climate risk management that: a) assesses the integration of climate into the policy implementation practices of public authorities; and b) measures policy contributions to climate resilient development and vulnerability reduction. In this context, climate M&E builds a specialist knowledge base that begins to inform government planning processes and improves policy effectiveness for adaptation/climate resilience.

This study provides a full costing and economic valuation of the climate M&E framework in the Ministry of Public Works and Transport (MPWT) in Cambodia. Such an exercise is complex, due to the multi-faceted benefit structure of an M&E system. The objective is to provide a sense of the monetary value of the climate M&E framework. The benefit pathway chosen is improving policy effectiveness as one of the main outcomes of implementing a climate M&E system that facilitates learning and risk management from assessing adaptation/climate resilient policy. Monetary values are extracted by observing the relationship between strong M&E systems (i.e. appropriate conceptual design and indicators) and policy effectiveness, and establishing what this means for the returns on future climate finance inflows.

Methodology

The study uses in-country interviews and secondary sources. The research design assumes a development M&E framework as the counterfactual (or baseline scenario), upon which the additional costs and benefits of using a climate M&E framework in the MPWT are built; and from which, the calculation of Net Present Values (NPV) provides a sense of the returns available when investing in a climate M&E framework.

The analysis works through several steps to arrive at additional costs and benefits:

Step 1 – costs the additional resources necessary to assimilate the climate M&E framework into MPWT M&E functions, relative to the development M&E framework baseline scenario;

Step 2 – begins the benefit valuation process by first comparing the types of returns [via Benefit-Cost Ratios (BCR)] available from adaptation/climate resilient development policy; and compares the magnitude of returns possible between medium (BCR = 2.49) and high effectiveness (BCR = 4.25);

Step 3 – uses the World Bank International Evaluation Group's data on the association between strong M&E systems (appropriate conceptual design and indicators) and high policy effectiveness, relative to average M&E systems (inadequate conceptual design and indicators) and high policy effectiveness; this simulates the impact of using a climate M&E framework for adaptation/climate resilient development policy, and therefore the likely contribution (in terms of improving BCR) of climate M&E to high adaptation/climate resilient development policy effectiveness.

Step 4 – uses the findings from Step 3 (BCR increases by .13), in combination with projections of climate finance inflows (2013–2023), to estimate the additional monetary value of implementing the climate M&E framework; this final step works by calculating improvements in investment yields (i.e. higher BCR) brought about by raising the effectiveness of future climate finance.

Analysis

The analysis compares the additional costs and benefits over time to establish Net Present Values (present valuation of net benefits – discounted and inflation adjusted) of implementing the climate M&E framework in the MPWT. Total additional costs of implementing the climate M&E framework are $503k (£336.7k), which compare with benefits under a range of learning assumptions and uncertainty scenarios.

The climate M&E framework may take up to six years to begin improving adaptation/climate resilient development policy effectiveness, and may only have partial effects. Assuming benefits incrementally increase to reach 50% and 100% of the full improvement in BCR, the yield improvements under medium discounting scenarios – the benefits of the climate M&E framework – range from $2.68m (50%) and $5.37m (100%) to $0.81m (50%) and $1.64m (100%) when observing in-country expenditure and external assistance respectively over 11 years. Under these assumptions, NPVs are positive – ranging from $5.78m (max) to $0.23m (min) – after sensitivity testing and the application of pessimistic learning assumptions, which indicates significant returns for investing in the climate M&E framework.

Break-even analysis shows when the climate M&E framework generates positive returns. This is the intersection where accumulative costs and benefits meet, indicating investors cover initial costs and maintaning TAMD implementation thereon generates positive revenue. Using the 50% and 100% impact scenarios and learning-effectiveness delay, investors cover costs between 8–10 years depending on whether improvements in effectiveness are from domestic expenditure or external assistance.

Overall, findings indicate returns from investing in the climate M&E framework are considerable despite various forms of uncertainty and highly cautious benefit scenarios. It is worth considering that the high investment returns from certain scenarios are likely attributable to the fact that in the past very few cost-benefit analyses document large-scale improvements in governance processes. Nevertheless, the central finding that a climate M&E framework will incrementally improve the average BCR by .13 is entirely plausible. What the analysis illustrates most is that, with climate finance increasing in the future, the effectiveness of adaptation/climate resilient development policy is of paramount importance.

1

Introduction

Cambodia is a rapidly expanding economy, averaging 7.6% Gross Domestic Product (GDP) growth in the past 10 years (Trading Economics, 2015), and with comparable success in poverty reduction (MoE, 2011). This is remarkable when considering that, at the same time, Cambodia is ranked 12th most vulnerable country to the adverse effects of climate variability and change (Maplecroft, 2015). Climate events intersect with low adaptive capacity and high exposure to cause significant welfare losses and developmental constraints, particularly from unpredictable rainfall, drought, flooding and tropical storms (SPCR, 2013; GoC, 2014). For example, in 2000–02, loss and damage from rural flooding totaled $205m (MoE, 2006); in addition, the Post-Flood Early Recovery Needs Assessment (PFERNA) estimates aggregated losses from the 2013 floods at $356m from asset destruction and disturbances to economic activity (GoC, 2014a).

Policy makers and implementing organisations in Cambodia have for decades assisted institutions and populations to deal with the negative effects of flood, storms and land degradation. These challenges are now receiving renewed focus through adaptation/resilience-based drives and initiatives to address the intensification of climate variability and change. These include externally funded projects for sustainable livelihoods, climate resilient agricultural strategies (AidData, 2015), flood controls and drainage schemes (GoC, 2014); conversely, domestically funded programmes include the climate-proofing of national and rural roads and large-scale irrigation (ODI, 2012).

Yet programmes and projects need Monitoring and Evaluation (M&E) mechanisms for the Government of Cambodia (GoC) to develop effective policy (Rai et al., 2014). Effectiveness in this context means action that leads to climate resilient development,[1] despite intensifying climate variability and incremental climate change, and which ultimately means including climate risk management[2] in policy design and implementation. Climate-focused M&E provides the necessary evidence and specialism for learning, planning and management of policy (Dinshaw et al., 2014), especially given the relative novelty of climate adaptation policy (GIZ, 2012), which results in greater climate resilience for developmental trajectories (Anderson et al., 2014).

The Climate Change Department (CCD) within the Ministry of Environment (MoE), acting as the Secretariat of the National Climate Change Committee (NCCC), is establishing a system-wide national M&E framework and M&E unit (Ponlok et al., 2014) for climate policy in the Cambodia Climate Change Strategic Plan (CCCSP) (2013–2024).[3] This will integrate the climate M&E framework into national and subnational planning processes and facilitate accountability, risk management and learning (Ponlok et al., 2014). The climate M&E framework uses IIED's Tracking Adaptation and Measuring Development (TAMD) approach to develop national and sector-level indicators used to assess the integration of climate risk management into institutional practices and measure the success of adaptation/development actions in reducing vulnerability/progressing resilient development.

[1] Climate-resilient development is defined as development that ensures systems on which human populations depend exhibit resilience in the face of climate change (Brooks *et al.*, 2011).

[2] Climate risk management is a process of "incorporating knowledge and information about climate-related events, trends, forecasts and projections into decision making to increase or maintain benefits and *reduce potential harm or losses."* (Travis and Bates, 2014).

[3] This is being developed through on-going engagement between the Cambodia Climate Change Alliance (CCCA), CCD, MoE, the Ministry of Public Works and Transport (MPWT) and the International Institute for Environment and Development (IIED).

All efforts to build government capacity for a climate M&E framework have costs and values, yet few studies demonstrate the economic viability of investments in climate M&E (Barrett, 2014), or even the relationship between M&E systems and positive developmental outcomes (IEG, 2013). The monetary effect of new methods of thinking and practice are difficult to measure (IEG, 2009). Such complex policy implementation scenarios are often seen as too challenging to conduct cost-benefit analysis (Asian Development Bank, 2013). For reasons of pragmatism, researchers prefer analytical contexts where clear linkages exist between inputs and economic outcomes (Bert et al., 2006), or where valuations of a single benefit are possible (Tol, 2012). This study applies in-country interviews and discussion groups to develop an ex-ante cost and values evaluation of implementing the climate M&E framework in the MPWT in Cambodia (GoC, 2013); offering the first cost and values study of a climate M&E framework that has deep integration into government systems.

Economic viability requires present values of additional benefits to be greater than the additional costs. The development-based Results Framework M&E in Cambodia provides the baseline, or 'do nothing' counterfactual, upon which additional costs and benefits of the climate M&E framework are compared. The analysis specifically estimates the additional costs and benefits of implementing the climate M&E framework in the Ministry of Public Works and Transport (MPWT). The MPWT is the first sector to pilot the climate M&E framework as part of a broad range of institutional strengthening measures to address climate impacts (Transport Sector Working Group, 2015). Estimates are developed using in-country interviews and data collection in association with the MTPW and other associated ministries and agencies.

The finding is that the climate M&E framework offers a quality M&E system with appropriate conceptualisation, indicators and baselines designed specifically for adaptation/development policy aiming to achieve climate resilience and vulnerability reduction. Conversely, development M&E omits consideration of climate as a factor that compromises development trajectories. Crucially, this study provides a 'sense' of the benefits of the climate M&E framework. The monetary benefit under focus is the additional improvement in effectiveness of adaptation/development policy attributable to raising the quality of the M&E system – but this is just one of many tangible and less-tangible beneficial effects of a climate M&E framework. As such, the study does not aim to provide an encapsulating valuation of all the benefits of the climate M&E framework.

2

Context

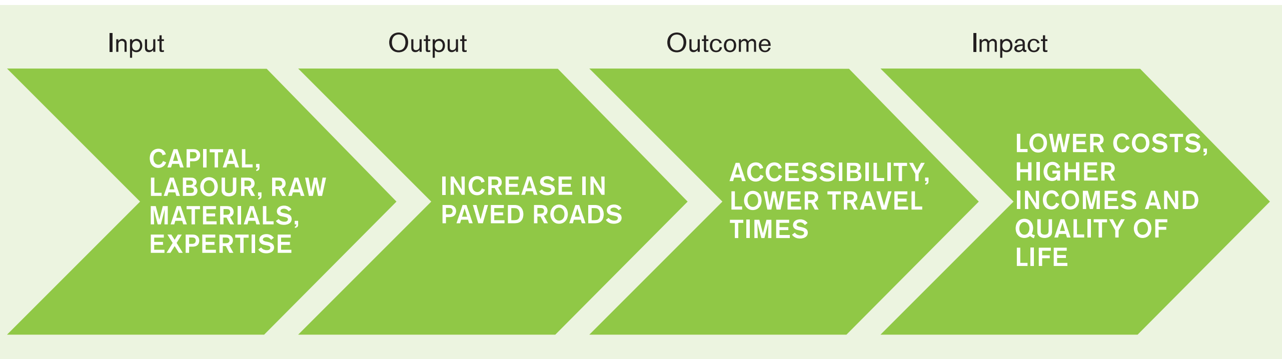
The following section outlines the standard M&E of government programmes in Cambodia and compares this with the climate M&E framework in place using TAMD. The standard government M&E illustrates what would have been implemented to assess climate policy had investments in climate M&E not taken place. Without climate focused M&E systems, M&E lacks the requisite specialism to build knowledge for effective adaptation and climate resilient development.

2.1 National and Sector Level Development M&E Framework

The development M&E in Cambodia operates under the direction of the National M&E Working Group (est. 2012) within the Ministry of Planning (MoP), which is informed by directives from the National Strategic Development Plan (NSDP) (GoCb, 2014) and the priorities of the Rectangular Strategy (currently in Phase III) (GoCc, 2014; GDoP, 2014). Each line ministry has assigned personnel in charge of ensuring progress on the NSDP, and which report using the M&E Framework to the National M&E Working Group in the Ministry of Planning (MoP). The National Working Group receives and aggregates reported information on key development indicators broadly relating to poverty, water and sanitation (to demonstrate progress in Millennium Development Goals), but which specifically addresses poverty reduction, economic stability, infrastructure, governance, human development and natural resource management[4] (GDoP, 2014).

At the MoP, two institutions use and provide M&E data – the General Directorate of Planning (GDoP) and the National Institute of Statistics (NIS). Statistical law in Cambodia dictates that only the NIS is at

Figure 1: Development M&E Results Chain



[4] The NSDP (2014) requests data collection and indicators on climate vulnerability, climate mainstreaming, clean development and climate finance expenditures. Therefore, in theory there is a danger of suggesting climate indicators do not exist in the development M&E frameworks. However, interviews state the development M&E framework only includes climate-based indicators due to the implementation of a climate M&E – meaning the absence of a climate M&E framework would have meant the omission of these indicators in the development M&E framework.

liberty to provide information for government records and publications (Cambodia Social and Economic Survey, Cambodia Demographic and Health Survey, and the Economic and Agricultural Census). The only exceptions are the information management systems for the Ministry of Health and the Ministry of Education, Youth and Sport – the Education Management Information System and the Health Information System respectively.

Ministries using the development M&E operate the Results Framework and Results Chain (see Figure 1) to conduct government M&E, focusing on development policy inputs, and most importantly, the outputs of development policy activities as results. This involves accounting for expenditures ministries and agencies make and their respective development results in a systematic Results-Based Management program that engages the wider planning framework (MoP, 2014). In particular, the Result Framework is designed to increase focus, select strategies, and allocate resources as an optimal strategy to achieve results (MoP, 2014). For example, the MPWT demonstrates progress on results through indicators, such as the kilometers of newly paved roads or operational railway lines (GDoP, 2014). The point to emphasise is the conceptualisation of results on progress in terms of development alone. Precisely what development progress means is specific according to each sectoral or ministerial context, but exogenous factors that compromise economic development – such as climate variability and change – lack consideration in analyses and planning processes.

2.2 Climate M&E Framework

The national and sector climate M&E framework in Cambodia is guided by the TAMD approach. TAMD is an M&E framework designed specifically to assess climate resilience/adaptation programmes (Brooks et al., 2013). There are two tracks of assessment: Track 1 focuses on climate risk management processes by appraising the integration of climate into policy design, development and decision-making processes; Track 2 concentrates on policy contributions to development and resilience/adaptation outcomes, documenting changes in climate resilience, vulnerability or economic wellbeing. Linkages are made across the two tracks by using theories of change. The whole M&E process contributes to the climate risk management of resilience/adaptation policy, through either the institutionalisation/assessment of risk management processes (Track 1), or via the utilisation of evidence gathered on policy contributions in the country context. TAMD can be applied differently depending on country needs – from guidance on design and policy evaluation, to simply establishing parameters to analyse ex-post programme data.

In Cambodia, the CCD, as Secretariat of the NCCC, is in the process of implementing the national climate M&E objectives set out in the CCCSP. In the short to medium term (2013–2018), the TAMD framework raises the capacity of M&E systems and procedures on two levels of government – national and sectoral (GoC, 2013); with the latter first being piloted to assess the significant adaptation/development portfolio of the MPWT (ODI, 2012), with further up-scaling across all climate-relevant sectors forecast for completion by 2018 (GoC, 2013). The climate M&E framework combines an innovative 'readiness ladder' approach[5] in Track 1 that assesses how national and sector institutions manage climate risks, with a vulnerability index (national level) and policy contribution indicators (sector level) accounting for Track 2 that measures progress towards adaptation and development objectives (Rai et al., 2014); whilst using existing data sources from the National Institute of Statistics (NIS) wherever possible to minimise transaction costs and facilitate sustainability (Ponlok et al, 2014). Finally, progress in the national and sector contexts are defined by the theory of change within the CCCSP, which links intervention outputs, outcomes, and longer-term impacts (Rai et al., 2014).

At the national level, Track 1 indicators have been developed through participatory consultations with MoE and CCD staff using the readiness latter approach to track climate risk management capacity. Indicators measure institutional developments such as the present status of climate policies, strategies and action plans; the integration of climate into planning; and the application and use of climate information services. Track 2 measures the changes in vulnerability and development by using disaggregated spatial data to develop a national level compound vulnerability index that includes parameters such as: a) the percentage of vulnerability households; b) loss and damage from climate extremes; c) mortality from exposure and sensitivity to climate events; and d) green house gas emissions per sector/per capita (Rai et al., 2014).

At the sector level, Track 1 indicators have been developed using the same readiness ladder methodology, but instead conceptualise climate risk management in terms of requirements of the MPWT (Transport Sector Working Group, 2014). Indicators measure issues such as the level of consideration for climate in sectoral planning; institutional capacity and coordination on climate; the use and application of climate information services; and the integration of

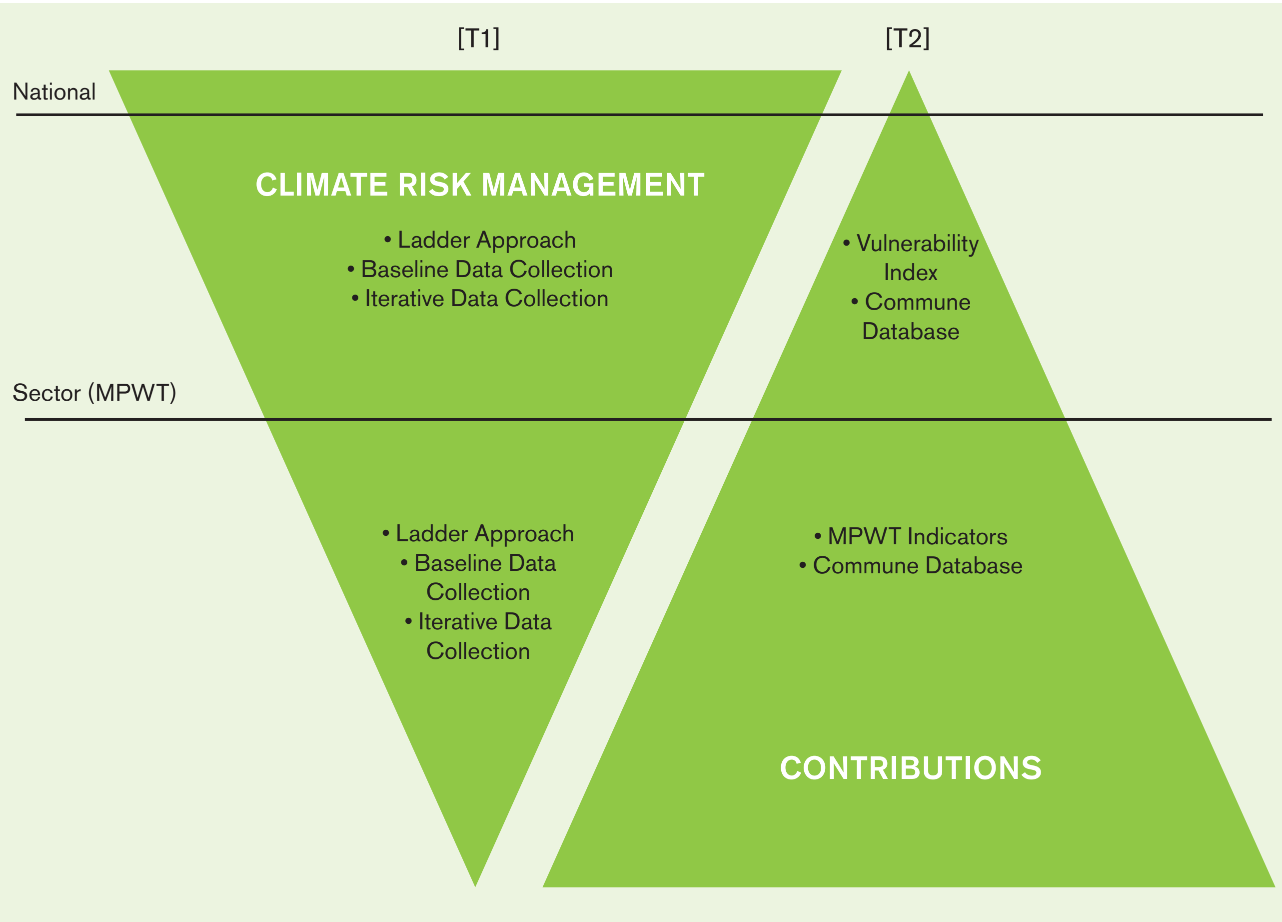
[5] The readiness ladder provides a standardised method to track institutional climate risk management by weighting each run or benchmark as 'Yes' (2), 'Partial' (1), or 'No' (0) according to the degree of criteria achievement [for further details see Rai et al., (2014)].

climate into financing. Conversely, Track 2 assesses standard impact indicators of loss and damage according to the specific climate risks experienced by the MPWT (CCCA interview, 2015).

By using TAMD instead of a development-focused M&E to guide the design of the climate M&E framework, there are notable differences in design and practice. First, Track 1 conceptualises, and takes seriously in the assessment of policy performance, institutional processes and mechanisms that address climate-related risks (Brooks and Fisher, 2014). Development-focused M&E omits any such evaluation. Second, designers of M&E frameworks often set targets under the assumption of a stationary climate, or current climate variability (Brooks et al., 2011). The inherent conservatism of such practices fails to recognise, or take the necessary measures (i.e. application of climate information in policy formulation), to design and assess policy under climate change that protects development trajectories and vulnerable populations [see Brooks (2014) for the utilisation of climate information in assessing adaptation effectiveness].

The climate M&E framework redefines progress on development as climate resilient development (Brooks et al., 2013). Development M&E includes implicit assumptions such as ceteris paribus – 'all other things being equal' – that enable cause-effect linkages in M&E processes (GDoP, 2014). The reality of intensifying climate variability and change brings into question the validity of notions of progress within development M&E (GoC, 2014b), especially in contexts where economic productivity often depends on weather patterns (Harmeling and Eckstein, 2011), and climate events cause considerable loss and damage to public authorities, private interest and vulnerable populations (Huq et al., 2013).

Figure 2: National and Sector Climate M&E Framework



3 Methodology

The methodology outlines the analytical steps necessary to demonstrate the additional costs and benefits of the climate M&E framework in Cambodia. To establish the additional costs of implementing the climate M&E framework, over and above the development of M&E, the study compares resource requirements of each scenario. Conversely, documenting the additional benefits involves a priori assumptions of the likely impact of a climate M&E framework, which are then given monetary value by comparing economic returns of effective and less effective policy and using projections of future climate finance inflows into Cambodia.

3.1 Additional Costs of Climate M&E Framework

The study uses in-country interviews to first develop baseline costs of establishing and maintaining development M&E operations within the MPWT. The second step calculates the additional costs of implementing a climate M&E framework in the MPWT. The process of evaluating first year establishment and annual maintenance costs for these scenarios demarcates the expenditures necessary to develop M&E into one with climate capacity. Principal components include extra personnel, capacity building, technical assistance, and office and transportation costs.

3.2 Benefit of Climate M&E Framework – Policy Effectiveness

Relative to M&E with development capacity, the benefits of a climate M&E framework are in the way it improves adaptation/development policymaking to deliver more effective policy outcomes. Through learning and risk management outputs, the climate M&E framework structures the outcome of more effective adaptation/development policy.

3.2.1 Learning

Development M&E frameworks exclude climate as a factor in policy design and implementation. Alternatively, a climate M&E framework facilitates specialist learning and knowledge accumulation about adaptation/development policy. A climate M&E framework differs in the following ways: a) the conceptual basis defines development as being climate resilient and with capacity for vulnerability reduction (Brooks et al., 2011; IEG, 2013); b) it incorporates climate variability and change as emerging risks that undermine policy developmental performance (Anderson, 2011); and c) ToC exercises establish the risks in each context (Anderson et al., 2014) and the relevant indicators (IEG, 2013). The approach develops the learning capacity of government institutions to better address climate risk through effective adaptation/development policy, rather than the expected effects of policy inputs for development results alone (MoP, 2014), ensuring institutional readiness for climate resilient development and the economic viability of government operations even under situations of climate stress.

The climate M&E system structures government learning on climate policy under climate stress that feeds back into the understandings of policymakers (Dinshaw et al., 2014). The consequence is more effective (IEG, 2013) and efficient decision-making (LDCF, 2007) (see Figure 3). Investment outputs vary between different adaptation strategies and climate scenarios (Lasage et al., 2014) and the climate M&E framework facilitates a rational comparison of policy strategies using the evidence base from the climate M&E framework (FAO, 2014). Later, investment outcomes include the economic benefits of resilience to climate stress – reductions in climate losses, uninhibited development, efficient resource allocation and lower asset exposure.

3.2.2 Climate Risk Management

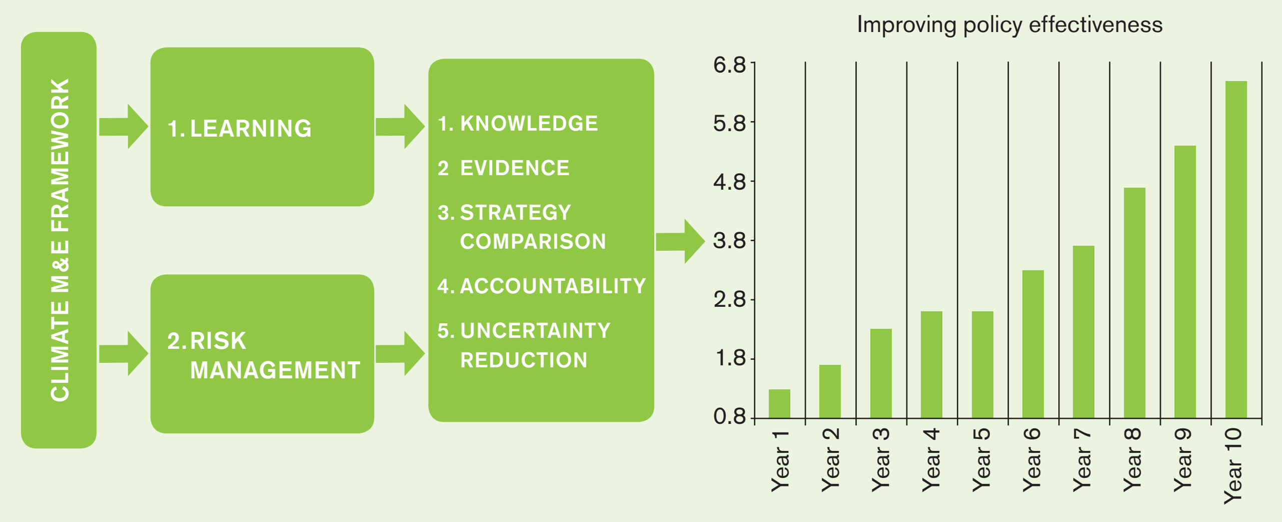
The climate M&E framework introduces effective risk management in complex and changing policy contexts (Travis and Bates, 2014). "Knowledge is information that changes something or somebody – either by becoming grounds for action, or by making an individual (or an institution) capable of different or more effective action" (Drucker, 2009). For instance, the use and application of climate information services – seasonal forecasts, early warning systems or longer-term climate modeling – reduces uncertainty for policy decision support and design, and again promotes effective/informed resource allocation (Agrawala and Van Aalst, 2008; Eakin and Lemos, 2006). Hence the abundance of policy and academic literature advocating the use and application of climate information services to develop effective policy (Orlove et al., 2004; Lemos et al., 2002; Hammer et al., 2001). Climate M&E institutionalises the introduction and systematic use of climate information services into government functions (IIED, 2013) by assessing its use and usefulness for planners and decision-makers in public authorities.

The climate M&E framework in Cambodia also structures the sustainability of effective adaptation/development policy. The framework is designed specifically to raise government capacity – including public authorities in joint-ownership and policy management with a variety of in-country partners (NCCARF, 2013; Brooks et al., 2011). Indeed, the use and sustainability of an evaluation mechanism depends on joint recognition and ownership (IIED, 2013). In addition, the maximum use of pre-existing data sources and indicators (Ponlok, 2014) minimises the possibility of a parallel system becoming perceived by government as an unnecessary expansion of bureaucratic functions.

The additional benefit of a national and sector level climate M&E framework is the systematic improvement in adaptation/development policy effectiveness. Figure 4 illustrates how these two effects of establishing and maintaining a climate M&E framework increase policy effectiveness in spite of more intense climate variability and climate change.

Figure 3: Climate M&E Framework and Learning

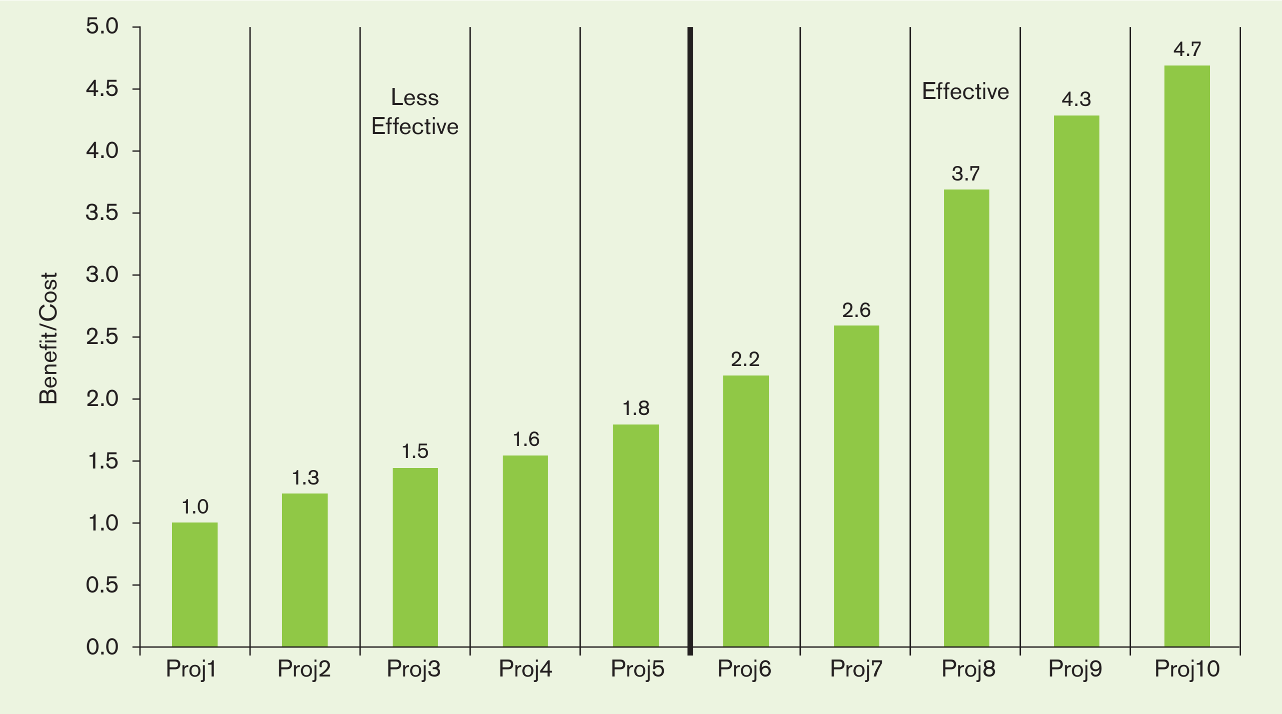
Figure 4: Learning, Risk Management, Information and Policy Effectiveness



3.3 Additional Benefit Valuation

To place a monetary value on improvements in policy effectiveness, the study first documents the types of returns associated with both effective and less effective adaptation/development policy (an illustration is shown on Figure 5). Central to the following research is the claim that standard development M&E (i.e. as the counterfactual) results in less effective policy as climate variability and change intensifies (Brooks et al, 2011; GIZ, 2012). Therefore, knowledge building through best practices and climate risk management within the climate M&E framework structures the outcome of effective adaptation/development policy. By understanding: a) the economic returns of effective versus less effective policy; b) the likely returns from effective policy from improving M&E quality alone; and c) by observing forecasts of future climate finance, the study extracts monetary values for the benefits of a climate M&E framework based on the values associated with improvements in future climate finance effectiveness. This estimates the economic returns of investing in a country with a climate M&E framework relative to a development M&E, such as the Results Framework.

Figure 5: Less Effective-to-Effective Projects – Illustrative Benefit/Cost Ratios



The World Bank International Evaluation Group (IEG) report on the relationship between policy effectiveness (see Table 1) and M&E systems using M&E systems of the International Financial Corporation and Multilateral Investment Guarantee Agency (IEG, 2013). The study uses a simple analysis of the IEG's World Bank project rating data to illustrate the relationship between quality M&E systems (appropriateness of conceptual design, suitability of indicators and data collection) and policy effectiveness (achievement of objectives through appropriate design and implementation) (IEG, 2013a).[6] The findings from the IEG data, in combination with values of policy effectiveness and projections of future climate finance, enable the development of monetary valuations for the benefits of the climate M&E framework.

This results from a series of sequential steps:

Step 1: benefit/cost ratios of adaptation/development projects in Cambodia identify the difference or range between effective and ineffective projects;

Step 2: the range between effective and less effective projects identifies the additional value of effective policy when considering future projections of climate finance inflows to Cambodia;

Step 3: the weight of the relationship between policy effectiveness and M&E systems is used to estimate the likely contribution of the climate M&E framework.

Table 1: IEG Criteria for Policy Effectiveness and Adaptation/Development Policy Application

LESS EFFECTIVE	EFFECTIVE
1. Objectives: One or More Not Achieved Example: No Improvement to Resilience/ Vulnerability	1. Objectives: Achieved Example: Climate Resilient Development/ Vulnerability Reduction
2. Efficiency: Sub-Optimal Use of Resources Example: Climate Losses Remains Constant	2. Efficiency: Optimal Use of Resources Example: Reduction in Climate Losses
3. Context: Low Relevance to Country Needs Example: Remains Climate Vulnerable Context	3. Context: High Relevance to Country Needs Example: Addresses High Climate Vulnerability

[6] For further elaboration see Section 5.1.

4

Additional Costs of Climate M&E Framework

The following section first costs the development M&E capacity within the MPWT; documenting the necessary resources to implement the infrastructure for the government-based Results Framework to cover all adaptation/development policy. This process is made possible by working with Planning Department personnel within the MPWT, and the Ministry of Education, Youth and Sport. The second sub-section outlines the costs of developing the climate M&E framework in MPWT for this same portfolio. Figures are established by working with members of the CCCA, CCD, and IIED representatives. The third sub-section compares the above figures to determine the additional costs of the climate M&E framework.

4.1 Costs: Development M&E Framework

As development M&E units are yet to become fully operational within the MPWT, the figures are estimations of establishing this capacity within government, and in line with the Results Framework of the National Strategic Development Plan (2014–2018). Up until now the majority of M&E work has been project-based and conducted by teams of M&E consultants working for multilateral development banks, or other implementing agencies. Therefore, the figures below represent the first estimate of the resources needed to establish such a function

A small unit, composed of existing staff, is in charge of the direction and assessment of M&E functions. The unit follows the Results Framework approach by creating strategic emphasis and resource allocation activity primarily directed towards results (MoP, 2014). In the first year, six staff members work part-time, and for every following year this number falls to four. Duties include site visits, collating information, and developing reports in accordance with the Results Framework (GoC, 2014b). In particular, staff members ensure MPWT institutional priorities align with indicators and chosen evaluation methodologies (GDoP, 2014) and maintain duty of care in relation to compliance with environmental legislation (MPWT, 2014), the safe sourcing of supply materials, and other social and environmental safeguards (i.e. soil and location quality) (MPWT, 2011). Specifically in relation to these latter aspects, staff are provided with technical assistance by three consultants in year 1, and a single consultant for every following year.

Table 2: Development M&E Establishment and Maintenance Costs – MPWT

TYPE	DETAILS	COST ($)	COST (£)
	Year 1 Establishment Costs		
1. Core Staff	6 Staff Part-Time	$3,000	(£1,941)
2. Technical Assistance	3 Consultants	$8,000	(£5,178)
3. Training	2 Workshops	$13,000	(£8,415)
4. Office Costs	Rehabilitate Office and Equipment	$7,000	(£4,531)
5. Transport	Fully Operational Car, Fuel	$50,000	(£32,366)
6. Other Support	M&E Framework Preparation, MPWT Staff Training, and Printing	$3,000	(£1,941)
		$84,000	**(£54,372)**
	Annual Maintenance Costs (Average)		
1. Core Staff	4 Staff Part-time	$500	(£323)
2. Technical Assistance	1 Consultants	$2,000	(£1294)
3. Training	2 Workshops	$5,000	(£3236)
4. Office Costs	Office and Equipment Maintenance	$1,000	(£647)
5. Transport	Inspection and Fuel	$3,000	(£1941)
6. Other Support	Printing	$1,000	(£647)
		$12,500	**(£8,088)**

Two workshops are held annually in both the establishment and future years of implementation. These activities train staff on the conceptual bases of the Results Framework, select indicators and familiarise personnel with the relevant procedures for data collection. In the years that follow, workshops provide opportunities to refine M&E procedures, re-formulate/modify the design of indicators and report on development results.

The remainder of the expense is towards basic operating costs. This primarily includes the purchase of a new vehicle and its annual maintenance and necessary inspections. In addition, the new M&E unit needs its own office space, and so requires rehabilitation and maintenance of new areas within the Planning Department of the MPWT. Finally, on-going workshops and data collection, suggest the necessary provisions are made for printing M&E reports and survey documents.

4.2 Costs: Climate M&E Framework

The second sub-section provides the costs of establishing and maintaining climate M&E functions within the MTPW, and thus outlines the necessary resources to achieve the sector-based medium-term directives on M&E within the Cambodia Climate Change Strategic Plan (2014–2023) (GoC, 2013). At the time of writing, climate M&E activity is in the process of becoming operational. As a consequence, establishment year costs are based on on-going expenditures, and annual maintenance costs are estimates of future expenditure.

Establishment year costs often relate to the capacity building of MPWT staff within the M&E unit who conduct and coordinate M&E activities. This includes participatory learning initiatives designed to increase understanding of the core concepts, and build knowledge around the value of climate M&E (Ponlok et al., 2014). Next, IIED representatives work with MPWT staff to develop Track 1 and 2 indicators, which are finalised through iterative workshop consultations. Track 1 and 2 indicators require different types/levels of engagement: Track 1 indicators involve the identification of climate risk management within MPWT institutional practices, developing metrics to track progress using the readiness ladder approach (Rai et al., 2014), refining assessment terminology over several iterations of consultation, and establishing baselines; conversely, Track 2 parameters are designed to measure contributions of adaptation/development policy through the selection of indicators tailored to the MPWT – i.e. climate resilient development in relation to road, railways and other large-scale infrastructure – and baseline data are available from existing sources, such as the Commune Database (MoP, 2011).

In addition, there are additional operational expenditures designed to ensure the sustainability of the climate M&E framework when supports are removed in later years. In particular, new data requires the establishment of new subnational and sector level activities to alter institutional practices. These include: consultants working with M&E unit staff to design M&E reporting protocols for each indicator (formatted data sheets and measurement methodologies) that inform a new knowledge management system; expertise is required to experiment with new data on vulnerability or loss and damage not previously existing within the NIS; new surveys and studies are necessary to validate the new climate design of M&E; and finally, project level indicators have to be designed and trailed that can link with the MPWT on the sectoral level (see item 7, Table 3).

Further capacity building is provided through the exchange meetings (held in Addis Ababa, Ethiopia in February 2015). Implementing climate M&E is often a complex process with consistent barriers to its effective functioning across cases that require participatory learning (GoC, 2013). The objective of annual exchange meetings is to share experiences and learn about implementing climate M&E frameworks in varying contexts, and so participants take lessons learnt back to their respective government ministries and agencies.

Table 3: Climate M&E Establishment and Maintenance Costs – MPWT

TYPE	DETAILS	COST ($)	COST (£)
	Year 1 Establishment Costs		
1. MPWT Inception Workshop	15 MPWT Staff	£4,171	(£2,700)
2. Track 2 Indicators	MoPWT – 15 Staff	$4,171	(£2,700)
3. Finalise Indicators	MoPWT	$200	(£129)
4. Exchange Meeting	1 Government Staff – Flights/ Logistics	£1,500	(£2,317)
5. Core MPWT Staff + CCD Support	2 Part-Time MPWT Staff + 2 Part-Time CCD Staff	$5,320	(£3,443)
6. IIED Technical Support	2 x Part-Time IIED Staff	$53,426	(£31,584)
7. Operational Costs[7]	See footnote below	$138,000	(£89,330)
		$206,788	**(£132,203)**
	Annual Maintenance Costs (Average)		
8. Core MPWT Staff	2 Part-Time MPWT Staff	$1,000	(£647)
9. Database Modifications/Addition Evidence	Adjust of National Indicators, Supporting Evidence[8]	$52,000	(£34,682)
10. Implementing Partner (Also Conducts Analysis)	Local Consultancy Organisation	$23,988	(£16,000)
11. Workshop	Reporting of Progress on Action Plan	$2,000	(£1,294)
		$78,998	**(£52,623)**

[7] Additional costs include: travel costs ($4,000); survey costs ($120,000 assuming 4 districts); further convening workshops ($9,000); and technical support ($5,000). These additional resources are subject to the successful access to funding for further work on survey data collection and analysis.

[8] This includes: adjustment of indicators already collected by the National Institute of Statistics ($2,000); annual supplementary/supporting data collection if needed – estimation of 3 such surveys ($50,000).

An implementing partner is chosen with the necessary capacity to support the climate M&E framework through the early years of operations. This is an institution with a proven record of implementing similar M&E functions and past engagement with government. They provide conceptual and analytical in-country support to direct the establishment of the climate M&E operations.

A distinct characteristic of the climate M&E framework in Cambodia is the exceptionally low maintenance costs. After various capacity building exercises of the first year, costs begin to fall significantly. In terms of data collection, only a few modifications to data gathering efforts ('climate proofing' indicators) are on going within the department (Transport Sector Working Group, 2014). This includes developing one or two new questions within operational surveys. Second, implementing partner consultants are necessary to conduct the analysis for the first few years of operations, but through incremental capacity improvements, the competency gradually transfers to MPWT staff. Finally, there are annual outlays for workshops designed to facilitate reporting on progress for the Climate Change Action Plan for the Transport Sector (Transport Sector Working Group, 2014).

In summation, the climate M&E framework costs $122,788 (£79,483) more to establish compared to the development M&E framework (Table 4); additional maintenance costs for the climate M&E framework comes to $66,498 (£44,535) for each additional year of operations. Higher costs in the establishment year are due to capacity building efforts in workshops, technical assistance and more expensive data collection and management activity. Conversely, once the necessary changes in data collection procedures are made, institutions established and staff trained, the focus shifts to less cost intensive activities of supplementary data collection, annual analysis and reporting. The next section explores what investors in the climate M&E framework receive for the additional outlay of capital in the early years.

Table 4: Additional Costs – Climate M&E Framework

TYPE	($)	(£)
Development M&E Establishment Costs	$84,000	(£54,372)
Climate M&E Establishment Costs	$206,788	(£132,203)
Additional Climate M&E Establishment Costs	**$122,788**	**(£79,483)**
Development M&E Maintenance Costs	$12,500	(£8,088)
Climate M&E Maintenance Costs	$78,998	(£52,623)
Additional Climate M&E Maintenance Costs	**$66,498**	**(£44,535)**

5

Additional Benefits of Climate M&E Framework

This section estimates the additional benefit of the climate M&E framework in Cambodia. Qualitative benefits are set out in the methodology (Section 3), and correspond to improving effectiveness of adaptation/development policy. To place monetary values on policy effectiveness, the analysis first uses findings from past cost-benefit analyses of adaptation/development policy to estimate the increasing economic returns associated with highly effective policy relative to that with medium effectiveness.

The second sub-section estimates how much of the yield improvements to attribute to strong M&E systems (optimal conceptual design, appropriate indicators and data collection) versus those of medium quality (sub-optimal conceptual design, indicators and data collection for adaptation/development policy) in order to estimate the contribution of the climate M&E framework (see Table 5). The analysis uses the term 'average M&E quality' for the development M&E framework, and 'high M&E quality' for the climate M&E framework, due to their correspondence to three criteria in relation to adaptation/development policy: a) an appropriate conceptual design (i.e. suitable to assess improvements in climate resilience and vulnerability reduction); b) indicators to measure contributions from the policy under assessment (i.e. improvements in climate resilience and vulnerability reduction); and c) corresponding baseline data. Criteria to differentiate strong from average M&E is based on the objectives of policy within each context (IEG, 2013). The climate M&E framework is conceptualised to track and assess how policy is achieving climate risk management and contributing to resilient development and vulnerability reduction; rather than a development M&E framework without any systematic consideration of climate as

Table 5: M&E Quality for Adaptation/Development Policy

AVERAGE M&E	HIGH M&E
1. Development Based Conceptual Design	1. Climate Resilience or Vulnerability Reduction Conceptual Design
2. Development Focused Indicators	2. Climate Resilience/Vulnerability Indicators
3. Development Baseline Data	3. Climate Resilience/Vulnerability Baseline Data

a factor. From this relevant conception arrives the appropriate selection of indicators and baseline data that facilitates understandings of progress under climate stress.

Third, the additional weight of strong M&E systems on policy effectiveness is used to demonstrate the likely impact on the economic returns of future climate finance flows to the MPWT. The finding is that even a small positive impact on the rates of economic return yields considerable monetary benefits, due to the scale of projections of climate finance over the coming decade.

5.1 Climate M&E Framework and Policy Effectiveness

The following analysis focuses on variation in economic effectiveness of adaptation/development policy within Cambodia. Data for this exercise is based on interviews with government officials, multilateral development banks, implementing bodies and research institutions, and draws on expert opinions for the widest sample possible of ex-ante or ex-post cost-benefit analyses of adaptation development policy.

Data gathering uncovered 21 cost-benefit analyses of adaptation/development projects in Cambodia (see Table 6). The projects under analysis either: a) are explicitly designed to facilitate climate adaptation or climate resilience; b) address the direct and indirect effects of climate variability and change – floods, drought, erratic rains, storms and land degradation (IPCC, 2001); or c) are provided by one of the climate funds. Projects are for irrigation and water management in drought prone areas, climate proof infrastructure including roads, sustainable livelihoods and agriculture/livestock, and climate resilient urban development.

Information about the return on investment is not standard across the project documents. Some cost-benefit analyses produce Benefit-Cost Ratios. BCRs demonstrate the return from the investment when

Table 6: Projects, Benefit-Cost Ratios, Internal Rates of Return and Z-Scores

ADAPTATION/ DEVELOPMENT POLICY DETAILS	B/C RATIO	IRR	Z-SCORE	Z-SCORE DERIVED B/C RATIO
1. Flood Proof Sanitation	1.68	n/a	–1.36	1.68
2. Water Conservation	1.88	n/a	–1.18	1.88
3. Rural Roads	2.54	n/a	–0.57	2.54
4. Irrigation	n/a	15%	–0.56	2.55
5. Road Improvement	n/a	15%	–0.56	2.55
6. Agri.Development	n/a	19%	–0.48	2.63
7. Urban Develop.	n/a	21%	–0.44	2.69
8. Piped Water	2.73	n/a	–0.4	2.73
9. Irrigation	n/a	23%	–0.4	2.73
10. Sustainable Livelihood	n/a	24%	–0.38	2.75
11. Road Restoration	n/a	24%	–0.38	2.75
12. Livestock Program	n/a	31%	–0.24	2.88
13. Rural Infrastructure	n/a	32%	–0.22	2.91
14. Irrigation Construction	3.17	n/a	0.01	3.17
15. Resilience-Coastal areas	3.3	n/a	0.13	3.3
16. Water Conservation	n/a	56%	0.27	3.45
17. Community Fisheries	n/a	60%	0.35	3.53
18. Reservoir Construction	3.99	n/a	0.76	3.99
19. Energy Efficiency	4.18	n/a	0.94	4.18
20. Rehabilitated Irrigation	4.98	n/a	1.67	4.98
21. Agricultural Training	n/a	193%	3.04	6.36

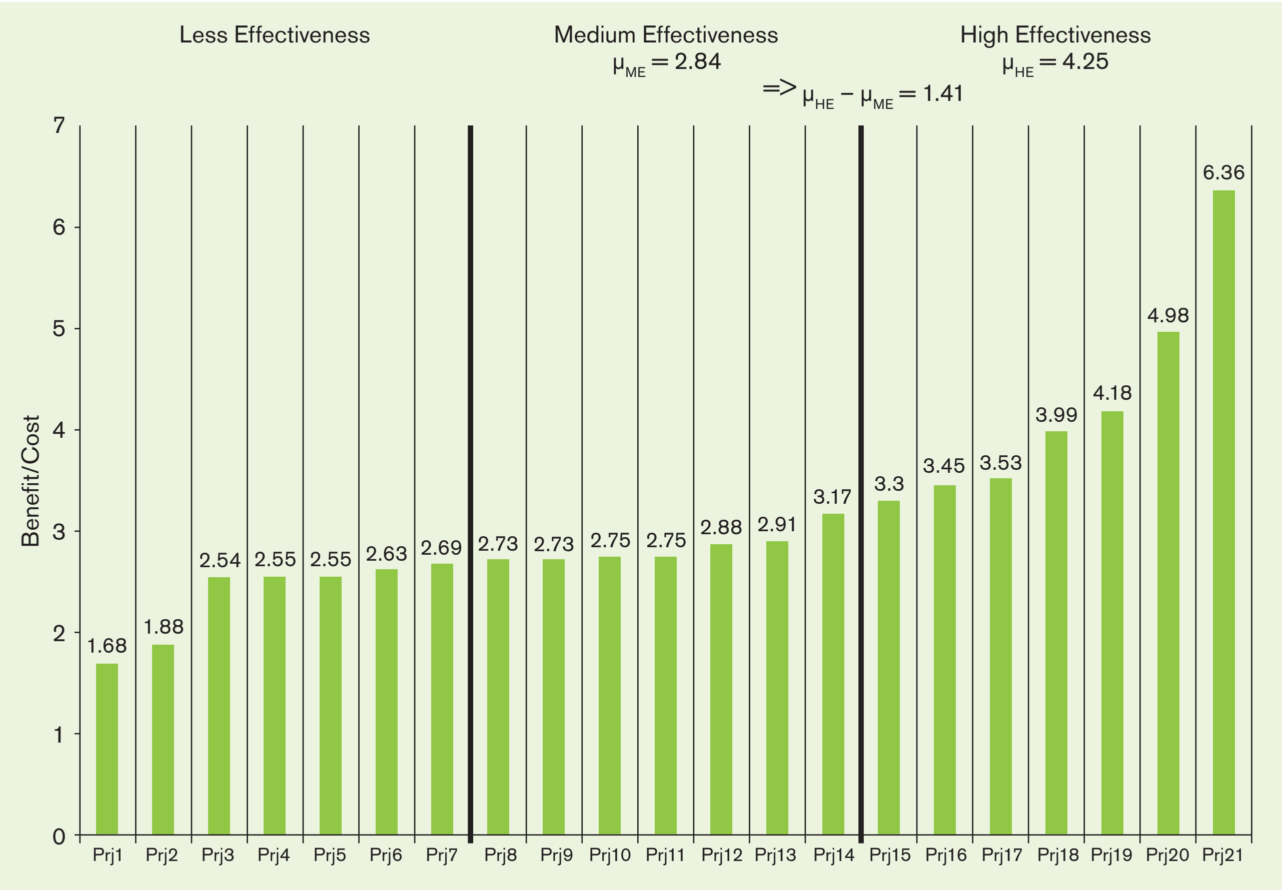
inflation adjustments and discounting[9] are included. Ratio scores read as follows: for every dollar invested, you receive X dollars in return when accounting for inflation and time preference. The general decision-rule is that any benefit-cost ratio over 1 is economically viable. Other cost-benefit analyses show investment returns through the internal rate of return (IRR). The IRR score shows the level that the discount rate would have to be for the Net Present Value to be zero, and a viable investment is any IRR that is higher than the pre-determined discount rate.

Yet the BCR and IRR are both measures of the magnitude of returns on investment. To standardise these measures, both categories of figures are initially converted into z-scores and then aggregated into a single variable showing the proportional magnitude of returns from the investment (see Table 6). Using the z-scores, a final BCR variable is constructed that converts the IRR into BCR score based on this relative magnitude.

Using the IEG's analysis of M&E systems impact on project effectiveness, and the variation in adaptation/development effectiveness, what follows identifies the value of the linkage between high development effectiveness and strong M&E systems (the climate M&E framework in the context of adaptation/development policy) understood relative to the counterfactual of establishing the development M&E framework (of medium utility in the context of adaptation/development policy). The analysis: a) categorises the magnitude of investment returns into low, medium and high effectiveness; b) calculates the improving returns between medium and high policy effectiveness (see Figure 6); and c) uses the IEG's World Bank project ratings data to measure the relationship between strong M&E systems and high policy effectiveness to estimate the additional monetary benefit of strong M&E systems on investment returns.

Figure 6 demonstrates how adaptation/development projects vary in terms of their returns on investment. The difference between the mean BCR for medium (2.84) to highly effective (4.25) projects is a 1.41 increase. Therefore, the BCR for medium effectiveness (2.84) estimates the returns available under the development M&E framework (understood as the baseline). The next stage is to estimate how much of the increasing yield from medium to high effectiveness – or from the development-based M&E to the climate M&E framework (1.41) – it is reasonable to attribute to strong M&E systems alone.

Figure 6: Additional Returns on Investment for Effective Adaptation/Development Policy



[9] An issue is that variation in the discount rate chosen impacts on the benefit-cost ratio.

IEG (2015) provide data on the World Bank's project ratings and the quality of M&E used for each project. Bivariate correlations are positive (.22) and Table 7 provides a breakdown of the relationship when comparing medium to high project effectiveness. Over half of the 'highly effective' projects have strong M&E systems (51%). For the purpose of this analysis, the focus is on the difference in average to strong M&E quality – simulating development-based and climate M&E frameworks respectively – and their relationship to high project effectiveness. The simple analysis shows as M&E quality improves from average to strong, there is a 9.5% increase in highly effective projects under the strong M&E classification.

Therefore, using the weight of this relationship between M&E systems and project effectiveness (albeit without controls), the following estimate shows the likely contribution of high quality M&E (e.g. climate M&E framework for adaptation projects) relative to one with medium effectiveness (e.g. development M&E framework for adaptation projects), on improvements in the BCR: enhancing M&E from an average to strong quality yields a 9.5% increase in the likelihood of achieving a highly effective project based on past experience. Hence, when considering the improvements in BCR (1.41) from medium to highly effective adaptation/development projects, this suggests the BCR is likely to increase by 0.13 (1.41*.095) when implementing the climate M&E framework relative to the development M&E framework. What remains is to estimate what this means in terms of greater returns on future climate finance for adaptation.

5.2 Monetary Value of the Climate M&E Framework

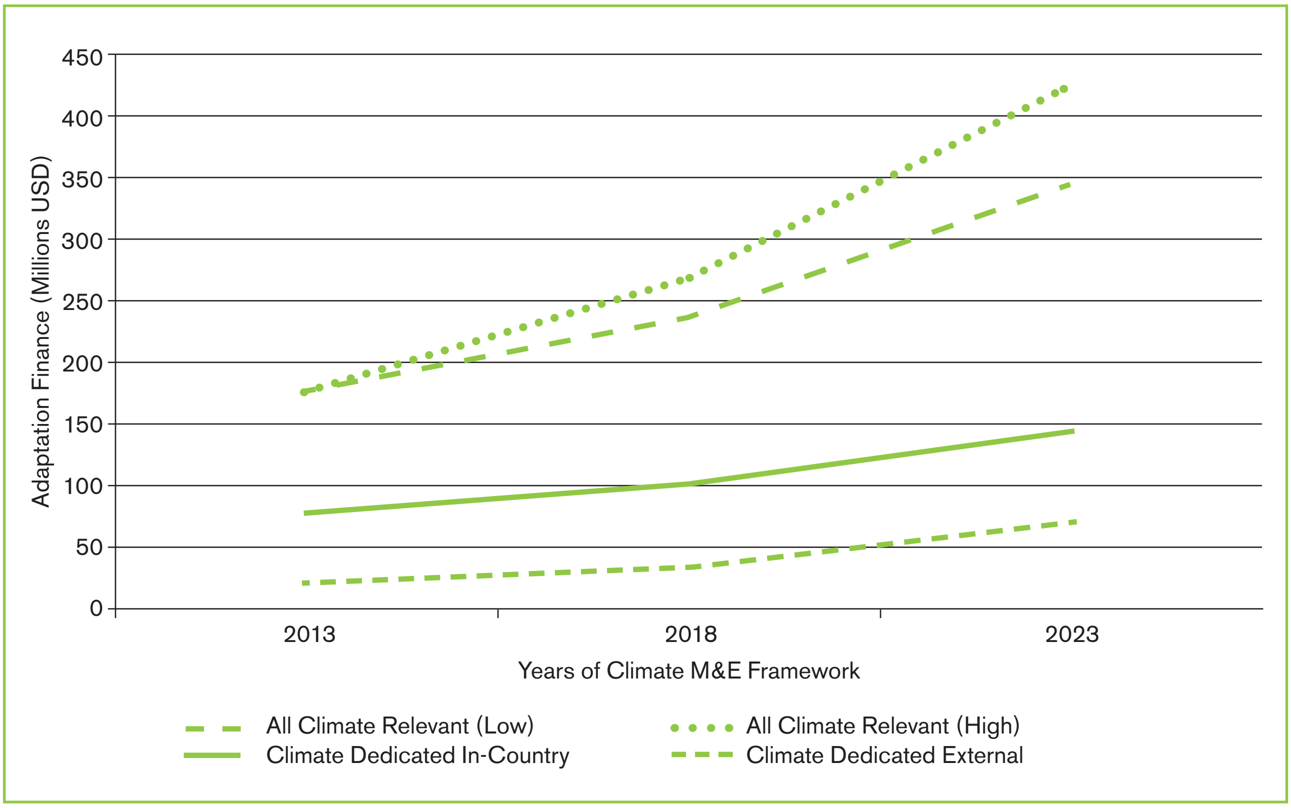
What follows outlines the monetary value of the climate M&E framework using the development M&E framework as a baseline; and using projections of climate finance inflows into Cambodia, and the MPWT more specifically. The most authoritative account of past climate finance is the Climate Public Expenditure and Institutional Review (ODI, 2012). A similar methodology is used to categorise and estimate future climate finance inflows for the Cambodia Climate Change Financing Framework (CCFF) (GoC, 2014). Figure 7 below uses estimates in the CCFF to show the projected increases in climate finance (2013–2023) – 7% and 10% per annum increases for low and high increase scenarios respectively. Projections of future climate finance for adaptation are significant: lower bound estimates see funding rising from $176m (2013) to $236m (2018), and $345m (2023); higher bound figures range from $270m (2018) to $425m (2023). Yet it should be kept in mind these figures include all domestic funds (even those of medium to low relevance), and from here on the focus is on in-country [$78m (2013) to $145m (2023)] and external [$22m (2013) to $70m] financing that is dedicated to climate adaptation.

Table 7: Project Effectiveness and M&E Quality

	LOW M&E	AVERAGE M&E	STRONG M&E
Medium Project Effectiveness	28.6%	39.6%	31.8%
High Project Effectiveness	7.5%	41.5%	51%

Source: IEG (2015)

Figure 7: Estimated Climate Finance Inflows (2013–2023)



The MPWT is a disproportionate recipient of climate finance for adaptation, which corresponds to their role as climate-proofers of infrastructure in Cambodia. The ministry oversees considerable large-scale climate resilient development projects, such as national roads, railways and bridges. As a consequence, climate finance for adaptation allocation to the MPWT is forecast at 19.5% of total flows from 2013–2018 [appreciating at approximately 6% per annum – $4.29m (2013) to $5.74m (2018) in the external assistance scenario, and $15.21m (2013) to $20.23m (2018) for the in-country scenario]. On the informed assumption (see national level forecasts above) this trend continues throughout the lifecycle of the climate M&E framework (10 years), the MPWT will receive $7.68m (external) and $27.23m (in-country) per annum by 2023.

Based on assumptions of investment returns under different M&E scenarios (Section 5.1), the development M&E framework as the baseline contributes to a return of between $43.2m (2013) and $77.36m (2023) when using in-country dedicated adaptation expenditure (see Figure 8), and between $12.18 and $21.82m for external dedicated adaptation assistance (see Figure 9). The additional benefit of a climate M&E framework – BCR increase of .13 – rises from between $1.97m (2013) to $3.54m (2023) using in-country dedicated adaptation expenditure, and from between $0.56m (2013) to $1m (2023) for external dedicated adaptation assistance. Total additional benefits accumulate to $29m (in-country) and $8.39m (external) over the 11 year lifecycle of the climate M&E framework.

Yet, the impact of learning initiatives is commonly understood to have a time-lag between knowledge building and improvements in procedures (IEG, 2009). The study uses a random sample of data on the duration of learning projects from the AidData portal to develop an assumption of when the benefits of the climate M&E framework will begin to influence the effectiveness of policy. Results show that such projects last on average 5.79 years. For a slow learning scenario, this study assumes positive effects begin at 6 years, and increase by 10% per annum to reach 50% of the potential benefits at the end of the climate M&E framework life-cycle. Annual benefits range from $0.28m (2013) to $1.77m (2023) for in-country dedicated adaptation expenditure, and $0.07m (2013) to $0.5m (2023) for external dedicated adaptation assistance. Second, the study assumes this same timeline for monetary benefits to commence, but for a more optimistic scenario instead incrementally realise 20% of benefits per annum to reach 100% of potential benefits on completion of the assumed lifecycle of the climate M&E framework. Annual monetary benefits range from $0.56m (2013) to $3.54m (2023) for in-country dedicated adaptation expenditure, and from $0.15m (2013) to $1m (2023) for external dedicated adaptation assistance.

Figure 8: Benefits of Development/Climate M&E from In-Country Adaptation Dedicated Expenditure

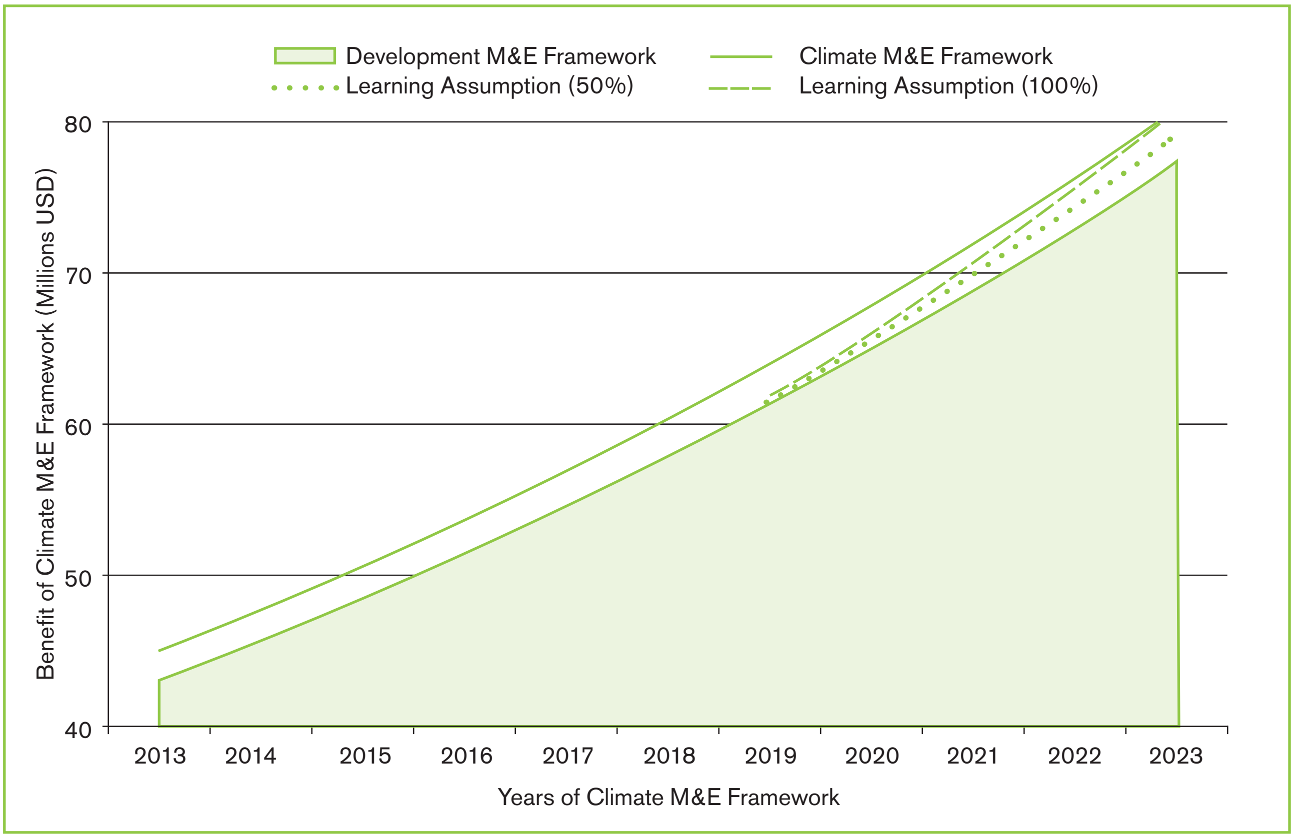
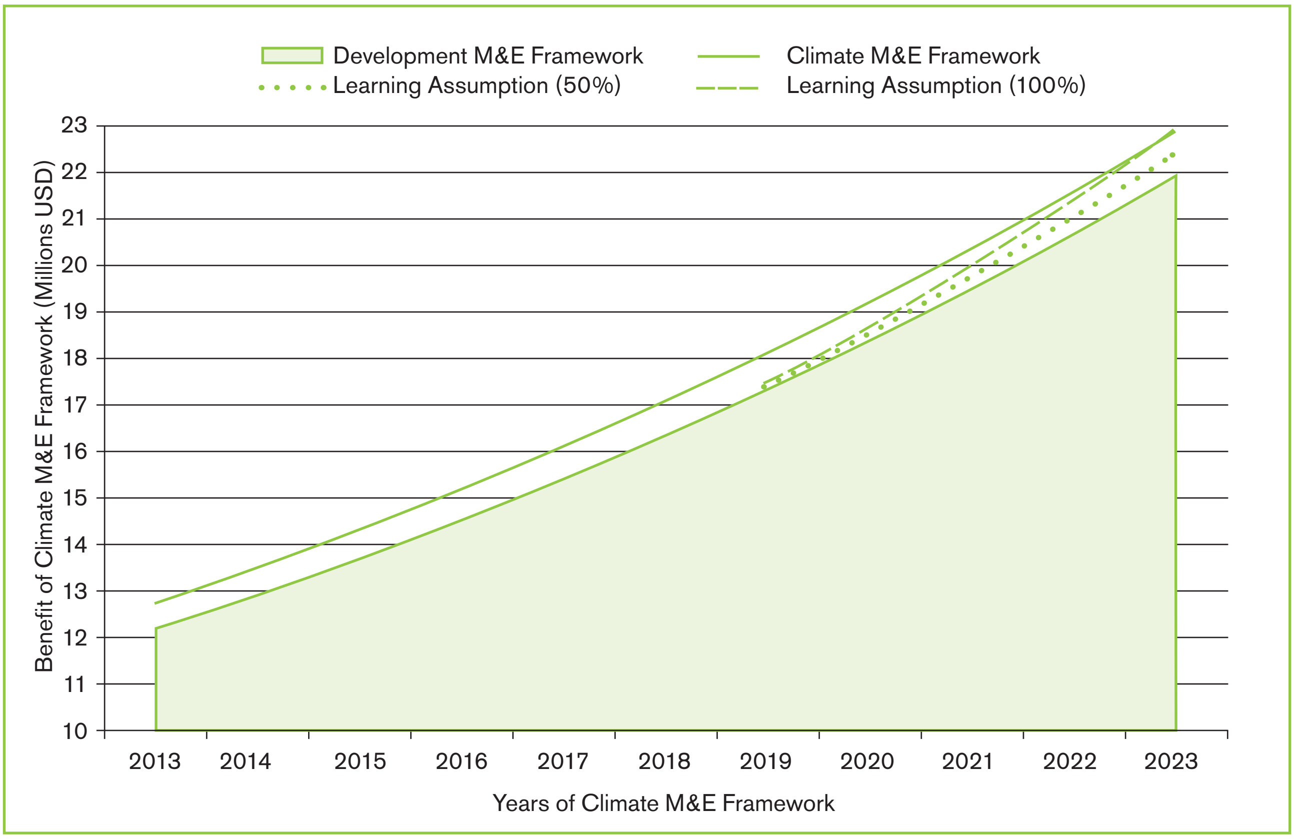


Figure 9: Benefits of Development/Climate M&E from External Dedicated Adaptation Expenditure



6

Findings

The final section compares the inflation adjusted and discounted costs and benefits of implementing the climate M&E framework to provide NPVs: Section 6.1 outlines the NPVs with a sensitivity analysis using variation in the discount rate; Section 6.2 uses figures to develop a break-even analysis showing when investors in the climate M&E framework will see returns.

6.1 Net Present Value of the Climate M&E Framework

The present value and net present value of additional costs and benefits of the climate M&E framework in the MPWT are given in Table 8. Under the assumption of delayed onset of benefits (i.e. learning takes 6 years to begin to influence policy design and implementation), and using two scenarios of realised benefits (50% and 100%), the NPVs of investing in the climate M&E framework are positive and significant for a 11 year investment. This holds for both in-country dedicated adaptation expenditure and external dedicated adaptation assistance, and in all discounting scenarios. The results demonstrate that even relatively small incremental improvements in economic returns (BCR increase of .13) brought about by improving policy effectiveness – representing one of the main benefits of investing in a climate M&E framework – result in considerable yields when effectiveness is improved across large-scale investment programs, such as finance inflows for dedicated adaptation/climate resilient policy.

The types of returns for establishing and maintaining a climate M&E framework are significant compared to other investments in adaptation/climate resilience. Yet it is worth considering that little cost-benefit research investigates improvements in governance capacity. Capacity building initiatives have systemic positive effects on governing processes, and any small improvements in economic returns, when operating across an entire section of government policy, result in overall monetary benefits that far out-weight the initial capital outlay.

Table 8: Net Present Values

PRESENT VALUE – COSTS	PRESENT VALUE – BENEFITS	PRESENT VALUE – BENEFITS	NET PRESENT VALUES
	50% LEARNING ASSUMPTION	100% LEARNING ASSUMPTION	
	In-Country Dedicated Adaptation Expenditure		
$577k (High)	$3.17m (High)		$2.59m (High)
$503k (Mid)	$2.68m (Mid)		$2.17m (Mid)
$446k (Low)	$2.27m (Low)		$1.82m (Low)
$577k (High)		$6.36m (High)	$5.78m (High)
$503k (Mid)		$5.37m (Mid)	$4.86m (Mid)
$446k (Low)		$4.56m (Low)	$4.11m (Low)
	External Dedicated Adaptation Assistance		
$577k (High)	$0.96m (High)		$0.38m (High)
$503k (Mid)	$0.81m (Mid)		$0.30m (Mid)
$446k (Low)	$0.68m (Low)		$0.23m (Low)
$577k (High)		$1.95m (High)	$1.37m (High)
$503k (Mid)		$1.64m (Mid)	$1.13m (Mid)
$446k (Low)		$1.39m (Low)	$0.94m (Low)

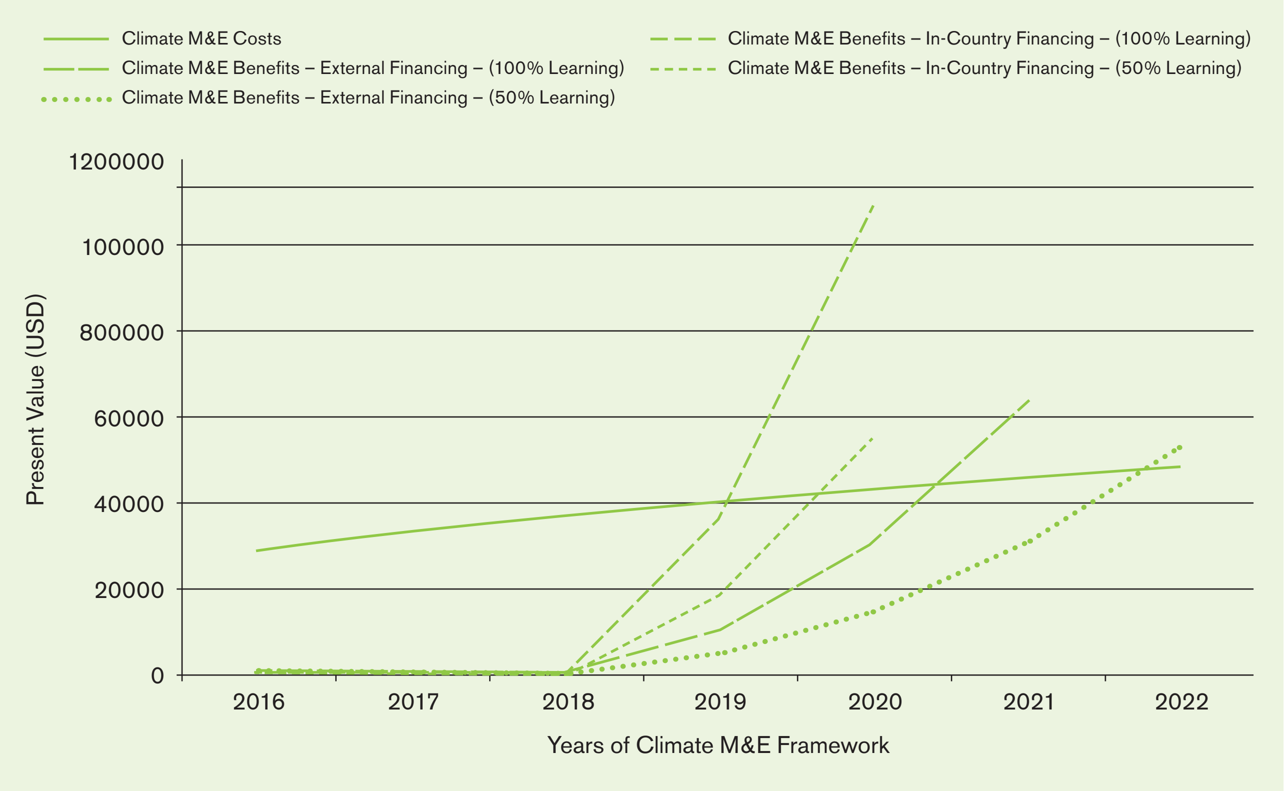
Discount Rate = 5.86% (High) , 3.86% (Mid), 1.86% (Low); Inflation (2013)

6.2 Break Even Analysis

This section estimates when applying the climate M&E framework will likely generate a positive return for investors. The break-even point is the intersection where accumulative costs and benefits meet. At this point, investors cover their initial costs and maintaining the climate M&E framework generates further positive revenue from improving policy effectiveness. This rests on the assumptions around learning and its effect on policy implementation and design stated previously. In particular, ideas around the assumed time lag between implementation of the climate M&E framework and the realised benefits are central to the findings.

By implementing the climate M&E framework and receiving the benefits from the external dedicated adaptation assistance alone, both the learning scenarios (50% and 100%) complete the payback period within 10 years; and take 4 years to cover costs once learning is assumed to begin to influence design and implementation of policy. Conversely, the figures for in-country dedicated adaptation expenditure are much higher, and generate higher returns for implementing the climate M&E framework. Under both learning scenarios (50% and 100%), the investment covers costs by the 8th year, and which represents the 2nd year when learning is assumed to have positive effects on policy design and implementation.

Figure 10: Break Even Analysis



7 Conclusion

Cambodia experiences significant impacts from climate variability and change. An ever-increasing amount of government policy addresses such adverse effects. Yet without a climate M&E framework – i.e. by using a development M&E framework – the conceptual basis of this learning mechanism is flawed from the outset, and thus unable to comprehend the complex threats of climate to development trajectories. The capacity to correctly understand the growing challenge of climate change to development processes is the first step to protecting economic productivity.

By using TAMD to guide the climate M&E framework, the Government of Cambodia will improve the effectiveness of adaptation/climate resilient development policy as related financing streams increase over time. The objective of this study was to provide a sense of the monetary benefits of the climate M&E framework, and compare these with the costs of implementation. The development M&E framework was used as the baseline to show the additional costs (associated with setting up necessary infrastructures) and additional benefits (greater policy effectiveness) of implementing the climate M&E framework inside the MPWT.

Results illustrate high returns from investing in a climate M&E framework guided by TAMD. Even under the assumption of a modest improvement in policy effectiveness (BCR = .13), and under particularly cautious learning-policy effectiveness feedback scenarios, the returns are significant. Two points are worthy of emphasis: first, current and future projections of climate finance inflows to the MPWT are in the tens of millions of US dollars, and thus improvements to policy effectiveness will be felt over a whole series of investments in adaptation/climate resilience; second, the relative set-up costs of the climate M&E framework in Cambodia are particularly efficient (and sustainable) in terms of design and data collection (the latter often being the most expensive component of M&E over time), especially given the assimilation of many often resource intensive M&E activities into pre-existing institutions.

With climate finance becoming more readily available across the developing world, findings on the benefits of the climate M&E framework illustrate the types of improvements in returns possible if governments progress policy design and implementation. Researchers using cost-benefit analysis typically avoid investigating policy options with complex and multi-faceted value pathways, such as raising the governance capacity in relation to adaptation/climate resilient policy. Though it is possible these types of policies – with relatively small investments in governance capacity at national/sector levels, and with yields across a whole system of government policy – are where the greatest returns are available.

References

Agrawala, S. and Van Aalst, M. 2008. Adapting Development Cooperation to Adapt to Climate Change. *Climate Policy* 8: 183–193.

AidData. 2015. AidData 3.0. William and Mary: Virginia.

Anderson, S. 2011. *Assessing the Effectiveness of Climate Adaptation*. IIED Briefing.

Anderson, S., Khan, F., Fikreyesus, D. and Gomes, M. 2014. *Forwards and Backwards Evidence-Based Learning on Climate Adaptation*. IIED Brief, 1–4.

Asian Development Bank (ADB) (2013) *Cost-benefit Analysis for Development: A Practical Guide*. Manila: Asian Development Bank.

Barrett, S. 2014. *Cost and Values of TAMD in Kenya*. IIED Working Paper.

Bert, F., Satorre, E., Toranzo, F., and Podesta, G. 2006. Climatic information and decision-making in maize crop production systems of the Argentinean pampas. *Agricultural Systems* 88, 180–204.

Brooks, N. 2014. *Using Wellbeing Indicators and Climate Information to Assess Adaptation Effectiveness*. IIED Briefing.

Brooks, N., Anderson, S., Burton, I., Fisher, S., Rai, N., and Tellam, I. 2013. *Tracking Adaptation and Measuring Development.* IIED Climate Change Working Paper 5.

Brooks, N., Ayers, J., Anderson, S., Burton, I. and Tellam, I. 2011. *Tracking Adaptation and Measuring Development.* IIED climate change working paper 1.

Brooks, N. and Fisher, S. 2014. *Tracking Adaptation and Measuring Development: A Step-by-Step Guide*. IIED Publication.

Dinshaw, A., Fisher, S., McGray, H. and Schaar, J. 2014. *Monitoring and Evaluation of Climate Change Adaptation Methodological Approaches*. OECD working paper.

Drucker, P. 2009. *The New Realities*. New Jersey: Transaction Publishers.

Eakin, H. and Lemos, M. 2006. Adaptation and the State: Latin America and the Challenge of Capacity-building under Globalization. *Global Environmental Change* 16: 7–18.

Food and Agricultural Association of the United Nations (FAO). 2014. *Evidence-based Climate Change Adaptation and Globally Important Agricultural Heritage Systems*. FAO Policy Brief.

General Directorate of Planning (GDoP). 2014. *M&E Approach in the NSDP Cycle 2014–2018*. Phnom Penh: Cambodia.

GIZ. 2012. *A Closer Look at Monitoring and Evaluation (M&E) of Adaptation*. Policy Note. GIZ and the Federal Ministry for Environment and Nature Conservation and Public Safety.

Government of Cambodia (GoC). 2013. *Cambodia Climate Change Strategic Plan (2014–2023)*. Phnom Penh: Cambodia.

Government of Cambodia (GoC). 2014. *Cambodia Climate Change Financing Framework*. Phnom Penh: Cambodia.

Government of Cambodia (GoC). 2014a. *Post Flood Early Recovery Need Assessment Report*. Phnom Penh: Cambodia.

Government of Cambodia (GoC). 2014b. *National Strategic Development Plan (2014–2018).* Phnom Penh: Cambodia.

Government of Cambodia (GoC). 2014c. Rectangular Strategy Phase III. Phnom Penh.

Hammer, G., Hansen, J., Phillips, J., Mjelde, J., Hill, H., Love, A., and Potgieter, A. 2001. Advances in Application of Climate Prediction in Agriculture. *Agricultural Systems 70*: 515–553.

Harmeling, S. and Eckstein, D. 2012. *Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events (1992–2011)? Global Climate Risk Index 2013*. Germanwatch Briefing Paper.

Huq, S., Roberts, E., and Fenton, A. 2013. Loss and damage. *Nature Climate Change* 11: 947–949.

International Evaluation Group (IEG). 2009. Independent Evaluation of IFC's Development Results 2009**.** Washington DC: United States.

International Evaluation Group (IEG). 2013. *Assessing the Monitoring and Evaluation Systems of IFC and MIGA*. Washington DC: United States.

International Evaluation Group (IEG). 2013a. *Guidelines for Reviewing World Bank Implementation Completion and Results Reports*. Washington DC: United States.

International Evaluation Group (IEG). 2014. *Results and Performance of the World Bank Group 2013: An Independent Evaluation*. Washington DC: United States.

International Evaluation Group (IEG). 2015. *World Bank Project Ratings*. Washington DC: United States.

Intergovernmental Panel on Climate Change (IPCC). 2001. *Climate Change 2001: Synthesis Repor*t. Cambridge: Cambridge University Press.

International Institute for Environment and Development (IIED). 2013. *Tracking Adaptation and Measuring Development (TAMD) in Ghana, Kenya, Mozambique, Nepal and Pakistan: Scoping for Development*. TAMD Scoping Phase Summary.

Lasage, R., Veldkamp, T., De Moel, H., Van, T., Phi, H., Vellinga, P., & Aerts, J. 2014. Assessment of the Effectiveness of Flood Adaptation Strategies for HCMC. *Natural Hazards and Earth System Science* 14:1441–1457.

Lemos, M., Finan, T., Fox, R., Nelson, D., and Tucker, J. 2002. The Use of Seasonal Climate Forecasting in Policymaking: Lessons from Northeast Brazil. *Climatic Change*, *55*: 479–507.

Maplecroft. 2015. *Climate Vulnerability Index 2015*. Bath: United Kingdom.

Ministry of Environment (MoE). 2011. *Building Resilience: The Future of Rural Livelihoods in the Face of Climate Change*. Phnom Penh: Cambodia.

Ministry of Environment (MoE). 2006. *National Adaptation Programme of Action for Climate Change*. Phnom Penh.

Ministry of Planning (MoP). 2011. *Commune Data for the Commune/Sangkat Development Planning*. Phnom Penh: Cambodia.

Ministry of Planning (MoP). 2014. *Monitoring and Evaluation: An Approach to Strengthen Planning in Cambodia*. Phnom Penh: Cambodia.

Ministry of Public Works and Transport (MPWT). 2014. *Enviromental Management Plan*. Phnom Penh: Cambodia.

Ministry of Public Works and Transport (MPWT). 2011. *Safeguards Monitoring Plan*. Phnom Penh: Cambodia.

National Climate Change Adaptation Research Facility (NCCARF). 2013. *Supporting Decision-making for Effective Adaptation*. Policy Guidance Brief 3.

Overseas Development Institute (ODI). 2012. *Cambodia Climate Public Expenditure and Institutional Review*.

Orlove, B., Broad, K., & Petty, A. 2004. Factors that Influence the Use of Climate Forecasts: Evidence from the 1997/98 El Nino Event in Peru. *Bulletin of the American Meteorological Society* 85: 1735–1743.

Ponlok, T., Thy, S., Kamal, U., Baroda, N., Nkem, J., Chevillard, J., Reaksmey, N., Tin, D.,Vuthy, V., Cuccillato, E., Rai, N. 2014. *Cambodia National Climate Change Monitoring & Evaluation Framework Workshop*. IIED Event Report.

Rai, N, Ponlok, T., Baroda, N., Brooks, N. & Nash, E. 2014. *Developing a National Framework to Track Adaptation and Measure Development in Cambodia*. IIED Brief.

Strategic Pilot Program for Climate Resilience (SPCR). 2013. *Vulnerability and Adaptation Assessment for Key Sectors Including Strategic and Operational Recommendations*. Ministry of Environment: Phnom Penh.

Tol, R. 2012. A cost–benefit analysis of the EU 20/20/2020 package. *Energy Policy* 49, 288–295.

Trading Economics. 2015. *Cambodia GDP Annual Growth Rate*.

Transport Sector Working Group (on climate change). 2015. *Draft of Climate Change Action Plan for Transport Sector*. Phnom Penh: Cambodia.

Travis, W. and Bates, B. 2014. What is climate risk management? *Climate Risk Management* 1, 1–4.

The Tracking Adaptation and Measuring Development (TAMD) Monitoring and Evaluation (M&E) framework enables public authorities to assess climate risk management processes and contributions from adaptation/climate resilient development policy. In Cambodia, TAMD is used to guide the climate M&E framework in assessing these processes at national and sectoral levels. Yet little is known about costs and benefits of applying TAMD in Cambodia, and how implementing the framework improves the effectiveness of investments. This study documents the additional costs and benefits of implementing the climate M&E framework. What follows first provides a complete account of additional costs; and second, estimates likely contributions of a climate M&E framework to policy effectiveness, and corresponding monetary returns from future climate finance inflows in Cambodia.

International Institute for Environment and Development
80-86 Gray's Inn Road, London WC1X 8NH, UK
Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
email: info@iied.org
www.iied.org

Knowledge Products

This research was funded by UK aid from the UK Government, however the views expressed do not necessarily reflect the views of the UK Government.