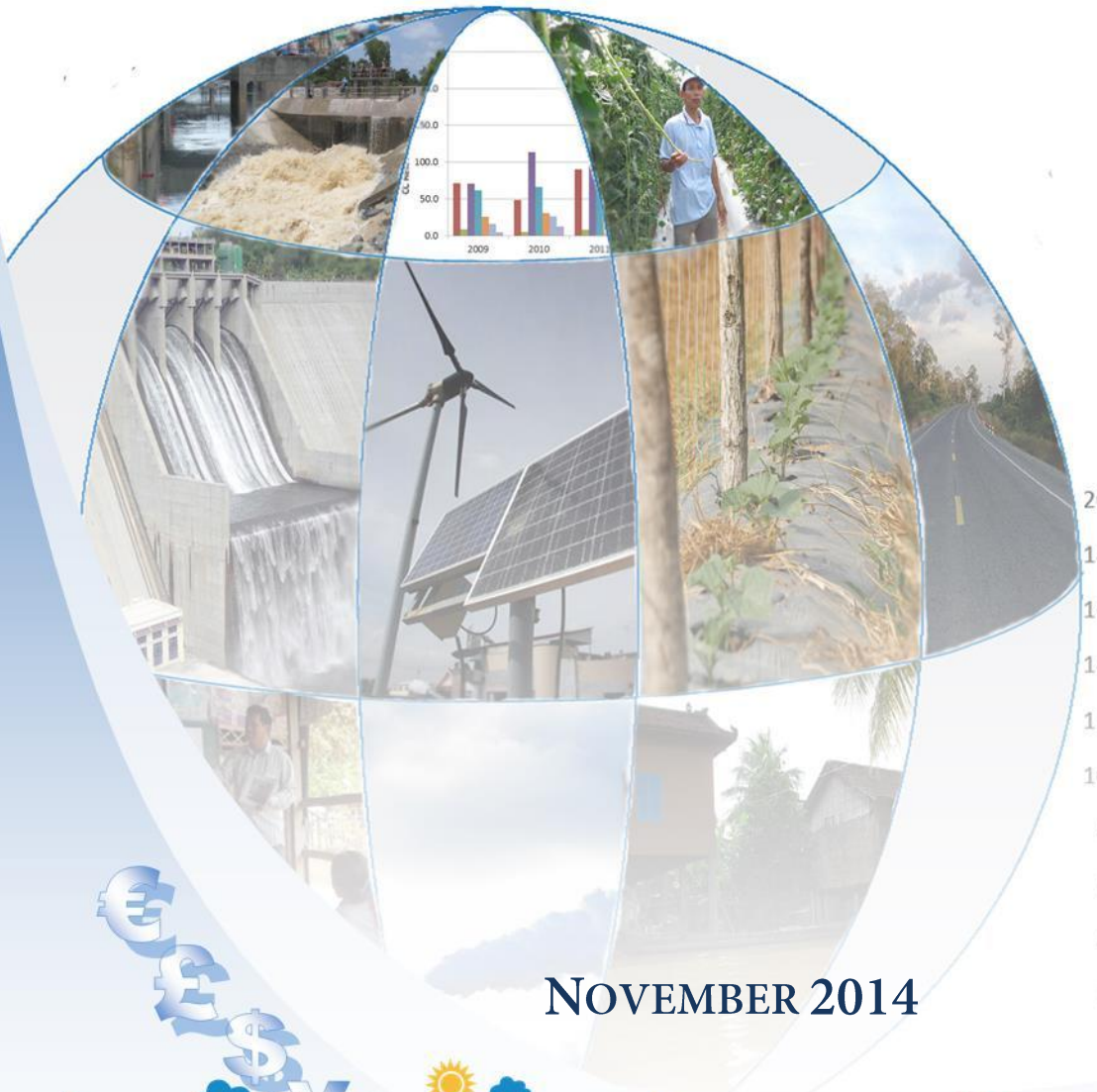
Analysis and Recommendations for a Cambodia Climate Change Financing Framework



November 2014

Cambodia Climate Change Financing Framework (CCFF)

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The work was led by the climate finance sub-group of the Climate Change Technical Team, coordinated by Ministry of Economy and Finance with technical support from Ministry of Environment / Climate Change Department. The team of national and international consultants was led by Mr Kit Nicholson, who is the lead author of the present report. Climate change focal points and National Climate Change Committee members in priority ministries have taken the lead for the development of their respective climate change actions plans.

Opinions expressed in this report are solely those of the authors and do not necessarily represent the views of the Royal Government of Cambodia, European Union, Sweden or UNDP.

ABBREVIATIONS AND ASSUMPTIONS

K = thousand, m = million, bn = billion
Exchange rate = 4000 CR/$ (CR are Cambodia Riel and $ are US$)

ADB	Asian Development Bank
AF	Adaptation Fund
AFD	Agence Française de Développement
BCR	Benefit Cost Ratio
BSP	Budget Strategy Plan
CBA	Cost Benefit Analysis
CC	Climate Change
CCAP	Climate Change Action Plan
CCBAP	Cambodia Community Based Adaptation Programme
CCCA	Cambodia Climate Change Alliance
CCFF	Climate Change Financing Framework
CCCSP	Cambodia Climate Change Strategic Plan
CCSP	Climate Change Strategic Plan
CDC	Council for the Development of Cambodia
CDM	Clean Development Mechanism
CIP	Commune Investment Plan
COP	Conference of the Parties (to the UNFCCC)
CPEIR	CC Public Expenditure & Institutional Review
CPP	Cambodia People's Party
CSF	Commune Sangkat Fund
CSO	Civil Society Organizations
CCCCF	Cadre of Cambodian CC Experts
CVI	Climate Vulnerability Index
DALY	Disability Adjusted Life Year
DIC	Department of Investment and Cooperation
DIW	District Integration Workshop
DMF	District/Municipality Fund
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EIA	Environmental Impact Analysis
FA	Forestry Administration
GEF	Global Environment Facility
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Greenhouse Gas
IP3	Three Years Implementation Plan
IPCC	Intergovernmental Panel on CC
LD	Line Department
LDC	Least Developed Country
LDCF	LDC Fund
LGCC	Local Governance and Climate Change
MAFF	Ministry of Agriculture, Forestry and Fisheries
MEF	Ministry of Economy and Finance
MIC	Middle Income Country
MIME	Ministry of Industry, Mines and Energy
MOE	Ministry of Environment
MOEYS	Ministry of Education Youth and Sports
MOH	Ministry of Health
MOP	Ministry of Planning
MOWRAM	Ministry of Water Resources & Meteorology
MPWT	Ministry of Public Works and Transport
MRD	Ministry of Rural Development
MTEF	Medium Term Expenditure Framework
MOWA	Ministry of Women's Affairs
NAPA	National Adaptation Programme of Action
NAPA-FU	Promoting Climate Resilient Water Management and Agricultural Practices in Rural Cambodia
NBC	National Bank of Cambodia
NCSD	National Council for Sustainable Development
NCDD	National Committee for Sub-National Democratic Development.
NCDM	National Committee for Disaster Management.
NCGG	National Council for Green Growth
NGO	Non-Government Organisation
NSDP	National Strategic Development Plan
ODA	Official Development Assistance
PFM	Public Financial Management
PFMRP	PFM Reform Programme
PIP	Public Investment Programme
REDD	Reduce Emission from Deforestation and Forest Degradation
RGC	Royal Government of Cambodia
RILGP	Rural Investment & Local Governance Project
PMU	Project Management Unit
PPCR	Pilot Programme for Climate Resilience

SDC	Swiss Agency for Development and Cooperation
SIDA	Swedish International Development Agency
SNA	Sub-National Authority
SNC	Second National Communication
SNIF	Sub-National Investment Facility
SPCR	Strategic Programme for Climate Resilience
SREX	IPCC Special Report on Extreme Events
SWAp	Sector Wide Approach
UNEP	UN Environment Programme
UNFCCC	UN Framework Convention on CC
UNDP	UN Development Programme
V&A	Vulnerability and Adaptation
VRA	Vulnerability Reduction Assessment
WRM	Water Resources Management

GLOSSARY OF TERMS

Adaptation. 'Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities' (IPCC).

Business as Usual. A scenario in which there are no changes to current government policies. Typically used to refer to a scenario in which no new mitigation actions are undertaken.

CC Relevance Weights. The extent to which a government or other activity is associated with CC. Usually measured in terms of the extent to the declared motives for the activity express a primary or secondary concern with adaptation of mitigation, although measured in the CCFF as the proportion of benefits that arise as a result of CC (see Box 1). In theory, used as the basis for determining eligibility for the level of CC top-up, compared to total funding.

Dedicated CC Activities. Activities that generate few or no benefits if there is no CC. These include, in particular, 'soft' activities (e.g. to strengthen CC planning). In practice, any activities for which at least 50% of benefits are derived as a result of CC are included, to simplify planning.

Integrated CC Activities. Activities for which the benefits arising as a result of CC account for up to 50% of the total benefits.

Mitigation. Actions that aim to reduce the level of climate change, typically by reducing greenhouse gas emissions or by promoting GHG sequestration.

Modalities. The methods for managing climate finance, including the institutions involved and the instruments and measures used by those institutions, along with any associated legislation or regulations required.

Non-CC Activities. Activities where the benefits are unaffected by whether CC takes place or not.

Proofing. Changing the design of an activity so that the potential damage arising from CC is reduced or eliminated.

Resilience. The ability to withstand the potential damage that may be caused by climate change. The opposite of vulnerability.

Soft Activities. Activities that do not directly provide benefits to the general population, including: capacity building, planning, public awareness, studies (except feasibility studies that are an integral part of delivering infrastructure or services).

Top-Up. Funding provided to activities that generate benefits regardless of climate change, to encourage the activities to be redesigned to pursue mitigation and/or adaptation benefits, in addition to the other benefits.

Vulnerability. The likelihood that a household or ecosystem will be harmed by climate change. Typically expressed as a combination of: a) exposure to risk; b) sensitivity to that exposure; and c) capability to cope with the exposure and sensitivity. The opposite of resilience.

EXECUTIVE SUMMARY

Background on Climate Change in Cambodia

Cambodia is highly vulnerable to climate change (CC). In most international indices, Cambodia falls amongst the 30 most vulnerable countries in the world and, in many indices is in the top 10. This is because the country is exposed to frequent flooding and other unpredictable rainfall event as well as to tropical storms and sea-level rise and has a low adaptive capacity. In addition, a large part of the population depends on natural resources for their livelihoods and has few other sources of income on which to depend in bad years.

Cambodia's emissions account for about 0.2% of global emissions in 2000 and mitigation is a lower priority for government than adaptation. Most emissions come from forestry and land use change (49%) and from agriculture (44%) and policies are in place to reduce these emissions as much as possible, whilst pursuing policies that also bring strong economic growth. The growth of industry and transport will mean that they account for a rapidly growing share of emissions and the government is committed to mitigating these emissions, focusing especially, but not exclusively, on opportunities for green growth, where mitigation can be achieved whilst also making profits.

Government's response to CC has been mainstreamed in the National Strategic Development Plan (NSDP). Sectoral strategies have been defined in sectoral Climate Change Strategic Plans (CCSPs) and the overarching framework for these plans is the Cambodia Climate Change Strategic Plan (CCCSP), which identifies 8 objectives and 61 strategies. Three of the objectives promote resilience to CC, one promotes mitigation and four are devoted to institutional strengthening, through improved capacities, participation and collaboration.

Cambodia's Climate Change Financing Framework (CCFF)

Recognising the importance of addressing climate change impacts and better managing climate finance resources, following the Climate Public Expenditure & Institutional Review (CPEIR) completed in 2012, the Government has undertaken the development of Cambodia's Climate Change Financing Framework (CCFF) with the following objectives:

- Updating the existing CC expenditure analysis across the most affected government agencies
- Review and estimating potential climate funding for Cambodia in the future through low growth and high growth scenarios (within 5 and 10 year timeframes)
- Conducting the Cost Benefit Analyses for the prioritization of climate actions and assessment of national benefits of climate finance
- Defining and analysing modalities that will be used for managing CC finance. In particular, the CCFF assesses the option of a National Climate Fund and considers the requirements for improved coordination.

Existing Climate Public Expenditure and Trends

The Climate Change Financing Framework (CCFF) aims to guide future climate financing, both from domestic and international sources. It promotes a common approach to defining CC financing and assesses the current level of CC financing and the prospects for future financing, showing how CC

financing will account for an increasing share of public finance, both domestic and international, in response to the challenges and opportunities posed by CC.

The CCFF defines three types of CC finance:

i) new funding that is dedicated to CC;
ii) modification to existing funding in order to respond to CC; and
iii) changes in the allocation of resources, without any modification, to take account of the changes in the benefits generated by expenditure arising from CC.

In the past, the methods of assessing CC relevance have been based on the extent to which adaptation or mitigation are declared as the primary or secondary objective. This approach is useful for actions that are dedicated primarily or secondarily to CC. However, it is less useful for adjustments to mainstream expenditure. The CCFF approach considers the benefits generated by public expenditure and the extent to which these are affected by CC. The focus on benefits is consistent with the government's initiatives to pursue results based management.

Cambodia's CPEIR (completed in 2012) identified six sectoral ministries that were considered to be responsible for the majority of CC related expenditure: MAFF, MOWRAM, MIME, MOH, MRD, and MOE. The recurrent and development expenditure of these ministries, plus all the support of donors, either within or outside the budget, were analysed and a total of CR 7,120bn of expenditure was considered to have some climate relevance in 2011. Weights were estimated for all the projects and budget items, based on the extent to which CC was declared as an objective of the expenditure. This led to an estimate that the share of spending on CC relevant expenditure that is devoted to CC had increased from 15% in 2009 to 17% in 2011.

The CCFF has updated the CPEIR analysis, using the new basis for estimating CC relevance weights and the latest expenditure data for 2012 and adding three new ministries (MPWT, MOEYS and MOWA) and NCDM. This updated analysis suggests that for total public expenditure of CR 11,381bn in 2012, CR 5,227bn had some relevance to CC. The expenditure that was directly relevant to CC was CR 741bn. The CC share of expenditure for projects and budget items that have some CC relevance has varied between 11% and 14% between 2009 and 2012, with little clear trend. As a proportion of total expenditure for these ministries and agencies, the CC share is 6.5% in 2012. Whilst donors have increased CC relevant spending through the period, government spending has been more variable, with a general tendency to increase interrupted by a reduction in 2011, resulting largely from the ending of some large projects supporting SNA level spending.

Sub-National Authorities (province, district and commune) account for about 6.3% of CC finance. But they are particularly important because a number of new modalities have been piloted at the SNA level. Four projects have provided interesting experience: RILGP, LGCC, CCBAP and NAPA-FU. All the projects provide a mixture of investment funds and technical support. RILGP demonstrated options for reimbursing SNAs for expenditure that they had planned and managed according to agreed principles. LGCC works with performance based climate resilience grants, which act as top-ups to spending by SNA in CC vulnerable areas, with support from contracted specialists for project design. CCBAP is aligned with Commune Investment Plans (CIPs), but is managed by NGOs. NAPA-FU relies on the procurement process of the National Council for Sub National Democracy Development/ three year investment plan (NCDD/IP3) and relies mainly on the Provincial administration for technical support.

Future Climate Financing Scenarios

Climate Finance in the CCFF
Baseline and Future Funding Scenarios

Through consultations with donors and national stakeholders, CC finance in 2013 is estimated to total $185m, including both international and domestic funding. Of this total, $25m is from dedicated global CC finance, $80m from other dedicated CC finance, mostly from in-country and regional donors, and $80m from the share of mainstream public expenditure that also delivers benefits associated with CC. The CCFF uses 2013 climate finance flows as the baseline for future scenarios.

The CCFF estimates the future climate finance flows based in four scenarios: low and high growth rates[1] within 5 and 10-year timeframes. These projections are driven by the expected trends for donor support and government finance[2]. The indicative future climate finance resources in the 4 scenarios are as follows:

Table X1: Indicative Future Resources of Four Funding Scenarios

Scenarios	Indicative Resources
Baseline (2013)	$185m
5- year Low Growth	$255m
5- year High Growth	$300m
10 - year Low Growth	$400m
10 - year High Growth	$500m

There are opportunities for expansion of private sector funding in the medium term, associated mainly with mitigation, either through investment in energy and transport or through trading in carbon emissions. Some of this investment (notably in energy efficiency) is profitable even without valuing carbon. The expected recovery of the carbon market after the Paris COP in 2015 will provide an important boost to private investment in mitigation.

Sectoral Climate Change Action Plans (CCAPs)

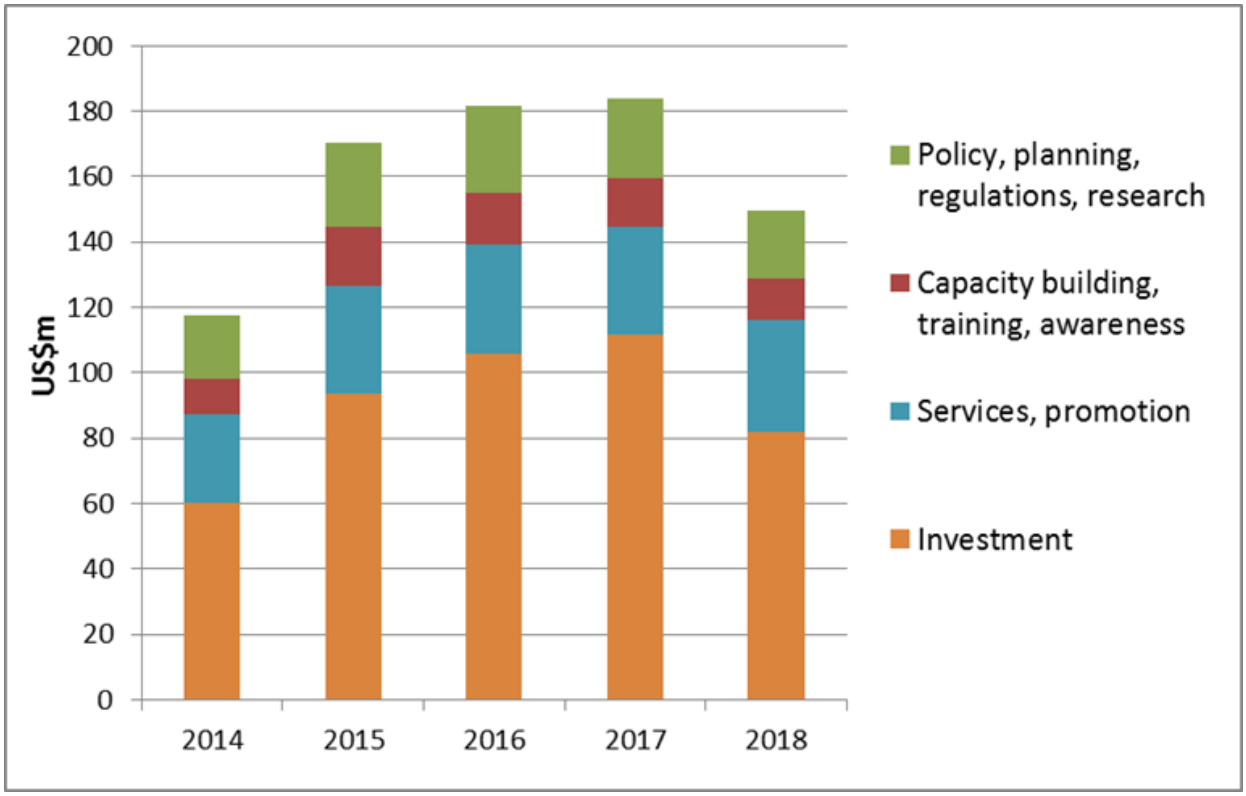
The strategies developed in the sectoral CCSP and the national CCCSP have been supplemented by CC Action Plans (CCAPs) for the eight CCSP ministries plus NCDM. These present a total of 117 priority actions, along with the associated budgets for those actions from 2014-18. These budgets are broadly consistent with ceilings derived from the low growth CC financing scenario, as presented in section 2.2 of the report.

The CCAPs include 39 actions to deliver services to beneficiaries, 10 actions involving investment in infrastructure and 68 supporting actions associated with policy, planning, capacity building, institutional

[1] The low growth scenarios suggests an increase in total CC finance of about 7% per year and the high growth scenario expects a growth of about 10% per year.
[2] Government finance is expected to increase in line with GDP in the low scenario and about 5% higher per year than GDP growth, in the high scenario. For both donors and government, the low growth scenarios assume that CC finance will retain a roughly constant share of total financing, whilst the high growth scenario assumes a small growth in the share of CC finance.

strengthening, awareness raising and research. The figure below summarises the spending on these actions. Expenditure on supporting actions accounts for 26% of the total in 2014, reflecting the fact that CC planning is new to many institutions and there is therefore an urgent need for technical support. This share falls steadily to 22% in 2018, as spending on services and investments expand. The drop in spending in 2018 is caused largely by MOWRAM's decision to front load investment in irrigation.

Figure X1 Planned Expenditure on CCAP Actions, 2014-2018 (US$m)



Source: CCAPs

National Benefits of Climate Finance

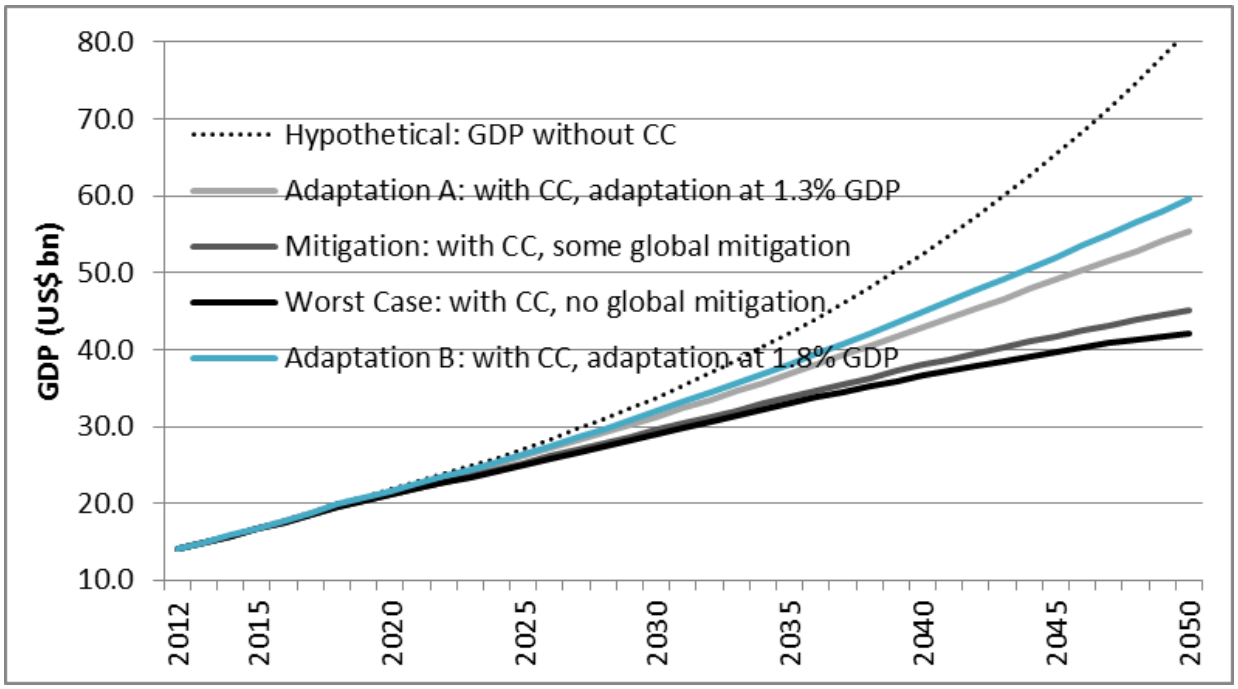
If the CCAPs are not implemented, then the damage to Cambodia from CC is expected to reduce growth by 3.5% of GDP by the time temperatures increase by 2°C. In the latest IPCC scenarios, this is expected to happen by about 2050, if emissions are not reduced. This will mean that CC will almost halt economic growth by 2050, if there is no mitigation and adaptation. The main sources of this damage are from: drought and floods in agriculture (1.42% of GDP); increased burden of diarrhoea and other climate sensitive diseases (0.85% of GDP); more rapid degradation of infrastructure, including roads, irrigation and rural water supply (0.71% of GDP); and flood damage to urban infrastructure (0.25% of GDP). It is assumed that this reduction in GDP growth will increase linearly between now and 2050, so GDP growth will be 1.5% lower by 2030.

In the short-term, the CCFF estimates the damage from climate change without any adaptation and mitigation could amount to $361m in 2018. The annual added benefits from climate finance could reach $11m (low-growth scenario) and $13m (high-growth scenario) in 2018, suggesting that the current

projections of climate finance will enable Cambodia to avoid between 14% and 16% of CC damage expected to be caused in that year.

In the longer term, assuming that the CC financing maintains the same share of GDP after 2018 (i.e. 1.3% of GDP for the low growth scenario and 1.8% of GDP for the high growth), by 2030, the share of CC damage that is offset by CC finance is about 25% for the low growth and about 35% for the high growth. By 2050, it has fallen to 18% and 23% of the potential damage (Figure X2 below), because the cumulative impact of CC on GDP is rising faster than the cumulative benefits from CC finance.

Figure X2: Long Term Impact of CC Damage and CC Financing on GDP Growth



The contribution from mitigation in Cambodia is currently low, because it is mostly from the CDM and the prices of carbon are volatile and low. However, global analysis of the social costs of carbon suggests that it is about double to highest levels achieved in the carbon market. If reforms in global policy on carbon markets are successful, especially after the 2015 Paris COP, and prices return at least to previous market levels and, potentially, rise closer to the full social cost of carbon, then the opportunities for investment in mitigation in Cambodia will be large, especially in forestry and in the energy and transport sectors, which are currently small but will become increasingly important, accounting for nearly half of all emissions by 2050, without mitigation.

Managing Climate Finance - The National Climate Funding Programme (NCFP)

The CCFF reviews the NCFP as an option for Cambodia to manage climate finance in the future and proposes steps for the relevant institutions to move towards the NCFP. The NCFP aims to be a coordinated programme for improved management of CC funding. It will include a strengthened role for the NCSD and will guide government and donors. Key features of the NCFP are as follows.

1	The NCFP will cover all CC adaptation and mitigation policies, including: government and donors; investment and recurrent expenditure; and regulations and incentives as well as expenditure.
2	Leadership will be provided by NCSD and technical support will be provided by the NCSD Secretariat. CCCSP, CCSPs and CCAPs will be kept up to date to provide strategic guidance.
3	The definition of CC finance will be determined by whether the benefits of a policy are affected by CC, using a version of the methodology developed in the CCFF and formalised by regulation.
4	The level of CC funding will be gradually introduced in budget submissions, in the national budget and in the government accounts, making use of a CC tag and score in the PFM system.
5	The NCSD will be established as a National Implementing Entity for the AF and GCF and funding through the NIE will evolve towards on-budget and on-treasury, though it may initially make use of project accounts and treasury special accounts.
6	Donors will be encouraged to build CC into all projects where it is relevant, through screening of donor project at the country strategy and project identification stages. This will apply to all modalities, including any sector or general budget support. Donors will be encouraged to pool funding, where possible.
7	Public support for mitigation will shift steadily from grants and direct investment to modalities that encourage the private sector to invest in mitigation.
8	Sub-national Authorities will receive an increasing share of CC finance, provided that PFM processes remain successful. This may require some further decentralisation of activities.
9	The NCSD Secretariat will maintain a cadre of Cambodian experts who will be available to line ministry planning units to help to include CC in project preparation and budget submission. This will normally be in the form of on-the-job support linked to CC expenditure decisions.
10	The NCSD will produce a Climate Finance Annual Progress Report (APR) which will record trends in expenditure and any evidence available on the effectiveness of the expenditure.
11	The NCFP works towards an endpoint at which a large share of CC finance is provide through budget support, including both sector budget support and general budget support.

Monitoring & Evaluation Framework

The CCFF is based on the benefits that are expected to be delivered by CC finance. At present, the evidence base for these expectations is weak and needs to be improved. To achieve this, the government is committed to a national framework for monitoring and evaluation of CC response. The CCAPs include indicators to measure the results of each action as well as sector impact indicators. There are also a set of national indicators, including 7 process indicators that address policy and institutional readiness and 4 indicators of national impact that cut across sectors. Five of these national indicators have been selected for inclusion in NSDP 2014-18. Cost-benefit analysis of climate expenditure will be supported by NCSD, in cooperation with concerned line ministries and MEF.

1 INTRODUCTION

1.1 Background

1.1.1 Climate Vulnerability

Cambodia is very vulnerable to climate change (CC). In most international indices, Cambodia falls amongst the 30 most vulnerable countries in the world and, in many indices is in the top 10[3]. The Draft Second National Communication (SNC) identified the main risks from CC. By 2050, temperatures are expected to be 0.5°C to 1.5°C higher. CC models do not yet give clear indications of the expected change in total annual rainfall, but it seems likely that total rainfall will increase in some areas and decrease in others. However, it is clear that floods and droughts will become increasingly frequent and severe. Recent evidence from global IPCC analysis has suggested that, globally, the scale of the increase in temperature may be towards the lower end of the range previously defined, but there is also some emerging evidence about the scale of the changes in extreme events which suggests that these will be serious, possibly doubling in frequency and severity by 2050[4] . There are also risks associated with sea level rise and saline intrusion in some coastal areas.

The draft SNC also shows that CC is likely to affect agriculture, health, energy and infrastructure. For the next decade, the damage caused will be modest. However, the damage will accelerate and, by 2050, CC could reduce growth to zero, if the country does not adapt to the change and if international efforts to mitigate CC are not successful.

1.1.2 Cambodia's GHG Emissions

The SNC includes a greenhouse gas (GHG) inventory for 2000. The land use, land use change and forestry sector (LULUCF) sequestered about 48.2m tCO2e in 2000. Total emissions were $48.4m tCO2e, of which nearly 50% was from LULUCF, 44% from agriculture and 7% from other sources, mainly energy and transport. Cambodia's emissions in 2000, excluding sequestration, made up 0.2% of total global emissions.

1.1.3 Government's Response to Climate Change

The SNC has been used over the last three years to help guide a range of initiatives to include CC in government planning. The National Programme of Action to Climate Change (NAPA) was produced in 2006 and contained a list of 39 actions in agriculture and water resources (20 actions), coastal areas (8), health (6) and cross-sectoral actions (5). The NAPA selected 20 of these actions as high priority. The NSDP (2009-2013) identified 10 CC priorities. Many line ministries have now integrated CC into the preparation of plans, budgets, annual work programmes and projects. Nine line ministries have prepared CC Strategic Plans (CCSPs)[5] and these have been compiled into a Cambodia CC Strategy Plan (CCCSP). The CCCSP defines the following eight objectives, supported by 61 strategies:

[3] {Alliance Development Works, 2012 #642}{Kreft, 2013 #912}

[4] IPCC (2012). Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Full Report.

[5] Ministry of Agriculture, Fisheries, and Forestry (MAFF); Ministry of Industry, Mines and Energy (MIME); Ministry of Education, Youth and Sport (MoEYS); Ministry of Health (MoH); Ministry of Women's Affairs (MoWA); Ministry

i. promoting climate resilience through improved food, water and energy security
ii. reduce sectoral, regional, gender and health vulnerability to CC impacts
iii. ensure climate resilience of critical ecosystems, biodiversity, protected areas and cultural heritage
iv. promote low-carbon planning and technologies to support sustainable development
v. improve capacities, knowledge and awareness for CC response
vi. promote adaptive social protection and participatory approaches in reducing loss and damage
vii. strengthen institutions and coordination frameworks for national CC responses
viii. strengthen collaboration and active participation in regional and global CC processes

The nine line ministries and agencies that have prepared CCSPs have followed up by producing CC Action Plans (CCAPs), which identify the main actions required to deliver the CCSPs.

The main focus of CC policy is on adaptation and a large majority of the historical and proposed funding is for adaptation. The Climate Change Fiscal Framework (CCFF) makes a first broad estimate of the possible damage caused by CC in Cambodia and of the potential value of adaptation in reducing that damage. This estimate relies on case studies of the likely impact of CC on agriculture, health and infrastructure and of the potential for proofing against this increased level of damage.

Under the Kyoto agreement, the developed countries of the world were required to make commitments on reductions to greenhouse gas (GHG) emissions compared with historical rates of emissions. Most developed countries have now done this. Over the last five years, many middle income countries, including the BRICS countries, have also made voluntary commitments to reduce emissions, usually expressed as reductions compared with business as usual. Given the low absolute level of Cambodia's emissions, the main focus of government CC policy has been on adaptation. However, in line with recent UNFCCC commitments at the Warsaw CC Conference, Cambodia is also developing a plan for reducing emissions. The SNC includes some initial indications of what is possible and further work is being done in preparation for the commitments that will be made in Paris in 2015.

The sectoral composition of emissions will change dramatically over the medium term. Without mitigation, energy and transport's share in total mitigation will rise from 7% to about 40%, according to the SNC. The focus of mitigation plans therefore covers both land-based sectors (i.e. agriculture and LULUCF) and energy and transport.

1.1.4 Managing Climate Finance

Climate finance available to Cambodia mostly comes from international and increasingly national sources. A large part of this funding will come through the modification of mainstream spending on development and services. This will require changes in practices, to ensure that the modifications that are made are appropriate and that enough resource are allocated to adaptation. It will also be useful to consider the optimum level of CC funding, as this will encourage improved practices and standards for addressing current climate conditions as well as the changes required to reflect CC.

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of Water Resources and Meteorology (MoWRAM); Ministry of Public Works and Transport (MPWT); Ministry of Rural Development (MRD); and the National Committee for Disaster Management (NCDM).

There is some uncertainty about the level of international funding that is dedicated to CC. It seems unlikely that the targets established internationally, such as the Green Climate Fund, will be met. This creates some challenges for government, especially as much of this funding will need to be provided as 'top-up' funding to match on-going expenditure by government or by development partners. The government is therefore making plans to manage the uncertainty in these resources, based around the prioritisation and costing of climate actions in the CCAPs.

1.2 Objectives of the CCFF

The CCFF aims to achieve the following:

1. ***Update of existing CC spending***: Updating the existing CC expenditure analysis across the most affected government agencies since the 2012 CPEIR
2. ***Future climate funding projection***: Reviewing the level of funding likely available to Cambodia, both from international and national sources over the next 5-10 years which provides indicative allocation ceilings for CC related activities of the relevant line ministries
3. ***Prioritization of Sectoral Climate Actions***: Providing Cost Benefit Analysis (CBA) of existing and proposed adaptation and mitigation actions (CCAPs) which, together with the Multi-Criteria Analysis (MCA), helps inform the prioritization of climate actions.
4. ***Aggregate Benefits of Climate Finance***: Assessing the overall added benefits, in the short- and long-term, of the estimated climate finance, compared to the damage of CC to Cambodia without any climate actions
5. ***Better Climate Responsive Budgeting and Planning***: Providing guidance on evidence-based resource allocation based on the prioritization of climate actions, estimation of costs and benefits of those actions and clearer indicators for progress monitoring
6. ***Modalities for managing CF:*** Defining and analysing modalities that will be used for managing CC finance. In particular, the CCFF assesses the option of a National Climate Fund and considers the requirements for improved coordination. It also aims to help improve public awareness about CC and the way in which government, the private sector and society can respond.

1.3 Scope of the CCFF

CCFF Ministries: The Cambodia CCFF focuses its analysis on 9 government agencies, namely:

- Ministry of Agriculture, Forestry & Fisheries (MAFF)
- Ministry of Water Resources & Meteorology (MOWRAM)
- Ministry of Industry, Mines and Energy (MIME)
- Ministry of Public Works and Transport (MPWT)
- Ministry of Rural Development (MRD)
- Ministry of Health (MOH)
- Ministry of Education Youth and Sport (MOEYS)
- Ministry of Women's Affairs (MWA)
- National Committee for Disaster Management (NCDM)

Ministry of Environment and Sub-National Administrations were also included in the review of climate public expenditure and financing modalities.

Climate Actions[6]: The CCFF covers both adaptation and mitigation actions, including a variety of different types:

1. Policies that do not require to be changed in design, but which deliver benefits that are affected by CC and so may justify more (or less) funding.
2. Policies that need to be modified to take account of CC (e.g. Climate proofing irrigation etc.)
3. Policies that are primarily devoted to CC. These are often associated with technical work (such as studies, strategies and information) and may be linked to investments or to planning capacity, including support for local resilience. They may also include retro-fitting climate proofing features to infrastructure and relocating settlements and economic activities away from floods and vulnerable natural resources.

Climate Finance: The CCFF assesses public climate finance resources available to Cambodia, including from international and national sources, including the following:

1. *Dedicated/global funds:* climate finance available from global institutions and mechanisms such as CIF (including SPCR), GEF, LDCF, AF, FCPF7, UN-REDD[8] and the upcoming GCF, that are dedicated to addressing CC through adaptation and/or mitigation
2. *Dedicated/in-country funds:* are the portion of climate funds that are dedicated for addressing climate issues and that is directly financed by the Cambodian government through its annual budget means and by bilateral and multilateral donors active in Cambodia. This type of funds also includes projects that are managed by donors' regional offices.
3. *Integrated/in-country funds* refer to the type of resources financed by the government and donors in Cambodia that is not primarily meant for climate issues, but involves some degree of relevance (low and mid) to CC either explicitly or implicitly. In this type of finance, the climate aspect is integrated or embedded in the mainstream development projects.

CCFF Timeframe: the CCFF presents the analysis of climate expenditure in the time period of four years whilst extending the analysis of impacts to 2050.

1.4 Method in Developing the CCFF

1.4.1 Overview of CCFF Method

The CCFF delivers three main results through six work streams, as shown in Figure 1. The results are outlined in red and are:

- Prioritization of sectoral CC Action Plans;
- Conclusions on national benefits of climate finance; and
- Arrangements to manage future climate finance.

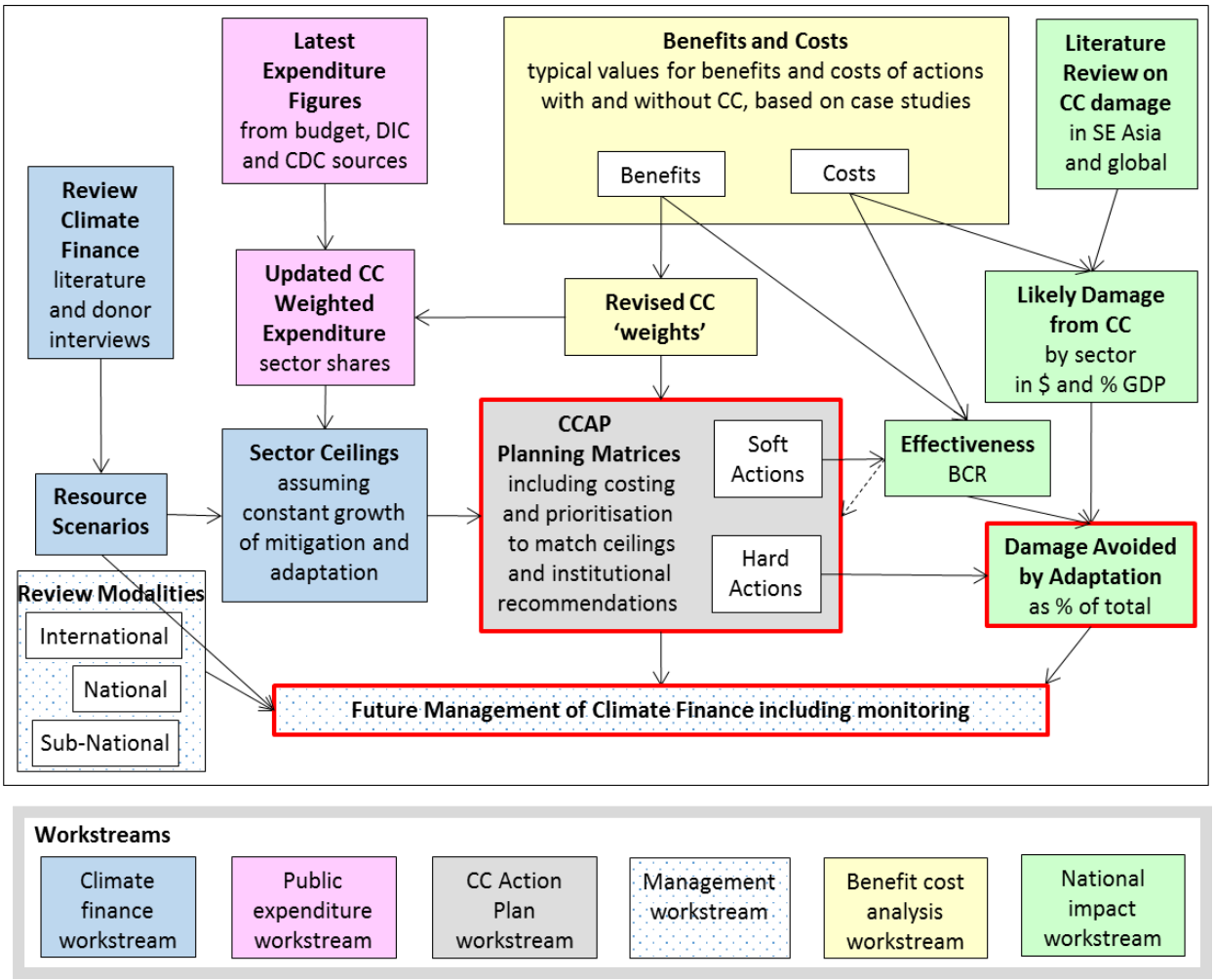
[6] A CC action is defined as any action that is affected by CC and undertaken in a different manner or scale as a result of CC. It therefore responds to a particular CC risk or opportunity.

[7] Forest Carbon Partnership Facility

[8] United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation

The method and process for the six workstreams are described in the rest of this section, including: climate finance, public expenditure, CCAPs, benefit cost analysis, national impact and future management.

Figure 1 Overview of CCFF Methodology



1.4.2 Public Expenditure Workstream - Existing Climate Public Expenditure

The CCFF is based on an analysis of existing climate finance, including recurrent and development spending by government and expenditure by donors, both through the budget and outside the budget. The process started with an update of the Climate Change Public Expenditure and Institutional Review (CPEIR) analysis (2012). The main sources of evidence were the government budget and the CDC database[9]. The analysis covered the eight ministries most affected by CC, plus NCDM, the Ministry of Environment and Sub-national Authorities.

[9] Some care was required to eliminate the double counting between these two sources (CDC and Budget/DIC sources).

1.4.3 Climate Finance Workstream : Future Climate Finance Scenarios

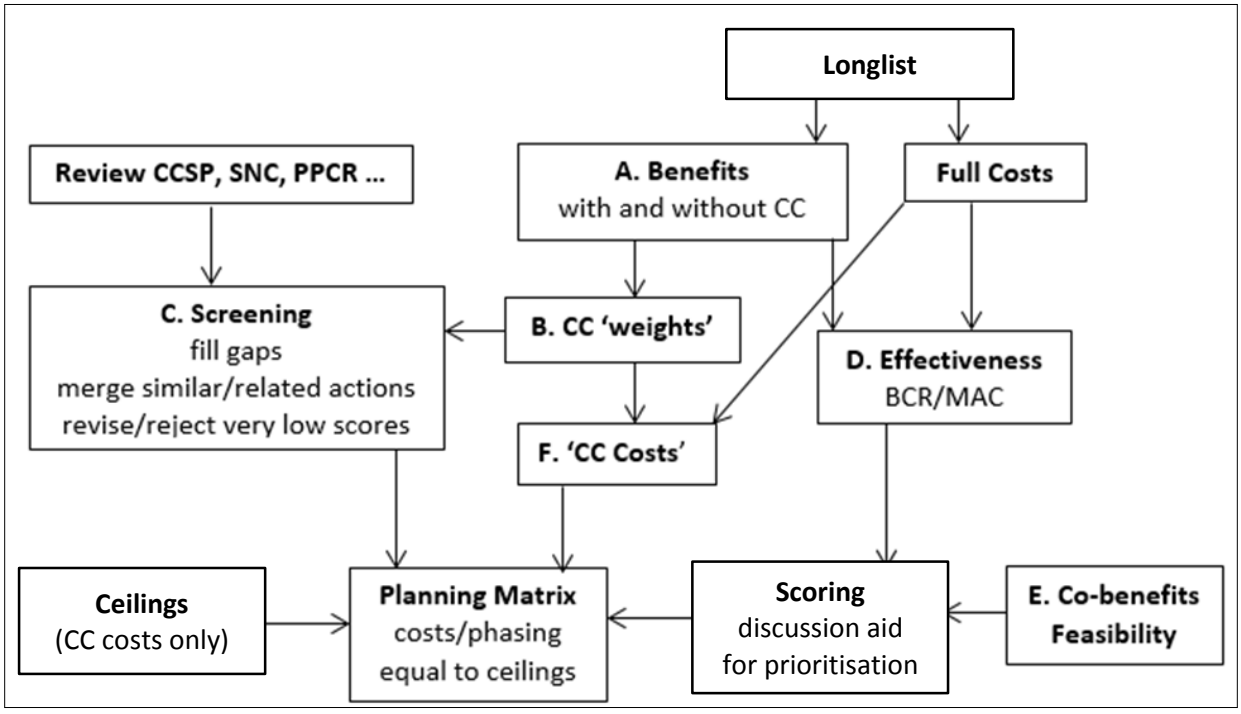
Consultations with donors regarding their intentions for future climate-related financial support to Cambodia and a desk review were the main sources of information for the climate finance scenarios. The baseline provided the basis for defining two five year scenarios (low and high growth) and two ten year scenarios (low and high growth). The share of the climate spending for each line ministry in the baseline is based on experience to date (2009-2012), using the updated analysis of existing climate expenditure.

For the 5-year low growth scenario, the CC financing scenarios determined the average growth rate in climate financing, which were 6% for adaptation and about 16% for mitigation. The CCFF assumes that these average growth rates apply to all ministries. As such, the CCFF estimated the indicative ceilings of climate finance available for each relevant line ministries. There are no major changes to the line ministry shares of climate finance. Some minor differences do emerge because mitigation-focused ministries would have a faster growth rate than adaptation. However, given that the total spending on mitigation is still small, this does not have a major impact on line ministry shares.

1.4.4 Climate Change Action Plan Workstream - Prioritization of Climate Actions

The CCFF is based on the actions identified in the CC Action Plans (CCAPs) for the eight ministries most affected by CC, plus NCDM (as in the scope of the CCFF mentioned above). The CCAPs identify selected priority actions that the ministries will pursue, in order to deliver their sectoral CC Strategic Plans (CCSPs). The CCAPs were prepared by working group in each of the institutions, which included representatives from each of the departments involved in CC related work, plus the planning department. Guidance was provided by MoE, supported by a team of local experts funded by the CCCA. The methodology for developing the CCAPs is summarised in Figure 2.

Figure 2 CCAP Methodology



Long-listing of possible climate actions: The identification of possible actions drew heavily on the CCSPs. In addition, the ministry CCFF working groups reviewed the risks and opportunities of CC in the sector based on the SNC and ensured that every action included was associated with these CC risks and opportunities.

Short-listing of climate actions: A system was then used to prioritise amongst the longlist of actions, using two related stages. Firstly, the longlist was reduced to a shortlist, by a process of selection and repackaging detailed activities into a single action; and, secondly, a phased budget was specified for each action and each institution was given a resource ceiling for their climate budget, based on the financing scenarios mentioned above.

A multi-criteria analysis (MCA) was also used to help guide the debate on shortlisting and budgeting. The MCA used a system of scoring on a set of criteria. The allocation of the scores was completed by a subjective assessment of a team of experts from Line Ministries, with a central team ensuring consistency. The system defined three primary criteria related to the effectiveness or efficiency in contributing to adaptation or mitigation:

i. the scale of CC risk addressed by the action;
ii. the cost per beneficiary of adaptation actions (expressed as $/person); and
iii. mitigation cost effectiveness (expressed as $/tCO2e).

Secondary criteria is related to co-benefits, which reflect the extent to which actions deliver benefits other than those associated with CC. The three types of co-benefits were: i) economic co-benefits; ii) social co-benefits; and iii) environmental co-benefits. In addition, three related criteria drew attention to issues of feasibility: i) political commitment; ii) capacity to deliver; and iii) ease of implementation, including coordination and phasing issues.

A scoring grid was used, including numbered scores and 'traffic light' style colour codes. However, the scoring process was designed only as a checklist for discussion and was not used to produce a total score leading to a ranking of the actions, since the prioritisation process did not pretend to be fully scientific and based on clear and strong sources of evidence.

Planning Matrix: The key output of the CCAPs was the Planning Matrix, which lists the priority actions and provides the phased budget. Fiches were prepared for each priority action, describing the objectives, activities and expected results of each action, along with the challenges, implementation arrangements, costs and potential financing. These fiches provided the basis for an initial 'bottom up' costing, based on ideal needs, but also taking into account the capacity of the ministry to deliver any expansion in activity. These bottom up costings were then adjusted so that the total costing was roughly consistent with the ceilings indicated by the scenarios. As the scenarios present only a rough indication of future resource availability, the planning matrices were not required to match the ceilings exactly.

1.4.5 Cost Benefit Analysis Workstream

In this workstream, cost benefit analyses (CBA) of selected climate actions (nine case studies) were carried out. In addition to enabling the estimation of aggregate benefits of the climate finance to be spent on these actions, the CBAs inform another important element of the CCFF, which is the determination of how climate relevant these actions are.

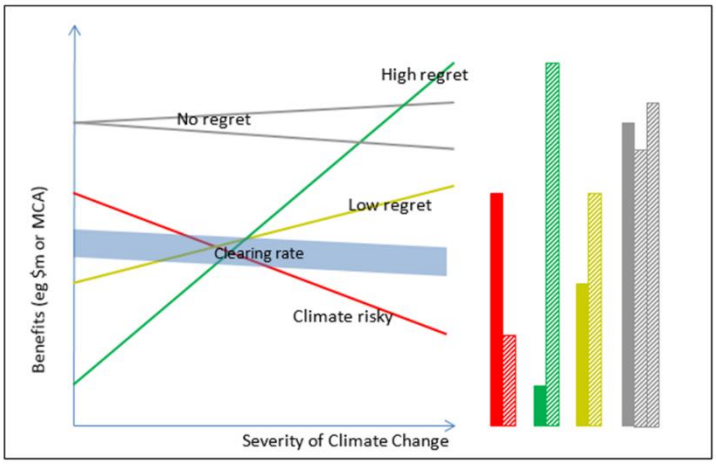
Climate Relevance ("CC Weights"): The CCFF recognises that, whilst some actions are dedicated exclusively to CC, many are mainstream actions that provide some benefits without CC and a different level of benefit with CC. For those actions that are partly mainstream and partly CC, a CC 'weight' is defined to indicate the proportion of the action that is relevant to CC. It is expected that this weight could determine the share of funding that could come from domestic funding or from international sources of CC finance. Box 1 describes how the CCFF estimates the CC weights.

Box 1 Climate Change Weights and the Benefits of Actions

Two types of CC finance are defined: a) dedicated funds for actions that are dominated by CC; and b) funding for rescaling or modifying existing expenditure, where CC is important but of secondary importance, compared to economic, social and environmental development. For these actions, a CC 'weight' is defined, which indicates the part of the action that is relevant to CC. In most existing analysis, including that done for the CPEIRs, the CC weight is based on a subjective assessment of the extent to which the action is motivated by adaptation and/or mitigation, as opposed to mainstream development.

In the CCFF, a more demanding definition is used. The CC weight (W) is defined by comparing the benefits that will occur as a result of the action if CC takes place (B) with those that would occur without CC (A), such that W= (B-A)/B. If W is 50% or higher, then the action is classified as dedicated to CC. For such actions, it is assumed that CC finance will fund the full costs of the action, even though it may also produce important benefits without CC.

The diagram illustrates the above analysis, with the shaded bars on the right showing B for each type of action and the solid bars showing A. For climate risky actions, W is negative. High regret actions are dedicated to CC and W is close to 1, while low regret actions deliver strong benefits without CC and W is low, but positive. For no regret actions, W may be positive or negative.



The estimation of weights is thus based on an analysis of the benefits generated by the actions and the extent to which CC affects these benefits. Annex 1 provides more details about how this is done. In many cases, the analysis considers the extent to which benefits are affected by climate variability (i.e. flood, drought, seasonality, dry spells …) and then uses the most recent evidence from the Special Report on Extreme Events[10] and assumes that the frequency and severity of the events will double by 2050. Wherever possible, evidence from local case studies has been used in this analysis of benefits. Where local evidence is not available, estimates have been based on international studies.

[10] IPCC (2012). "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Full Report."

Examples of the way in which CC may affect the benefits from public and private expenditure including the following: increased benefits from irrigation due to the fact that rainfall in the wet season is more variable and so protection from dry spells is more valuable to farmers; reduced benefits from infrastructure due to increases in the damage to infrastructure from flooding; increased benefits from health programmes due to an increased health burden from diarrhoea and other climate sensitive diseases; and increase benefits from sanitation due to increased health risks arising from flooding without sanitation. Where the benefits to infrastructure are reduced because of higher flood damage, at least some of the reduction in benefits may be offset by flood proofing designs.

For the resource scenarios, the results were obtained from discussions with donors and there was insufficient detail about the sectoral composition of future intentions to determine the CC weights, except by reference to the declared objectives. As a result, any programme that was considered by donors to be primarily generating CC benefits was assumed to be dedicated to CC (i.e. type a or b in Table 6**Error! Reference source not found.**) and those with a weight of less than 50% were considered to be 'integrated' actions (i.e. type c in Table 6). The CC share of this finance was assumed to match that derived from the analysis of existing finance. This compromise results in a loss of information about the minority co-benefits of some dedicated CC actions, it was considered a pragmatic simplification and the distinction between dedicated CC finance (which is actually defined as primarily justified by CC benefits) and integrated CC finance was seen as potentially useful in future management.

1.4.6 Workstream V - National Benefits of CC Finance

The CCFF presents the expected benefits from CC financing. This analysis draws on the same cost benefit analysis (CBA) that is required for the estimation of benefits for the CC weights. These benefits are then aggregated (in Table 19) compared with the scale of damage that may be expected from CC (in Table 18), to explore the extent to which the CC finance matches the needs. No comprehensive national assessment of the potential damage from CC has yet been done in Cambodia and the CCFF analysis should be considered as a preliminary analysis that requires more detailed evidence and refinement.

1.4.7 Workstream VI - Management of Climate Finance

The preparation of the CCFF explored in some detail the feasibility of establishing a National Climate Fund that would rely on government processes, as foreseen in the NSDP. This analysis was based on experience with other institutions in Cambodia, including those operating in Sub-National Authorities and the full range of donor funding modalities, from independent projects to the sector pooled funding arrangements in health and education. It also included a review of experience in other countries, and concluded that a more flexible Climate Change Funding Programme may be more adequate. The CCFF also provides a suite of indicators to guide MEF and line ministries to monitor progress of climate actions.

1.5 Structure of the CCFF

Chapter 2: presents the update of the climate expenditure analysis.

Chapter 3: covers the development of the future climate finance scenarios from international and domestic sources, based on the baseline scenario (2013). In this chapter, the CCFF also estimates the

indicative ceilings of climate finance likely available to each line ministry in the 5-year low growth scenario.

Chapter 4: presents the draft Planning Matrices of nine CCFF institutions. The Planning Matrices outline the selected priority actions together with the phased budget over 5 years (CCAPs). The costing of these actions are also mapped against the indicative ceilings of available resources determined in Chapter 3.

Chapter 5: outlines the assessment of national benefits of the estimated climate finance resources, compared with the damage of CC without any action. The benefit assessments cover both short- and long-term impacts.

Chapter 6: analyses existing modalities for climate finance management and formulates recommendations for a Climate Change Funding Programme in order to manage the projected climate finance resources. It also suggest a list of indicators for monitoring progress on these actions.

2 EXISTING CLIMATE EXPENDITURE ANALYSIS

2.1 Existing Climate Expenditure

2.1.1 2012 CPEIR Findings

The Climate Change Public Expenditure and Institutional Review (CPEIR) reviewed expenditure on activities that are related to CC, and assessed the extent to which this expenditure is guided by existing policy and institutional responsibilities. The CPEIR adopted similar methods to other CPEIRs conducted in Nepal, Bangladesh, Thailand and Samoa, each of which has been followed up in different ways to influence climate change planning and budgeting.

The CPEIR focuses equally on domestic expenditure and external expenditure and covers both recurrent and development expenditure. It has also used the OECD definition for mitigation and adaptation[11]. It aims, among other things, to help improve the balance and focus of existing climate expenditure, and to guide new climate finance that is likely to be available to Cambodia through international climate funds and through the funding provided by bilateral and multilateral programmes.

The 2012 Cambodia CPEIR defined three categories of climate relevance.

- High relevance programmes have clear objectives of delivering concrete and visible outcomes that improve climate resilience or contribute to mitigation. The CPEIR assumes that 80% of the expenditure in these programmes contributes to adaptation or mitigation.
- Mid relevance programmes make strong contributions to adaptation or mitigation but are motivated primarily by broader development concerns. They include economic forestry, biodiversity, many water programmes and infrastructure that have a strong climate proofing element. The CPEIR assumes that 50% of the expenditure contributes to adaptation or mitigation.
- Low relevance programmes contribute to adaptation and mitigation only indirectly. They include livelihoods programmes and more general infrastructure and planning capacity. The CPEIR is assumed that 25% of the expenditure contributes to adaptation or mitigation.

The CPEIR assessed expenditure in six sectoral ministries: MAFF, MOWRAM, MIME, MOH, MRD, and MOE over the period 2009-2011. The CPEIR estimated that total expenditure with some degree of climate relevance (2009-2011) was CR3076bn ($ 769m). CC relevant expenditure accounted for about 17% of the total expenditure on budget lines and projects that had some CC relevance. This share had increased from about 15% in 2009 and there was a marked shift towards activities that were more highly relevant to CC.

The main ministries involved in CC relevant expenditure were: MPWT (with about 27%), MOWRAM (13%), MOH (10%) and MAFF (5%). About 7% was implemented jointly by various ministries, and government agencies and international NGOs each implemented about 5%. Nearly 4% was implemented

[11] Mitigation is defined as actions that '*contribute to the objective of stabilisation of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by promoting efforts to reduce or limit GHG emissions or to enhance GHG sequestration*' and adaptation is defined as actions that '*reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience*' {OECD, 2011 #599}

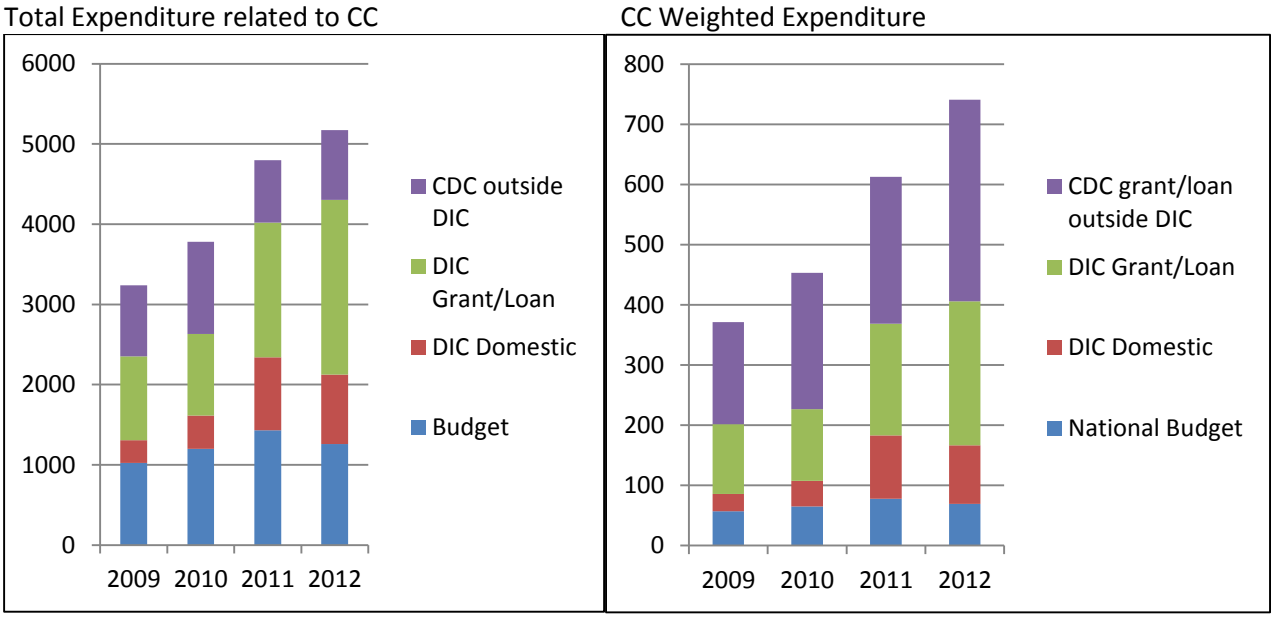
by SNAs. By type of expenditure, the largest category was roads (about CR 800bn or $200m), followed by livelihoods ($100m), disaster response and reduction ($85m) and health ($60m).

The CPEIR noted that there were strong ongoing initiatives to improve the recognition of the importance of CC in sectoral and national policy and planning. It noted strong opportunities for integrating CC even more strongly into the key national policy documents, including the revised NSDP and Rectangular Strategy, to be prepared in 2013. Finally, it noted the importance of the ongoing preparation of CC Strategic Plans in line ministries and of the SPCR and CCCA initiatives. The establishment of the National Council for Sustainable Development (NCSD) has helped to give momentum and commitment to these changes. The CPEIR suggested that a CC Annual Report be prepared to maintain the profile of CC, especially in central planning institutions.

2.1.2 Updating the 2012 CPEIR

The CCFF has added four new ministries to those considered in the CPEIR: MWA, MOEYS, MPWT, and NCDM. Furthermore, the weights used for all years in the CCFF have been refined as discussed in the methodology section above and the analysis has added 2012 data. The new analysis undertaken for the CCFF suggests that the proportion of CC relevant expenditure in the total expenditure on items that have some CC relevance varied between 11% and 14% between 2009 and 2012.

Figure 3 Public Expenditure on Climate Change Related Actions (CRbn)



Note: most externally funded expenditure is associated with a government ministry, although funding may not go through the budget, but about 5% is managed by NGOs as shown in Table 1.
Source: Revised CPEIR (2013)

The indicator for CC finance in the NSDP is the total CC weighted expenditure divided by the grand total expenditure, including both CC and non-CC expenditure. This will not be an easy indicator to monitor on a regular basis as it requires checking for double counting between the two main records of international finance (i.e. CDC and DIC). Based on the analysis for the 9 government bodies included in the CCFF, this share was 5.4% in 2009, 5.8% in 2010, 5.5% in 2011 and 6.5% in 2012. These variations are

caused by lumpy changes in donor funding that is not related to CC, rather than by changes in CC financing. This suggests that it may not be the most effective indicator for NSDP, even if it were easy to measure on a regular basis. Expressed as a % of GDP, CC financing has grown steadily from 0.86% in 2009 to 0.96% in 2010, 1.18% in 2011 and 1.31% in 2012.

The CCFF has also analysed the expenditure by implementing institution, including ministries, SNAs, NGOs and NCDM. This analysis is complicated by the fact that many projects are implemented by a range of different institutions and an estimate has been made of the share attributed to each implementing partner. This analysis has allowed 89.2% of all CC relevant expenditure to be attributed to an implementing institution, as shown in Figure 4 and Table 1. MOWRAM manages 29.0% of the CC relevant expenditure, reflecting the large volume of spending on irrigation, which has a high CC weight. MPWT managed 17.4% of CC relevant expenditure, with a larger total expenditure, but a lower CC weight. MAFF accounted for 13.9%, MOH for 5.4%, MRD for 4.9% and MoE for 4.8%. SNAs implemented 6.3% of the total and NGOs managed 4.6%. MIME managed only 1.7% of CC relevant expenditure, reflecting the relatively low priority given to mitigation until now in Cambodia's development. The importance of CC in MIME's activities is likely to increase, as energy consumptions expands and there is increasing emphasis on green growth.

At present, the only technique that is used within government for tracking CC expenditure, is the marker that is included in the CDC database. The guidance on the use of this marker asks donors to tick the CC box if their project includes work that is relevant to CC. For domestic expenditure, the level of detail provided for recurrent expenditure is still at a very high level and does not allow detailed tracking. There is scope, however, to introduce a tracking/scoring system for DIC Chapter 21 expenditure and for the DIC record of external loans and grants.

Table 1 Climate Related Expenditure, after applying the climate relevance weights

	Total donor and national					
			in CRbn			
	2009	**2010**	**2011**	**2012**	**Total**	
WEIGHTED						
MAFF	71.3	48.4	90.0	93.5	303.3	13.9%
MOWRAM	71.1	113.8	197.6	250.3	632.8	29.0%
MIME	9.1	5.7	8.4	13.4	36.5	1.7%
MPWT	61.7	66.6	130.8	119.3	378.4	17.4%
MRD	26.2	30.8	24.1	26.1	107.2	4.9%
MOH	15.9	26.6	29.9	45.4	117.9	5.4%
MEYS	0.0	0.0	0.4	0.4	0.8	0.0%
MWA	0.8	0.7	1.1	2.7	5.3	0.2%
NCDM	4.9	12.6	0.0	0.2	17.8	0.8%
MOE	10.0	13.7	24.6	57.1	105.3	4.8%
SNA	45.0	75.9	6.6	9.9	137.4	6.3%
NGO	14.9	27.9	17.6	40.3	100.7	4.6%
Total CC, CCFF ministries	**330.9**	**422.6**	**531.2**	**658.8**	**1,943.5**	**89.2%**
CC, other ministries	40.5	30.6	81.6	82.4	235.1	10.8%
Total CC, all ministries	**371.4**	**453.2**	**612.8**	**741.1**	**2,178.6**	**100.0%**
in USD	92.9	113.3	153.2	185.3	544.6	

Figure 4 Climate Related Expenditure for Key Ministries

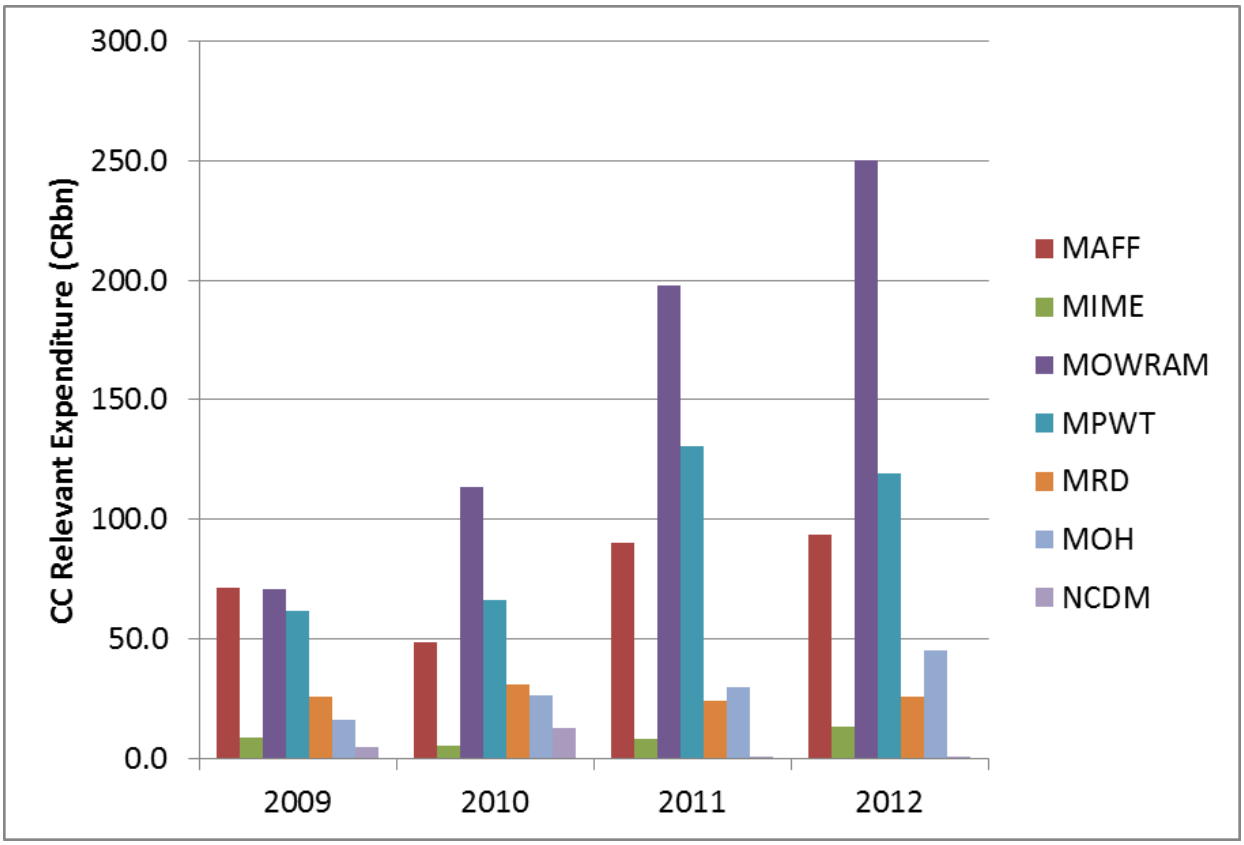


Table 2 shows that there are 34 projects with expenditure of at least $2.5m between 2009 and 2012. The total spending from these largest projects amounted to $216m, or about CR864bn, which is roughly half the total CC financing in Cambodia.

Table 2 Projects with CC Weighted Expenditure of more than $2.5m between 2009 and 2012

Donor	Project	Cat.	$m	Ministry
Japan	Project for Facilitating the Implementation of REDD+ Strategy and Policy	JPY	17.55	MAFF
China	Development Project of Design-Build Stung Pursat Dam	USD	14.21	MOWRAM
ADB/CIF	Climate Resilient Rice Commercialization Sector Devt Program (TA grant)	USD	11.45	Various
Sweden	Support to PSDD Cambodia 2010-2011	SEK	10.94	SNA
China	Kampong Trabek River Flood Control Project in Prey Veng Province	USD	10.85	MOWRAM
Multi	Cambodia Climate Change Alliance (SIDA, UNDP, EU/EC, Danida)	PCC	10.74	MOE
Denmark	Natural Resource Management and Livelihoods Programme	LVT	9.99	Mins
Canada	Pilot Program Devoted to Building Climate Resilience	PCC	8.89	MDB
China	Kanghot Irrigation Development Project in Battambang Province	IRR	8.73	MOWRAM
Japan	Flood Protection and Drainage Improvement in Phnom Penh(Phase II)	ICP	8.72	SNA
ADB	Climate Resilient Rice Commercialization Sector Devt Program (Loan)	LVT	7.53	MPWT
ADB	Supporting Policy, Reforms and Capacity Development in the	WG	7.49	MRD/MOW

	Water Sector			
Sweden	Cambodia Community Based Adaptation Programme (CCBAP)	PCC	6.86	UN
China	Prek Stung Keo Water Resources Development Project in Kampot Prov	WG	5.91	MOWRAM
ADB	Northwest Irrigation Sector Project	IRR	5.84	MOWRAM
Japan	Improvement of Capabilities to Cope with National Disasters Caused by CC	DRM	5.70	MOWRAM
UK	Multi Donor Facility for Natural Resource Management and Livelihoods	LVT	5.64	Bilateral
Global Fund	Renewed Efforts to Achieve High Coverage of Prevent Malaria Interventions	HCC	5.29	MOH
France	Support Project for Agricultural Development of Cambodia (PADAC)	LVT	5.20	MAFF
Rep. Korea	Krang Ponley Water Resources Development Project	WG	4.61	MOWRAM
Canada	Least Developed Country Fund for Adaptation to Climate Change	PCC	4.48	MOH
World Bank	DPO Smallholder Agriculture and Social Protection Support Operation	LVT	4.00	MEF
ADB	Tonle Sap Lowlands Rural Development Project	LVT	3.50	Mins
Germany	Flood Repair Measures for Rural Infrastructures	DRR	3.45	MPWT
China	National Road No. 62 (South Section) & Extension Roads No.8-1&No.8-2	ROG	3.25	MPWT
World Bank	Transport and Water & Sanitation- Main -IDA 48180 - Ketsana ERRP	DRR	3.09	MRD NCDM
EU/EC	Reducing chronic food insecurity and vulnerability in Mondulkiri/Ratanakiri	LVT	3.03	INGO
Japan	The Project for Construction of Marine Aquaculture Development Center	LVT	2.99	MAFF
China	Construction and Rehabilitation Project of the National Road 78	ROG	2.88	MPWT
China	The Rehabilitation of National Road 57B Project	ROG	2.86	MPWT
China	Design & Construction National Roads 62 & 210	ROG	2.67	MPWT
Global Fund	Moving towards Malaria Pre-Elimination Status in Cambodia (Round 9)	HCC	2.65	MOH
World Bank	DPO Smallholder Agriculture and Social Protection	LVT	2.64	MEF
Canada	Food Security for the Most Vulnerable in Cambodia	LVT	2.53	UN
Total			**216.16**	

2.2 Existing Climate Finance Management

2.2.1 Coordination and Planning

National Council for Sustainable Development: The NCSD has the mandate to coordinate government activities related to CC, including CC finance. NCSD has representation from 20 ministries/agencies. It has led CCCSP formulation, together with the Climate Change Technical Team (CCTT), which has a less clear legal basis. The NCSD has been successful in facilitating inter-ministerial cooperation. Separate arrangements have been established for the coordination of green growth (GG), which also has a National Council for Green Growth (NCGG) and General Secretariat. Stronger coordination between NCSD and NCGG is needed, as CC constitutes an important component of the GG agenda.

The technical secretariat to the NCSD (NCSD-TS) is currently provided by CCD through a ministerial proclamation, or Prakas. This arrangement has limitations, as the secretariat is not yet inter-ministerial

and remains a department of MOE, but CCD has been active in providing support to MoE and other ministries in identifying and developing CC projects and accessing CC finance both from multilateral (GEF/LDCF, AF, UN-REDD, CIF, EU GCCA) and bilateral sources (MoU with USAID, partnership with Japan, Sweden, etc.). A total of $250m of climate finance has been mobilized by the CCD from 2010-2012. The need to further strengthen the secretariat has been stressed by the Prime Minister, who also designated the NCC-TS as a candidate for accreditation as a NIE for the AF (and GCF).

Donors fund about 80% of CC expenditure, so coordination with donors is critical. However, there is no regular mechanism for coordination and dialogue with donors, apart from biennial CC Forums (2009, 2011, 2013). An informal donor group meets under UNDP coordination about every 2 months.

Ministry of Economy and Finance: MEF has responsibility for managing the national budget and for approving of budget submissions from line ministries, some of which are affected by CC. MEF will coordinate the definition and application of new systems to highlight the CC benefits of domestic expenditure in budget submissions. MEF is also responsible for approving all foreign loans and will therefore be in a position to require these loans to include an assessment of the implications of CC in the routine appraisal of loan performance.

Ministry of Planning: MOP has started work on integrating CC into national planning, with new guidelines and processes for the preparation of NSDP. There has also been some initial work on M&E, in coordination with NCSD. Actual data collection is the responsibility of line ministries, except for NIS-led surveys.

Line Ministries: Eight ministries and NCDD have been intensively engaged in CCSP/CCAP process, supported by MoE. This has been achieved through working groups with representation from relevant technical departments and the planning departments. Usually headed by a SoS or Under SoS, network of focal points is starting to emerge. Efforts have been made to mainstream CCSP/CCAP in sector planning, starting with NSDP submissions for 2014-18. However, much remains to be done to ensure effective mainstreaming in planning, budgeting, implementation and M&E procedures. And to raise the profile of CC (awareness of impacts on the sector and potential solutions) with sectoral decision makers.

However, some of the ministries with the highest levels of CC-relevant spending do not at this stage have programmatic approaches and the programmes that are defined are still at a broad level. In practice, funds tend to be negotiated on a project-by-project basis (whether donor funded or government-funded), in line with sector strategies and government priorities. This is the case in particular for MPWT, MOWRAM, MRD, MIME. In the absence of these standards, it will be very difficult to operationalize climate-smart investments.

NGOs and the Private Sector: There is also an informal NGO group – the CCCN/NGO forum. Some private sector groups are starting to emerge, such as the Green Business Committee of the European Chamber of Commerce.

2.2.2 Budgeting Process

Budget Cycle: One of the main objectives of the CCFF is to encourage as much climate finance as possible to be managed through the budget. The budget cycle is described in Box 2 and summarised in Figure 5.

Box 2 Cambodia's Budget Cycle

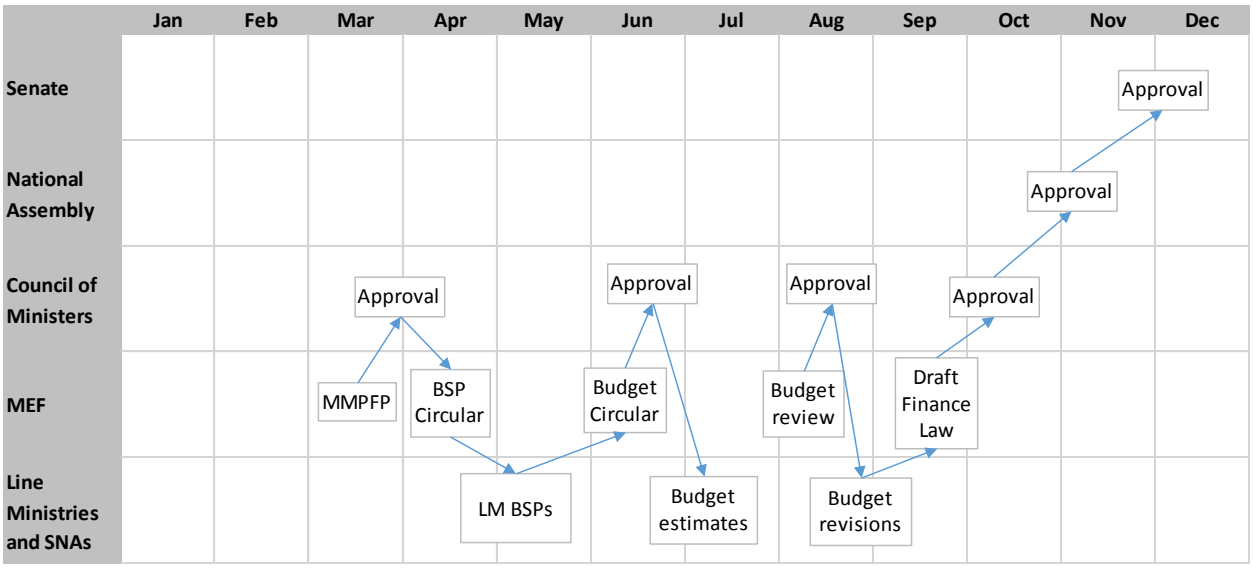
Budget Strategy Plan (March-May). The budget process starts in the first week of March, when MEF prepares the Mid-term Macroeconomic and Public Finance Policy (MMPFP) in line with national development policy. The MMPFP is developed based on a prognosis of macro-economic variables (GDP growth and inflation, balance of payments, money growth and the exchange rate) and provides a forecast of the total resources available to government over the medium term. The MMPFP is submitted to the CoM for approval and is then used as the basis for the preparation of a Budget Strategy Plan (BSP). A circular on preparation of the BSP is issued by MEF Budget Department and line ministries and local authorities then prepare their submissions for the BSP and submit these to MEF by mid-May. The BSP includes three year projections of spending for each ministry, and it is the foundation for: a) the linkage between the budget and policy, including the Rectangular Strategy and NSDP; b) the calculation and justification of budget needs; c) the sustainability of programmes; and d) the evaluation of the budget package and budget appropriation.

The BSP is the tool for line Ministries to prepare their medium term and annual expenditure plans. The BSPs have a programmatic structure based on the identification of organisational objectives, budget activities, output targets and indicators for Ministry spending. At the moment, the BSPs only capture government resources. In the future, they will also include donor flows. One of the difficulties in incorporating donor funds into the BSPs is associated with the parallel modalities which are used to manage many donor projects.

Budget Circular (June-September). Once the BSP has been approved, MEF drafts a circular on budget preparation, specifying the conditions and procedures to be followed. This is approved by the Council of Ministers and is then forwarded to line ministries and local authorities for drawing up detailed revenue and expenditure estimates to be submitted to MEF by July 25. In August, MEF consolidates the revenue and expenditure estimates and invites line ministries and local authorities to perform necessary adjustments before incorporating these into the draft Finance Law by September.

Adoption of Budget (October-December). MEF submits the draft budget law to the Council of Ministers during the first week of October and to the National Assembly during the first week of November for approval. Finally, the draft budget law is submitted to the Senate by the first week of December and for adoption prior to December 25.

Figure 5 Budget Cycle



The Budget Cycle has evolved since 2005, when the government started a comprehensive programme of reform through its Public Finance Management Reform Programme (PFMRP), with donor support. The PFMRP aims to transform the PFM system into one practicing accepted international best standards. The ten year timescale (2005-15) recognizes the time required to achieve the reforms and has four sequenced stages of: i) strengthening budget credibility; ii) enhancing financial accountability; iii) the progressive development of policy-based budgeting and iv) increasing performance accountability.

In the next step, the PFMRP aims to improve and expand the implementation of program budgeting and improve budget comprehensiveness and integration. As part of the promotion of results based budgeting, the government adopted a Sub-decree, in May 2013, to establish a Budget Entity inside ministries and institutions. The detail guidelines are to be determined by a Prakas of MEF.

Programme Budgeting: The conventional budget system in Cambodia does not define budgets or monitor expenditure at any functional level below the Ministry. To help government to align resources with policy priorities, a partial form of programme budgeting was introduced in the early 2000s, with the adoption of Priority Action Programmes. These were replaced in 2007 by programmes. There are 33 budget entities, of which 8 currently have programmes identified (MLVT, MLMUC, MOJ[12], MWA, MRD, MAFF, MEYS, and MOH). These innovations have helped ministries to pursue policy priorities and encourage the integration of recurrent and capital budgets. However, there are practical difficulties particularly relating to capturing donor flows.

Public Investment Programme (PIP): The budget includes a list of projects that comprise the PIP, which is based on the National Socio-Economic Development Plan (NSDP). The PIP is prepared by line ministries, under the coordination of the Ministry of Planning (MOP), which approves all projects and ensure that they are consistent with the NSDP. MoP has prepared guidelines and a template table to align the donor-funded programmes with the NSDP policy. In practice, most of the capital budget is funded by donors and line ministries tend to deal directly with donors, or with the Council for the

[12] MLVT = Ministry of Labour and Vocational Training, MLMUC = Ministry of Land Management Urban Planning and Construction, MOJ = Ministry of Justice

Development of Cambodia (CDC), whose role is to coordinate external funding for projects as well as to maintain a database on these projects.

Currently, according to MOP, CC related activities have not yet been mainstreamed in the PIP process, although some line ministries have identified their priority departments, activities, or subgroups related to CC activities. Prioritisation in the PIP is done only by line ministries within their sectors of responsibility. Some sectors require Environmental Impact Assessments for certain types of project, but this is not done in a systematic manner. MOP compiles line ministry submissions, without any prioritisation between sectors.

Since 2010, the CDC database includes a tag to identify those projects that address CC. Entries in the CDC database are made directly by donors and they are left to decide whether to tick the climate tag box. The tag does not yet provide an opportunity for indicating the level of CC relevance.

Domestically funded capital spending is managed by DIC. This has traditionally been very low compared to externally funded capital spending by donors as loan and grants, but recent years have seen a marked increase, mainly in spending on national roads (MPWT), rural roads (MRD) and irrigation (MOWRAM). Domestically funded capital spending is generated from a one-line item in the budget law document titled unexpected expenditure, which is used for financial charges and unexpected expenditures due to unforeseeable events, and is later distributed to line ministries through MEF[13] following the approval of the Prime Minister. Generally, the available funds are allocated for capital spending according to the priority sector of the government, mainly roads and bridges and irrigation. Historically, the composition of this expenditure has not been reported and, even in recent years, it is not linked with the MTEF or the PIP.

On-Budget Donor Investment: DIC supervises externally financed investment projects that use project accounts in the National Bank of Cambodia. DIC are assigned to assist the Executing Agencies (EAs) and line ministries in managing the government's portfolio of externally assisted projects. These are mainly the loan and grant financed projects of the multilateral lending institutions, and appear in the budget under line item 99 as 'Capital expenditure outside NT' and 'External financing (Project aids)'.

Another element of the capital budget is financed by budget support (funds provided by donors and administered through the National Treasury). Budget support funds can be used for both capital and recurrent spending. Since 2000, moves have been led by donors in the health and education sectors, to introduce Sector Wide Approaches (SWAps). These were motivated by the realisation that new and more comprehensive approaches were needed, both to provide more holistic sector planning, and to bring more donor resource flows under one coherent sector policy and strategy framework. Having donors adopt common implementation arrangements has been more difficult, though a degree of joint planning and monitoring activity has been achieved. However, channelling donor resources through government systems to save transaction costs, and to stop diversion of scarce skills to PMUs, has not yet been generally accepted by most donors because of fiduciary risk, despite the improvements being achieved under the PFMRP. Japan provides a form of commodity aid that generates revenue for the

[13] According to the article 58 of the Law on Finance promulgated in 2008, "A sub-decree issued following a request by MEF can allocate budget appropriation recorded under unexpected expenditures in forms of additional appropriation beneficial to various chapters of ministries, institutions, or similar public entities".

budget and the EC has recently started an education budget support programme that is under assessment.

***Treasury Functions*:** At central and provincial government, the Executing Agency is required to prepare a set of documents including the description of the proposed purchases and their estimated market prices using a pro-forma invoice or requisition. This proposal is examined by the financial controller of MEF to check that: a) it is in compliance with the approved budget and the spending program sent from MEF; b) the cost is reasonable; and c) all procedural formalities have been met. The principal initial document is the 'commitment visa'. If approved, the commitment is forwarded to the Minister acting as the Principal Manager for central government, or to the Governor acting as the Delegated Manager on behalf of the line Executing Agencies for the provincial government.

DIC is assigned to carry out MEF's different roles and responsibilities through DIC's operational divisions assisting the EAs and line ministries in managing the government's portfolio of externally assisted projects. DIC is responsible for establishing and maintaining a management information system (MIS) for monitoring and evaluating the projects, collected from the EA and their project implementation team.

Executing Agencies deal directly with the projects, and send the disbursement report (withdrawal application signed by the managers of the Executing Agencies) to DIC, who process the report and requests disbursement to the development partner.

MEF can release funds directly or make a commitment (credit advice) to project expenditure, while ADB/WB can also make direct payments or use an imprest/special account in NBC, or other bank account agreed by the Minister of MEF.

Government Borrowing: Actual revenue collected by the government was only 13.2% of GDP in 2012, compared to budget spending of 19.4% of GDP according to the IMF article IV in 2013, reflecting the reliance of government on donor grants and loans. According to the debt sustainability analysis of the IMF, external debt has increased from 28.4% of GDP in 2009 to around 30% of GDP in 2012 and domestic revenue compared to external debt is high at around 240% in 2011.

External loans and other forms of borrowing are governed by the Annual Budget Law. For instance in 2013, the budget law set the budget ceiling of concessional borrowing at SDR 600m in 2013. In addition, the government is allowed to issue: treasury securities of CR 100bn; government bonds of CR 22.08bn to finance the Cambodia Life insurance company; and loans to Electricite du Cambodge of CR 121.5bn.

2.2.3 Development Partners

Donor Strategies: Most donors produce medium term strategy documents, usually at country level. Many donors are required by their international guidelines to include reference to CC in their country strategies. In many cases, the CC dimensions of their strategies are now well developed and refer to the CC risks in Cambodia and to Cambodia's own CC strategies. However, the rapid progress in national CC strategies means that there are opportunities for updating and improving the treatment of CC in donor strategies.

Project type intervention: According to the Cambodia Aid Effectiveness Report, over 90% of donor support to Cambodia is delivered through projects providing investment and/or technical assistance[14] . A project is a set of inputs, activities and outputs, agreed with the partner country to reach specific objectives/outcomes within a defined time frame, with a defined budget and a defined geographical area. Projects include aid channelled through NGOs or multilaterals. The CCFF aims to record all project support, even if there was no direct agreement between the donor and the partner country. However, the analysis relies heavily on the registration of donor funding in the CDC database and some donors do not respect the government request to register all funding in this database.

Projects that are funded outside the NBC's treasury account are generally managed directly by line ministries and donors. These include many of the bilateral grant projects. These projects may be included in the budget, if they feature in the PIP. In theory, DIC monitors disbursement for these projects, but the flow of information is not as smooth as for the projects that are funded through the NBC.

Government Counterpart Funds are required by many donor projects, including those working through the NBC and those working directly with line ministries. Counterpart funds are managed by DIC and may be provided in cash or in kind (e.g. in the form of staff or physical facilities or resettlement).

A small number of projects are managed through contributions to pooled programmes and funds, in which the donor relinquishes the exclusive control of funds by sharing the responsibility with other stakeholders, including other donors, NGOs, multilateral institutions, Public Private Partnerships. Examples include the following.

- Core support to NGOs, foundations, other private bodies, PPPs and research institutes, in which funds are paid directly to these institutions and are managed by the institutions.
- Core contributions to multilateral institutions, providing a pooled fund that is managed exclusively by the multilateral institution.
- Pooled contributions to specific-purpose programmes and funds managed by international organisations (including multilateral institutions and international NGOs), including, for example, UNICEF girls' education, Education For All Fast Track Initiative and various trust funds, including the CCCA Trust Fund.

The existing programmes that are dedicated primarily to CC are implemented outside the budget, mostly as pooled funds. They tend to focus on high relevance activities and are more limited in their support for mid and low relevance climate programmes, with the exception of the SPCR which provides 'top-up' funding for mid and low relevance projects.

Because projects and pooled funds are implemented outside the budget, there are challenges in harmonising approaches and information. Efforts have been made in Cambodia to harmonize the survey data from donors and INGOs through the CDC database. There are some challenges to expanding the use of pooled funding, particularly concerning lack of harmonisation of procedures, limited flexibility, poor country ownership, unpredictability of funding, reliance on parallel systems, and high transaction costs.

[14] CDC (2011). The Cambodia Development Effectiveness Report 2011.

The PFMRP suggests that donors should aim to use the SWAps mechanism to pool grants and loans into a specific sector or sub-sector through a multi-donor trust fund, usually managed by one donor. This approach provides funding into the government internal financial management systems for use in funding the implementation of programs linking to sectoral policy or strategic plans. The approach gives increased flexibility and lower transaction costs and reporting requirements. It should also enhance the coordination and harmonization of donor aid. In reference to the 2013 budget law, MEF is allowed to manage and maintain such trust funds, if the government has signed an agreement with the donor and the trust fund has been established by an MEF Sub-decree. The Commune Sangkat Fund (CSF) is a good example of such basket funding.

Budget Support: Budget support is a method of financing a recipient country's budget through a transfer of resources from an external financing agency to the recipient government's national treasury. The funds thus transferred are managed in accordance with the recipient's budgetary procedures. Funds transferred to the national treasury for financing programmes or projects managed according to different budgetary procedures from those of the recipient country, with the intention of earmarking the resources for specific uses, are therefore excluded. Thus, under budget support, the donor relinquishes the exclusive control of its funds by sharing the responsibility with the recipient.

Under Sector Budget Support, the donor provides support to the implementation of a partner government's program (sectoral or issue based), rather than on overall policy and budget priorities. The support is often related to a range of easily defined impact indicators that are monitored as part of sector management (e.g. literacy for education or vaccination rates for health). Compared with general budget support, there are fewer external factors that would distract from the ability to deliver this impact and achievement of the indicators should therefore be related to effective use of the budget support. This approach often attempts to coordinate all interested donor's efforts and pool resources. The EU provides budget support pilot programmes in the education sector.

Under General Budget Support, unearmarked contributions are made to the government budget including funding to support the implementation of macroeconomic reforms (e.g. structural adjustment programmes and poverty reduction strategies) as well as other agreed indicators of the impact of public expenditure. The success of the support depends, fundamentally, on the ability of ministries to use the funds effectively to deliver improved impact. But it also requires that impact can be measured and that there is an agreed approach for isolating the impact of government actions from those of other factors, such drought or economic crises. Currently general budget support in Cambodia is limited to a programme of commodity aid funded by the Government of Japan. The revenue from the sale of commodities provides RGC with budget revenue.

2.2.4 Sub-National Authorities

As a large part of climate finance will be managed by Sub-National Authorities (SNAs), it is important to be aware of the range of modalities available for financing through SNAs. Cambodia has 23 Provinces plus Phnom Penh, 171 districts and 1621 communes. Much of the activity in SNAs takes place at the lowest level, through the work of commune sangkats[15] (CS), NGOs and other actors. In the last few years, the focus on decentralization reform has been on the district and municipality (DM) level, where progress has been made in: planning processes, including integration with other levels; the establishment of a DMF; and technical support, both the DM and CS level.

[15] Sangkats are urban communes and the term commune sangkat (CS) refers to all communes, rural and urban.

SNA Planning: According to the 2010 Technical Guideline, the key strategic planning document is the 5 year plan (5YP), prepared at DM level. This is supported by 3 year Investment Plans (IPs), which are prepared at CS, DM and provincial levels and which define the projects that will implement the 5YP. These planning documents involve government at all levels, including line ministries, plus NGOs and the private sector. An annual District Integration Workshop (DIW) provides a key tool for ensuring consistency between the IPs for the DM and the SF levels. In theory, these planning documents provide the opportunity to integrate CC adaptation and mitigation into SNA activities and some pilot initiatives have shown that this is possible. However, progress is still slow, especially at lower levels.

The planning process at the provincial and district level has faced a number of challenges. At the provincial level, the *salakhet*'s[16] decisions on use of their development budgets have not been based on systematic project prioritization. The link between the development priorities of de-concentrated line departments (LDs) and the priorities in SNA plans has also been weak and efforts to encourage consistency have sometimes involved unrealistic timing and overly rigid procedures. Many DMs have not been able to implement any projects because of (i) lack of the relevant legal framework of sub-national finance and (ii) delays in the enactment of the District/Municipal Fund (DMF) and (iii) no transfer of own source revenue mobilization to the DM[17].

Nation-wide experience suggests that, while CC has been integrated into the SNA planning process, few dedicated CC activities have been implemented because of funding constraints and CC related activities remain the low priority for SNA[18] (although this depends also what constitute a CC adaptation investment). DM think that implementation of CC activities are beyond the capacity of DM. However, the experience is somewhat different in CS and DM with funding supports to work specifically on CC issues.

In response to the above challenges, NCDD is developing an SNA planning policy framework to provide policy guidance for the reform of the existing SNA planning system and propose changes in term of planning institutions, instruments, process, timeframe and support system. This is because the existing regulations and guidelines of planning system were quickly put in place in 2009 after the SNA councils formed, under exceptional time and political pressure, to ensure that the newly formed SNA councils could comply with their legal obligation[19] to prepare a five year Development Plan and a three year rolling Investment Program within the first year of their mandate. NCDD-S commits to complete and approve by this year. There is also some work being done to develop CC mainstreaming guidelines for SNAs.

SNA Finance and the CSF and DMF: The CSF was established as part of the arrangements to initiative commune elections in 2002 and has grown to become an important component of development finance, as described in Box 3.

[16] The Salakhet is the provincial administration

[17] Field interviews and interviews with the NCDD Policy Advisors (date)

[18] This argument is based on the fact that SNA rarely consider CC as the main challenge in their localities. However, it is very possible that, without thinking or not, some of the approved projects of the SNA such as irrigation and water supply do help address climate change issues.

[19] Organic Law, article 39

Box 3 Budget Reimbursement: the Commune Sangkat Funds Modality

The Commune Sangkat Fund (CSF) is considered a success in Cambodia and is sometimes referred to as a possible model for partially on-budget external climate financing. The experience with the CSF may provide useful lessons for CC financing at other levels of government.

The CSF was established in 2001 and has become an important feature of the De-concentration and Decentralisation policy, accounting for nearly 2% of all public expenditure in 2010, amounting to about US$ 36m. The funds are used to implement local investments in Commune Investment Plans prepared by communes and sangkats. The majority of the funds are used for rural roads (65%), irrigation (17%) and rural water (6%), most of which have at least mid-relevance to adaptation. This means that the CSF probably accounts for about 7% of all climate expenditure. 88

CSF funds are made available by a direct transfer from the central government budget, based on a formula that takes into account the population and conditions of the commune or sangkat. The funds are disbursed through the budget of the NCDD-S and channelled through the national treasury system. Whilst there have been issues associated with disbursement rates, the CSF is widely believed to be transparent and successful at reflecting local priorities. About half the CSF funds have been provided by the RILGP, funded by the World Bank. The RILGP funding has been provided as reimbursement to the NCDD-S for all investments undertaken under the CSF that meet certain criteria (URS 2010). This approach will continue through the Sub-National Democratic Development Reform Program (SNDD-RP), also funded by the World Bank.

Although the RILGP works as a form of budget support, there is some conditionality included in the eligibility criteria, which cover financial management, land acquisition, environmental assessment and participation of minorities. Another form of influence is being introduced by allocating a proportion of the SNDD-RP funds to a new line of CSF funding that is reserved for recurrent costs. Financial management is generally considered good, although there are problems with disbursement rates (Dom 2008). The use of environmental assessment has been varied and generally disappointing (Ashwell, undated).

In addition to the CSF, the DM levels started to receive their own DMF in 2011. In the 2013 budget, the DMFs received $19m, of which about $11m was for salaries and administration and $8m for development. DMF funds were disbursed through the Salakhet (Provinces) in 2011 and 2012, but allocations were made directly to DM accounts in 2013. However, the limited capacity of DMs has meant that, as of Sept 2013, none of the 2013 DMF development budget had actually been disbursed. The initial problems have been associated with procurement problems. The situation is made worse by constraints over changes between budget lines and rules prohibiting carryover of unspent funds at the end of the year.

Technical Support to SNAs: At the provincial level, Technical Facilitation Committees (TFCs)[20] have been established, with members are from all LDs and advisory roles to support the council on key tasks, including the preparation of the Development Plan and Budget and coordination works between the CS councils and line departments and the DM and CS councils.[21] In addition, in each province, an IP 3 provincial advisor has also been appointed to assist provincial administration in preparing development

[20] Sub-decree on establishment of Technical Facilitation Committee

[21] Organic Law

plan and rolling investment program. One contracted provincial facilitator has also been assigned to assist and coach the councils to understand their roles and tasks.[22]

For the DM level, the key technical support staff include one contracted advisor at each DM to support DM general works and one contracted council facilitator covering 2-4 councils. Few DMs or CSs have the resources to recruit additional expertise. The TFCs have been constrained by limited resources and have met only once or twice a year, therefore providing limited support to DMs. To address this, Technical Support Officers (TSO) have been assigned, located at the province level, but provided by LDs (mainly from MRD), who assist CS in project preparation and implementation.

On CC, the challenges are: (i) both SNA and LDs officials still have limited knowledge about the issues; (ii) most LDs still have not integrated CC into their sector strategies and action plans; and (iii) there is a lack of connection between national CC strategies and the process of SNA development planning.

Box 4 LGCC, CCBAP and NAPA-FU Projects

LGCC. The LGCC project was designed by the NCDD-S and UNCDF and funded by the CCA Trust Fund and SIDA. The project was a pilot demonstration of the important role of SNA in CC adaptation. The first phase was implemented in 2012 in one municipality (Daun Keo) and two districts (Bati and Borei Chulsa) in Takeo. In 2013, the second phase was implemented as a continuation from LGCC I in Takeo, and expanded to include 4 districts in Battambang.

LGCC transfers performance based climate resilience grants to pilot DM and CS administrations in CC vulnerable areas to top up projects that have been proposed in their IPs. The top up is 100% for service and 33% for infrastructure projects. In 2012, expenditure was $120K, of which $73K was for infrastructure and $47K for planning, services and administration. The expenditure on infrastructure was used for irrigation ($37K), rural roads ($20K) and water and sanitation ($16K). The technical support included support for training and for the preparation of a CC Adaptation Strategy. The projects are also monitored and assessment using a participatory process.

According to the CCFF fieldwork, most LGCC funding has topped up activities that would anyway have been funded without the LGCC. There is, however, good evidence that LGCC has had some success in encouraging DMs and CSs to integrated CC into the design of their projects. This is partly because LGCC pays for a Technical Support Consultant, who has some training in CC and receives better incentives than the TFCs, TSOs or IP3 advisers used by other projects. In the short to mid-term, communes are likely to continue to focus on CC proofing existing actions. The design and implementation of dedicated CC activities, involving more long-term and strategic perspectives, will require more capacity than is available in most communes and will remain mainly at the DM level, or higher.

CCBAP. The overall objective of the CCBAP is to improve community based adaptation in flood/drought prone provinces. As of the end of 2012, the project has funded 46 projects through 38 local NGOs and 8 CBOs in 380 villages, in 107 communes, 56 districts and 21 provinces. The support is based on an integrated approach to community-based adaptation and includes support for infrastructure, farming know-how, capital and governance.

[22] The IP3

CCBAP has been implemented with the existing CIP process. This has led to high ownership of the local authority over the project, which in turn motivates them to contribute to the project implementation and sustainability. The project has used the concept of Vulnerability Reduction Assessment (VRA) as a tool to help mainstream CC into planning. Conclusions about the impact of CCBAP are similar to those for LGCC. The funds appear to have been highly appreciated and well used, but the projects supported are ones that are likely to have been funded even if CCBAP funds were not available.

The CCBAP projects use the same procurement process as the CIP, which is reported to be successful at ensuring greater transparency than LD expenditure and in achieving lower unit costs in procurement. Technical support for CCBAP projects are supposed to come from LD offices of MOWRAM. In some cases, this has been highly effective. But it is less effective for more isolated projects and, in some cases, projects have sought the assistance of TSOs.

The NAPA Follow Up Project. The NAPA-FU project is funded by UNDP and the GEF/LDC Fund and implemented by MAFF. The project was one of the first initiatives in Cambodia to translate the adaptation agenda from policy level into practice at provincial and commune levels, following up the National Adaptation Programme of Action for Climate Change (NAPA) launched in 2006. The main areas of activity are: mainstreaming CC into planning; agriculture and water management; gender; and public awareness about CC.

The Mid-Term Review and key informant interviews indicate that the project has done well in terms of mainstreaming CC into planning and in raising awareness. There is an important opportunity to share these successes. Implementation is strongly supported by the provincial administration, but funding does not use budget channels, which can create challenges for coordination, both with planning (which is affected particularly by clashes between procedures at different levels of SNA government) and with any complementary activities funded by government.

The implementation of the NAPA-FU project at the SNA level uses the procurement process of the NCDD/IP3, which helps to strengthen of the SNA management system. The field evidence suggests that procurement is more transparent than that of the MEF. What is unclear in the current arrangement is the roles and level of ownership of the communes and district level in the project implementation, although NAPA-FU has already been integrated in the project selection stage of the CIP.

Phnom Penh: Phnom Penh Capital has nine Khan and 96 sangkats, with a population of more than 1.6m in 2013. The city administration is classified as a Salakhet, and its budget is included in the total budget for provinces. The 5 Year Development Plan and 3 Year Investment Plan (3YIP) indicate four development sectors: economic; social; land management/environment/disaster management/climate change; and safety/public order. The Capital, in its plans, recognizes the need to prepare itself for disaster management and climate change, which relates mainly to flood management, sewage rehabilitation and maintenance, operation of pumping stations, awareness raising and communication[23].

As a local administration, Phnom Penh has its own budget which is allocated and indicated in the National Budget Law. The budget grew from $53m in 2012 to $78m in 2013, which is 50% and 60%, respectively, of the total budget allocated to the provincial level. The investment activities in Phnom Penh have been funded not just by the Capital budget, but also the DMF which has been allocated to the nine Khan and the CSF to the 906 sangkats. Other funding comes from donors and NGO projects,

[23] Phnom Penh Capital (2013). The 3 Year Rolling Investment Program: Phnom Penh, Cambodia.

political parties and the private sector. However, the research could not obtain detailed data on each of the funding sources and what they have been used for.

The 3YIP provides a good picture of the types of development activities it has been doing and plans to do. The plan identifies 132 ongoing projects, 214 committed projects and 250 'non-committed' projects, which reflect future plans. The ongoing projects are expected to involve $152m between 2013 and 2015, whilst the committed projects are expected to deliver $424m in that period. The non-committed projects are the projects for which the Capital is seeking funding and amount to $631m.

The 'environment/disaster management/climate change' sector accounts for about 25% of the planned expenditure on ongoing projects, largely because of a single JICA project involved in flood protection and sewage, which accounts for 90% of this spending. For the committed projects, the sector accounts for only 4% of planned expenditure because there are almost no committed projects in the sector funded by donors. It seems unlikely that this reflects a dramatic change in priorities and it is more likely to be caused by the coincidence of project cycles or a lack of data. In an attempt to correct the perceived under funding in commitments, about 90% of the non-committed projects are in the environment/disaster management/climate change sector, including three large projects in water storage ($200m), sewage ($215m) and flood protection ($75m).

There is also likely to be a modest climate change component in expenditure in the infrastructure sector (i.e. roads, parks, schools, and other buildings), to the extent that construction designs incorporate some proofing against climate change. The infrastructure sector accounts for over 50% of planned expenditure on ongoing projects and most of the planned expenditure on committed projects. Although the 3YIP does not provide evidence on the extent to which climate proofing is taken into consideration in designing infrastructure, the fact that climate change is mentioned in the plan suggests that there is growing awareness in the city administration.

SNA Expenditure Analysis: SNA funding includes: a) the provincial Salakhet budget (which includes the Phnom Penh budget) and LD budgets; b) unconditional transfers from central budget, including the CSF and DMF; c) NGO and LD project support at DM or CS level, typically going through the DIW; d) other sources, including political parties, the Red Cross and funding through NCDM; and e) some private investment. There is reasonable data on the first three of these categories, but limited evidence on party funding, private investment and NGO funding outside the DIW.

Table 3 below provides a nation-wide picture of the Cambodian budget allocated among different tiers of government, and the distribution between central and LD expenditure for selected ministries. The Table shows that the budget allocated to SNA (i.e. Salakhet, DMF and CSF together) is still very small (roughly 6% of total budget). The average DMF per district was $113K and the average CSF per commune was $27K. Whilst at the national level, the line departments at provincial level receive only about 15% of total expenditure, their share is much higher for the selected ministries that are most concerned with local development, including MAFF, MRD, MOWRAM and MWA.

Table 3 National Budget and Budgets of Selected Ministries ($ million)

National Budget

	2011	2012
Ministerial	2,071.67	2,242.50
Line department	330.68	383.83

Budget of Selected Sectors

	2011		2012	
Selected sectors	**Central**	**LD**	**Central**	**LD**
Agriculture	15.62	8.47	17.73	9.01

Salakhet	89.40	106.96		Rural Development	13.95	7.04	15.91	7.47
DMF	14.16	18.25		Water Management	5.84	4.31	7.75	4.77
CSF	38.88	44.39		Women Affairs	3.38	3.51	3.53	3.70

Each of the SNA budgets is divided between administrative and development, including infrastructure. The approximate share of the development component of each of the budgets is as follows: Salakhet less than 20%; DMF 40%; and CSF 70%.

The SNIF is being prepared as a source of funding for middle level projects at DM and CS level that would not be funded by DMF or CSF. It will mainly be used for infrastructure, but investments in social services and local economic development ventures will also qualify. IP3 foresees that the SNIF will consist of several financing "windows" (such as windows for natural resource management or adaptation to CC). As such, the SNIF will help develop the capacities of SNAs for discretionary funding, thereby increasing their capacity for decentralized service delivery. SNIF will provide competitive grants (as SNAs are not permitted to borrow). Projects proposals submitted by SNAs will be evaluated on the basis of merit (unlike proposals that currently financed by the CSF, which automatically qualify for financing unless they are on a negative list).

Box 5 Climate Change Expenditure in Takeo

The sectoral allocation of SNA expenditure is now well established and fieldwork for the CCFF confirmed the patterns of expenditure. The majority of funding is for local infrastructure, and for roads and irrigation in particular.

There are 10 districts and 100 communes in Takeo. Funding for the Salakhet and LDs in Takeo amounted to about $688K in 2012. Rural development and water resources account for nearly two thirds of this. Development spending is 55% of total spending for rural development and 40% for water resources. For other LDs, development account for less than one third and much of this is devoted to relief spending, which is also classified as development expenditure.

In addition to the above sources, districts receive funds from the DMF, the CSF and the District Integration Workshop (DIW). Investigations in Prek Kabas District suggested that these amount to about $0.35m, which is roughly in line with the national average. In Bati District, spending on the DMF, CSF and DIW amounted to $1.26m, including NGO support of $1.02m.

In addition to the funding from Salakhet, DMF and SCF, many projects supported by donors and NGOs are managed locally. Data on the scale of project funding is not available in a single source, but initial estimates suggest that project based funding that is implemented locally in Takeo could be about $1.25m. Many of these are supported by LDs and SNA institutions, who may receive additional budget for their work, but the role of these institutions varies greatly.

Finally, there is also substantial additional funding from the Cambodia People's Party (CPP) and from the Red Cross and NCDM. According to records from Prek Kabas, CPP funding was between $30K and $260K per commune, over the 5 years from 2008 to 2013, suggesting that it made a significant contribution to development. Reliable records for Red Cross and NCDM funding are not available.

Line Departments and SNAs: At the provincial level, the most engaged LD is the Department of Planning who assists the provincial administration, DM and CS in updating the commune databases, analysing the current situation and coordinating in the DIW. Most LD budgets are limited to recurrent costs and these are generally inadequate to provide the full level of technical support required by DMs and CSs. Other

LDs play uneven and indirect roles in local project implementation, unless they have projects to implement or are supported by additional incentives by other projects. The ability of LDs to support DMs or CSs is also affected by the fact that they generally have a top-down approach to planning, with limited understanding of the principles and practices of local development. The CCFF fieldwork at local level, suggested the following conclusions for different LDs.

- MAFF are well engaged with SNAs, with extension workers active down to village level. They have limited experience with procurement, however.
- MOWRAM is the least engaged with SNAs, focusing mainly on larger scale irrigation, where procurement issues are different. In theory, MOWRAM approve advice from TSOs, but this rarely happens in practice.
- MRD are also well engaged with SNAs, especially down to DM level. They are familiar with small project planning and implementation, although they do have some problems with procurement. They often provide technical advice and supply most of the TSOs.
- MWA are also engaged at community level, providing awareness raising of gender issues. They have limited project experience, however.

Table 4 summarises the main features of the modalities in use in Cambodia.

Table 4 Main Modalities in use in Cambodia

	Scale $/yr	Planning	Technical Support	On-budget	Disbursement	Procurement	Accounts
SNA							
CSF	$36m 2010	CIPs	TFC, IP3	Yes – direct transfer	AWP	CSF/NCDD Rules	Treasury
DMF	$19m 2013		TFC, IP3	Yes – direct transfer	AWP	CSF/NCDD Rules	Treasury
RILGP & SNDD-RP		CIPs	TFC	Yes – via NCDD-S	Reimbursed – has been slow	CSF/NCDD Rules	Project A/C?
LGCC	$129K 2012	CIPs/DIPs	TSC	No	Performance based grants	CSF/NCDD Rules	Project A/C
CCBAP	$4.47m (2010-15)	CIPs	MOWRAM LD (+TSOs)	No	Project based	CSF/NCDD Rules	Project A/C
NAPA-FU	$3.09 (2009-13)	CIPs	Provincial LD	No	Project based	NCDD/IP3	Project A/C
SNIF	Unknown	SNIF rules - to be agreed	SNIF rules - to be agreed	Yes – direct transfer	Competitive grants	SNIF Rules - to be agreed	Treasury
Donors							
SPCR	$20m/yr '14-'18	Project	MoE	Yes (via ADB loan)	Top-up to ADB projects	ADB rules	Treasury Special A/C
CCCA	$3m/yr '10-'14	AWP	NCSD-TS /UNDP	No	Competitive top-ups?	UNDP rules	Project A/C
Donor Projects		Project	Consultants	No	Project	Donor rules	Project A/C
NGOs		Project	NGO	No	Project	NGO rules	Project A/C
Sector Budget Support (MoH)	?	MoH	MoH	Yes	6 monthly (?) Tranches	RGC rules	Treasury
Future							
NCF	?	AWP	NCSD-TS	Flexible	Flexible	Flexible	Treasury Special A/C?
Sector Budget Support	?	Sector budget	NCSD-TS	Yes	6 month tranches?	RGC rules	Treasury

3 SCENARIOS FOR FUTURE FINANCING

3.1 Public Funds

This section estimates the CC finance that is currently active in Cambodia and considers scenarios of possible future CC finance that could be available to Cambodia through the following three major sources. The section covers both international funds and the CC contribution of domestic financing, including both recurrent and development expenditure.

(a) Dedicated/global funds are finances available from global institutions and mechanisms for CC, for instance CIF (including SPCR), GEF, LDCF, AF, FCPF[24], UN-REDD[25] and the upcoming GCF, that are dedicated to addressing CC through either mitigation or adaptation reasons.
(b) Dedicated/in-country funds are the portion of climate funds that are dedicated for addressing climate issues and that is directly financed by the Cambodian government through its annual budget means and by bilateral and multilateral donors active in Cambodia. This type of funds also includes projects that are managed by donors' regional offices.
(c) Integrated/in-country funds refer to the type of resources financed by the government and donors in Cambodia that is not primarily meant for climate issues, but involves some degree of relevance (low and mid) to CC either explicitly or implicitly. In this type of finance, the climate aspect is integrated or embedded in the mainstream development projects.

3.1.1 The Baseline

The literature related to global climate finance was reviewed and personal interviews were held with key donors, implementing partners, private sector, and concerned government institutions in order to discuss the current and future scenarios of resources to finance climate activities in Cambodia. From all these sources, the estimated amount of annual commitments to climate finance in Cambodia is about $185m in 2013. Table 5 below summarises the climate finance baseline (2013) for Cambodia.

Table 5: Climate Finance Baseline for Cambodia (2013)

Sources	Amounts	Sources
Dedicated/global funds	$25m	CIF, GEF, LDCF, AF, FCPF and UN-REDD
Dedicated/in-country funds	$80m	Regional and in-country projects of Government and donors active in Cambodia
Integrated/in-country funds	$80m	Estimated amount of climate related expenditure embedded in mainstream development projects

The CIF, through SPCR, is the largest source of dedicated global climate funds to Cambodia. The SPCR fund is currently set at $91m, of which $55m is grant and $36m is loan. With an expected completion date of 2018, the SPCR will involve expenditure of about $20m per year. Other dedicated funds include around $3m from GEF and about $1m per year from each of LDCF, AF, FCPF, and UN-REDD. The SPCR involves one TA project for capacity development and coordination support and 7 investment projects (4 to infrastructure, 1 for irrigation, and 2 in agriculture). The implementing agency, ADB, uses the fund

[24] Forest Carbon Partnership Facility
[25] United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation

to support its existing portfolio to Cambodia. For instance, the SPCR finance is incorporated into a $70m loan agreement between ADB and the RGC to promote the country's rice and financial sectors. Of the loan, $55m is the Climate-Resilient Rice Commercialization Sector Development Program, aimed at transforming Cambodia's rice sector from subsistence farming to commercially oriented value-chains, and $15m are allocated from SPCR.

Dedicated CC finance is almost entirely dependent on donors, with little contribution from the government budget. In 2013, bilateral and multilateral donors in Cambodia will have disbursed about $75m to activities with the primary objective of addressing CC and around $5m will have come from regional projects addressing climate issues. Major bilateral contributors to regional projects are USAID, followed by AFD, plus SIDA and the Swiss Agency for Development and Cooperation (SDC). ADB also fund regional projects, especially in the transport and energy sectors, but all the ADB regional funds for each recipient country are divided and recorded at the national level.

About CR 4,000bn (or $1bn) of the domestic public expenditure in 2012 was climate relevant, with either a low or mid relevance. Based on the CBA exercise, approximately 3% of the benefits generated by low relevance expenditure are from adaptation and/or mitigation and the equivalent figure for mid relevance expenditure is 25%. Assuming that the share of expenditure that is categorised as climate relevant is proportional to the share of benefits that come from adaptation and/or mitigation, the total climate relevant expenditure is around $80m in 2012, or about 8% of the total expenditure on categories that have some degree of relevance to CC. About $30m of this was low relevance and $50m was mid relevance. This has great potential to increase in the future.

3.1.2 Indicative scenarios

The prospect is the climate finance in Cambodia available from all sources will continue to increase over the next 5-10 year timeframe although its expansion will move at different paces. Nonetheless, the increase in any sources is expected to slow down over a longer-run. The overall increase in the low-increase scenario will likely be around 7% per annum while 10% will be expected from a high increase scenario over the next 5-10 year timeframe.

Dedicated global funds: The resource from dedicated global funds for climate intervention is currently small, but it has great potential to increase faster than other sources if the global commitment to CC is fulfilled. The Climate Policy Initiative (CPI, 2013) estimates that the climate finance flow from governments averages around $12bn in 2012 of which $1.6bn was through climate funds, majority of which was through loan instrument and for mitigation intervention (CPI, 2013). While the UK, Japan, Germany, and the US are the top four contributors of the funds, the major recipients of the funds include Bangladesh, the Philippines, Brazil, and Thailand, and followed by India, China, and Mexico. Of note, sectors that have benefited most from the climate funds are agriculture, forestry, land use and livestock management, renewable energy, disaster risk management, transport, and energy efficiency. Among other recipients, Cambodia has received about $25m per annum through global climate funds, which is about 0.2% of the total climate finance internationally available.

From recent developments at COP19 in Warsaw (Nov 2013), it appears that the GCF, which is one of the key mechanisms to mobilize $100bn per annum to finance climate related expenditure in developing world by 2020, will struggle to meet this target (Box 6 International Climate Finance FundsBox 6 provides more details on international climate finance funds). According to the High Level Advisory Group on Climate Finance, of the $100bn pledge, private sector is expected to contribute half and thus

about $50bn per annum are supposed to come from public sources[26]. The projections of dedicated global fund flows to Cambodia are, assuming the allocated share for Cambodia remains 0.2%:

- 5-Year scenario:
  - $40m for a low-growth scenario (assuming 50% disbursement rate of funds)
  - $50m for a high-growth scenario (assuming 60% disbursement rate of funds)
- 10-year scenario:
  - $90m for a low-growth scenario (assuming 85% disbursement rate of funds)
  - $105m for a high-growth scenario (assuming 100% disbursement rate of funds)

Box 6 International Climate Finance Funds

The Adaptation Fund. The AF was created under the Kyoto Protocol by parties to the UNFCCC. It has been administered by the GEF since 2007. It is largely financed through a 2% levy on revenues from the sale of CDM credits and operates on a project basis, with project proposals being made by implementing entities to the central board.

Implementing entities could be national, multi-national bodies or regional bodies. The Adaptation Fund website lists 28 accredited implementing entities, of which 15 are national, 10 are multinational (including the major development banks and four UN agencies) and 3 are regional. The national institutions include: ministries (in Jordan and Rwanda); agencies or authorities (Uruguay, Kenya, Morocco and Chile); institutes (Senegal, South Africa, Mexico, Argentina); funds (Benin, Costa Rica); one bank (India) and one trust (Belize).

The Adaptation Fund has approved 30 projects with a total budget of about $200m. One of these is being implemented in Cambodia by UNEP, with a budget of about $5m.

The Green Climate Fund. The establishment of a GCF was agreed in Durban in 2011. It is expected to provide an important element of the medium term financing of $100bn annually, by 2020. After some delays, the Board of the GCF is now operational and the GCF espouses the principles of national ownership. However, there is still strong ongoing debate about the modalities that will apply. Recipient countries (i.e. developing and middle income countries) argue for strong national ownership, with fund management and project selection being delegated to government bodies, and with the GCF providing only coordination and supervision of fiduciary propriety. Funding countries (mainly developed countries) argue for a more cautious approach relying more on mechanisms more similar to those used for the Adaptation Fund, at least initially.

Dedicated/in-country funds: Although Cambodia is going to join a lower middle-income group in a few years to come, it will remain a relatively poor country; therefore, the overall ODA is not expected to shrink over the next 5-10 years although its relative size to the overall GDP is expected to decline. Some donors may leave Cambodia and their departure will not much affect the gross volume of ODA as big donors are likely to stay and new partners may join, as in the case of the Swiss Agency for Development Cooperation. Major donors like ADB, EU, France, Japan, Australia, South Korea, World Bank and China are more likely to increase their portfolio although there will be some shift in modality and terms of

[26] {HLAG, Nov 2010 #733}

assistance. For instance, assistance from OECD donors is likely to be more in the form of loans. Likewise, because Cambodia will remain in early developing stage, it will need to borrow even more for investment needs such as infrastructure development.

The discussion with key donors in Cambodia suggests that the integrated ODA may see a range of increase between 25% for a low scenario and 40% for a high scenario over the next 5 years. Because donors are likely to pay more attention to CC through dedicated than integrated projects, it is expected that the allocated share for dedicated CC finance will increase higher than the increase in integrated funding. Thus, dedicated climate finance from multilateral and bilateral donors[27] is expected to increase at:

- 30% for a low growth scenario and 50% for a high increase scenario by 2018 (5-year).
- 60% for a low growth scenario and 150% for a high increase scenario by 2023 (10-year).

Integrated climate finance: Integrated climate finance that is part of mainstream development projects will also play a major role, especially in contributing to adaptation. Although the awareness of CC is reasonably high, it is still expected to affect sectors such as irrigation, agriculture and disaster management and is less associated with education and health, for example. As such, there is room for increasing climate expenditure through more awareness and application of climate sensitive activities across a wider development landscape. By mainstreaming CC into development projects, the contribution through the government budget is expected to increase around 9-10% per annum for the low increase scenario (which is roughly in line with the rate of nominal GDP growth and expenditure projection for 2013-17[28]) and 14-15% for a high increase scenario, if the government gives a higher priority to climate response (which is in line with the annual increase of domestic revenue 2009-11). The contribution from donors to CC mainstreaming in low and mid relevant climate projects is expected to move in line with the overall growth of ODA. Within the next 5 years, donor funding for integrated finance is expected to increase by around 25% (or 4.6% /yr) for the low scenario and around 40% (or 6-7% /yr) for the high scenario. On a 10-year timeframe, donor disbursement will see a slower increase of around 50% (4% /yr) and 60% (5% /yr) respectively for the low and high increase scenarios[29].

[27] Despite this, the actual availability of funds, especially from traditional donors will, in addition to economic recovery in home countries, be subject to Cambodia's performance with regard to democracy, respect for human rights, reducing corruption, promoting the rule of law, and protecting the environment.

[28] IMF (2013): IMF Country Report No. 13/2 (Cambodia)

[29] These scenarios have, in addition to evidence from the discussion with key donors, taken into account the fact that ODA to Cambodia experienced an annual growth of around 8% between 1992 and 2011, from $250m to $1,235m in 2011 (CDC, 2011[29]) and that slower growth is likely to follow in the next decade.

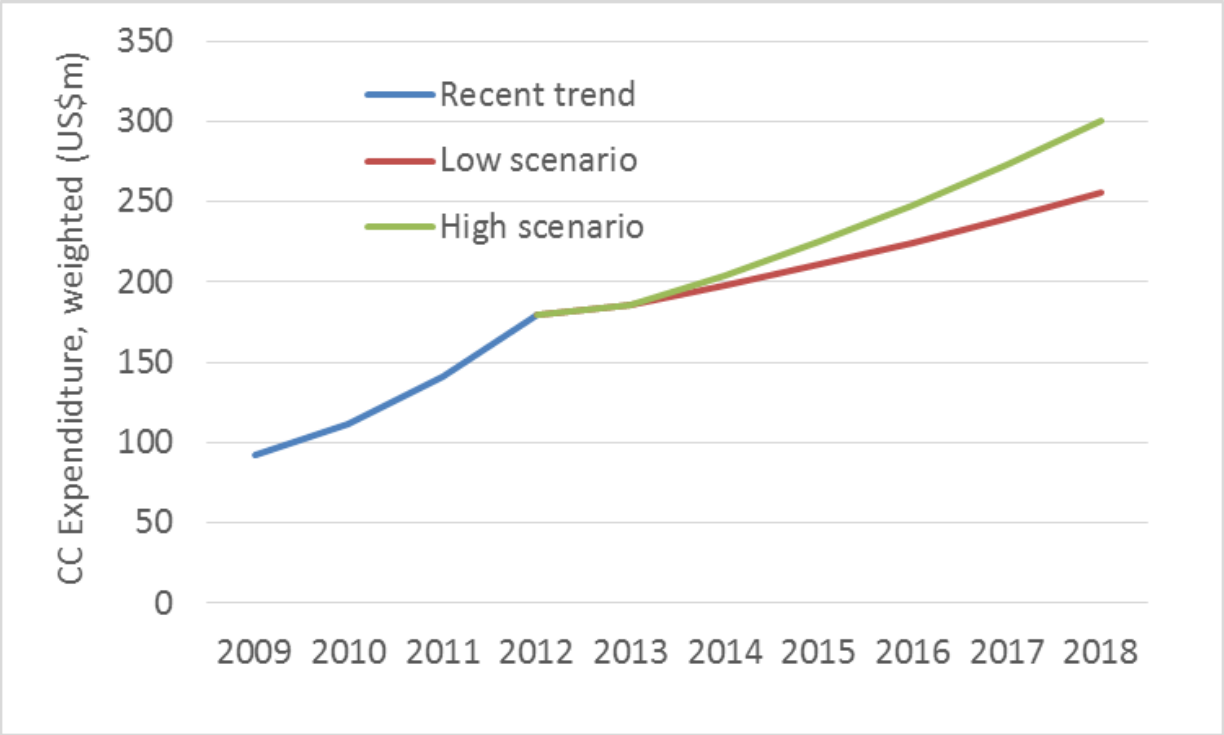
Table 6 summarises the estimation of future climate finance resources in different scenarios.

Table 6 Overall Climate Financing Scenarios

Scenarios	Total climate finance			(a) Dedicated/global funds			(b) Dedicated/in-country			(c) Integrated/in-country		
	Miti.	Adapt.	**Total**	Miti.	Adapt.	**Total**	Miti.	Adapt.	**Total**	Miti.	Adapt.	**Total**
(0) Current/ Baseline (2013)	9	176	**185**	3	22	**25**	2	78	**80**	4	76	**80**
				Global CC Finance flow: $12 Bln Cambodia thru int'l CC inst.: $25m or 0.2% of global flow			In-country donors: $75m Regional projects: US$5m			CC weights Low relevance: 3% ($30m) Mid-relevance:25% ($50m)		
(1) 5-Year Low-Increase (By 2018)	19	236	[$70m up] **255**	7	33	[$15m up] **40**	4	101	[$25m up] **105**	8	102	[$30m up] **110**
				Global target: $40 Bln, Achieve 50%: $20 Bln Cambodia share holds: 0.2%			30% increase from baseline			CC weights hold ODA: 25% increase (4.6% p.a) Domestic finance: 9-10% up p.a.		
(2) 5-Year High-Increase (By 2018)	30	270	[$115m up] **300**	10	40	[$25m up] **50**	8	112	[$40m up] **120**	12	118	[$50m up] **130**
				Global target: $40 Bln, Achieve 60%: $24 Bln Cambodia share holds: 0.2%			50% increase from baseline			CC weights hold ODA: 40% increase (7% p.a) Domestic finance: 14-15% up p.a		
(3) 10-Year Low-Increase (By 2023)	55	345	[$215m up] **400**	20	70	[$65m up] **90**	15	145	[$80m up] **160**	20	130	[$70m up] **150**
				Global target: $50 Bln, Achieve 85%: $43 Bln Cambodia share holds: 0.2%			100% increase from baseline			CC weights hold ODA: 50% increase (4% p.a) Domestic finance: 9-10% up p.a.		
(4) 10-Year High-Increase (By 2023)	75	425	[$310m up] **500**	25	80	[$80m up] **105**	20	180	[$120m up] **200**	30	165	[$110m up] **195**
				Global target: $50 Bln, Achieve 100%: $50 Bln Cambodia share holds: 0.2%			150% increase from baseline			CC weights hold ODA: 60% increase (5% p.a) Domestic finance: 14-15% up p.a		

Error! Reference source not found. compares the two scenarios for future growth in CC funding with the rend over the last 4 years. The figure suggests that the low scenario is conservative compared with recent trends and that the high scenario is not excessively optimistic.

Figure 6: Past CC Expenditure and Future Scenarios

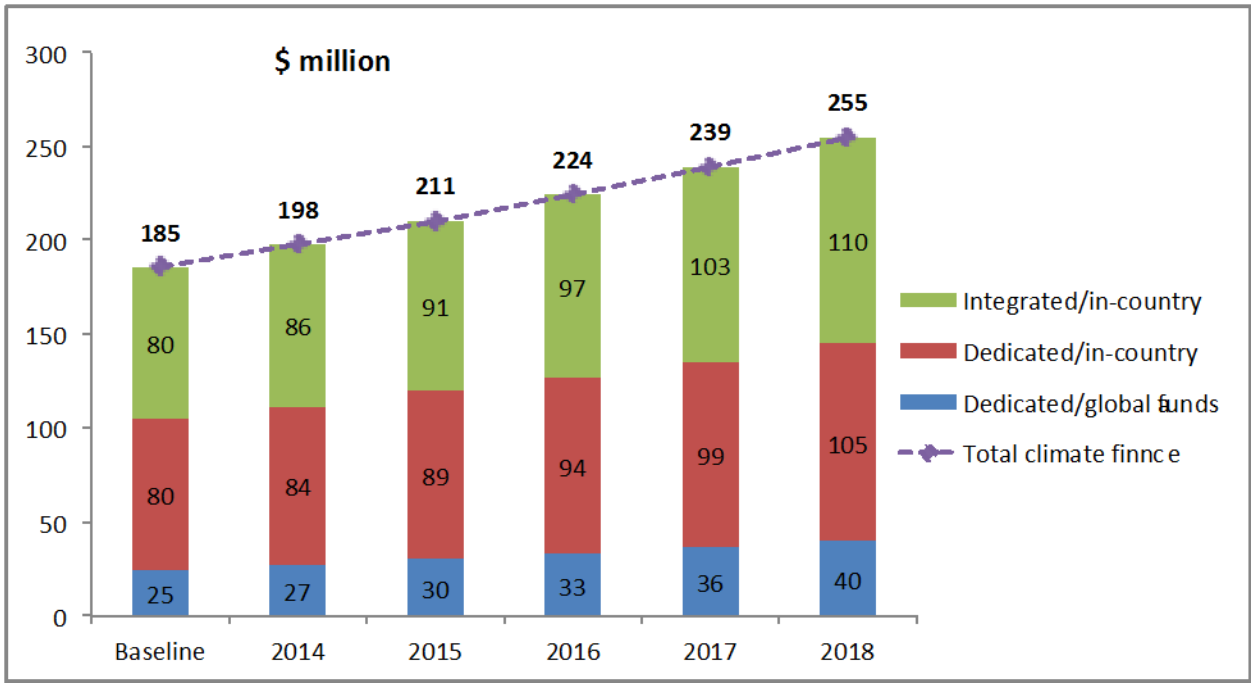


Note: based on CCFF figures for 2009 to 2012 and then following scenario projections

3.1.3 Indicative Resource Ceilings

From a conservative perspective, Cambodia anticipates an annual flow of climate finance of $255m by 2018 (Low-growth 5 year Scenario). Dedicated and integrated CC projects from in-country sources will remain the prominent features of climate finance source in Cambodia. Both make up 85% of the total and account for almost an equal share. The dedicated fund from global climate mechanisms represents a smaller share, but expects a faster rate of increase. Figure 7 illustrates the flow of climate finance on a linear trend between the baseline (2013) and 2018. Over 5-year period (2014-18), the whole flow expects to provide a total indicative resource of $1,127m to be available for financing climate expenditure, $640m of which are expected to come in the form of dedicated climate finance.

Figure 7 Indicative Progression of Climate Finance, 2014-18



Growth Rates of Adaptation and Mitigation Finance: In Cambodia, the CPEIR suggested that over 95% of CC expenditure was motivated by adaptation. Whilst this may have been appropriate in the past, Cambodia is now becoming an MIC and is likely to graduate from LDC status by 2020. Cambodia will therefore be seeking, increasingly, to contribute to global mitigation, in line with COP19 decision to reach a new international climate agreement in 2015 at COP21. Whilst mitigation will become increasingly important for Cambodia, it is expected that the private sector to play an increasing role on mitigation spending, as regulations and incentives to encourage private sector's engagement are being developed and private businesses' appreciation for the economic benefits of improved efficiency increases.

The CCFF assumes that mitigation spending will grow at about 16% per year in nominal terms, compared to 6% for adaptation, ensuring that Cambodia gradually changes, over a period of about 35 years, to a pattern of roughly equal mitigation and adaptation spending that is more common in High Income Countries. The different growth rates for adaptation and mitigation have little effect on the balance between ministries in the next five years, but will become more important in the mid to long term.

Ministry Indicative Resource Ceilings: Using the assumptions on growth rates of adaptation and mitigation finance above, the CCFF estimates the resource ceilings for the implementing agencies based on the baseline and the low-growth 5-year scenario. Table 7Error! Reference source not found. below displays various institutions that are involved in implementing CC activities and their respective allocated share of the CC funding, which is based on 2009-12 experience. The role of MIME which works on the energy sector, has not yet been high, which reflects the fact that climate finance to Cambodia has predominantly been allocated to adaptation rather than mitigation. The CCFF also takes into account the fact that a large part of MIME spending and small parts of MAFF and MPWT spending are devoted to mitigation, which is assumed to grow faster than adaptation funding.

Table 7 Indicative Allocations by Implementing Agencies, 2014-18

Implementing agencies	Mitigatin/ Adaptation	Base share	Growth Rate	Base (2013)	Indicative Ceilings (US$ million)					
					2014	2015	2016	2017	2018	2014-18
MAFF	Adaptation	7.7%	6.0%	14	15	16	17	18	19	**85**
	Mitigation	2.7%	16.1%	5	6	7	8	9	10	**39**
MIME	Adaptation	0.1%	6.0%	0.2	0.2	0.2	0.2	0.2	0.2	**1**
	Mitigation	2.2%	16.1%	4	5	6	6	7	9	**33**
MOWRAM	Adaptation	31.3%	6.0%	58	62	65	69	73	78	**347**
MPWT	Adaptation	19.5%	6.0%	36	38	41	43	46	48	**216**
	Mitigation	0.3%	16.1%	0.6	0.6	0.8	0.9	1.0	1.2	**4**
MRD	Adaptation	5.3%	6.0%	10	10	11	12	12	13	**59**
MOH	Adaptation	4.4%	6.0%	8	9	9	10	10	11	**49**
MEYS	Adaptation	0.8%	6.0%	1.5	1.6	1.7	1.8	1.9	2.0	**9**
MWA	Adaptation	0.2%	6.0%	0.4	0.5	0.5	0.5	0.5	0.6	**3**
NCDM	Adaptation	1.1%	6.0%	1.9	2.1	2.2	2.3	2.5	2.6	**12**
MOE	Adaptation	5.2%	6.0%	10	10	11	11	12	13	**57**
SNA	Adaptation	8.4%	6.0%	16	17	18	19	20	21	**93**
NGO	Adaptation	4.5%	6.0%	8	9	9	10	11	11	**50**
Others	Adaptation	6.4%	6.0%	12	13	13	14	15	16	**71**
Total		**100%**		**185**	**198**	**211**	**225**	**240**	**256**	**1,128**

3.1.4 Factors Affecting the Future Climate Finance Scenarios

Cambodia generally sees the prospect to benefit from increasing climate finance that is expected to be available both internationally and within the country. The extent of the increase will depend on the following opportunities and challenges.

Table 8 Challenges and Opportunities Affecting Climate Change Financing Scenarios

Challenges	Opportunities
• Weaker growth in traditional Western development partners could squeeze budgets	• Scope for new bilateral partnerships (e.g. Japan, Korea and China)
• Graduation to middle income status could reduce development assistance	• Most CC finance is more accessible to MICs • More scope for private investment
• Cambodia is more accustomed to adaptation funding than mitigation, while the majority of global CC finance is devoted to mitigation	• Opportunities for low carbon development will increase as Cambodia industrialises • Cambodia is highly exposed to CC risk, which should generate strong international interest in adaptations funding
• Perceived lack of transparency in public administration undermines confidence in verification of carbon credits	
• Uncertainty about future of carbon market price	• Developing countries are a prime target for buyers of carbon credits

	• Develop examples of strong verification for carbon credits • Possible recovery of carbon markets by 2015, following COP21, when new reduction targets are in place
• Varied awareness about the importance of CC in different sectors (not always reflecting actual differences in importance)	• Opportunities to mainstream climate finance into mainstream funding, in budget or through top-up funding
• Problems of institutional competition in RGC could delay agreements (e.g. REDD+ projects)	
• Limited capacity to manage increased CC finance in some ministries	
• Lack of confidence in public finance management reduces willingness of development partners to fund through the budget	• While confidence in public finance is being established, there will be more opportunities for private finance
• Limited interest in and commitment to CC amongst central RGC bodies	• Improved tracking of CC funding and analysis of benefits • Establishment of National Climate Fund • Accreditation of National Implementing Entity

Initial indications are that there is strong interest amongst donors in expanding financing related to CC. Examples include:

- a large agricultural project is being discussed through ASEAN, with funding from Japan, Korea and China
- SPCR projects are moving ahead, including on agriculture, roads, urban infrastructure and irrigation
- the ongoing IFAD ASPIRE project will be expanded with the new PADEE project to result in funding of about $100m for agriculture, including a climate change component

3.2 Private Sector Participation

The role of the private sector and NGOs will become increasingly important as the country develops, especially for the investment required in mitigation and for promoting the growth in public awareness and lobbying for corporate social responsibility.

3.2.1 Carbon Market

As in the case of low public financing for mitigation, the role of private sector in climate finance is still limited. The participation of private sector in mitigation remains mainly in the Clean Development Mechanism (CDM) and is expected to increase in other mechanisms such as Japan's bilateral Joint Crediting Mechanism[30] (JCM).

[30] Cambodia and Japan signed the bilateral document on JCM on 11th April 2014 (https://www.jcm.go.jp/kh-jp/information/54)

One of the key challenges of the CDM market is the current volatile and low prices of carbon. In the case of CDM projects, the current CER price is around $1-2 per tCO2e (down from about $20 in 1997 and $5-8 in 2011) and around $4-8 per tCO2e credits of REDD projects.

10 CDM projects had been developed between 2006 and 2012, with total potential carbon credits of around 2m tCO2e per annum. However, 90% of these credits could be attributed to 4 hydropower projects that are still under validation stage. Only one project of 50,000 tCO2e per annum capacity was approved by the Executive Board and is now being traded. Therefore, the contribution of CC finance through CDM will remain minimal and ambiguous at least until the COP21 to be held in Paris in 2015, which aims for the legal binding agreement. As a positive development, the recent COP19 seems to revive a hopeful prospect for the CDM as countries were called to promote the voluntary cancellation of carbon credits without double counting. This should pave the way for higher demand for the CDM projects[31].

With regards to REDD, there has been more interest from countries such as Japan, China, and Korea and Cambodia is currently planning to have up to 15 REDD projects as of now. Nonetheless, only 2 projects are relatively advanced and thus have more substantial information for consideration – respectively, Odder Meanchey and Seima projects, which potentially sequester 1.7m tCO2e and 58m tCO2e of carbon credits over an initial 10 year period. Prey Lang project also expects 4.5m tCO2e. At 6 $/tCO2e, the three projects would generate $38.5m per annum, but the market prospect is not promising in the near future. There have been international investors who are ready to buy credits from, for example Odder Meanchey project, but the Cambodian government was not able to sign off.

Besides REDD, the participation of carbon credit developers is still very nascent. NEXUS is currently implementing two projects to develop carbon credits for the voluntary market. These two projects are “Ceramic water purifier” with fund support from Hydrologic and “Cook Stove” funded by GERES. Both projects are respectively expected to generate about 300,000 – 500,000 tCO2e over 7 years and about 2m tCO2e over 10 years. Currently low price of carbon credits is a critical challenge for the market to operate.

3.2.2 Renewable Energy and Energy Efficiency

The room for Cambodia to benefit from energy efficiency is ample and promising. UNIDO conducted a project to explore the potential for improve energy efficiency, working with 12 small and medium manufacturing enterprises. The average saving per enterprise was about $270,000, including both savings on energy and on other costs arising from the investment in improved efficiency. The project was highly appreciated by entrepreneurs, giving very high returns and suggesting that incentives should be high enough to motivate private investment. The saving in the first year already accounts for an average of 82% of the investment cost. According to Economic Census 2011, 787 enterprises currently employing more than 100 staff. If all these firms were able to achieve similar savings through improved efficiency and productivity, Cambodia would save more than $200m per annum from energy efficiency.

The potential contribution from renewable energy is less clear. There are now around 10 importers of solar panels, but it is difficult to track the share that has been purchased by the private sector.

[31] www.theecologists.org: Climate action? Warsaw 2013 to Paris 2015. http://www.theecologist.org/blogs_and_comments/commentators/2200973/climate_action_warsaw_2013_to_paris_2015.html

Nonetheless, the increasing number of solar panel importers is a positive sign and indicates the existence of more demand and competition. Moreover, the price of solar panel has reduced from about $4-$5 for 1 watt-power panel in 2011 to about $2-3[32] as a result of lower international prices and a cut in Cambodia's tariff[33] from 84% to 15%.

Through a Technology Transfer project, UNIDO invests $1.8m over 2012-2015 to promote the application of biomass gasification in rice mills, ice production, and garment factories with aim to contribute to low emission and at the same time help address high energy cost that is a constraint for businesses in Cambodia. Overall, the participating enterprises have saved around 50-70% of their cost on energy. Such gain should be significantly attractive for businesses to consider their investment.

[32] Interview with UNIDO

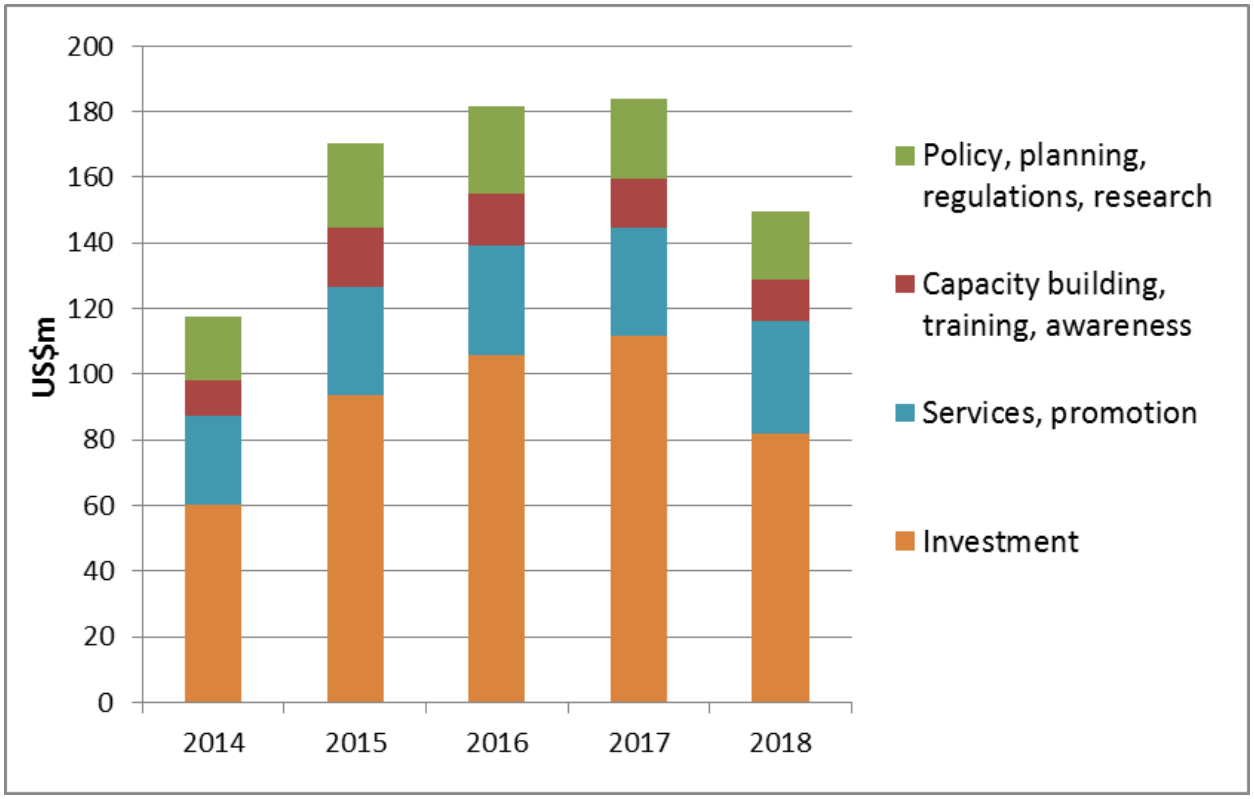
[33] Interview with Climate Change Department of the MOE.

4 SECTORAL CLIMATE CHANGE ACTION PLANS

CC Action Plans (CCAPs) have been prepared for eight ministries plus NCDM. These are summarised in the sections below. The CCAPs include a planning matrix which identifies the priority actions required to deliver the CCSP strategies and priorities. There are a total of 117 actions, with most institutions having between 8 and 16 actions. Because of the wide responsibility of MAFF, and the relevance of most of their activities to CC, MAFF have 32 actions. The total expenditure under the action plans amounts to $843m over the five years, which accounts for 75% of the $1128m that is expected to be available under the low growth scenario. The remainder of the CC financing is managed by MoE, SNAs, NGOs and other institutions.

The CCAPs include a range of types of action. Of the 117 actions, 10 involve investment, mostly in infrastructure, and these account for 56% of the total expenditure. Services and promotion account for 39 actions and 20% of the total spending, whilst policy accounts for 36 actions and 15% of spending and capacity building accounts for 32 actions and 9% of funding. The share of spending on policy and capacity building falls from 26% in 2014 to 22% in 2018, suggesting that the initial demands for investment in institution building are beginning to be satisfied. The drop in funding in 2018 is caused mainly by MOWRAM's proposal to front-load expenditure on rehabilitation of irrigation. Figure 8 presents this information.

Figure 8 Types of Action Proposed in Climate Change Action Plans



It is not easy to provide general guidance on the appropriate level of expenditure on the supporting 'soft' activities related to policy, capacity building etc. In sectors with heavy investment expenditure (e.g. in roads, irrigation and water) spending on soft activities would not normally account for more than

10% of total spending. In social sectors where the design of social services is well established and programmes are large (e.g. in health, education and welfare) the soft activities would not normally account for more than 5% to total spending. In sectors that require more complex planning and participation and that involve targeted services (e.g. in local government or rural development), the acceptable level of soft expenditure may be much higher and may even rise to over 30%. The situation is further complicated by the fact that, in some sectors, it is not even easy to define what a supporting activity is. In some cases (e.g. participatory planning in rural development) attempting to separate such activity can undermine the effectiveness of public expenditure.

The above guidelines for acceptable levels of soft supporting expenditure apply to mature government institutions with well-established roles. Where new challenges are being addressed and new practices are being introduced, it may be justifiable to have substantially higher levels of expenditure on soft support. This would apply to CC planning over the next five years. There is no fixed rule on the maximum level, but, if it rises to more than double the normal guidelines suggested in the paragraph above, then there are risks that the effectiveness of soft support will be undermined because it will become detached from the hard activities that it is designed to support. In such cases, special justification is probably required.

It is useful to monitor the balance between hard and soft activities to ensure that a reasonable balance is maintained and to understand the extent to which government's management of climate finance is maturing.

4.1 MAFF

4.1.1 Crop Production

Crop production is strongly affected by weather. The following paragraphs describe the main ways in which CC will affect crop production.

- Floods and droughts have a major impact on crop production in Cambodia, and especially on rice production. The regular seasonal pattern of flooding and drought is central to traditional agricultural practice, ensuring fertility and productivity. Traditionally farmers have been able to plant different rice varieties according to what they expect from the upcoming seasons. CC will not only result in more intense and frequent floods and droughts, but also will make the onset of seasons less predictable. National average yields in bad years are typically 10% to 20% below the trend average yield and up to 40% below the yield that could be expected in good years. The main adaptation response to increasing rainfall variability is to expand irrigation. Access to irrigation is currently at between 27% and 40% of total cropped area, depending on definitions and data source, so most crop production is still dependent on rainfall.
- The predictions that wet seasons will be shorter but with higher levels of rainfall, while the dry season will be longer and drier, will also result in shifts in the distribution of rainfall between areas. The changes to the length of seasons, combined with the delayed onset of the wet season after a longer dry season, will affect traditional cropping practices.
- There is some evidence that the yield of rice decreases by 10% for every 1°C increase in the minimum temperature during growing season (Peng et al 2004). Similar impacts have been reported for wheat and other crops (Cruz et al 2007). Higher temperatures will lead to

higher evapotranspiration and increased water demand, increasing the importance of irrigation.

- There is a risk of an increase in pests and diseases, due to a longer growth cycle, warm winters, higher growth rate of pathogens and increase weed competition.
- There may be some fertilization effect arising from increased C02, with plants accelerating vegetative growth. However, in some crops, it is possible that a lack of other nutrients will limit the benefits from this factor. There is also some recent research that changes in ground level ozone during early germination could have a major impact on reducing crop growth potential.
- Sea level rise and saline water intrusion will reduce viable crop area in the Mekong Delta and some coastal areas, with flooding in the tidal areas and saline water intrusion.

4.1.2 Livestock

Livestock is an essential part of rural livelihoods and contributes about 15% of total agricultural production. Livestock provides a store of wealth and a critical coping strategy to help household survive in years when the weather is bad for crops. However, productivity is low and is highly vulnerable to floods and droughts, both directly through their impact on animal health and through their impact on feed sources.

4.1.3 Forestry

Forests are an essential source of livelihoods for many Cambodians. Over 80% rely on fuelwood for cooking, plus 8% on charcoal. Nearly 4m people live within 5km of a forest and the Forest Administration estimates that forests account for between 10% and 20% of household consumption for these people. CC affects forestry in two ways: firstly, by placing a value on carbon sequestration, it gives a higher priority to sustainable forest management and protection against deforestation; and, secondly, CC affects the health of forests.

- There are strong commercial pressures for deforestation, both for timber and to convert the land to agricultural use. Sustainable forest management does provide an alternative income, but can only compete with deforestation if a high value is placed on the non-market products of forestry, including carbon sequestration, watershed protection, genetic resources, recreation and biodiversity. Government policy includes commitments to protect forests against deforestation and to promote sustainable community forestry. Efforts are being made to introduce mechanisms such as REDD+, which recognise the value of carbon sequestration. However, there are major institutional challenges to controlling deforestation and to administering payment for carbon sequestration.
- All forests will be exposed to longer dry seasons in 2050 which will reduce forest productivity and increase the risks of fire. This situation may reverse after 2050, at least in upland and mountain forests, where dry seasons are expected to shorten in the last half of the century.

4.1.4 Rubber and Cassava

Rubber production is growing rapidly in Cambodia. In 2010, 429,730ha of forest land had been allocated to rubber production. In 2013, a further 1.2m ha were allocated as economic land concessions, mainly for rubber, of which about 50% have been planted.

4.1.5 Fisheries

Fishing also holds a central place in the rural livelihood strategies and cultural practices for between 2m and 4m people. Fisheries provide about 25% of agricultural output and are a critical source of nutrition. Two types of fishing are practiced: the first involving the capture of fish in the extensive network on rivers and water bodies; and the second involving aquaculture. Production is increasingly being managed by small scale fisheries communities, thus ensuring the benefits are spread amongst a large number of households, many of whom are amongst the most vulnerable to CC. The impact of CC on fisheries is still not well understood, but may include the following effects.

- If there are delays in the onset of the monsoon, this will change the flood season, which will in turn affect fish migrations, with unknown implications for fisheries productivity.
- In some areas, dry seasons are expected to be longer. Whilst some fish species can survive dry spells in some circumstances, the impact of more extended dry spells is not known, especially if this affects the health of key habitats, such as flooded forests. It is likely that the increased exposure of the brood stock in extended dry seasons, will damage fisheries productivity.
- Shorter wetter rainy seasons will affect the migration triggers for fish and will reduce the season for breeding, spawning and feeding, which will limit fish growth and harm immediate productivity as well as maturity and breeding for future season.
- A small rise in sea level of 20cm will affect water levels and salinity 25km inland and will allow saltwater to move further upstream in the dry season. There will be some change in fish species composition, but the net effect of fisheries productivity is not known.
- Aquaculture is particularly vulnerable to CC.

All four of the main agro-ecological zones (Tonle-Sap, Mekong Delta, coastal and uplands) are vulnerable to CC, in different ways. Vulnerability in the Tonle-Sap and Mekong Delta is particularly high, in view of the high population density and reliance on water resources for agriculture.

The CCSP states that the objectives for addressing CC in the agriculture are based around reducing the negative effects of CC. The CCSP identifies the following 5 strategic responses:

- building institutional capacity to develop new technologies and practices to adapt to CC, affecting all sub-sectors
- promoting adoption of these techniques by farmers, foresters and fisherfolk
- reducing GHG emissions from forest degradation, animals and crops and encouraging sustainable forest management
- adaptation of fisheries through research and management of water resources
- capacity building in CC adaptation for MAFF

Table 9 MAFF Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
AGRICULTURE AND AGRO-INDUSTRY							
1	Promote resilient and sustainable farming systems	2,000	2,868	2,868	2,868	2,868	13,470
2	Promote post-harvest technologies	200	200	200	200	200	1,000
3	Develop new CC resilient crop varieties	2,676	2,676	2,676	2,676	2,676	13,380
4	Research into appropriate technology responding to CC	2,300	2,300	2,300	2,300	2,300	11,500
5	Research on appropriate post-harvest technology	500	500	500	500	500	2,500
6	Knowledge and information systems on CC	520	520	520	520	520	2,600
7	Promote appropriate technologies to reduce GHGs	1,454	1,454	1,454	1,454	1,454	7,270
8	Capacity building for disaster management	140	140	140	140	140	700
9	Promote low carbon growth for agro-entrepreneurs	310	310	310	310	310	1,550
	Subtotal	10,100	10,968	10,968	10,968	10,968	53,970
RUBBER SECTOR							
1	Promote IERRDB rubber clones	281	662	349	338	349	1,979
2	Promote new rubber clone trials	86	227	339	291	291	2,496
3	Establish experimental rubber networking sites	361	346	262	262	262	1,493
4	Training to technical staff in CC	165	208	208	208	208	996
5	Promote energy efficiency for latex and rubber	73	73	73	73	73	365
	Subtotal	966	1,516	1,231	1,172	1,183	7,329
LIVESTOCK SECTOR							
1	Promote resilience in livestock production	2,000	2,000	2,000	1,000	1,000	8,000
2	Enhance animal waste management to reduce GHGs	1,500	1,500	1,000	1,000	1,000	6,500
3	Promote breeding and husbandry to adapt to CC	2,000	3,000	2,000	2,000	2,000	11,000
	Subtotal	5,500	6,500	5,000	4,000	4,000	25,500
FORESTRY SECTOR							
1	Promote sustainable forest management	450	450	450	450	450	2,250
2	Promote reforestation and afforestation	1,640	1,640	1,640	1,640	1,640	8,200
	Capacity/research/awareness for REDD+	320	320	320	320	320	1,600
3	Develop/implement REDD mechanisms	820	820	820	820	820	4,100
4	Promote CC resilience of community forestry	820	820	820	820	820	4,100
	Subtotal	4,050	4,050	4,050	4,050	4,050	20,250
FISHEREY SECTOR							
1	Promote resilient aquaculture systems	1,300	1,300	1,300	1,300	1,300	6,500
2	Promote resilient wild fisheries resources	500	500	500	500	500	2,500
3	Promote adaptation capacity in fishery sector	3,000	3,000	3,000	3,000	3,000	15,000
4	Establish GHG inventory for fisheries	200	200	200	200	200	1,000
7	Enhance value in the fisheries chain in response to CC	400	400	400	400	400	2,000
	Subtotal	5,400	5,400	5,400	5,400	5,400	27,000
CROSS-CUTTING							
1	Land use zoning	3,880	3,880	3,880	3,880	3,880	19,400
2	Climate modelling for agriculture	1,570	1,570	1,570	1,570	1,570	7,850
3	Capacity building for CC adaptive capacity	6,198	6,198	6,198	6,198	6,198	30,990
4	Gender participation in CC adaptation/mitigation	700	700	700	700	700	3,500
4	Knowledge management re CC	2,000	2,000	2,000	2,000	2,000	10,000
	Subtotal	14,348	14,348	14,348	14,348	14,348	71,740
GRAND TOTAL		**40,364**	**42,781**	**40,996**	**39,937**	**39,948**	**205,789**
	Ceiling	20,769	22,598	24,630	26,893	29,417	124,307

Note: shaded cells are estimates that are not yet included in the draft CCAP, assuming equal annual distribution

4.1.6 Management and Monitoring

MAFF comprises 19 departments, plus several administrations and a variety of centres and units, supported by the 24 provincial and municipal line departments. MAFF is taking part in the programme budget pilot and has one programme accounting for 14% of ministry expenditure. Key entry points are likely to be: the routine preparation of budget submissions; Annual Operating Plans; and project appraisal work. Monitoring will focus on 10 key indicators, as follows:

- Agricultural output increased by 20% (about 1.5 million ton in rice)
- Beneficiary income increased by 20% (about $30/month/household increase in rural areas).
- Employment in agri-business and agro-industrial sector increased by 20%
- Areas planned to cash crops resilient to climate change to be increased by 20%
- Value of agricultural exports increased by 30%
- Value of formal bank loans for capital investment in agriculture increased by 25%
- Number agri-business SME's increased by 10%
- Mapping areas of crops and forest for agricultural zoning, multi-development areas established
- Number of aquaculturists developed for climate resilient
- About 5 million farmers received agricultural extension services resilient to climate change
- Livestock production resilient to climate change increased by 3%

4.2 MOWRAM

MOWRAM has two major roles: major irrigation schemes, to supply water for agriculture and for domestic and industrial consumption in rural areas; and flood control and polder structures to provide agricultural land and other property. Policy is guided by the National Policy on Water Resources Management approved in 2004 and by the Law on Water Resource Management (2007), with various sub-decrees. Irrigation policy relies on the effectiveness of Farmer Water User Communities (FWUCs) and there are 350 FWUCs with 305,550 households.

In addition, the Strategy for Agriculture and Water (SAW 2006-2010, updated 2009-2013) ensures good collaboration with MAFF. Collaboration is also required with MIME for hydropower, with MRD for smaller scale rural water supply and irrigation and with municipalities and Phnom Penh for urban water supply.

Water resources are highly vulnerable to CC. Increased temperatures will raise evapotranspiration, thus increasing demand for crop water. In some upland areas, there may be potential to increase crop productivity, but most areas will experience lower yields. The changes in rainfall that may occur with CC in Cambodia are not yet fully clear, with some models suggesting significant regional differences in average annual rainfall trends. However, it is clear that there will be a major increase in the variability of rainfall and that most areas of Cambodia will have more frequent and severe floods and droughts, with the available rainfall concentrated into fewer periods of more intense rainfall and with shorter and less predictable seasons. This will have a strong impact on the hydrology of the Mekong River and of the Tonle Sap, affecting water supply, agriculture, water supplies, inland fisheries and flooding. There will be a major increase in the benefits derived from water storage in dams and water control through the design of roads and through floodwater protection. Improved management of groundwater will also become more important, with CC. Finally, sea level rise will place coastal areas under greater risks of

flooding, erosion and saltwater intrusion, so raising the importance of coastal protection. These problems are increased by deforestation in the upper areas of many watersheds, which increases the rapidity of flooding, the level of erosion and the siltation of reservoirs.

MOWRAM is currently coordinating 15 irrigation projects, with total commitments of over $500m. Most of these are loans and are funded by ADB, China or Korea. There are also a further 11 projects currently under discussion, mostly with the same donors, with costs totalling nearly $1bn.

The MOWRAM CCSP identifies four strategic areas for responding to CC in the water sector. These strategic areas are pursued by the actions described in the planning matrix below.

- Improved hydrological planning and management and early warning
- Improved flood and drought management, through changes in design of reservoirs and irrigation and protection infrastructures, especially in vulnerable zones
- Capacity development for MOWRAM staff
- Promoting gender responsiveness in CC planning in the water sector

Table 10 MOWRAM Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
HYDRO-METEOROLOGY							
1	Strengthen climate information and EWS		1,500	2,000	2,000		5,500
2	Strengthen Dept of Water Resources in CC data	500	1,500	500	500	500	3,500
3	Strengthen institutions for weather forecasting	500	1,500	1,000	1,000	1,000	5,000
4	Install weather stations	500	1,000	1,000	500	500	3,500
	Subtotal	1,500	5,500	4,500	4,000	2,000	17,500
IRRIGATION							
5	Rehabilitate and CC proof irrigation infrastructure	30,000	50,000	50,000	50,000	20,000	200,000
6	Innovative technologies for areas of torrential rain	1,000	2,000	3,000	4,000	5,000	15,000
7	Support FWUCs on CC and disaster management	200	300	400	500	600	2,000
8	Capacity building on CC for irrigation engineers	250	400	400	250	200	1,500
9	Upscale pumping capacity for mini-droughts	100	400	6,500	6,500	6,500	20,000
	Subtotal	31,550	53,100	60,300	61,250	32,300	238,500
FLOOD AND DROUGHT							
10	Develop/rehabilitate flood protection dykes	400	600	800	1,000	1,200	4,000
11	Improved capacity for forecasting floods/droughts	200	700	500	300	300	2,000
12	Establish national hydrology forecasting centre	450	450	340	360	400	2,000
13	Upscale ground water management using ISOTOP		700	750	500	550	2,500
	Subtotal	1,050	2,450	2,390	2,160	2,450	10,500
SEA-LEVEL RISE AND SALINE INTRUSION							
14	Sea-dykes for CC resilient agriculture	500	600	650	650	600	3,000
15	Assess impact of sea level and saline intrusion	250	400	400	250	200	1,500
	Subtotal	750	1,000	1,050	900	800	4,500
CLIMATE CHANGE AND GENDER							
16	Promote gender responsiveness in CC		300	350	400	450	1,500
	Subtotal		300	350	400	450	1,500
TOTAL		**34,850**	**62,350**	**68,590**	**68,710**	**38,000**	**272,500**
	Ceiling	61,599	65,316	69,257	73,436	77,868	347,476

Management and Monitoring

The main departments in MOWRAM are: Water Resources Management and Conservation, Water Supply and Sanitation, Irrigated Agriculture, Hydrometeorology and Administration and Personnel. Most of the project development work in irrigation is managed by the Project Management Office (PMO), which has a similar departmental structure to MOWRAM. The PMO is supported by various Project Management Units and reports directly to the Minister, using an accounting system that is separate to the ministry and outside the treasury. There are no budget programmes. Key entry points are likely to be: the routine preparation of budget submissions; Annual Operating Plans; and project appraisal work. The key monitoring indicators are as follows:

- Effective hydrology and meteorology networks and stations upgraded and installed nationwide.
- 25,000 ha/year and 24% of climate proofed34 irrigation networks.
- Ha of agricultural land drought proofed.
- The areas of cropping land with access to irrigation services increased by 100,000 ha
- The incidence of drought or flood affected farmland reduced by 20%/year
- Reduced impact from saltwater, flood and drought for at least 10,000 hhs in vulnerable areas
- % of households in vulnerable areas with year round access to water supply (agricultural)
- At least 50% of total FWUCs (350 FWUCs) are fully functioning throughout the country
- At least 500 members from selected 150 FWUCs (70% women) understanding climate change.

4.3 MPWT

MPWT is responsible for public works and transport, including national and provincial roads, bridges, ports, railways and waterways. CC affects MPWT's activities in two main ways. Firstly, the increasing frequency and severity of floods will increase the rate of deterioration of Cambodia's roads, requiring a combination of more resilient design and increased expenditure in rehabilitation and maintenance. Secondly, transport contributes about one third of GHG emissions and is expanding rapidly.

The CCSP for MPWT addresses both the impact of CC on infrastructure and the need to promote low carbon consumption for GHG reduction in the transport sector. The actions to deliver this response to CC are described in the planning matrix below. Over 80% of the resources are devoted to improving the quality of road infrastructure. Most of the remainder is allocated to improving the railway in Cambodia, to shift long distance freight from road to rail.

[34] Climate proofed infrastructure results from engineering designs that incorporate the increase in temperature, droughts, floods and other climate hazards projected in the next 20-30 years.

Table 11 MPWT Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
TRANSPORT INFRASTRUCTURE							
1	Design standards for road resilience	50	250	200			500
2	Repair/rehabilitate road with CC proofing	25,000	30,000	35,000	40,000	40,000	170,000
3	Capacity building in MPWT for CC	250	500	750	750	750	3,000
	Subtotal	25,300	30,750	35,950	40,750	40,750	173,500
LOW CARBON TRANSPORT							
4	Raise public awareness of GHGs from transport	200	400	500	500	500	2,100
5	Enhance maintenance and inspection of vehicles	50	250	100	100	100	600
6	Promote integrated public transport in cities	50	150	200	200	200	800
7	Green belts along major roads for mitigation	50	150	250	250	250	950
8	Mass transit and cycle systems in cities	50	150	200	200	200	800
9	Promote efficient and proven transport technology	25	50	100	100	100	375
10	Shift long distance freight to rail	1,250	7,500	7,500	7,500	7,500	31,250
11	Enhance traffic management	50	100	150	150	150	600
	Subtotal	1,725	8,750	9,000	9,000	9,000	37,475
TOTAL		**27,025**	**39,500**	**44,950**	**49,750**	**49,750**	**210,975**
	Ceiling	38,600	41,800	43,900	47,000	49,200	220,500

4.4 MRD

The Ministry of Rural Development has four main areas of activity: a) community development; b) economic diversification; c) rural infrastructure, including roads, small scale irrigation, water supply and sanitation; and d) primary health care in rural areas. These activities are strongly affected by CC. Flooding has a big impact on the design and maintenance of rural infrastructure, including roads, small scale irrigation, water supply and sanitation. Droughts, changes in the seasonality of rainfall and increased frequency of dry spells, along with the impact of temperature on evapotranspiration and groundwater recharge, will also have a big impact on rural water supply. In coastal areas, changes in sea level will also require changes in the design of rural infrastructure. Changes in temperature and in the spatial and seasonal distribution of rainfall will change the distribution of the health burden of climate sensitive diseases, including, in particular, diarrhoea. Finally, one of the ways that rural households can build resilience to increased unpredictability of rainfall patterns is to diversify sources of incomes.

The CCSP defines the following four strategic priorities, supported by 33 activities.

- improved policies and design standards for rural infrastructure, to allow them to withstand extreme events;
- economic diversification to provide coping strategies when agriculture fails;
- improving the resilience to CC of roads, small scale irrigation, water and sanitation
- raising awareness in rural areas and capacity amongst village development committees

These priorities and activities are adopted in the CCAP, which defines the following key actions.

Table 12 MRD Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
POLICIES FOR RURAL INFRASTRUCTURE							
1	Map CC vulnerable rural infrastructure	150	150	100			400
2	Develop options for CC proofing rural infrastructure	50	250	200			500
3	Build awareness of CC in rural development planning	100	200	200			500
LOCAL BUSINESS OPPORTUNITIES							
4	Scale up micro-finance for mitigation and adaptation		1,000	1,000	1,000	1,000	4,000
RURAL INFRASTRUCTURE STRENGTHENING							
5	Risk assessment to improve water supply in Tonle Sap		1,000	1,000	1,000	1,250	4,250
6	Build capacity in CC proofing for 215 civil engineers		300	300			600
RURAL AWARENESS							
7	Raise awareness of CC in Village Devt Committees		1,800	1,800	1,900		5,500
8	Pilot CC adaptation in VDCs in Mekong delta						0
9	CC proofing Mekong river islands' roads/ferries		1,000	2,000	2,000	2,000	7,000
TOTAL		300	5,700	6,600	5,900	4,250	22,750
	Ceiling	10,404	11,032	11,697	12,403	13,152	58,688

4.5 MIME

Industry and energy are also strongly affected by CC. Changing rainfall patterns will have a strong impact on hydroelectric power generation and will also influence bio-energy production and the productivity of solar power. Higher temperatures will increase losses during transmission and may also affect the productivity of solar power. All types of energy infrastructure are vulnerable to damage from extreme weather events. And, finally, increasing temperatures will result in higher demands for energy for cooling in residential, commercial and industrial buildings.

Industry and energy are also responsible for part of the GHG emissions in Cambodia. Although emissions are dominated by agriculture and forestry, the share of energy and industry in emissions in 2000 was already 7% and is growing rapidly, with energy use growing at nearly three times the rate of GDP growth. The switch to renewable energy sources is likely to increase the cost of electricity, except in some isolated areas, at least in the short term.

The CCSP for MIME identified four priorities in the industry sector: a) energy efficiency (particularly for the food sector, rice milling, garments, brick and tile and paper and pulping); b) green industry; c) reducing pollution and adoption of environmentally sound technologies; and d) chemical management in industry. For energy, the CCSP identified a range of new policies and investment. The primary objective of energy policy is to ensure that there is a sufficient and secure supply to meet the rapidly growing needs of economic growth. This involves increased investment in a diverse range of energy sources, relying as much as possible on local sources, whilst also accepting some international trade in energy. New policies include support for renewable energy and energy efficiency. Rural electrification has a high priority and is particularly appropriate for private investment and renewable energy.

The CCAP for MIME identified five strategic priorities:

- Improved energy security, through improved infrastructure, renewable energy and decentralised sources
- Low carbon development, with appropriate guidelines, incentives and instruments
- Capacity development, including training, communication and research
- Reducing risks of damage from extreme climate events to infrastructure in industry and energy
- Strengthened institutions and coordination framework

Table 13 MIME Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
ENERGY SECURITY							
1	Upgrade energy infrastructure	2,000	2,500	2,500	3,000	3,000	13,000
2	Promote energy efficiency to reduce GHGs	100	200	300	200	200	1,000
3	Integrate renewable energy in energy systems	600	600	600	600	600	3,000
	Subtotal	2,700	3,300	3,400	3,800	3,800	17,000
LOW CABRON DEVELOPMENT							
4	Develop low carbon policies	50	250	200			500
5	Promote small scale low carbon development	50	100	100	150	150	550
	Subtotal	100	350	300	150	150	1,050
AWARENESS IN ENERGY AND INDUSTRY							
6	Capacity building in energy/industry	50	150	100	50	50	400
7	Promote green information sharing in energy/industry	50	100	75	75	75	375
8	Promote CC research in/for energy/industry	50	200	300	400	500	1,450
	Subtotal	150	450	475	525	625	2,225
ADAPTIVE APPROACHES TO REDUCING LOSS							
9	Promote private sector participation in CCAP activities	200	300	300	400	400	1,600
	Subtotal	200	300	300	400	400	1,600
TOTAL		**3,150**	**4,400**	**4,475**	**4,875**	**4,975**	**21,875**
	Ceiling	5,200	6,200	6,200	7,200	9,200	34,000

Management and Monitoring

MIME operates largely through projects, which are guided by the relevant sector strategy and by the PIP, which is managed by the Planning Department. Future CC initiatives will be included within this planning approach by being added to the MIME PIP. These could include greater use of regulations governing public and private investment. MIME is not one of the ministries using programme budgets and there is no donor Technical Working Group. MIME was split into two ministries as this report was being finalised: the Ministry of Mines and Energy and the Ministry of Industry and Handicrafts.

4.6 MOH

CC has a direct and indirect impact on human health. Flooding and storms cause death, injuries, morbidity and mental problems. High temperatures can cause respiratory and cardiovascular disease, nerve system disorder and diarrhoea, especially among older people and children. Changing rainfall and hydrological patterns have an impact on water-borne diseases. Increases in rainfall create favourable conditions for mosquitos, which affect the health burden from dengue fever and malaria. Decreases in

rainfall also create health challenges for those communities that do not have safe water supplies and latrines that can survive drought.

Information on the level of the impact of CC on health in Cambodia is still limited, although there is some international evidence that can be used to give some indication of the order of magnitude. The vulnerability of the population to these increased challenges depends on their access to health services, on their access to safe water and sanitation and on the literacy, food security and the resilience of household incomes and well-being to CC.

The above assessment, combined with the CC Health Vulnerability and Adaptation Assessment undertaken by MOH in 2010, with the support of WHO, suggest the following three priority areas for CC actions in health: a) risks of increased transmission of vector-borne diseases arising from changes in rainfall, moisture and flooding; b) the effects of increased flooding, droughts and temperature on vulnerability to water/food borne diseases arising from poor sanitation and water quality; and c) health outcomes associated with food insecurity arising from floods, droughts and storms. This assessment has led to the identification of three strategies in the MOH CCSP:

- promoting the resilience of the population to an increase in vector and water borne diseases arising from CC
- reducing the impact of extreme events and disasters on health through better emergency preparedness
- capacity building on the impact of CC on health for the population and health personnel

Table 14 MOH Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
RESILIENCE TO CC SENSITIVE DISEASES							
1	New guidelines for treating CC sensitive diseases	50	50	50	50	50	250
2	Upscale communicable disease control nationwide	200	200	200	200	200	1,000
3	Dengue Control Programme in CC vulnerable areas	300	300	300	300	300	1,500
4	Upscale Malaria Control Programme	6,000	6,000	6,000	6,000	6,000	30,000
5	Upscale programmes for diarrhoea and others	100	100	200	200	200	800
DISASTER MANAGEMENT							
6	MIS for health impact of natural disasters	50	50	50	50	50	250
7	Strengthen emergency preparedness	1,000	2,000	3,000	3,000	1,000	10,000
CAPACITY TO COPE WITH CLIMATE CHANGE							
8	Update health database with CC variables	50	50	50	50	50	250
9	Training of health officials in CC, with other institutions	300	300	300	300	300	1,500
10	Promote public awareness on CC, esp. with women	200	200	200	200	200	1,000
11	Capacity building for CC in Special Operating Agencies	50	50	50	50	50	250
TOTAL		**8,300**	**9,300**	**10,400**	**10,400**	**8,400**	**46,800**
	Ceiling	8,659	9,182	9,736	10,323	10,946	48,846

Management and Monitoring

The Health Strategic Plan 2008-2015 (HSP II) provides the overall framework for health planning and a Budget Strategic Plan provides three year rolling plans, including budgets for each department. MOH is one of the ministries using programme based budgeting and about 12% of the budget in 2012 was devoted to the four programmes. Health activities are supported through a range of modalities,

including: the national budget, pooled funding and contributions from bilateral and multilateral donors and NGOs, both through the budget and off-budget. CC is a new concern for MOH and the ministry is still evolving the practices and capabilities to respond to the challenges from CC. The Health CCAP will help to ensure that CC concerns are integrated into health planning and into the annual Operational Plan, which serves as a basis for the allocation of budget and pooled funding. This will be coordinated by the CC Working Group, but will be implemented primarily by increased awareness from departments themselves. Monitoring will be done using the following core indicators, supported by results based indicators for the main actions.

- Dengue incidence rate per 1000 pop.
- Dengue mortality rate (%).
- Malaria incident rate per 1000 pop.
- Malaria mortality rate (%).
- % of houses in vulnerable areas with at least one net and/or receiving insecticide spreading.
- Incidence rate of water/food borne diseases (diarrhoea, cholera, dysentery...etc.) per 1000 pop.

4.7 MOEYS

The education sector is expected to be affected by CC both directly, through increased damage to schools and other education infrastructure, and indirectly, through the impact on a range of socio-economic behaviour that will change the behaviour of students and their families. More challenging weather conditions may reduce school enrolment, both because of difficulties in getting to school and higher education, but also because families may require children and young people to help with household tasks and income generation and because reduced incomes may harm child nutrition and increase disease burdens amongst pupils and students, which will reduce learning abilities. CC may also lead to migration patterns that will require adjustment in the distribution of education capabilities.

The CCSP for education states that the vision is to develop quality education about CC and the mission of the MOEYS is to lead, manage and develop the education sector in delivering this vision. MOEYS is therefore a key partner in promoting better awareness of CC across Cambodia and in enabling households to improve resilience to CC. The vision will be achieved by: building the capacity of teachers, students and communities on CC education; increasing understanding of CC adaptation; and optimizing mitigation opportunities for sustainable development.

MOEYS has already started work on this, focusing on the following themes: improving the quality of education of students and communities about CC impact, disaster risk, adaptation and resilience to CC; encouraging teachers, students and communities to engage with CC education; and promoting community participation.

The CCAP defines four priority areas for CC education as follows:

- education policy and planning for building resilience capacity in order to respond to CC
- education quality on CC subjects for formal education
- awareness raising and mainstreaming CC in non-formal education
- green concepts and climate-proofing of schools, universities and education facilities

Table 15 MOEYS Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
POLICY AND PLANNING							
1	Develop education policy for CC	400	300	300	100	100	1,200
2	Strengthen capacity in MoEYS for CC planning	100	400	400	0	0	900
3	Promote university capacity in CC	100	300	300	300	300	1,300
IMPROVING QUALITY OF EDUCATION							
4	Capacity assessment for higher education in CC	100	300	100	100	0	600
5	Strengthen university capacity in CC	100	200	200	200	200	900
6	Upgrade CC curricula, methods, libraries etc. in schools	300	400	100	100	100	1,000
7	Enhance school teacher capacity in CC	100	200	400	200	100	1,000
8	Integrate CC into existing degrees and courses	50	100	100	100	100	450
AWARENESS IN NON-FORMAL EDUCATION (NFE)							
9	Upgrading CC curricula, methods, libraries etc. in NFE	100	200	50	50	50	450
10	Establishing CC communities in education institutions	100	100	100	100	100	500
EDUCATION INFRASTRUCTURE							
11	Mapping CC impact of education infrastructure	50	50	50	50	0	200
12	CC proofing and retrofitting of schools	350	350	350	350	350	1,750
13	Integrating green concepts in building design	150	150	150	150	150	750
TOTAL		**2,000**	**3,050**	**2,600**	**1,800**	**1,550**	**11,000**
	Ceiling	1,573	1,668	1,769	1,875	1,988	8,873

Management and Monitoring

The Education Strategic Plan 2009-2013 (ESP) provides for the guidance and coordination of the education sector. There is a Joint Technical Working Group (TWG) for donor coordination, which also includes NGOs and is supported by the ministry Planning Department. MOEYS prepares an Annual Operational Plan (AOP), based on the ESP, which serves as the basis for their budget. The ESP, TWG and AOP all provide opportunities for ensuring that CC is mainstreamed in MOEYS. MOEYS is one of the ministries that is involved in piloting programme budgeting and about 15% of their budget was under the pilot programmes. The EU provides sector budget support and many other donors support the sector through a range of modalities, including a pooled funding arrangement to support the Capacity Development Partnership Fund, administered by UNICEF.

4.8 MOWA

Women and men are both affected by CC and should both be empower to participate in adaptation and mitigation to reduce these effects. However, the effects of CC on men and women are different, due to the division of labour within households, communities and societies and to differences in access to resources. The vulnerability of women to CC is affected by a number of factors:

- women have less access than men to resources, but their lives are more dependent on natural resource that are affected by CC
- they are less well educated and are therefore less able to understand advice about dealing with extreme events, less able to diversify income sources and more likely to be burdened by obligations to others, which may become particularly serious at times of crisis
- women are less integrated in political decisions and are therefore less aware of the risks and of the plans that exist to address CC

- women are more susceptible to some CC sensitive diseases and are less able, physically, to survive extreme events and more vulnerable especially when they are pregnant or are caring for young children
- the behaviour of women in crises also affects their vulnerability, since they are more likely to put themselves at risk whilst trying to assist others
- women are often dependent on employment in brown economies that contribute to GHG emissions and may be affected (both positively and negatively) by policies to promote mitigation

The participation of young women and men is particularly important, given the long-term nature of the risks. In addition, there are ethnic and religious minorities in Cambodia that are particularly vulnerable to CC, because of their location in CC vulnerable areas or because of the challenges they face in integrating in society, and these groups needs special attention.

The CCSP for MOWA identified 6 strategic objectives:

- increased participation of women in CC policy making
- gender sensitive budgeting for CC financing
- raising awareness of gender amongst CC policy makers
- development of initiatives to fund women's engagement in adaptation and mitigation, based on the findings of vulnerability analysis
- improved capacity to plan, implement and monitor gender integrated CC initiatives
- scaling up of proven experience on gender integrated CC initiatives

The CCAP identifies 4 strategies:

- reducing the vulnerabilities to CC of women and other disadvantaged groups
- reducing GHG emissions from household and economic activities undertaken by women
- building capacity and awareness on gender related CC response
- strengthening institutional capacity and cross sectoral coordination

Table 16 MOWA Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
1	Strengthen gender CC capacities	50	200	200	100	130	680
2	Promote gender CC resilience in NSDP	0	50	50	50	10	160
3	Promote women's participation in CC policy	100	100	100	100	100	500
4	Studies of gender-based CC vulnerability	60	100	100	20	20	300
5	Education and awareness of CC gender impact	50	200	200	100	130	680
6	Piloting gender-based CC adaptation/mitigation	300	300	300	200	200	1,300
TOTAL		560	950	950	570	590	3,620
	Ceiling	461	489	519	550	583	2,602

Management and Monitoring

MOWA is guided by a Neary Ratanak Strategy 2013-2018. The ministry has some pilot programme budgets, which account for 35% of its domestic budget, and is planning to expand programme budgeting to cover the whole budget. A Technical Working Group assists donor coordination. It should be possible

to mainstream CC into the MOWA work on strategy, budget submission, Annual Operating Plan and project appraisal. MOWA is also considering acting as service providers to other ministries who implement CC projects, using the existing gender working groups in line ministries. This would enable gender based adaptation to be funded through CC funding across a range of line ministries.

4.9 NCDM

Cambodia has always been subject to flooding, droughts and tropical storms. There is some evidence that these are becoming more frequent and CC projections suggest that the frequency and severity of the flooding will double by 2050. In addition, the country is threatened by disease pandemics and these threats will be affected by CC.

The role of NCDM is: to coordinate with ministries, UN agencies, IOs, NGOs, International Communities, National Associations, and Local Donors in order to appeal for aid for Emergency Response and Rehabilitation; and to make recommendations to the government and to issue principles, policies and warnings on disaster preparedness and management, on emergency response and on interventions in evacuating people to safe havens.

The CCSP for NCDM defines a vision of building communities that are resilient to disasters caused by climatic hazards and defines the mission of NCDM as adhering to the Hyogo Framework for Action and maximising the use of existing knowledge and experience on disaster risk reduction and CC adaptation.

The CCAP identifies three major strategies for addressing the challenges posed by CC:

- strengthen NCDM institutional capacity in disaster risk management and reduction, food and health security planning
- build resilience capacity for disaster risk reduction at the sub-national levels
- promote awareness and education campaign on DRR and Adaptation

Table 17 NCDM Planning Matrix (in $'000)

#	CC Action	2014	2015	2016	2017	2018	Total
CAPACITY FOR DISASTER MANAGEMENT							
1	Integrate DRR into NSDP and sector plans	50	75	75			200
2	Build capacity of NCDM at all levels	100	200	200	250	250	1,000
3	Develop maps in disaster prone areas	200	450	450	450	450	2,000
4	Set up DRR insurance scheme			50	100	100	250
	Subtotal	350	725	775	800	800	3,450
SUB-NATIONAL CAPACITY							
5	Strengthen EWS in SNAs	100	200	200	200	200	900
6	Integrate DRR/CC into CDPs and CIPs	100	100	100	100	100	500
7	Pilot community based DRM plans	750	1,250	1,250	1,250	1,500	6,000
8	Set up disaster database system		150	150			300
	Subtotal	950	1,700	1,700	1,550	1,800	7,700
AWARENESS FOR DRR AND ADAPTATION							
9	Mainstream DRR/CC in education curricula with MoEYS		100	100	100		300
10	Mainstream DRR/CC in royal admin school curriculum	25	25				50
11	Public awareness and education in DRR/CC	50	50	50	50	50	250
	Subtotal	75	175	150	150	50	600
TOTAL		**1,375**	**2,600**	**2,625**	**2,500**	**2,650**	**11,750**
	Ceiling	2,067	2,191	2,323	2,464	2,612	11,657

5 NATIONAL BENEFITS OF CLIMATE FINANCE

This chapter presents the benefits that are derived from CC finance. It starts by considering the loss and damage expected to be caused by CC. It then considers additional benefits arising from CC finance, in the short, med and long term and concludes by comparing these benefits with the damage and loss.

The chapter provides a framework against which future policy and actions can be appraised, to assess the extent to which the expenditure will help to reduce the potential damage from CC. It assists MEF in challenging those submitted expenditure requests to include CC in the appraisal of their proposed actions, whether these action are funding by the domestic budget or by international partners. For the priority sectors addressed in the CCFF, proposed actions that are not supported by appraisal that demonstrates the implications of CC on expected performance may be rejected by MEF until this analysis is included in the appraisal. Even more important, the chapter provides line ministries with a framework within which to ensure that their activities are well adapted to CC and that the people that the ministries serve will be protected from CC as much as possible, with the funds available.

5.1 The Cost of Doing Nothing

Table 18 describes the main sources of damage arising from CC, as described in the sectoral analysis. Damage is defined to include both physical damage and losses to productive activities. The table gives an indication of the damage that will occur if CC is ignored and no adaptation takes place. No comprehensive assessment of the potential value of this damage has yet been made, but the table gives some initial indications. The analysis suggests that the damage could amount to 3.5% of GDP by 2050, if no adaptation measures are adopted. This excludes some damage that may be very important, but for which there is no data, or no accepted way of valuing damage, including: costs associated with ecosystems, changes in social vulnerability and damage in coastal and urban areas and to forestry, livestock and aquaculture.

Table 18 Sources of Damage from Climate Change and Potential Value of Damage

Source of Damage	Potential Value of Damage, without Adaptation
• Losses in agricultural production arising from less predictable seasonality of rain and from more damaging dry spells in the wet season	• The Agriculture PER suggests that second crop margins will be most affected by seasonality. If yields of second crops were 20% lower with CC, the loss in margin would be worth about $40m, or 0.28% of GDP.
• Greater losses in agricultural production arising from increased frequency and severity of floods and droughts.	• The Agriculture PER estimates that the average annual loss of rice yields arising from poor rainfall distribution is about $80m. Similar losses can be expected from other crops, which account for about half of the value of output, bringing total losses to perhaps $160m or 1.14% of GDP. This rate of loss is expected to double with CC.
• Losses for livestock and forestry, though they will follow a different patterns. Fisheries will experience some gains and some losses.	• These losses and gains have not yet been estimated.

• Losses in the energy sector from reduced hydroelectric power generation, higher losses in transmission and damage to infrastructure from extreme climate events	• Electricity production currently amounts to about 5000 GWh/year, worth about $500m. About $15m of this comes from hydropower, which will be strongly affected by rainfall patterns. Total losses during transmission are about 10% worth $50m and these are affected by storms and by temperature. The costs of cooling in thermal power generation also increase with temperature. Surprisingly, there is little international evidence of the potential magnitude of this damage and the CCFF assumes that damage will be about $10m. This is 0.07% of GDP in 2010, but is likely to increase sharply as energy's share of GDP increases.
• More rapid degradation of national and rural roads, irrigation, rural water and other infrastructure. These losses can be reduced by higher spending on maintenance.	• CBA suggests benefits are 8000 $/km for roads, 450 $/ha for irrigation and 40 $/person for rural water points. With 40,000km or roads, 0.8m ha irrigation and 4m people using rural water, the total benefits from this infrastructure are worth about $840m per year. If proper maintenance is not undertaken, most of this infrastructure degrades within 5 to 10 years, suggesting annual losses of between $100 and $180m. Much of the loss is caused by flooding and these losses are expected to double with CC, suggesting losses from CC of about $100m, or 0.71% of GDP.
• Increased loss of life and injury, and damage to urban and rural property, arising from more frequent and severe storms. • Increased flood damage for urban infrastructure	• The SNC estimates that damage from floods was $157m in 2000, $30m in 2001 and $12m in 2002, excluding loss of life and injury. The Mekong River Commission flood damage analysis estimated the average damage to infrastructure in three districts between 2000 and 2007 was 2.5 $/person/year, suggesting a national total of about $35m, or 0.25% of GDP. This damage is expected to double by 2050.
• Flooding and salinization arising from sea level rise and abandonment of some coastal areas	• No estimates are yet available for the potential costs in coastal areas.
• Increased occurrence of diarrhoea and other climate sensitive diseases	• Climate sensitive diseases result is the loss of about 400,000 DALYs per year. WHO estimates that these could increase by 10% with CC. Cambodia does not yet have a planning yardsticks for the value of a DALY, but the WHO guideline is three times per capita GDP, which suggests that the extra health burden from CC would be about $120m or 0.85% of GDP.

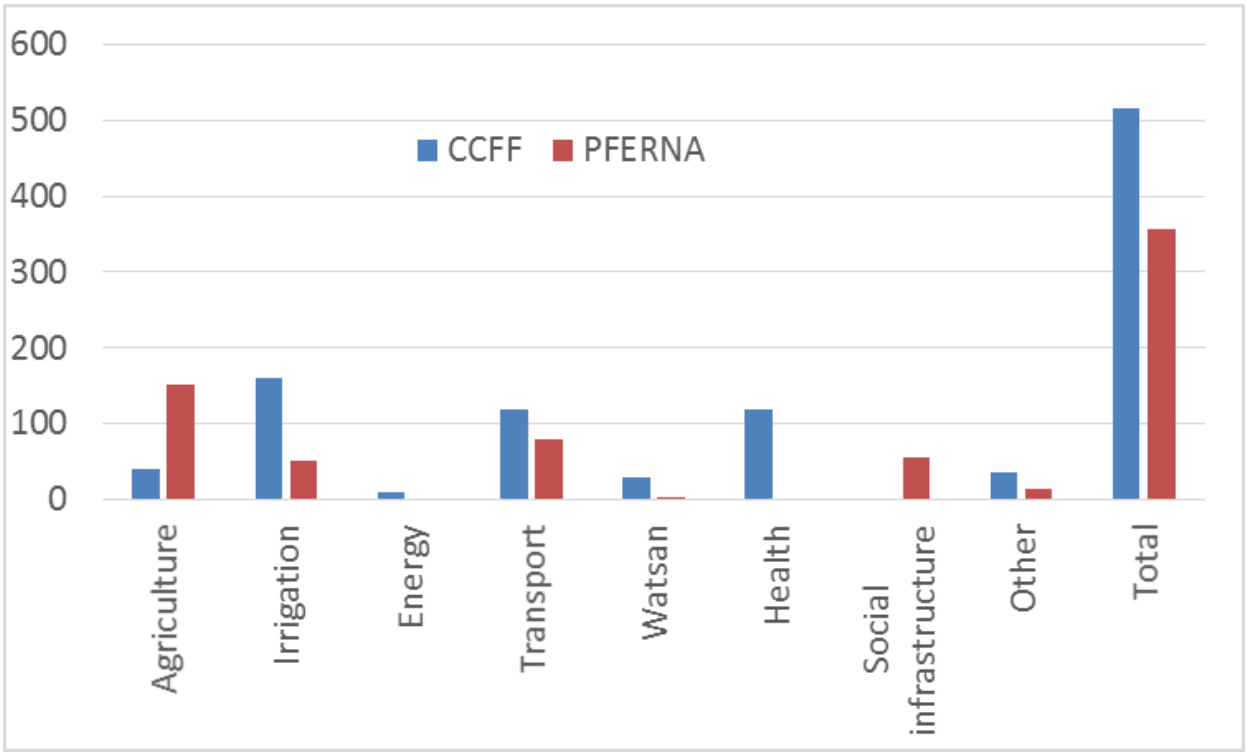
The above estimates may be compared with a recent Post Floods Early Recovery Need Assessment (PFERNA) of the damages arising from the floods in 2013[35]. The PFERNA assessment records an initial humanitarian response totalling over $15m, which dealt with immediate needs and included some recovery and rehabilitation work, for example on water and sanitation. The PFERNA estimated total damages to physical assets at $153m and total losses in production and economic flows at $203m. The total damage thus amounted to $356m, or about 2.5% of GDP. Sectors covered included: transport

[35] RGC (2014). Cambodia Post-Floods Early Recovery Needs Assessment Report.

($80m); watsan ($3m); water management and irrigation ($52m); housing, health and education infrastructure ($18m); livelihoods damage ($38m; and losses in agriculture, industry and tourism ($167m).

Figure 9 presents the CCFF estimates of average annual damage due to CC by 2050, as presented in Table 18, with those estimated by the PFERNA for 2013. The figure shows that the 2013 damages were only about two thirds of the expected average annual increase in damage due to CC by 2050. This may reflect the fact that the 2013 floods, although serious, affected mainly the Northwest of the country. In addition, the PFERNA did not include the impact of the floods on health, which is an important element of the damage estimated in the CCFF. On the other hand, the PFERNA did include damage to social infrastructure (mainly education buildings) which are not included in the CCFF. Agricultural losses were higher in the PFERNA, but irrigation losses were lower, perhaps reflecting the fact that the 2013 floods did not have such a serious impact in the most intensively irrigated parts of the country. In general, the comparison between CCFF and PFERNA analysis shows good consistency and lends confidence to the estimates in the CCFF of the potential damage due to CC.

Figure 9 Comparison of Damage and Loss Assessments of CCFF and PFERNA



The above analysis is roughly in line with international evidence on the potential damage of CC.

- A study of the costs of CC in Southeast Asia in 2009 suggested that GDP could be reduced by 6.7% by 2100, under the IPCC A2 scenario, which involves no global mitigation. The study shows that the impact of CC on GDP in Southeast Asia will be over twice as great as the global average. The modelling work in the ADB study is based on Indonesia, the Philippines, Vietnam and Thailand.

- The Stern Review estimated that global GDP would be at least 5% lower, without mitigation, and possibly as much as 20% lower globally, with developing countries having higher levels of damage.
- Working Group II for the IPCC's Fourth Assessment Report reviewed a wide range of estimates of the potential damage from CC which suggested that an increase temperature of 1-3^{o}C would reduce GDP by 1-5%, with developing countries being more severely affected than other countries.

Taking into account the above range of evidence, it is safe to assume that the full damage of CC in Cambodia is likely to be at least 3.5% of GDP, without adaptation, unless global mitigation efforts succeed in limiting temperature rises to less than 2^{o}C by 2050. The full damage of 3.5% of GDP is based on CC projections for 2050, assuming the IPCC A2 scenario (i.e. with no global mitigation and a 2^{o}C temperature rise) and the SREX projections for that scenario. The CCFF assumes that the scale of this average annual damage will grow linearly over the next 37 years until 2050. This means that GDP growth will be about 1.5% lower by 2030 as a result of the damage and loss from CC. Most of the damage from CC will come through increase variability of rainfall, including extreme events and estimates of the impact of this damage are based on the SREX report. The report suggests that, if the world is able to introduce global mitigation efforts to stabilise emission reductions, as defined in the IPCC scenario B1, then the increase in extreme events in 2050 will be 10% less than with scenario A2. The main gains from investing in the B1 scenario come after 2050, when the situation will deteriorate dramatically if global mitigation is not successful.

The scale of the damage will also increase in line with GDP over this period. The CCFF assumes that, without CC, GDP growth would have been sustained at 6% for the next 5 years and would then have declined to 4.5%, which is the average growth rate for lower middle income countries over the last 37 years. As a result, by 2050, the growth rate will decline to only 1%, because the expected growth rate of 4.5% without CC will be offset by annual damages of 3.5% of GDP. Total GDP in 2050 will then be about half what it would be without CC.

5.2 Benefits of Climate Finance – Cost Benefit Analysis

5.2.1 Benefit Cost Ratios – With and Without CC

The benefits of CC finance are determined from the cost benefit analysis (CBA), which estimates the BCRs for public expenditure with and without CC and with and without CC proofing. For expenditure that does not include proofing, the difference between the BCR with and without CC gives the contribution of the expenditure to generating higher benefits, to offset CC damage. For expenditure devoted to proofing, the difference between the BCR with and without proofing, assuming CC does take place, reflects the net benefits of the proofing expenditure and, hence, the contribution of the CC finance to reducing CC damage.

The CBA undertaken for the CCFF is summarised in Figure 10. The following conclusions can be drawn about the performance of the expenditure without CC. Further conclusions about the impact of CC on returns, and about the effects of climate proofing, are presented below the table, referring to the two figures that follow.

- The BCRs for irrigation are mostly between 2.5 and 3, which is high. These high BCRs show what is achievable if crops can be marketed and if irrigation schemes are maintained

effectively (which are typically the main challenges for irrigation). Returns for rehabilitation are somewhat higher than for new schemes.

- For crop research and extension, BCRs are also high at over 2.5. This is in line with international evidence on returns to research.
- For forests, the BCR reflects the returns to sustainable forest management compared with deforestation and conversion to commercial agriculture. Some benefits do not have clear market values, including: watershed stability, fuelwood, recreation, biodiversity, genetic resources and carbon sequestration. Without these non-market benefits, sustainable forestry is not attractive. Including the non-market benefits, but excluding the value of carbon brings the BCR up to 1.5, which is positive but marginal. Including carbon benefits, valued at the social cost of carbon, improves the BCR dramatically, to nearly 3.0.
- For rural roads and water programmes, BCRs are positive and generally above 2.5.
- Sanitation BCRs are between 1.5 and 2.0, which is positive but only just competitive with other public expenditure, given the range of positive returns achieved in other sectors. The benefits rely heavily on the value attributed to time savings, as well as health benefits.
- The BCRs for health are about 2.0, which are competitive. Benefits are highly sensitive to the assumptions made about the value of Disability Adjusted Life Years (DALYs), which are normally used to compare alternative health programmes, rather than to compare health programmes with other sectors.
- Energy efficiency and renewable energy both give highly positive returns, both with and without CC.

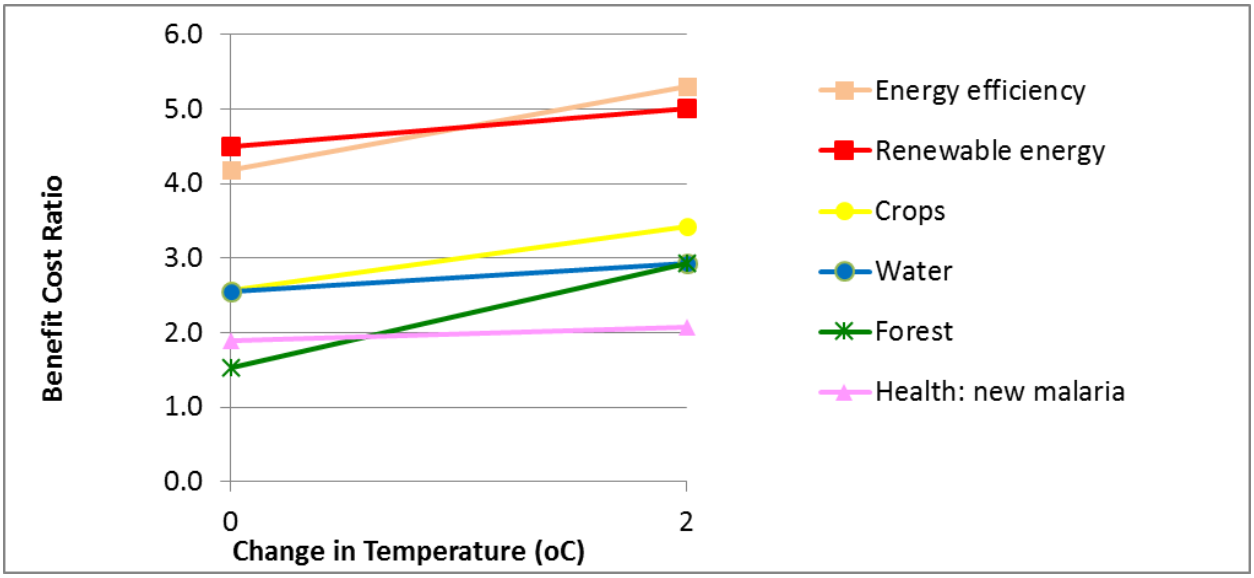
Figure 10 Costs and Benefits of Public Expenditure with and without Climate Change ($m)

Costs and benefits in US$m			Without CC				With CC			
			Public costs	Private costs	Bene fits	BCR	Public costs	Private costs	Bene fits	BCR
Irrigation: new										
No proofing	10,000	ha	39.1		103.8	2.66	56.7		121.8	2.15
Proofing	10,000	ha	41.0		103.8	2.53	41.0		121.8	2.97
Irrigation: rehab										
No proofing	50,000	ha	177.4		518.9	2.92	265.4		609.1	2.29
Proofing	50,000	ha	157.2		518.9	3.30	157.2		609.1	3.87
Crops	10,000	ha	1.6		4.1	2.56	1.6		5.5	3.42
Forest	100,000	ha	15.5	280.3	449.6	1.52	15.5	280.3	867.4	2.93
Rural roads										
No proofing	5,000	km	508.0		1392.5	2.74	825.5		1392.5	1.69
Proofing	10,000	km	1097.3		2785.1	2.54	1097.3		2785.1	2.54
Water	100,000	people		15.9	40.6	2.55		15.9	46.4	2.92
Sanitation										
No proofing	50,000	hholds	38.3		68.2	1.78	47.5		74.0	1.56
Proofing	20,000	hholds	16.9		27.3	1.62	16.9		29.6	1.76
Health	500,000	people	98.0		185.3	1.89	98.0		203.8	2.08
Energy efficiency	50	schemes		16.8	70.4	4.18		16.8	89.2	5.30
Renewable energy	2,000	kW		10.0	45.1	4.50		10.0	50.2	5.01

The above analysis suggests that much of the expenditure on CC related actions gives positive returns, if CC is assumed not to happen. The impact of CC on the returns is variable, with some actions generating

higher benefits (sometimes called 'no regret' actions) and some actions generating lower benefits (sometimes termed 'climate risky' actions). This is summarised in Figure 11.

Figure 11 Benefit Cost Ratios with and without Climate Change – Actions with Improving Returns



The main conclusions from Figure 11 are described below.

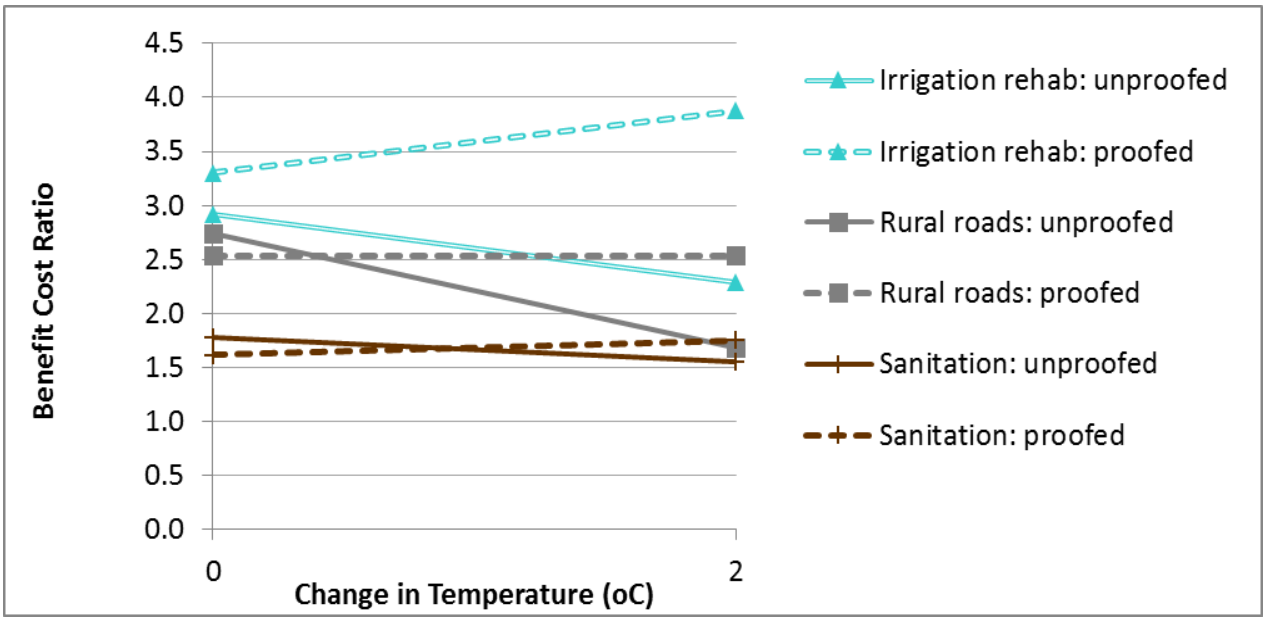
- For energy efficiency and renewable energy, returns are substantially higher with CC, because the value of mitigation is taken into account.
- For irrigation, CC increases the costs of maintenance and rehabilitation, but it also increases the benefits from irrigation, because rainfall becomes more variable and the protection provided from rainfall variability is therefore more valuable to farmers. The net effect depends on the details of the scheme and, in particular, its vulnerability to flood damage and the hydrological balance in the area. However, the higher costs of rehabilitation will normally be larger than the higher benefits arising from the increased value of protection for rainfall variability.
- The crop research and extension under consideration addresses the development of drought and flood resistant crop varieties. Whilst these varieties provide improved returns without CC, the benefits from improved resilience are more valuable with CC, because of the higher exposure of most farmers to drought and flood.
- Returns to water supply investments increase modestly with CC because beneficiaries are exposed to longer dry seasons and dry spells, and benefits are highest in these periods.
- Sustainable forest management has the lowest BCR if the value of carbon sequestration is not taken into account. However, adding the value of carbon sequestration improved the BCRs substantially to levels that are comparable with other actions.
- The BCRs for health increase by about 10% in line with the WHO finding that CC is likely to increase the burden of climate sensitive diseases by 10%.
- CC increases the costs of maintenance and rehabilitation for rural roads and so reduces the returns to investment. (Some of these losses can be addressed through climate proofing and this is addressed below.)
- Improved sanitation is exposed to higher maintenance and rehabilitation costs, with CC, although the benefits are also higher because the improved sanitation is particularly valuable

during floods, when households are otherwise exposed to higher health risks and when they benefit from great time savings. The net effect of CC will depend on the location of the sanitation and the nature of the household.

5.2.2 Benefits from Climate Proofing

Most infrastructure in Cambodia (including roads, irrigation, water and sanitation) incurs maintenance and rehabilitation costs that are associated with extreme weather events and, in particular, with flooding. The design of this infrastructure already takes into account the risk of flooding and so includes a degree of flood proofing. CC will increase the frequency and severity of flooding and designs will have to be adjusted to take this into account, thus proofing the infrastructure not only against existing flood patterns but also against the increasing patterns associated with CC. Just as there is a limit to the level of flood protection that is currently built into designs, there is also a limit to the extent to which CC proofing should take place. In some cases, engineers and local communities themselves, are already aware that floods are becoming more frequent, and therefore make allowances for this in designing infrastructure. CC proofing makes this implicit process more explicit.

Figure 12 Impact of Climate Change Proofing on the Performance of Actions



The appropriate level of resources to add to standard design to provide CC proofing depends on the details of the infrastructure. It also depends on the extent to which the CC proofing is actually addressing a shortfall in level of normal proofing that should ideally have been applied even without CC. As a general yardstick, it may be useful to consider that CC proofing might add 50% to the investment costs and that this might halve the level rehabilitation expenditure required. The conclusions drawn below are derived using that yardstick. The returns to CC proofing will be larger if it requires lower additional investment costs or if the reduction in rehabilitation is larger than these yardsticks. The conclusions to be drawn from the analysis presented in Figure 12 are as follows.

- CC proofing for irrigation results in modest net costs, if CC does not happen, but improves the BCR dramatically (from 2.1 or 2.2 to 3.0) if CC does happen, because of the reduced requirements for rehabilitation costs. For rehabilitated irrigation, the proofing actually produces a higher BCR even without CC, which suggests that, on the basis of these assumptions, the CC proofing includes an element of routine flood proofing expenditure that should anyway be undertaken regardless of whether CC takes place.
- A similar situation applies for roads, although the effect is even more dramatic, with the BCR increasing for about 1.6 to 2.5, if CC does happen.
- For sanitation, the threats posed by increased rebuilding frequency are less serious, and the cost of CC proofing is relatively expensive, and the net benefits from CC proofing are therefore more modest.

The analysis suggests it would be reasonable to expect average BCRs of at least 2.0 to be achieved for adaptation spending across all sectors. With a 5% discount rate and an equal annual benefit stream over the long term, this means that annual benefits should be about 12% of the investment cost. These benefits will initially be small, but will accumulate as the adaptation is sustained and the benefits are maintained. Thus, whilst the challenge from CC does not appear to be too serious until after 2020, the CCFF recognises that the foundations for the national adaptation effort have to be laid now, so that they can then be accelerated after 2020, and especially from 2030 onwards, when the potential damages become increasingly serious.

5.2.3 Benefits from Mitigation Expenditure

The benefits from mitigation are shared internationally and it is therefore not possible to determine a direct benefit to Cambodia from mitigation undertaken by Cambodia. However, for planning purposes, it is reasonable to assume that mitigation by Cambodia will have benefits that are similar to the average benefits of international mitigation. These benefits are determined by the social cost of carbon, which is determined by dividing the damage from CC by the level of emissions that cause the damage.

5.2.4 Benefits from Expenditure on Supporting Institutions

The above analysis does not distinguish between expenditure in investment and services, which delivers benefits directly to the population, and expenditure on supporting ‘soft’ expenditures associated with planning, monitoring and enforcing the expenditure, regulations and incentives that deliver the investment and manage the maintenance and the various capacity building and awareness raising activities. According to the planning matrices in the CCAPs, this soft expenditure will account for 23% of total CC expenditure between 2014 and 2018. There could be an argument for removing this soft expenditure from the economic analysis because it does not lead directly to benefits. However, the analysis assumes that expenditure on soft supporting activities is fully integrated with the associated expenditure on investment and services and so contributes to benefits. Indeed, it is an essential element in achieving the higher returns obtained by CC expenditure.

5.3 Benefits of Climate Finance – Short- and Long-term Assessments

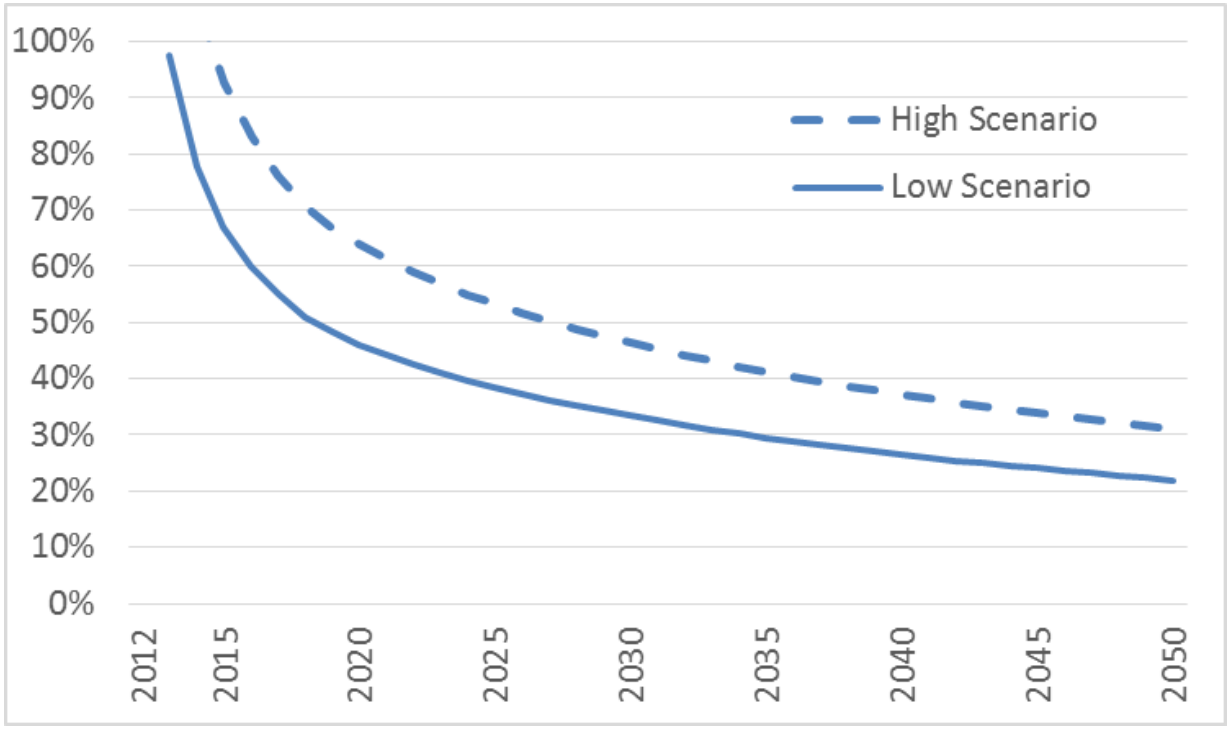
5.3.1 The Timing of CC Impact and of Adaptation

The costs of CC increase both as a result of the increase in climate change impacts and because growing GDP means that there are more assets and productive activities to be damaged. The adaptation benefits also rise with time since most adaptation spending takes the form of investment and generates a long term stream of sustained benefits, which accumulate every year as investment continues. The relative contribution of adaptation in reducing the costs of CC depends on the balance of these different growth rates.

Figure 13 shows the proportion of CC damage that is avoided with the following assumptions:

- CC damage is 3.5% of GDP in 2050 and approaches this level in equal annual steps
- GDP growth is 6% until 2018, after which it is 4.5%
- Adaptation funding is either 1.3% of GDP (i.e. the low growth scenario) or 1.8% of GDP (i.e. the high growth scenario) and generates BCRs that are 0.6 above those obtained by the other expenditure that is displaced by adaptation

Figure 13 Proportion of CC Damage Avoided through Adaptation



5.3.2 Short Term Benefits 2013-2018

Table 19 summarises the expected benefits to be gained from CC financing, using evidence from the CBA.

Total expenditure in the 12 ministries and bodies covered by the CCFF was $1179m in 20, 12, including both domestic and donor funding. This expenditure refers to all expenditure on actions that have some relevance to CC and includes both the CC and non-CC element. The CBA suggests that this generated annual benefits of $149m, if CC is ignored and adaptation and mitigation are assumed to have no value. These are the routine benefits obtained from public expenditure assuming that current BCRs apply.

Assuming that GDP growth is 6% until 2018 and that CC damage grows to 3.5% by 2050, in equal annual steps, climate change damage would be $361m in 2018 (Table 20).

The table also presents the annual added benefits from climate finance in the baseline (2013), 2018 low growth and 2018 high growth scenarios:

- Baseline Scenario (Columns E to G of the table)
  - Total estimated climate finance: $185m, out of the total (ie the total in 2013 of the activities that involved $1179m expenditure in 2012).
  - Annual added benefits[36] associated with mitigation and adaptation actions in 2013 would be $6.6m.
  - Total annual benefits from public expenditure therefore increase from $149m to $155.6m.
  - Performance of public expenditure increases substantially from an average BCR of 2.4 to 2.8, reflecting the extra gains from mitigation and adaptation benefits.
- 2018 Low-Growth Scenario (Columns H to K)
  - Total estimated CC finance is $255m.
  - Assume there is a small improvement in the effectiveness of expenditure by 2018, reflected in an increase of 0.1 in BCR, as a result of the investment in technical support.
  - Annual increment in benefits from climate finance increases to $11m in 2018 (from $6.6m in 2013).
  - Assuming the incremental benefits increase in equal steps over 5 years, total added benefits from climate finance in 2018 under the Low-Growth Scenario, therefore, amounts to $52.8m, offsetting 14.6% of annual CC damage expected to be caused in 2018.
- 2018 High-Growth Scenario (Columns L to N):
  - Using similar calculations as the 2018 low-growth scenario, with $300m of climate finance in 2018, the annual increment in benefits rises to $13m in 2018. Under this scenario total added benefits from climate finance reaches $58.8m in 2018, increasing the proportion of CC damage to be avoided in 2018 from 14.6% in low-growth scenario to 16.3%.

[36] These are the added benefits from adaptation and mitigation and are calculated from the difference in BCRs, with and without CC.

Table 19 Benefits from Climate Change Financing by 2018 ($m)

	BAU Benefits			2013 Scenario			2018 Low Scenario			2018 High Scenario		
	Total expenditure on CC related actions ($m 2012)	Business-as-Usual BCR	Annual Benefits without A&M ($m/yr)	CC Expenditure 2013	BCR with CC	Annual Added Benefits from A&M ($m/yr)	CC Expenditure 2018 Low Scenario	BCR with CC	Annual Added Benefits from A&M ($m/yr)	CC Expenditure 2018 High Scenario	BCR with CC	Annual Added Benefits from A&M ($m/yr)
	A	B	C	E	F	G	H	J	K	L	M	N
CCFF Ministries			BxA/X			Ex(F-B)/X		B+0.1	Hx(J-B)/X		B+0.1	Lx(M-B)/X
MAFF	77	2.6	12	19	3.4	1.0	29	3.5	1.7	34	3.5	1.9
MOWRAM	220	2.2	28	58	3.0	2.9	78	3.1	4.3	92	3.1	5.1
MIME	100	4.2	25	4	5.3	0.3	9	5.4	0.7	11	5.4	0.8
MPWT	429	1.7	43	37	2.5	1.9	49	2.6	2.8	58	2.6	3.3
MRD	70	1.7	7	10	2.5	0.5	13	2.6	0.7	15	2.6	0.9
MOH	233	1.9	26	8	2.1	0.1	11	2.2	0.2	13	2.2	0.2
MEYS	0	2.5	0	1	2.5	0.0	2	2.6	0.0	2	2.6	0.0
MWA	9	2.5	1	0	2.5	0.0	1	2.6	0.0	1	2.6	0.0
NCDM	0	2.5	0	2	2.5	0.0	3	2.6	0.0	3	2.6	0.0
MOE	17	2.5	3	10	2.5	0.0	13	2.6	0.1	15	2.6	0.1
SNA	4	2.5	1	16	2.5	0.0	21	2.6	0.1	25	2.6	0.1
NGO	18	2.5	3	8	2.5	0.0	11	2.6	0.1	13	2.6	0.1
Others	0	2.5	0	12	2.5	0.0	16	2.6	0.1	19	2.6	0.1
Total	**1179**	**2.4**	**149**	**185**	**2.8**	**6.6**	**255**	**2.9**	**11**	**300**	**2.9**	**13**

Notes: A&M = adaptation and mitigation; X = the ration between annual benefits and the NPV of those benefits over 37 years

See Box 1 for more details of the calculation of CC weights used in column B

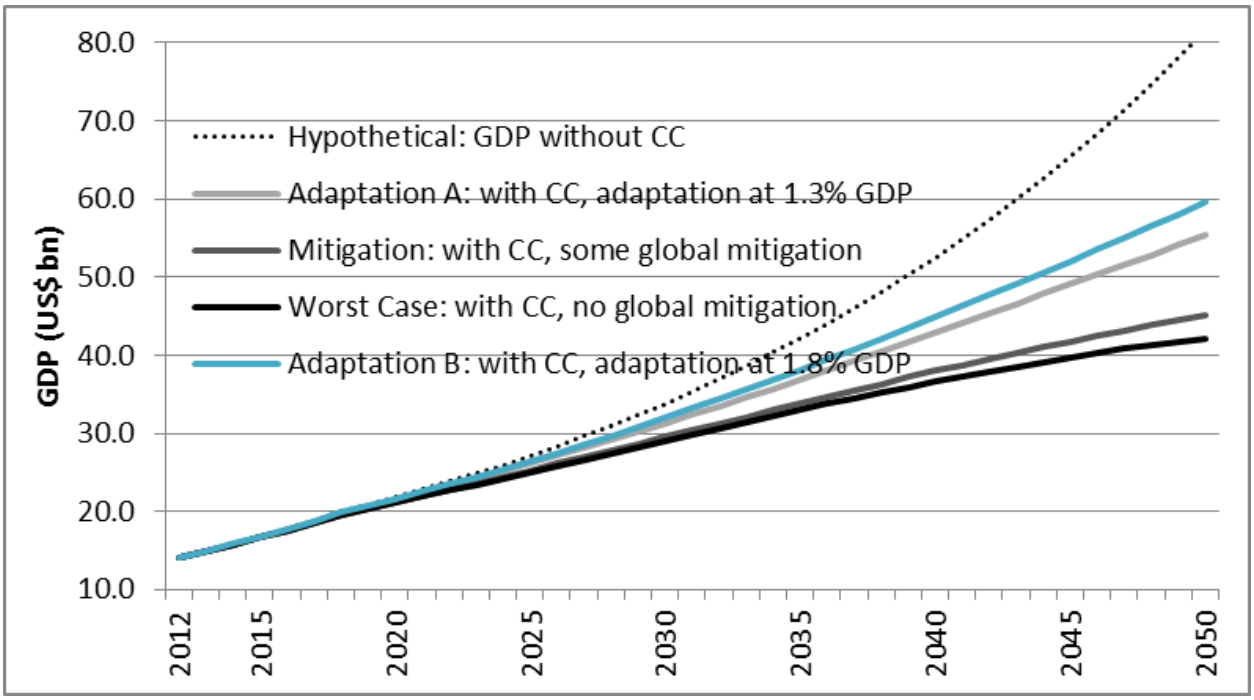
5.3.3 Longer Term Benefits.

Figure 13 shows that the proportion of CC damage that is offset by CC finance is expected to fall over time as the severity of CC increases faster than the accumulating effects of the CC finance. Assuming that the CC financing maintains the same share of GDP after 2018 (i.e. 1.3% of GDP for the low growth scenario and 1.8% of GDP for the high growth), by 2030, the share of CC damage that is offset by CC finance is about 25% for the low growth and about 35% for the high growth. By 2050, it has fallen to 18% and 23% of the potential damage. Table 20 and Figure 14 summarise the changes in GDP growth, with different CC finance scenarios.

Table 20 GDP in 2013, 2018,2030 and 2050, with Different Mitigation and Adaptation Assumptions ($bn)

	2013	2018	2030	2050
Hypothetical GDP if there was no CC	14.9	19.9	33.8	81.6
GDP assuming CC, with no global mitigation	14.9	19.6	29.1	42.1
GDP assuming CC, with global mitigation, but no adaptation	14.9	19.6	29.5	45.1
GDP assuming CC, with global mitigation and adaptation using 1.3% GDP	14.9	19.8	31.4	56.1
GDP assuming CC, with global mitigation and adaptation using 1.8% GDP	14.9	19.9	32.1	60.7

Figure 14 Long Term Impact of CC Damage and CC Financing on GDP Growth



The impact of CC on government revenue will be roughly proportional to its impact on GDP. It is possible that some of the sectors that are most affected (notably agriculture) have relatively low tax rates and so government revenue may be less severely affected by CC than GDP as a whole.

5.4 Matching CC Finance to the Needs

The national response to CC can aim to address only part of the total damage caused by CC, because avoiding some damage is either physically impossible or not cost effective. The 'optimal' proportion of damage to be avoided will depend on the particularly situations in each country. According to the Stern Report, countries could typically aim to address about two thirds of the damage. In Cambodia, this would require adaptation spending to be 3.3% of GDP, if it were maintained at this level up to 2050. This assessment assumes that investment in adaptation will need to be diverted from 'normal' investment

and so the benefits from that normal investment will be lost, in favour of the higher benefits from adaptation and mitigation.

Figure 13 shows that the optimal policy response would be to gradually increase the scale of CC financing, as the impact of CC becomes more serious. In the medium term, Cambodia will seek to achieve substantially higher financing scenarios, in order to protect its objective of growing in line with other MICs. However, the CCFF demonstrates the challenges that face all MICs as the effects of CC take hold.

The above analysis assumes that all CC financing delivers the BCRs estimated in the case studies. These studies refer to the main 'hard' expenditure on services and infrastructure that deliver benefits directly to the population. They do not cover the supporting 'soft' expenditure (e.g. on policy, planning, capacity building and awareness). This soft expenditure can be viewed as an 'overhead' that is required to ensure the effectiveness of hard expenditure, but does not generate its own benefits. According to Figure 8, the soft expenditure will account for about 25% of total expenditure in CCAPs, which would suggest that the actual benefits from the expected CC finance scenarios will be 25% lower than those estimated above. As capacity is built, the share of expenditure devoted to soft activities should decline slightly, probably to less than 20%, thus increasing the hard expenditure faster than average and so responding to the need for expanded expenditure mentioned above.

6 MANAGING CLIMATE FINANCE

This chapter reviews the options for future management of CC actions and proposed a set of steps to be taken by each of the leading institutions involved. The options the CCFF assessed include a National Climate Funding Programme and a National Climate Fund. Finally, this chapter also outlines different sets of indicators for a Monitoring and Evaluation (M&E) framework.

6.1 National Climate Funding Programme

6.1.1 Key Features of a NCFP

This section describes a National Climate Funding Programme (NCFP) for coordinating adaptation and mitigation finance, which will coordinate the actions to implement the CCFF. The NCFP accommodates a range of different funding arrangements, including those currently being used. It foresees a progression towards greater government engagement and responsibility, but does not force either government or donors to participate in a single centralised management system.

The NCFP is not the same as a National Climate Fund (NCF) that is fully managed by government and receives international funding. Such a fund is unlikely to play an important role within the next ten years, primarily because of concerns about public finance management, reflected in donor policies that favour project approaches for CC financing in the medium term. However, it may be possible to introduce a pilot NCF on a small scale, starting with joint management procedures.

Whilst accepting diversity, the NCFP aims to maximise consistency, minimise duplication and ensure that investment is matched by appropriate technical assistance. The NCFP will be guided by an endpoint and will contain the key features described in Table 21.

Table 21 Key Features of the National Climate Funding Programme

1	The NCFP will cover all CC adaptation and mitigation policies, including: government and donors; investment and recurrent expenditure; and regulations and incentives as well as expenditure.
2	Leadership will be provided by NCSD and technical support will be provided by the NCSD Secretariat. CCCSP, CCSPs and CCAPs will be kept up to date to provide strategic guidance.
3	The definition of CC finance will be determined by whether the benefits of a policy are affected by CC, using a version of the methodology developed in the CCFF and formalised by regulation.
4	The level of CC funding will be gradually introduced in budget submissions, in the national budget and in the government accounts, making use of a CC tag and score in the PFM system.
5	The NCSD will be established as a National Implementing Entity for the AF and GCF and funding through the NIE will evolve towards on-budget and on-treasury, though it may initially make use of project accounts and treasury special accounts.
6	Donors will be encouraged to build CC into all projects where it is relevant, through screening of donor project at the country strategy and project identification stages. This will apply to all modalities, including any sector or general budget support. Donors will be encouraged to pool funding, where possible.
7	Public support for mitigation will shift steadily from grants and direct investment to modalities that encourage the private sector to invest in mitigation.
8	Sub-national Authorities will receive an increasing share of CC finance, provided that PFM processes remain successful. This may require some further decentralisation of activities.

9	The NCSD Secretariat will maintain a cadre of Cambodian experts who will be available to line ministry planning units to help to include CC in project preparation and budget submission. This will normally be in the form of on-the-job support linked to CC expenditure decisions.
10	The NCSD will produce a Climate Finance Annual Progress Report (APR) which will record trends in expenditure and any evidence available on the effectiveness of the expenditure.
11	The NCFP works towards an endpoint at which a large share of CC finance is provide through budget support, including both sector budget support and general budget support.

Key phases to implement the NCFP: The NCFP does not impose a single pathway towards the above endpoint. However, there are a number of key changes that define the progress of climate funding towards the endpoint, as summarised in Figure 15. Phase 1 involves stronger government involvement in planning. The CCCA and the SPCR lead the way, but the changes also affect other donor projects as government capacity improves. Phase 2 involves more government engagement in management, including the introduction of some joint work on budgeting. Donors are not expected to hand over responsibility for budgets and management in all projects and programmes. However, they will increasingly encourage government to take the lead and will exercise their power to stop funding only in extremis (i.e. when they believe that the viability of the funding is at risk). In Phase 3, government officials lead on the preparation of budgets and donors exercise their power of veto only in extremis. In the final phase, government takes increasing responsibility for treasury functions and for procurement and the preparation and audit of accounts. This phase is the most challenging and is likely to require some carefully managed piloting.

The phasing presented in Figure 15 will not progress evenly across all government and donor activities. Some ministries will be able to move faster than others, depending partly on the capacity of the ministries, but also on how straightforward it is to manage the CC activities involved.

Figure 15 Possible Phasing of Reforms in Climate Financing

Phase	Key Features
Now	• ***RGC budget*** spending small, but increasing mainstreaming of CC in planning • For projects, donors do most ***recruitment, budgeting, workplans and accounting*** • Joint activity in ***strategy, programming, management, reporting and evaluation*** • CCCA Trust Fund option for ***pooled funding*** to improve donor coordination • ***Top-up funding*** through SPCR provides a major source of funding for donor projects
1: Planning	• RGC more involved in joint ***annual work planning*** of CCCA, SPCR and other projects • RGC lead on ***strategic programming and workplans*** for increasing range of projects
2: Management	• Joint donor/RGC ***budget preparation*** for CCCA, SPCR and some other projects, with both donors and RGC having to agree • RGC lead on ***recruitment*** for key staff, expanding from CCCA/SPCR to other projects, with donors have power to stop funding, in extremis • RGC lead on ***management*** meetings/practices and on annual ***reporting***
3: Budget	• RGC lead on ***budgets***, with donors have power to stop funding, in extremis • RGC lead on ***technical support and evaluation***
4: Accounting	• RGC increasing responsibility for ***treasury, procurement and accounts***, initially on a joint basis and, eventually, with sole responsibility for some funding

6.1.2 National Council for Sustainable Development (NCSD)

Potential Role of the NCSD in NCFP

- *Update of CCCSP*: The NCSD, supported by its Technical Secretariat, will provide overall coordination of the NCFP. It will continue to provide an updated CCCSP that acts as a guide for all government and donor funding for adaptation and mitigation. Each updated CCCSP will take into account the latest evidence on CC scenarios available from the IPCC and from any regional or national studies. It will also provide guidance on the optimal balance between technical support and expenditure on services, through investment or recurrent expenditure. This guidance will include arrangements for ensuring that capacity building is closely linked to the management of expenditure.

- *Climate Finance Annual Progress Report (CFAPR):* The CCCSP will be complemented by a Climate Finance Annual Progress Report (CFAPR) that records expenditure on CC over the previous year, using an agreed classification system. The CFAPR will report on a national vulnerability index and on a set of core national indicators and the impact indicators from the CCAPs. As part of the monitoring of CC funding, NCSD will use the CDC database CC tagging feature to maintain records of planned, ongoing and completed CC funding in order to provide the evidence to government and donors that is required to achieve a good balance of funding across sectors.

- *Technical Experts*: Technical support to line ministries and SNAs will be provided through a Cadre of Cambodian CC experts (CCCCE), coordinated by NCSD. Support will be provided in the preparation of projects and in the preparation of budgets, to ensure that climate change is taken into account in designing investments and services, and that this is then used to justify budgets and to monitor success. In most cases, the technical assistance will be designed to complement and support expenditure on investments or services that have direct benefits for the population. It will therefore normally be provided as on-the-job support with the objective of affecting the routine outputs of officials, rather than abstract training.

Key Steps of Implementation

- *Update of NCSD mandate*:
  - In order to achieve this, the mandate of the NCSD needs to be updated, with more specific reference to the coordination of CC planning and finance. This should take place through a Royal Decree.
  - The possibility of consolidation with the NCGG should be considered.
  - The status of the CCTT and the NCSD secretariat needs to be clarified.
  - The NCSD Secretariat needs to be upgraded to a General Secretariat, with legal personality, in order to act as an NIE for the AF and GCF. Financial responsibilities for the NIE will remain with MEF, in a similar arrangement to that used for the CSF.

- *Coordination mechanism*:
  - The NCSD needs to establish a regular coordination mechanism with key CC partners, to manage the implementation of the CCCSP and the NCFP. This will include a dialogue mechanism with the private sector, in partnership with CDC/CIB. This is likely to be

particularly important for activities associated with energy efficiency and renewable energy, which are expected to generate widespread interest from private investors. Given the positive financial returns available for some of these activities, it is expected that levels of investment will steadily become independent of government promotion. Where financial returns are marginal, the NCSD will collaborate with MEF in determining the government incentives and/or regulations that are required to encourage private investment.

- As Cambodia progresses from LDC status, the government will need to pass sub-decrees on the responsibilities for UNFCCC obligations covering: the GHG Inventory; guidelines on mainstreaming; an MRV registry; and systems for sharing information. The NCSD should also collaborate with line ministries on possible revisions of sectoral laws and support collaboration within MoE on including CC in laws on EIA, DRM and WRM.

6.1.3 Ministry of Economy and Finance

MEF will ensure that government planning and budgeting systems explicitly recognise the importance of integrating CC into the design of mainstream activities. The budget documents will include explicit reference to the need for government programmes to take account of CC.

MEF will continue to expand the use of programme budgeting, so that each department will have its own budget. The budget will include a tagging and scoring system that registers the proportion of the budget of each department that is devoted to adaptation and mitigation. The scores that are claimed by each department will be developed in collaboration with the NCSD-TS and will reflect the detailed planning of the activities of the department and, in particular, the extent to which the benefits claimed by the department are affected by climate change.

For the line ministries covered in the CCFF, MEF will require all submissions for funding to include an assessment of the implications of CC for the benefits generated by the action. This will apply both to budget submissions and to project proposals by development partners. For major actions, the analysis will be required to include some estimation of the costs and benefits and how these will be affected by CC.

In more advanced middle income countries, a large part of the investment in mitigation is undertaken by the private sector. Cambodia is expected to follow this same path in the mid to long term. MEF will play the leading role in defining the regulations and incentives that will be required to encourage and require the private sector to invest in mitigation. This will, however, require strong cooperation with relevant line ministries.

6.1.4 Line Ministries

Cooperation between Line Ministries

Many CC actions involve cooperation amongst a variety of public and private institutions. In general, such coordination is still weak in Cambodia and presents a barrier for the inflow of climate finance to the country[37]. The NCFP aims to achieve better cooperation among government agencies, for instance,

[37] As case in point, the government was not ready to sign off the contract with buyers of carbon credits from REDD projects in Oddor Meanchey Province.

between MAFF and MOE over the management of natural resources and between the Cambodia Red Cross and NCDM for the work related to disaster preparedness and emergency relief.

Sectoral Strategies

The successful mainstreaming of CC into line ministry operations starts with the inclusion of CC in sector strategies. The CCSPs will help to promote this, but revisions should also be made in broader sector strategies, reflecting the conclusions in the CCSPs.

In sectors with programme approaches (e.g. health, education or decentralization), the role of CC planning should be done primarily through the programming procedures, including the HSP II procedures in health and the CSF/DMF/SNIF manuals at sub-national level. CC in screening tools should be introduced (possibly as part of an expanded EIA process) at the project identification and development stages.

Planning Process

In all ministries, technical guidelines and standards should be updated (and regularly revised based on evolving science/evidence) to include CC. This is true in particular for infrastructure, but also for services such as in health, education curriculums, school building standards and disaster preparedness. Improvements in programme design should include more explicit attention to the implications of CC for the benefits of public expenditure, and for the cost benefit performance.

In most cases, a relatively light structure (such as a working group) bringing together CC focal points from various concerned departments may be sufficient, to provide support to their colleagues and monitor CCSP/CCAP implementation. This approach would ensure that CC is effectively mainstreamed, and does not become another "silo" within ministries. But in some ministries with high levels of CC expenditure, creation of small dedicated support units may be considered. All should benefit from technical support from the NCSD Secretariat, and through the CCTT mechanism.

Budgeting Process

In order to integrate CC in the budget, the BSP, project screening and the introduction of coding in the budget can be the entry points.

- For the BSP, specific guidelines will be developed to encourage LMs to recognise the important of CC in their investments and services. This will be in the context of other cross-sectoral concerns, such as the environment and gender awareness.
- For project preparation, guidelines will be prepared that define climate-smart standards for projects. Defining and maintaining these standards will require participation by LMs and cooperation from development partners, while MEF will need to provide quality control. MEF will coordinate the definition and use of new practices that require LMs to assess the implications of CC for the benefits and costs of any actions that are affected by CC. For major actions, this should include some quantitative analysis of the impact of CC on benefits, as part of the normal rigorous appraisal process.
- There is no tracking or coding yet for the recurrent budget. This is partly because the recurrent budget does not yet identify sufficient detail on programmes, in most cases. Regular CPEIRs may be the best option in the short to medium term. When budgets are

sufficiently disaggregated, a tag and score could be introduced to track CC finance. This could be tested by improving the CC tracker in the CDC ODA database, to estimate CC relevance of projects, using lessons learnt from CCAP/CCFF exercise.

In order for LMs to fulfil their roles in CC planning and budgeting, capacity development is required, covering the following skills: budget preparation; project design and appraisal to identify and address CC risks; CBA of CC related investments to assess the impact of CC on benefits.

6.1.5 Sub-National Authorities

The Sub-National Authorities (SNAs) currently deliver about 6.3% of total climate finance. In general, the experience with CC funding in SNAs is positive and the NCFP expects the share of CC funding that goes through SNAs will increase to between 12% and 20% in the medium term.

SNAs already give significant attention to CC. Both the 5 and 3 year plans at SNA level integrate types of risks, losses, damages, changes and negative impacts which have happened as a results of CC or disasters, including irregular flood, drought, increased temperature, irregular level of rain and water rain. The plans propose relevant solutions to prevent, minimize and tackle the negative impacts of CC. The SNA planning process allows local administrations to demonstrate their concern for CC resilience by raising and integrating aspects of CC into their sub-national planning and finance systems.

However, there are a number of challenges. Firstly, there is a need to adjust the timeframe for preparation of CS plans, programs and budgets, to align them and facilitate greater coordination and/or integration with those of their respective Districts, Khans and Municipalities. Secondly, the current system expects SNA plans to follow national patterns and processes and there is scope to allow SNAs to develop their own systems.

The SNIF provides an opportunity to extend the successes of the CSF to higher SNA levels. Providing resources to ensure that funding through the SNIF takes CC into account will be an important task for the NCFP.

The RILGP reimbursement method is seen to have been an effective method of building capacity and helping to address these challenges, contributing to the general success of the CSF and to building national capacity (URS 2010). There are some operational challenges associated with the unpredictability of reimbursement arrangements and these will need to be resolved if it is to be an effective option at national level.

In view of the experience with LGCC, CCBAP and NAPA-FU, it will normally be realistic to provide technical support from LMs and from provincial and DM levels. Ideally, this will be achieved by providing adequate resources to TFCs and TSOs, although some additional incentives may be required for major initiatives that require a one-off boost to capacity.

6.1.6 Donors

Outlook of Support

Despite the weak economic situation in some developed countries, and the withdrawal of some partners, major donors will continue to support development in Cambodia. This assistance is likely to be increasingly in the form of loans, rather than grants. There will be more opportunities for increased cooperation from bilateral partners in Asia such as Japan, Korea, and China.

Because of Cambodia's high exposure to CC risks, and its low capacity to cope with the risks associated with LDC status, the country should be among the high priority nations to benefit from funds that are available for CC adaptation. The early establishment of an NIE for the AF and GCF will ensure that Cambodia has early access to these funds. In addition, although Cambodia will move into MIC status soon, its relatively low Human Development Index may help the country to maintain eligibility for the $30m threshold of the LDCF, managed by GEF. Given the fact that MICs have been a major destination of climate funds, especially for mitigation, Cambodia should expect an overall rise in flow of climate funds and a shift from adaptation to mitigation.

Confidence in PFM in general, and the procurement system in particular, is critical for Cambodia's access to international climate funds and Cambodia's ability to absorb funds from donors in the form of budget support. Without credibility in the fiduciary system, projects and the NGO and private sector will be the preferred modality for donors. The most important ministries for CC actions now have CC working groups, but their capacity and function remain weak. This will be addressed by government as a matter of urgency, both through the general PFMRP and through the various institutional strengthening actions contained in the CCPAs.

Donor Strategies

CDC will introduce procedures and screening tools to address CC relevance at the country strategy stage, when donors negotiate their multi-year strategies. In particular, donors will be expected to refer to the CCCSP in their strategies. The NCSD will be involved in reviewing the climate relevance of donors' country strategies, and will provide recommendations through CDC mechanisms.

Mainstreaming CC into Projects

Climate finance can be increased significantly through mainstreaming CC into normal development projects. This is achievable through greater awareness of the implication and impact of CC in every mainstream sector affected by CC. Although there is broad awareness of CC, this varies among sectors and agencies. For example, the association of CC is more obvious to stakeholders in sectors such as forest, energy, irrigation, agriculture, and disaster, but less in other sectors.

Strategies to address this include:

- The Cadre of Cambodian CC Experts (CCCCE) will be coordinated by NCSD and will be available to assist with project design. The CCCCE will work with line ministry planning departments, and will provide on-the-job training using the projects that line ministries are considering.

- The NCSD will development clear rules about the classification of donor expenditure, along with agreed practical codes of practice associated with the application of these rules. Donors will be required to registration CC relevance in the donor database involves both a tag and a score. The CCCCE will be available to help donors to do this in a consistent and meaningful manner and to ensure that they understand the importance of doing this, for government's efforts to address the risks associated with CC in cost-effective manner. Where donors are supporting actions that fall outside the responsibility of government, the NCSD-TS will be informed about the projects being funded and about the levels of expenditure on these projects. Ideally, these will be included in the CDC database.

Pooled Funding

Where several donors have similar objectives, they will be encouraged to provide pooled support so that the relevant ministry can ensure that there is consistency across approaches and that duplication is avoided. This may apply to donors working in the same sector, or to donors that have shared cross-sectoral objectives, including in CC itself, but also in other cross-sectoral concerns that may have CC dimensions.

Budget Support

NCSD and MEF will encourage donors to consider providing support for CC in the form of budget support as soon as the PFM reforms deliver greater confidence in the transparency of public expenditure and more detailed budgets, at least down to the level of departments. Budget support is likely to require a tagging and scoring system that allows the level of spending on CC to be assessed during budget preparation and to be monitoring in government accounts. Recent work on the CPEIR and in the CCFF, combined with some evolving experience with the CC tag in the CDC database, will help government to introduce this system.

Budget support will require donors to disburse funds into a Treasury account, where they would be subject to the normal budget processes. Normally, one would expect the budget processes to allocate some additional resources to those LMs and SNAs that have the largest impact on CC resilience and/or on mitigation. However, it would not be easy or necessary to isolate the impact of the budget support on LM and SNA allocations, which are subject to many other factors. It is a well-established principle of budget support that its success should depend primarily on the achievement of outcomes, rather than on changes in spending patterns. Budget support outcomes would normally be associated with reducing vulnerability and/or reducing GHG emissions, with each sector having different output indicators to reflect these outcomes. It would be possible and acceptable for LM's to reduce vulnerability of GHG emissions without increased budget, simply by giving more weight to this in their activities and this would be a successful outcome for CC budget support. The options for monitoring outputs and outcomes are discussed in section 6.3.

6.1.7 Carbon Markets

Developing countries are an important source of carbon credits for those operating in the carbon market and Cambodia should be able to attract traders in the carbon market. The government will continue to pursue pilot carbon market operations to prepare the country for the larger scale opportunities that are expected to arise following the consolidation of emission reduction targets in the COP 15 discussions in Paris in 2015.

The successful expansion of carbon markets will require progress in the transparency of government and in the project cycle. Businesses interested in carbon trading will require high standards of transparency. Cambodia can address this challenge and offer strong governance of carbon markets. Another challenge is the uncertainty and volatility of the carbon market, which has seen dramatic movements in price in the last five years, large as a result of changes in policy in developed countries. The recent COP19 has given some positive signals for the revival of CDM projects, as countries were called to promote the voluntary cancellation of carbon credits without double counting.

6.2 National Climate Fund

Many countries have been exploring the possibility of establishing a National Climate Fund (NCF) to help coordinate climate change funding. This interest is driven, fundamentally, by political concern about the impact of climate change. It is also motivated by the desire to show that it is safe and effective for international climate funds and other donors to devolve responsibility for managing climate finance to beneficiary countries and, in particular, to establish effective National Implementing Entities for international climate finance. After an initial boost of activity[38], progress has been slow, perhaps reflecting uncertainty about the arrangement for the Green Climate Fund.

Box 7 describes the limited international experience. The Funds that have received donor support have had a variety of management arrangements, but all have involved some form of joint supervision responsibilities, usually with a joint board comprising government and donor representatives and joint provision of technical support. Financial management has been separate from the Treasury, although some Funds have used some elements of government financial management and procurement, sometimes combined with no-objection arrangements. Several of these jointly managed Funds are intending to adopt full national management, but this has not yet been realised. There are also a number of Funds that have been established by government and funded fully by government. For these funds, the environment ministry usually chairs the board, which would not be feasible under current practices in Cambodia, where such government funds are chaired by MEF. To date, the government and donor supported Funds have operated exclusively to support projects and have not involved any programme or budget support.

Box 7 International Experience with National Climate Funds

Indonesia established the Indonesia Climate Change Trust Fund (ICCTF) in 2010. The institutional status and activities of the ICCTF are similar to the CCCA in Cambodia, with funding provided mainly by DFID ($9.5m out of $11.2m) and management provided by UNDP. There are plans to transfer management more to government, but these are still under discussion. In addition, a 'Letter of Intent' was signed with the Norwegian government in 2010 covering $1bn between 2010 and 2016 to be implemented through mechanisms similar to REDD+, with funds disbursed to government in return for proven reductions in emissions. To date, the funding has concentrated on institutional readiness, plus some support for the moratorium on forest concessions. Pilot activities are starting in 2014 for performance based emission reduction schemes.

[38] Gomez-Echeverri, L. (Oct 2010). "National Funding Entities: their role in the transition to a new paradigm of global cooperation on climate change " ECBI Policy Report.

Bangladesh has two funds that aim to respond to the national Climate Change Strategy and Action Plan (BCCSAP) approved in 2009: the CC Trust Fund (BCCTF) and the CC Resilience Fund (BCCRF). The Climate Change Unit in the Ministry of Environment and Forests (MoEF) provides Secretariat services for both funds. The BCCTF is funded entirely by government whilst the BCCRF is funded by donors. The BCCTF was approved by parliament in 2010 and has received a block government grant of $300m, to be managed as an endowment fund, with 66% used to support the BCCSAP and 34% to be held as an emergency response fund. There are 12 trustees, of which 2 are from CSOs and 10 from government, supported by a Technical Committee and various sub-committees. Funds have been allocated to projects, but questions have been raised about the process of allocation and disbursement has been slow. No donor funding has yet been allocated to the BCCTF. The BCCRF was established in 2008 with contributions of about $125m over five years. The board is chaired by MoEF and includes eleven other Government representatives, two civil society representatives and two donor representatives. An 80% majority (13 votes) is required for board decisions. The BCCRF has received $188m to date, mostly from DFID ($94m), with additional contributions from Sweden, EU, USAID, Australia, Switzerland and Denmark. 10% of resources are earmarked for non-government organizations. Three large government projects have been funded to date, with funding of about $25m each, as well as a number of smaller technical assistance and research grants of less than $500,000 each. Routine management is provided under typical World Bank trust fund arrangements.

Brazil established a National Fund on CC (FNMC) in 2009, through a comprehensive act of parliament. The Fund is supervised by the Ministry of Environment. Government funding of $113m was provided, part of which came from oil industry revenue. The fund covers mitigation and adaptation, including both studies and investments. Projects are implemented by a development banking institution.

Rwanda established the National Fund for Environment and Climate Change (FONERWA) which started operations in 2013 and has received funding from government ($2.7m) and DFID ($35m). The Fund operates as a challenge programme, inviting proposals from across government and outside government, with NGOs and the private sector. The fund covers both environment and climate change and, given the rural nature of Rwanda, most activities funded are expected to be based on natural resources. Three projects have been approved to date. The Fund was created by a law and supervision is jointly managed by the Ministry of Natural Resources and donors, with technical work undertaken by a team of experts, partly recruited by DFID and partly provided by government. According to the DFID Business Case, financial management uses government systems and some top-up funding for donor budget support is expected to be provided, although the practices actually being used are still evolving. The fund also receives domestic financing in the form of revenues from logging concessions, plus 0.1% of all project costs that are classified as requiring EIA.

Vietnam has also been planning to establish a Green Growth Fund for two years, but there is no evidence yet available of the experience with this fund. Mexico's new Climate Change General Law refers to the possibility of establishing a Climate Change Fund, but the details of how this will be done have not yet been established. The ASEAN Ministers of Economy and Finance have discussed the possibility of creating a Climate Fund for the region.

There are also a number of national funds that address only part of the concerns of climate change, including the Amazon Fund in Brazil, China's CDM Fund, Guyana's REDD Investment Fund and the Thailand Energy Efficiency Revolving Fund. In addition, there are a range of donor trust funds that have been developed with government cooperation, including in Ecuador (the Yasuni ITT Trust Fund managed, by UNDP) and the Maldives (the CC Trust Fund, managed by the World Bank).

NSDP II includes a priority action to create a National Fund for Climate Change, with the objective of providing greater leadership, ownership and coordination, building awareness and embedding incentives within the planning system. The fund would be expected to support both mitigation and adaptation and both dedicated CC activities and top-up funding for integrated activities. The fund would not be treated as an implementing agency, except for a limited number of dedicated supporting activities, and most funds would be disbursed to other government bodies or, possibly, to non-government implementing agencies.

There are a range of options for the status of an NCF. At one extreme, it would be possible simply to rename the CCCA Trust Fund as an NCF. At the other extreme, a fully government managed NCF would be included in the budget and would use government systems for accounting, expenditure approval, procurement and financial reporting. Funding would be received from domestic and international sources. Whilst donors would normally operate as partners, they would not be involved in the routine management of the fund. Ultimately, however, donors would retain the right to cancel funding, if there were serious concerns about management, and so a good working relationship with donors would need to be maintained.

In theory, it would be possible for the NCF to be established with a similar status to the CCCA Trust Fund and to progress towards a fully government managed institution in several steps. However, in practice, a recent legal review concluded that new legislation would be required to establish a government managed NCF[39], and it is not practical to consider intermediate steps between the two extremes. In theory, the existing National Environment Fund (NEF) could be expanded to cover some CC activities. However, the objectives of the NEF do not include any reference to CC and this could create tensions in the management of the fund. New legislation for an NCF would need to define a secretariat that would be chaired by MEF (as with the CSF), with the NCSD-TS providing technical support.

The opportunities and challenges of a government managed NCF are presented in the table below.

Table 22 Opportunities and Challenges for a National Climate Fund

Opportunities	Challenges
Role in Securing Financing	
• Could help secure a proportion of domestic revenues for climate change. • Could increase contributions from donors interested in pooling resources (e.g. CCCA donors) and accelerate access to international climate finance.	• No additional resource mobilization foreseen in the short to medium-term, so the NCF would be an investment in readiness for longer term opportunities. • In the long term, external resource mobilization will depend on MDB and GCF business models and eligibility criteria, which are not yet defined. The proposals currently being discussed at the GCF involve discrete proposals (similar to projects) being submitted by an NIE, with a process for wider 'no-objection' approval from within government. The extent to which MDBs and GCF approve NIEs that use government systems will depend largely on their confidence in the PFM systems. • Civil society participation in the fund board may be required by some donors, which is not currently possible under MEF rules.
Ease of Establishment	
• Build on CSF experience for institutional mechanisms, and	• A law is required for full effectiveness, although the first phases can be achieved with the existing legislation. The law will need to be sufficiently

[39] Duggin, G. (2013). "Report on Strengthening the Legal Framework for Climate Change in Cambodia. Draft for Comment."

division of responsibilities between MEF and NCDD. • Phased approach will allow more difficult steps to be introduced over several years.	flexible to allow regulations to reflect GCF eligibility criteria as they become known. Negotiations on the law might be time consuming (e.g. SNIF negotiations over the past 2 years). • Should ideally involve merger of NCSD with NCGG, which will require further discussion, negotiation and political leadership.
Effectiveness and Efficiency	
• Potential for piloting new modalities (notably CC sector budget support). • Bring climate finance on-budget. • Allow for allocation in line with national priorities (subject to demand from ministries and agencies), including focusing funds on sectors giving the highest returns.	• Line ministries would be sensitive about allocation of resources between them, requiring rules on ministry shares agreed in regulations approved by Cabinet. • Operational issues may be complex (especially for top-up funding to donor projects) due to varying arrangements at sector level. This will apply especially to adaptation funding, for which there are, as yet, no agreed eligibility criteria either in Cambodia or internationally. • Depends on the success of PFM reforms and the ability to identify departmental expenditure in the budget and public accounts. • Size of the fund may be insufficient to generate interest from the big spending CC ministries (MPWT, MOWRAM), who would need to be convinced of longer term benefits from increased future funding. • Potential complications in providing financing for private sector support (e.g. through loan guarantees, interest rate subsidies or loanable funds) which could become more important as interest in mitigation grows.

The CCFF assessment suggests that an NCF would be unlikely to have a major impact on increasing climate finance in the short to mid-term. Scenarios for the longer term are uncertain. A successful NCF, based on funding from domestic sources and from selected donors, could help to influence some international climate finance to work more with government budgets. It is possible that Cambodia could act as one of a number of pioneers of government managed climate finance, but this will have to wait until the PFM reforms in the country are well established.

The CSF provides a useful model for an NCF. However, there are major challenges for the establishment and management of an NCF. The Fund would require new legislation, which would not be straightforward as it would involve negotiations over the role of different institutions and over the authority of the Fund to allocate resources between line ministries.

Eventually, an NCF does have the potential to reduce the costs of managing climate finance, by building on government procedures and by improving coordination and so reducing duplication and inconsistency. In theory, it could also improve effectiveness by allocating funds to those sectors where they are most effective at contributing to adaptation and mitigation. However, it could also be argued that the most effective adaptation and mitigation will come from actions that are fully integrated within the mainstream planning activities of line ministries. These challenges are particularly serious for adaptation, for which there are, as yet, no objective and operational eligibility criteria, either in Cambodia or internationally. Without an operationally effective definition of adaptation expenditure, it is difficult to see how the NCF could succeed in arbitrating between line ministries on the basis of technical evidence.

As a result of this analysis, it does not seem appropriate, in the short to medium term, to create a fully government managed NCF. Climate financing would be better served through conventional funding

mechanisms for investment and services, but with the improved coordination and technical assistance that is planned to support these investments and services. This situation should be subject to regular review, to consider whether progress with PFM reform opens up possibilities for pilot initiatives that take steps towards budget support, including the possible use of no-objection arrangements and other ways for donors to take a lighter role in management, without relinquishing full control.

6.3 Monitoring and Evaluation

6.3.1 NSDP Indicators

At the highest strategic level, four indicators have been submitted by CCD to MOP for inclusion in the NSDP 2014-18 (see Table 23). Two of these indicators relate to impact and two relate to process.

Table 23 Core Indicators Proposed for Inclusion in NSDP

Indicator	Unit	2013 Est.	2014 Proj.	2015 Proj.	2016 Proj.	2017 Proj.	2018 Proj.
Households vulnerable to CC (i.e. CVI)	%	47%	45%	43%	41%	39%	37%
Carbon credits from CDM, REDD+ and others	m tCO2e	2.05	2.10	2.15	2.20	2.25	2.30
CC related public spending / total[1]	%	6.3%	6.4%	6.5%	6.6%	6.7%	6.8%
Ministries with CC mainstreamed in planning	No.	11	13	15	17	19	21

[1] this indicator applies only to the 9 government bodies included in the CCFF and not to CC financing as a share the overall total public spending, including on functions like defence and justice

A national index of vulnerability will be the cornerstone for assessing impacts of CC financing in adaptation. Ideally, measuring progress in adaptation to CC should be based on changes at the household level, taking into account the exposure to risk, the sensitivity of the household to that risk and the capacity of the household to survive the risk. Such surveys do not yet exist in Cambodia, and it may not be efficient or necessary to measure household resilience. However, there is growing experience with measuring vulnerability at higher levels. The SNC defines and estimates a Climate Vulnerability Index (CVI) for provinces which combines four sub-indices: a) exposure to flood risk; b) exposure to drought risk; c) forest cover (because of the strong link with floods); and d) capacity to cope with risk, which is defined by a range of socio-economic indicators (e.g. schools, water, sanitation, electricity, housing, mortality etc.) plus population density. MoP have also developed a Disaster Risk Affectedness Index (DRAI), with assistance from UNDP. The DRAI is based on the commune database, which is a function of exposure, sensitivity and adaptive capacity. The management of the CC M&E framework will include a review of the CVI and DRAI and the definition of a single robust index to measure changes in vulnerability at the commune level. Ultimately, it should be possible to use the index as part of the evidence used for making decisions about disbursement of CC budget support.

For mitigation, the ultimate indicator is the change in GHG emissions and Cambodia will report on this through the normal international reporting mechanisms. Cambodia will also report on the carbon credits achieved from mitigation policies, including CDM and REDD+.

6.3.2 Core National Indicators

The CCCSP specifies that a national framework for M&E of CC response will be used to measure the progress of the CCCSP and of the CCSPs and CCAPs. The framework will be implemented in three phases

(short term in 2014, medium term 2015-2018, and long term 2019-2024). The development of the framework has started, and the main elements of the framework, including a draft set of indicators, were discussed in a national workshop in December 2013. The workshop defined a draft set of core cross cutting national indicators, comprising 4 impact indicators and 7 process indicators (see Table 24).

Table 24 National Core Indicator Set

Impacts:
1. Percentage of households vulnerable to CC
2. Damage and loss (USD) from extreme climate events (assets, infrastructure, biodiversity, crops …)
3. Number of deaths from extreme climatic events by gender
4. GHG emissions by sector and per capita
Policies, institutions and capacities:
1. Status of national policies, strategies and action plans for CC response
2. Level of inclusion of CC in long, medium (NSDP) and short term (PIP) planning documents
3. Status of national coordination mechanism for CC response and implementation of the CCCSP
4. Production, access and use of CC information
5. Availability and effectiveness of a CC Financial Framework
6. Institutional arrangements for integration of CC in national development planning and budgeting
7. Budget allocation for CC, by sector, by type and by source (i.e. national and international)[1]

[1] to be prepared using the tagging and scoring system being introduced in the budget

NCSD

will compile a short annual report, with assistance from MoE, reporting on the national monitoring indicators and providing the indicators for the NSDP monitoring report. This annual report will also provide a qualitative assessment supporting the evidence on indicators, including an assessment of the readiness of each ministry for mainstreaming CC into policy, planning and budgeting. The annual report will refer to any relevant evaluation work that has been done during the year.

6.3.3 CCAP Indicators

In addition to these national indicators, each line ministry and NCDM will produce its own annual report on CCAP progress. Four levels of indicator will be included: mainstreaming indicators; institutional readiness indicators; results indicators for each of the actions; and impact indicators for the sector as a whole.

The mainstreaming and institutional readiness indicators are standard for all CCAPs and cover:

- funds planned and actually disbursed, compared with the CCAP planning matrix
- proportion of actions funded from national budget, which will indicate the progress in mainstreaming financing into national budgets
- Integration of Climate Change into sectoral policy and budgeting
- Capacities for climate change mainstreaming
- Availability and use of data and information

The results indicators are defined in the action fiches and relate to the outputs achieved for each action. These indicators are used primarily for the managers of the actions.

The impact indicators are the key link to the benefits generated by the CCAP. The full list of these impact indicators is still being finalised. The following table was developed during the Dec 2013 national workshop and presents an example of the types of indicators that will be involved.

Table 25 Indicators for Monitoring Climate Change Financing

Institution	Indicators
DRR and social protection	
NCDM	1. Damage and loss (USD) from extreme climatic events (assets, infrastructure …) 2. Number of deaths from extreme climatic events by gender 3. Average lead time (hours) for flood and tidal surge warning 4. Households affected by drought that have benefited from weather micro insurance.
Health	
MoH	5. Vector borne diseases incidence rate in CC vulnerable districts or communes 6. Waterborne diseases incidence rate in CC vulnerable districts or communes
Agriculture and water	
MAFF	7. Ha and % of agricultural land planted with drought or flood resistant varieties 8. Tons and % of crop lost due to drought and floods 9. Rate of Prevalence of underweight children (under-fives) in areas Vulnerable to CC
MOWRAM	10. Length and % of climate proofed irrigation networks 11. Ha of Agricultural land drought proofed
MOWRAM, MRD, MAFF	12. % of households in vulnerable areas with year round access to farm water supply
Water and rural development	
MOWRAM, MRD	13. % of households in vulnerable areas with year round access to water supply (domestic, industrial)
Education	
MOEYS	**14.** % of schools using a curricula integrating disaster preparedness and CC
Rural development	
MRD, MPWT	**15.** Length and % of climate proofed rural roads
Environment	
MoE, MAFF	16. Ha of healthy mangrove forest 17. Ha of coastline lost because of sea level rise or coastal erosion (compared to 1990)
Gender	
MOWA	18. % of CC spending clearly targeting women, elderly and disadvantaged groups
Infrastructure	
MRD, MPWT	19. Length and % of climate proofed paved roads 20. % of climate proofed paved roads that have been damaged as a result of floods
Energy	
MIME, MAFF	21. Energy intensity by sector (industry, agriculture, transport, households, services)
MIME	22. Share of renewable energy in total electricity production 23. Share of energy infrastructure climate proofed (hydropower, solar, biomass)

For those indices that refer to vulnerable provinces, districts, communes or households (i.e. indicators 5, 6, 9, 12 and 13), the classification of vulnerability will be based initially on the vulnerability analysis included in the Draft SNC to the UNFCCC and on the Disaster Risk Affectedness Index developed by MoP.

This classification will be revised through a baseline national vulnerability assessment based on an improved methodology, to be finalised by 2015.

For those indicators related to climate proofing (i.e. indicators 10, 11, 15, 19 and 20), the indicator refers to the percentage of infrastructure (i.e. roads, irrigation …) that is designed to manage and survive floods with a return period that is specified and justified, taking into account potential changes in return periods associated with CC and using official guidance on design standards.

The CCFF monitoring and evaluation work aims to define the benefits that are expected to be generated by CC actions and then to assess whether these benefits are actually being achieved. Along with the information on costs, the indicators provide evidence on the key factors that determine the BCRs for the actions. For example, the MOWRAM impact indicators include the area of irrigated cultivation that is climate proofed, which is the key variable for determining the benefits to farmers from having functional irrigation and drainage, even during years of more extreme rainfall or drought. The MAFF indicators include the crop losses due to drought and flood, which are closely related to the adoption of drought/flood resilient varieties and practices, and the area of forest rehabilitated, which is a key indicator for forest-related benefits.

6.3.4 Evaluation

The CC M&E national framework includes a long-term program of evaluation to provide in-depth impact analysis for policies and investments. This evaluation work will use the indicators to estimate the benefits derived from the CC actions and so estimate the BCRs of CC funding. The analysis of benefits undertaken for the CCFF is rapid and illustrative and requires further evidence from experience within Cambodia. Improvements in the analysis will result in a better understanding of thresholds that have to be surpassed, to justify CC financing. The NCSD, MoE and National Climate Funding Framework will collaborate to ensure that climate finance is supported by clear monitoring and evaluation of the benefits arising from this finance.

ANNEX 1 Costs and Benefits of Mitigation and Adaptation

This annex summarises the cost benefit analysis (CBA) that has been undertaken for each of the main types of CC investment. The CBA serves as the basis for determining the CC weights and is also used to assess the aggregation of total benefits from CC funding.

To date, the use of CBA in Cambodia has been limited mainly to the appraisal of donor projects. This means that comprehensive data is not easily available and it is necessary to cross-check rough estimates from a variety of sources. As a result, a sensitivity analysis often suggests that the range of possible results is quite wide. However, this may be less serious for the estimation of CC weights because many variables with limited evidence affect equally the benefits both with and without CC and so do not affect the CC weights.

There are a number of key assumptions that affect several sectors. These include the following.

- It is assumed that the level of rainfall variability will double, so that an extreme event (whether associated with high rainfall, low rainfall or unseasonal rainfall) will become twice as likely. As a result, any damage arising from current rainfall events (notably floods) will become twice as damaging by 2050.
- All analysis is undertaken in constant real prices of 2010.
- There are a range of assumptions that affect energy policies. Fuel is valued at 1.0 $/lt, which is assumed to apply to a weighted average of petrol and diesel. The value is intended to reflect not the market price but the economic price (i.e. excluding taxes). The economic value of electricity is assumed to be 0.22 $/kWh. The carbon content of fuel is 0.7 kgCO2e/lt and for electricity it is 0.5 kgCO2e/kWh.
- Carbon is valued at 50 $/tCO2e, which is a conservative estimate of the full social cost of carbon. The estimate is taken from the Stern Review, inflated to 2010 prices. In practice, the social cost of carbon in Cambodia will be substantially higher because Cambodia is one of the most vulnerable countries in the world. The carbon benefits estimated are directly proportional to the price assumed, so it is easy to assess the implications of using alternative values, such as those from the EU carbon market, either when it was working effectively (i.e. 20-30 $/tCO2e) or at present (i.e. 6-7 $/tCO2e).
- Labour is valued at 2.5 $/day. This largely affects the agricultural policies.
- A discount rate of 5% is used. This is substantially below the opportunity cost of capital to the private sector. It is also below the 10% that is often as a minimum requirement for the IRR of public investment. However, governments around the world are increasingly concerned that using 10% as the target IRR tends to favour short term investments and would exclude approval of longer term investments, and especially those associated with climate change. Some countries have adopted 6% as an alternative target and the UK Treasury recommends using 3.5% for shorter term programmes and that the rate should decline to 1% for benefits and costs that are more than 30 years into the future (HM Treasury 2011). The use of 5% is therefore a compromise rate reflecting the range of alternative approaches used domestically and internationally. The benefits from adaptation and mitigation are mostly long term benefits that increase gradually to 2050 and beyond. As a result, the relative importance of these benefits would be higher, if a lower discount rate were used and would be lower if a higher discount rate were used. The implications of the discount rate for climate related benefits will be different for each action.

Table A1.1 summarises the results of the CBA and the default CC weights to a set of different types of action. The CC weight is defined as the change in benefits that takes place with CC compared to the total benefits with CC. Thus, if A = the value of benefits without CC and B = the value of benefits with CC, then W = (B-A)/B. When W = 100%, the action delivers no benefits without CC and when W = 0 the benefits from the action are not affected by CC. If W is negative, then an action is climate risky and the benefits will fall when CC takes place. Ideally, larger actions should be subject to individual analysis and the CC weight should be adjusted to reflect the particular design features. The values in the table below are informed by the case studies presented in the remainder of this annex. Where CBA analysis is not available, the following subjective assessment is made: if actions are primarily motivated by objectives associated with CC (i.e. adaptation or mitigation) they score 60% to 100%; if the benefits associated with CC are of roughly equal importance to other benefits (e.g. associated with economic, social or environmental development), the score is 40% to 60%; if the CC benefits are of secondary importance, then W is between 10% and 30%; and, if the CC benefits are of marginal importance, the score is less than 10%.

Table A1.1 Typical Default Climate Change Weights

W	Types of Action
100%	CC planning, management, awareness. This will have no value if CC does not happen.
100%	Coastal protection specifically for sea rise (i.e. not for general coastal protection against current risks). This will have no value if CC does not happen.
50%	Disaster response, reduction and management. Based on the SREX conclusion that extreme events will become twice as likely by 2050.
50%	Proofing against flood/drought (roads, water, crops …). Based on the SREX conclusion that extreme events will become twice as likely by 2050.
50%	Livelihoods targeted on climate vulnerable groups. Based on the assumption that the incidence of CC related risks with double, in line with SREX conclusions on extreme events
48%	Forestry protection, based on the relative value of carbon and other benefits.
33%	Introduction of improve crop varieties that are more resilient to rainfall variability
22%	Irrigation and water supply, based on the expected increase in the frequency of years when irrigation protects from poor rainfall.
27%	Energy efficiency and renewable energy, based on the value of emissions compared with economic benefits.
15%	Water supply projects, based on protection from increased health risks
13%	Sanitation projects, based on protection from increased time savings and health risks
10%	Support for climate sensitive diseases, based on WHO studies on impact of CC on health.
-38%	Road expenditure in general (i.e. not just CC proofing), based on the higher costs.

The case studies can be grouped into two types: a) expenditure on actions that will generate higher benefits if CC happens; and b) expenditure on actions that provide proofing to prevent a reduction in benefits. For the first type, a simple analysis of benefits with and without CC is required. For the second type, the with and without CC analysis is required both for unproofed and proofed expenditure.

Rural Sanitation (Wet Pit Latrine with Flood proofing)

About 75% of Cambodia's rural population does not have a latrine and practices open defecation. The case study examines the intervention of rural wet pit latrines, comparing the case of latrines with and without flood proofing. Then the case study examine both cases in scenario where CC happens and CC doesn't happen.

The case study relies largely on data provided in a WSP study of sanitation in Cambodia[40], the investment cost of an unproofed latrine is $116 with 8 years of amortization, plus annual costs of $52 for programme support and $1.9 for O&M We assume that the program cost is one off and after that the household will continue to use latrine for the 8 years. We further assume that large flooding happens every three years and that the rehabilitation of latrines post-flood is 1/3 of the latrine investment cost, which means that the average annual costs of flooding are 10%. If a wet latrine is built with moderate flood proofing, there is an additional $60 investment cost.

The benefits are measured in term of health costs averted (health care, health productivity and health mortality), which are about $21 annually per household, and savings in water access time and treatment costs of $10.8 annual per household. Cost saving on access time to open defecation for women is $8.8 per annum and for men is $12.4 per annum. The average household is 4.7 person and woman/man ratio= 52:48, thus cost saving = (4.7*8.8*0.52+4.7*12.4*0.48) = $50 per annum per household. The case study excludes other benefits such as tourism, reduction pollution, safety, and other business.

Based on the SREX rule, the CC weight for health cost is 10%. We estimate that access time to open defecation is double in flood years for one month. Thus, if CC happens, flood would take up to two months and/or be more severe during flood periods. The average access time to open defecation of rural people is 105 hour per year (men lose 123 hours a year while women lose 87 hours a year).

We assume X is monthly travel time without flood and annual access time without flood TTo= 13X. Access time with flood would be TTc=14X. Thus TTc/TTo= 14/13=1.08. In other words, it takes 1.08 times longer annually to access open defecation when CC happens. The same logic is applied to water access time. Thus, the benefit accounts without CC and with CC in case of without flood proofing and with flood proofing cases are as follows:

# Beneficiary	Costs (NPV)							Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Investment cost ($)	O&M ($)	Program cost	Rehabilitation cost without CC	Rehabilitation cost with CC	Total without CC ($)	Total with CC ($)	Without CC ($)	With CC ($)	Impact of CC ($)	Without CC ($)	With CC ($)	Without CC	With CC	
Wet latrine without flood proofing															
1 HH	502	32	50	183	367	767	951	1363	1480	117	825	777	1.8	1.56	-12%
Wet latrine with flood proofing															
1 HH	762	32	50	0	0	844	844	1363	1480	117	837	954	1.61	1.75	9%

Without CC, BCR for latrine without flood proofing is 1.8 and BCR with flood proofing is 1.6. This indicates that flood proofing is not a worth spending if there is no CC. However, if there is CC, the BCR increases from 1.56 from latrine without flood proofing to 1.75 for latrine with flood proofing.

[40] http://www.wsp.org/sites/wsp.org/files/publications/WSP-ESI-assessment-Cambodia.pdf

Water (Private Piped Water Investment)

Private piped water is important for rural Cambodians as state owned water operators are concentrated in a few cities. The case study examines the CBA of a private piped water project to serve 490 household or 2450 people which employs 9 kilometres of pipe network. The revenue and cost profiles are as follows:

Cost profile	**Revenue profile**
Investment cost *Station construction: $70,000* *Construction of pipe of 9km: $36,000* *Annual depreciation: $3000* Variable cost per cubic meter : $0.35	Water tariff: $0.6 per cubic meter Operating margin: $0.25 Per cubic meter Connection fee: $30 Annual water consumption per household: 16.6 cubic meter

Sources: Tapping the Market, Opportunities for Domestic Investment in Water for Poor (WSP&IFC):
Cost of network construction is estimated at $4000 per kilometre.

WHO estimates the time saved for water collection for piped water is one hour per day[41]. We assume that the average labour cost per hours is $0.25 ($2.5 per day for a 10 hour working day). WHO also estimates that benefits achieving from improved water supply (MGD target) are 75% from access time saving and 25% from health risks averted[42] In other words, health risk averted is 33.4% of water access time saving.

Floods are assumed to last one month in a typical year without CC, based on local knowledge. Following the SREX conclusion that rainfall variability will double by 2050, this will increase to two months with CC. We assume X is monthly access time without flood and annual access time without flood TTox= 13X. Access time with flood would be TTcx=14X. Thus TTcx/TTox= 14/13=1.08. In other words, it takes 1.08 times longer annually to access water when CC happens.

The same logic is applied for dry spells. We assume with CC, dry spells would last one additional month. If Y is monthly access time without dry spells, annual access time is TToy=12Y. With dry spells, annual access time is TTcy=13Y. Thus, TTcy/TToy=13/12=1.08. In other words, it takes 1.08 times longer annually to access water when dry spells happens.

water project (# people)	Costs (NPV)			Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Investment cost ($)	O&M ($)	Total ($)	Without CC ($)	With CC ($)	Impact of CC ($)	Without CC ($)	With CC ($)	Without CC	With CC	
2450	116,801	237,877	354,677	993,542	1,137,605	144,064	604,579	748,642	2.55	2.92	15%

The BCR is 2.55 without CC and 2.92 with CC, thus CC relevance measure is 15%. It is also expected that if there are more households living the area, BCR and will improve due to the economy of scale of the investment.

[41] http://www.who.int/water_sanitation_health/publications/2012/globalcosts.pdf. Page 30.
[42] http://www.who.int/water_sanitation_health/publications/2012/globalcosts.pdf. Page 34.

Rural Roads

Rural road improvement and rehabilitation is a key priority for government. The case study examines a rural road that serves 500 road users per day, using various vehicles, and travelling over 20 km.

The costs comprise rehabilitation (investment cost) and O&M cost. If rehabilitation is done without climate proofing, the rehabilitation cost of laterite is estimated at 40K $/km, assuming that the most cost effective opportunities are funded, and thus the total investment cost is $800K[43]. The annual periodic and routine O&M costs 9.5% of rehabilitation cost or $76K per annum[44]. With CC, the O&M costs are expected to be twice, at $152K per annum.

Climate proofing is expected to add 8% to the rehabilitation costs[45]. The O&M cost remains at 9.5% and so increases in line with the investment. However, with climate proofing, the O&M costs with CC do not increase.

The benefits comprise time saving, vehicle cost saving and additional business. We assume that passengers would save 0.4 hour/trip after the 20 km road is rehabilitated, and passenger and workers would travel 5 days a week. Thus, the time saving for total user is 0.4h/trip x labour cost x total user x 365 x 5/7. We also assume that the number of users would increase by 10% annually in all cases.

The vehicle saving cost (VOC) varies by types of vehicles[46]. We assume that after the road is rehabilitated the VOC is $0.01/km (or $0.2 per 20 km). We assume that workers would travel 5 days a week. Thus total VOC: $0.2 x number of users x 365 x 5/7. We also assume that the numbers of journeys increases by 10% annually.

There also other benefits from the rehabilitation of the roads, including: improved farm gate prices because farmers have better access to markets; incomes earned from more visits to local areas; more consumer products sold in local community; and improved access to health and school. In this case study, we assume that the additional business would generate $500/day over a 5 day week.

[43] According to Integrated Fiduciary Assessment and Public Expenditure Review, Agriculture, Irrigation and Rural Roads Public Expenditure Review (May 2010), the rehabilitation of laterite road in Cambodia cost $38K-$60K.

[44] Integrated Fiduciary Assessment and Public Expenditure Review, Agriculture, Irrigation and Rural Roads Public Expenditure Review (May 2010).

[45] According to ADB's Costs of Adaptation to Climate Change: Some Preliminary Estimates: http://www.google.com.kh/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CCkQFjAA&url=http%3A%2F%2Fwww.asiapacificadapt.net%2Fsites%2Fdefault%2Ffiles%2Fppts%2Fworkshops%2Ffy2013%2Faccess-to-funds-for-cca-june-2013%2Fadaptation-cost-estimation.ppt&ei=E_PAUrD1LeTkiAeY6IDQDA&usg=AFQjCNFHcC71eu9j6QTt08oTsCGm8d9G3Q&sig2=Q6AEJQmxEPrhACSI77V6QA&bvm=bv.58187178,d.dGI

[46] Source: Provincial/Rural Road Asset Management Project, MRD (2010).

With these assumptions, the results are in table below:

# Road users	Length of road (km)	Costs (NPV)					Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
		Investment cost ($)	O&M without CC ($)	O&M with CC ($)	Total cost without CC ($)	Total cost with CC ($)	Without CC ($)	With CC ($)	Impact of CC ($)	Without CC ($)	With CC ($)	Without CC	With CC	
Road rehabilitation without climate proofing														
500	20	761,905	1,270,058	2,540,116	2,031,963	3,302,020	5,570,104	5,570,104	-	3,538,141	2,268,084	2.74	1.69	-38%
Road rehabilitation with climate proofing														
500	20	822,857	1,371,662	1,371,662	2,194,520	2,194,520	5,570,104	5,570,104	-	3,375,584	3,375,584	2.54	2.54	-

Without CC, BCR declines from 2.74 (without proofing) to 2.54 (with proofing) because the proofing is a waste of money. In contrast, BCR increase from 1.69 to 2.54 in case of with CC.

Irrigation

The case study examines the CBA of: (i) the new constriction of irrigation and (ii) the rehabilitation of irrigation.

Costs comprise investment cost, rehabilitation cost and annual O&M and the assumptions used are presented in the table below[47].

Cost items	No climate proofing	Climate proofing
New construction		
Investment costs	1,200	1800
Rehab costs, without CC	40	20
Rehab costs, with CC	80	20
Annual operation and maintenance	60	90
Rehabilitation		
Investment costs	1000	1500
Rehab costs, without CC	40	20
Rehab costs, with CC	80	20
Annual operation and maintenance	50	50

In addition, production, labour, yields and prices are estimated as follows[48]:

[47] According to World Bank (2010): Integrated Fiduciary Assessment and Public Expenditure Review Agriculture, Irrigation and Rural Roads Public Expenditure Review, new construction of irrigation costs $1000-$1200/ha while rehabilitation costs $800-$1000/ha. The annual O&M costs 5% of investment costs.

[48] World Bank (2010): Integrated Fiduciary Assessment and Public Expenditure Review - Agriculture, Irrigation and Rural Roads Public Expenditure Review.

Rice cultivation		Wet Season Rainfed - without CC	Wet Season Rainfed - with CC	Wet Season Irrigated	Dry Season Irrigated
Costs of production, excl. labour & irrigation ($/ha)		75	75	120	221
Labour (days/ha)		120	120	150	220
Yield (t/ha)		2.00	1.60	3.20	4.40
Price ($/t)		270	270	270	270
Income ($/ha)		540	432	864	1188
Margin ($/ha)		165	57	369	417
Margin ($/t)		83	36	115	95

The benefits comprise incomes generated from paddy production in both dry and wet seasons. Without irrigation, there is no income from paddy production in dry season, and all income in the dry season is a result of irrigation investment. Overall, there is no difference of level of incomes from dry season in the scenario of with and without CC.

In the wet season, droughts typically cause about 25% loses and happen every three years[49]. Thus average annual losses due to drought is 25%*1/3. There are also frequent short dry spells during the normal years and the losses from these spells are expected to of similar size to the losses from major droughts. Thus, losses due to dry spells associated with larger droughts and more frequent short dry spells is: 25% x 1/3 x 2=16.7%, and this loss can be avoided using irrigation. In the case with CC, benefits from saving losses is double or 33.3%.

# of irrigated land	Costs (NPV)						Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Investment cost ($)	Reha cost without CC ($)	Reha cost with CC ($)	O&M ($)	Total cost without CC($)	Total cost with CC($)	Without CC ($)	With CC ($)	Impact of CC ($)	Without CC ($)	With CC ($)	Without CC	With CC	
New construction of irrigation no climate proofing														
1 ha	1,143	668	1,337	1,003	2,814	3,483	10,378	12,183	1,805	7,564	8,700	3.69	3.50	-5%
New construction of irrigation with climate proofing														
1 ha	1,714	334	334	1,504	3,553	3,553	10,378	12,183	1,805	7,159	8,964	2.92	3.43	17%
Rehabilitation of irrigation no climate proofing														
1 ha	952	668	1,337	836	2,456	3,125	10,378	12,183	1,805	7,921	9,058	4.22	3.90	-8%
Rehabilitation of irrigation with climate proofing														
1 ha	1,429	334	334	836	2,598	2,598	10,378	12,183	1,805	7,779	9,584	4.58	5.38	17%

The results demonstrate that the investments in all cases deliver high benefits. If there is no CC, the climate proofing actions are not worth spending, but if CC does happen, climate proofing actions deliver higher benefits, both for new irrigation and rehabilitated irrigation.

[49] World Bank (2010) Integrated Fiduciary Assessment and Public Expenditure Review - Agriculture, Irrigation and Rural Roads Public Expenditure Review.

Health: Malaria due to poor sanitation and hygiene

The case study examines the impact of CC on the health burden from malaria, as measured in disability adjusted life years (DALYs) lost as a result of poor sanitation and hygiene in children under 5 years old. The cost and value of DALY are estimated as in the table below:

Malaria DALY lost	0.0079	DALY/Person
DALYs lost without CC	7.9	DALYS/1000 people
DALYs lost with CC	8.69	DALYS/1000 people
Cost of one DALY averted	1,543	$
Value of one DALY	2,835	$

Source: www.wsp.org/sites/wsp.org/files/publications/WSP-ESI-assessment-Cambodia.pdf. Table 9, Page 22 for DALY burden and Table31, Page67 for cost per DALY averted.

Malaria DALYs lost attributed to poor sanitation and hygiene of 1000 children under 5 years old are estimated 7.9 DALYs per 1000 people. With CC, the disease incidences increase by 10%, and thus the Malaria DALYs of 1000 children increases to 8.69. The cost of one DALY averted is estimated at $1,543.

WHO suggests that the cost of reducing one DALY should be less than three times of the country's GDP per capita. We assume that this threshold is the minimum value of one DALY. With the country's GDP per capital of $945, thus the minimum value of DALY is $ 2,835.

# beneficiaries	Costs (NPV)	Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Cost of DALY averted	DALY reduction without CC ($)	DALY reduction with CC ($)	Impact of CC ($)	DALY reduction without CC ($)	DALY reduction with CC ($)	Without CC	With CC	
Malaria DALY control program									
1,000	203,706	374,274	411,702	37,427	170,569	207,996	1.9	2.1	10%

Thus, the malaria control program gives a BCR 1.9. According to WHO, if CC happens, then the health burden of malaria will increase by about 10% and the benefits associated with malaria control programmes will also rise by 10%, increasing the BCR to 2.1.

Crop

The case study examines the CBA of investment in research and extension into drought resilient crop varieties.

The benefit accounts comprise average improved crop margins and risk aversion benefits. With new varieties, the improved margin is about 10% on average or $ 16.5/ha/year.[50] In addition, there are also risk aversion benefits associated with general improvements in average annual margin, this is because the new seed gives higher yield in normal years. It is estimated that risk aversion benefit is about 50% of

[50] http://ageconsearch.umn.edu/bitstream/126037/2/1-PS-Birthal.pdf

average improved margin or $8.25/ha/year without CC.[51] In the case with CC, the risk aversion benefit is doubled or equal to an average improved margin or $16.5/ha/year.

The cost accounts comprise the investment research on varieties and its extension. No analysis has yet been done on the impact of agricultural research in Cambodia and the analysis therefore relies on international evidence. The global investment in drought resilient varieties is about $1bn with benefits of about 292m $/year or cost per ha is margin/ha*1000/292 or $85/ha (one off research investment cost).[52] It is observed that the expenditure on extension is typically similar to that on research of new varieties, and it is assumed that the cost of extension is equal to the research or $85/ha. As with research, this is a one off extension investment cost, which is not required to be repeated, once a farmer has started adopting the improved seeds.

# ha	Costs (NPV)			Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Research investment ($)	Extension ($)	Total cost ($)	Without CC ($)	With CC ($)	Impact of CC ($)	Without CC ($)	With CC ($)	Without CC	With CC	
Investment in research and extension into new varieties											
1	81	81	161	414	551	138	252	390	2.56	3.42	33%

The investment in the research and extension into drought resilient crop varieties gives a BCR 2.56 without CC. If CC happens, BCR increases to 3.42, and thus the CC relevance measure is 33%.

Forest

The case study examines CBA of a REDD+ forest protection project.

The costs comprise the management set-up (one off cost at the beginning of the project), annual management of the project and lost incomes (opportunity cost) by not using the land for agricultural plantation.

No recent research evidence was found for forestry. Analysis from 2002 suggested that 67K ha of REDD project in Oddar Meanchey costs about $323K on management set up or about 5 $/ha.[53] Likewise, it is estimated that the annual project cost is about $600K to operate 67K ha of REDD project or about 9

[51] http://ageconsearch.umn.edu/bitstream/126037/2/1-PS-Birthal.pdf, which values risk aversion benefits by multiplying the variance in yield by a risk aversion coefficient that is based on consultation with farmers asking them about the relative importance of variance in yield to average yield.

[52] According to http://ageconsearch.umn.edu/bitstream/126037/2/1-PS-Birthal.pdf, the global investment in drought resistant varieties is about $1bn with benefits of about 292m $/yr. The return on research investment is scare. Lybbert and Bell (2010) estimates that the investment in drought tolerance crossed $1 B. Gollin (2006) estimates an improvement of yields in developing countries, generating wheat and maize at $149M and $143M per year respectively.

[53] http://www.unredd.net/index.php?option=com_docman&task=doc_view&gid=7393&tmpl=component&format=raw&Itemid=53

$/ha.[54] It is assumed that the lost income comes from the alternate land use and is the crop margin in wet season rainfed. There is also value of timber logging while clearing the forest, and the margin of conventional logging is estimated at $2000 per ha.[55]

The benefits include: sustainable timber and NTFP sales, biodiversity, watershed benefits, recreation, generic information and value of emission reduction. Sustainable timber and NTFP sales is estimated 31 $/ha.[56] The value of biodiversity is estimated at 30 $/ha.[57] Pearce (2002) estimates the benefits of watershed at 15-850 $/ha or average 433 $/ha, the benefit of recreation at 2-470 $/ha or an average of 236 $/ha. The benefits of watershed and recreation cover a range of developing and developed countries in the world. It is assumed these two benefits are proportional to GDP, with world GDP PPP per capita/Cambodia GDP PPP per capita =18.3%. The value of watershed benefits are therefore = 79 $/ha and the recreation benefits are 43 $/ha. The benefits of genetic information are estimated at 1500 $/ha.[58] According to the SNC, carbon sequestration of mature forests contains 5 tCO2/year/ha. In theory, the figures from 2002 could be updated to 2010 prices, which would involve an increase of about 20%. This update was not done and the estimates may therefore be considered as conservative estimates.

# ha	Costs (NPV)			Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Set up cost ($)	Annual management ($)	Total cost ($)	Excluding mitigation value ($)	Including mitigation value ($)	Impact of mitigation value ($)	Excluding mitigation value	Including mitigation value	Excluding mitigation value	Including mitigation value	
REDD Forest Protection											
1	5	150	155	4,496	8,674	(4,178)	1,538	5,716	1.52	2.93	48%

The REDD project gives a BCR of 1.52, excluding mitigation value and 2.93 including mitigation. The CC relevance measure is 48%.

Energy Efficiency

The case examines the CBA of replacement of 5000 Fluorescent by LED in a garment factory which operates 10 hours per day and 340 days per year.[59] The cost of fluorescent bulb is far cheaper than LED, about 5% of LED.[60]

Annual operating hours	3400	hours/year
LED life time	50000	hours
LED lifetime	15	hears
Convectional fluorescent life time	6000	hours

[54] http://www.unredd.net/index.php?option=com_docman&task=doc_view&gid=7393&tmpl=component&format=raw&Itemid=53

[55] According to David W. Pearce (2002): Economic Value of Forest Ecosystem, University of Economic London, 2002, the value of conventional logging is between $200 to $4400 per ha.

[56] www.eepsea.net/pub/rr/2010-RR10-Kalyan.pdf

[57] www.idl-bnc.idrc.ca/dspace/bitstream/10625/39345/1/107390_v1.pdf

[58] David W. Pearce (2002): Economic Value of Forest Ecosystem, University of Economic London, 2002

[59] UNIDO &GEF: Industry Energy Efficiency Cambodia (IEEC): Garment Sector

[60] http://rmstoof.com/pdf/LED_advantages.pdf

Conventional fluorescent lifetime	3	years
Conventional bulb/LED cost	5%	

The table below indicates the cost of LED, energy saving and CO2 saved by LED:[61]

Installation of LED	24.7	$/LED
Energy saved by LED	74.8	kWh/LED/Year
Energy saving	374,000	kWh/Year
Energy cost unit	0.22	$/Kwh
CO2 saved by LED	1.2	t/1000kwh

The investment is the cost to install LEDs. The installation of LED costs $24.7 per LED.

The benefits comprise energy saving, CO2 saving and Savings in conventional bulb replacement. The energy saved by LED is estimated 74.8 Kwh per LED per year, thus 5000 LED replacement would save up 374,000 Kwh per year. The energy cost is $0.22/Kwh. CO2 saved by LED is estimated at 1.2 ton per 1000 Kwh.

# units	Costs (NPV)	Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Total LED ($)	Excluding mitigation value ($)	Including mitigation value ($)	Impact of mitigation value ($)	Excluding mitigation	Including mitigation	Excluding mitigation	Including mitigation	
Replacement of 5000 conventional fluorescent by LED									
5,000	336,321	1,407,390	1,783,806	-376,416	1,127,667	1,504,082	4.18	5.30	27%

Energy efficiency measure of replacing fluorescents by LED deliver highly positive net benefit. The case study demonstrates that BCR excluding mitigation value is 4.18, while BCR including mitigation value is 5.30. Thus the CC relevance measure is 27%.

Renewable Energy

The case study examines CBA of small hydropower (25 kW) as an evidence for renewable energy. It is assumed that the capacity factor is 70% and the small hydropower operates 24 hours a day or thus the operation time is 8760 hours a year.

With 70% capacity factor, the hydro power generates 153 Mwh per year. With the assumption of Carbon content of electricity at 0.5 KgCO2/Kwh, the hydropower would reduce 77 tCO2 per year.

Capacity of power generation	25
Capacity factor	70%
Operation time	8760
Electricity production	153
Emission reduction (tCO2)	77

[61] UNIDO &GEF: Industry Energy Efficiency Cambodia (IEEC): Garment Sector

The investment cost of small hydropower is about $112K with annual O&M 1%.[62] The benefits comprise electricity sales and emission reduction.

# Unit	Costs (NPV)			Benefits (NPV)			Net Benefits (NPV)		BCR		CC Relevance Measure
	Investment cost ($)	Annual O&M ($)	Total cost ($)	Excluding mitigation value ($)	Including mitigation value ($)	Impact of mitigation ($)	Excluding mitigation value	Including mitigation value	Excluding mitigation value	Including mitigation value	
Investment of 25 Kwh hydropower											
1	112,000	1,120	113,120	563,605	627,651	-64,046	438,222	502,268	4.50	5.01	11.2%

The investment on small hydropower delivers positive net benefits. The case demonstrates that BCR excluding mitigation value is 4.50 and BCR including mitigation value is 5.01. Thus, CC relevance measure is 11.4%.

[62] Ministry of Finance (2012) Indonesia First Mitigation Fiscal Framework

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