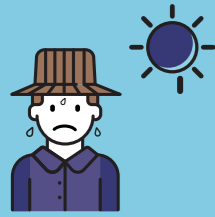


Matching Cambodia's adaptation effort to the type of climate change impact: some initial policy recommendations



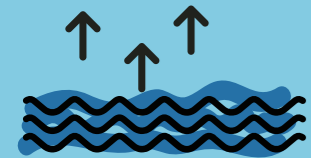
A major finding is that current adaptation activities underestimate the importance of heat stress on labour productivity. More attention should be paid to measures to protect supplychains and workers from heat stress, particularly in farming, construction and manufacturing. Private sector has a major role to play in this area, with support from public policies and public investments;



There is a need to strengthen evidence on the impacts of sea-level rise, as initial evidence suggests that these impacts could be higher than flood and storm damage, in which case responding to sea level rise is not sufficiently prioritized in the current response;



Although it is often assumed that agriculture will become less important economically in the long term, evidence suggests that this trend may slow down and agriculture remains a critical area for adaptation policy and from an equity and inclusive growth perspective;



The strong existing focus on climate-proofing infrastructure to avoid damage to assets is justified. Cost-effectiveness of these measures needs to be verified at design stage, and improved over time, for example through strengthening of the appraisal process for the public investment budget;



In many areas, the design of public policies will require more specific research. This includes for example analysis of how various vulnerable groups will be affected differently, impacts of sea level rise, and technology options to address labour productivity impacts.

Supported by



CLIMATE ECONOMIC GROWTH IMPACT MODEL (CEGIM): BUILDING A MODELLING TOOL FIT FOR CAMBODIA

<p>CEGIM is the result of consultations with concerned ministries and the National Council for Sustainable Development, taking into account the specific needs and constraints of Cambodia;</p>	<p>The model is simplified and transparent, run on a spreadsheet that can be understood by any economist;</p>
<p>CEGIM uses the key features of the most widely used models for the economic impact of climate change (e.g. PAGE and DICE models);</p>	<p>It has been calibrated using 23 years of data, mainly from national accounts;</p>

CEGIM 3 type CEGIM accommodates the three types of direct loss and damage in the following ways:

- ✓ Loss of income reduces GDP in the year of loss, but has no direct effect on subsequent GDP
- ✓ Heat stress and health effects reduce GDP through labour productivity
- ✓ Damage to assets from extreme events and sea level rise reduces capital stocks
- ✓ A reduction in GDP indirectly reduces future GDP by reducing investment

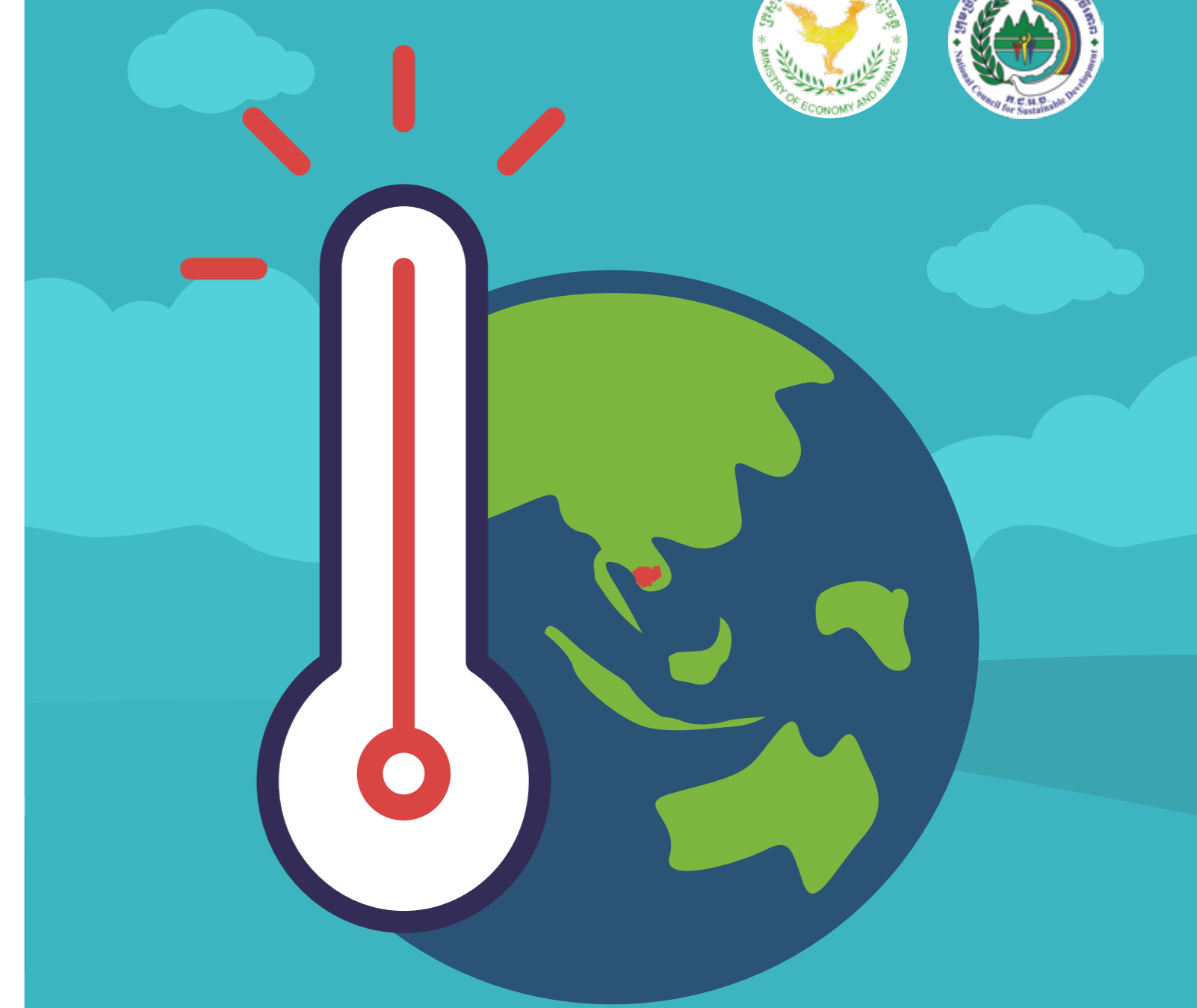
Figure 1 Overview of CEGIM

Climate Change Science	Three Types of Impact	Impact on Capital and Labour	Impact on GDP
<ul style="list-style-type: none"> Increased frequency of rainfall variability (flood, drought, storm, seasonality ...) Rising temperature 	<ul style="list-style-type: none"> Reduced output and/or increased costs Damage to assets Reduced labour productivity 	<ul style="list-style-type: none"> Indirect impact: reduced savings and investment Reduced capital assets Reduced labour productivity 	<ul style="list-style-type: none"> Reduced GDP Value Added in year of loss GDP = f(K,L) production function - reduced GDP Value Added growth path

- CEGIM incorporates best available evidence on loss and damage from climate change, as follows:

Type of L&D	Source of Data
Loss of income	Research, case studies, stakeholder consultations
Labour productivity	Physiological studies
Damage to assets	Flood, drought and storm damage assessments, sea level rise modelling

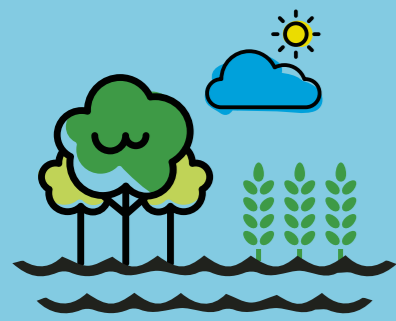
- CEGIM could be further developed with new features, such as the impact of policy on private investments or the distribution of climate change impacts on different sectors and social groups



ADDRESSING CLIMATE CHANGE IMPACTS ON ECONOMIC GROWTH IN CAMBODIA

A tailored model has been developed to estimate the impacts of climate change on economic growth in Cambodia, and identify priority areas of intervention to protect economic growth from these impacts.

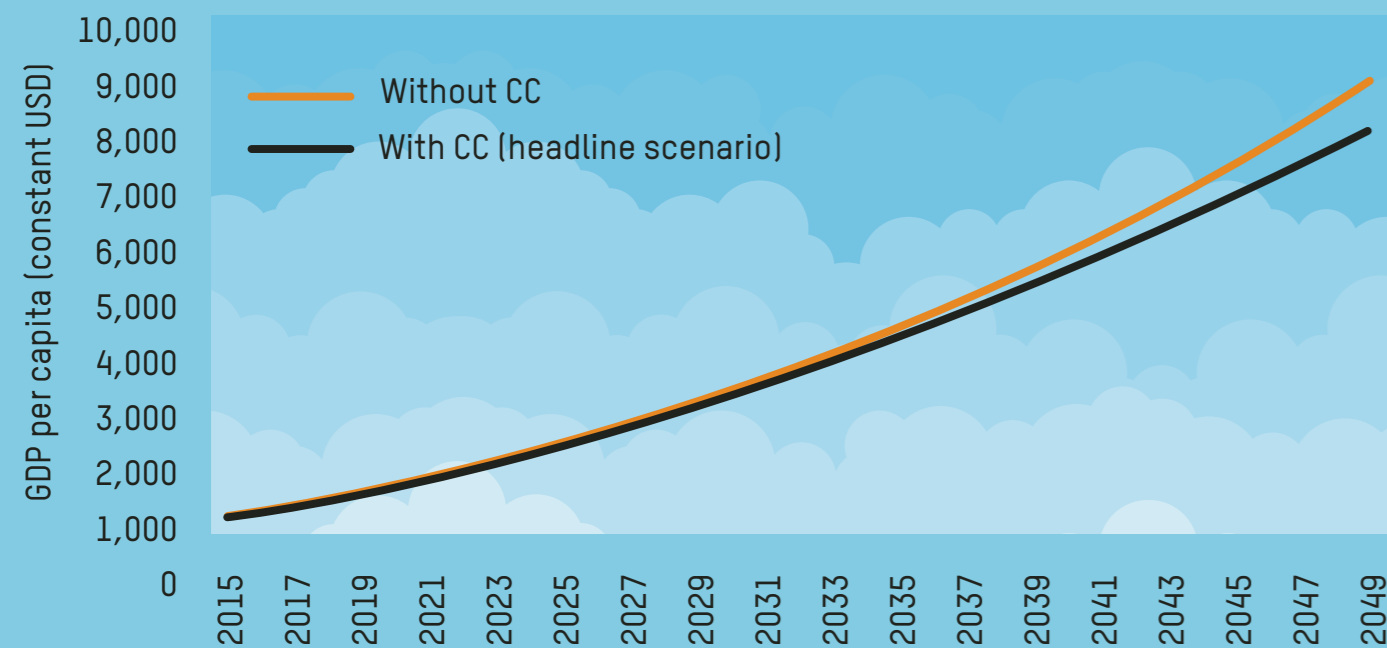
CLIMATE CHANGE IMPACTS ON GROWTH



A significant impact on the economy

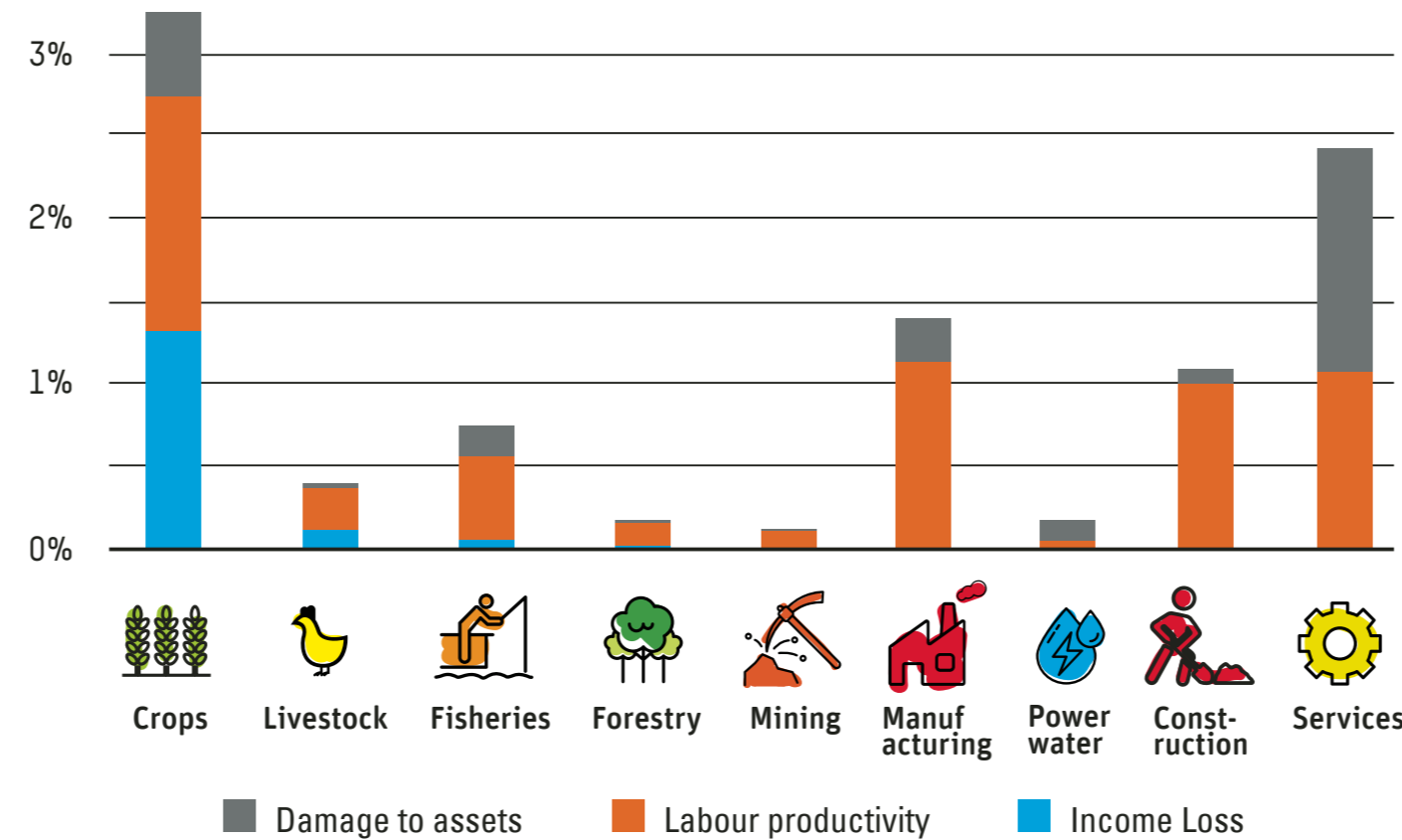
Under the main (headline) scenario, where the global rise in temperatures is kept below 2°C by 2100¹ and Cambodia maintains current levels of investment in climate change adaptation, climate change would reduce absolute GDP by 2.5% in 2030, and 9.8% in 2050. This corresponds to an average annual reduction in GDP growth rate of 0.3% between 2016 and 2050 (from 6.9% to 6.6%), and would delay Cambodia's accession to Upper Middle Income Country status by one year.

GDP in 2050 would be 9.8% lower

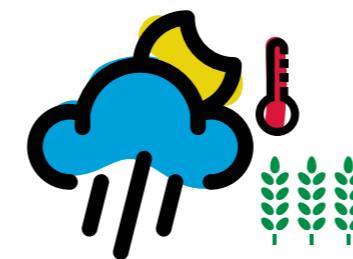


Agriculture is the most impacted sector, but labour productivity losses and damage to assets due to climate change affect all key sectors

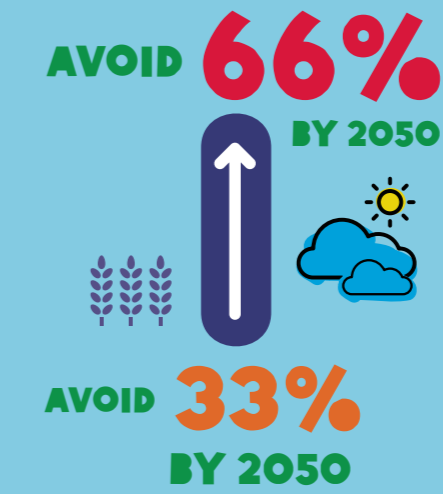
Economic Impact of CC by Sector and Type of Impact (% drop in absolute GDP 2050)



PROTECTING ECONOMIC GROWTH FROM CLIMATE CHANGE IMPACTS



While it is not possible to avoid all loss and damage from climate change in a cost-effective manner, international research suggests that more than half of this impact can be avoided through strong adaptation policies.

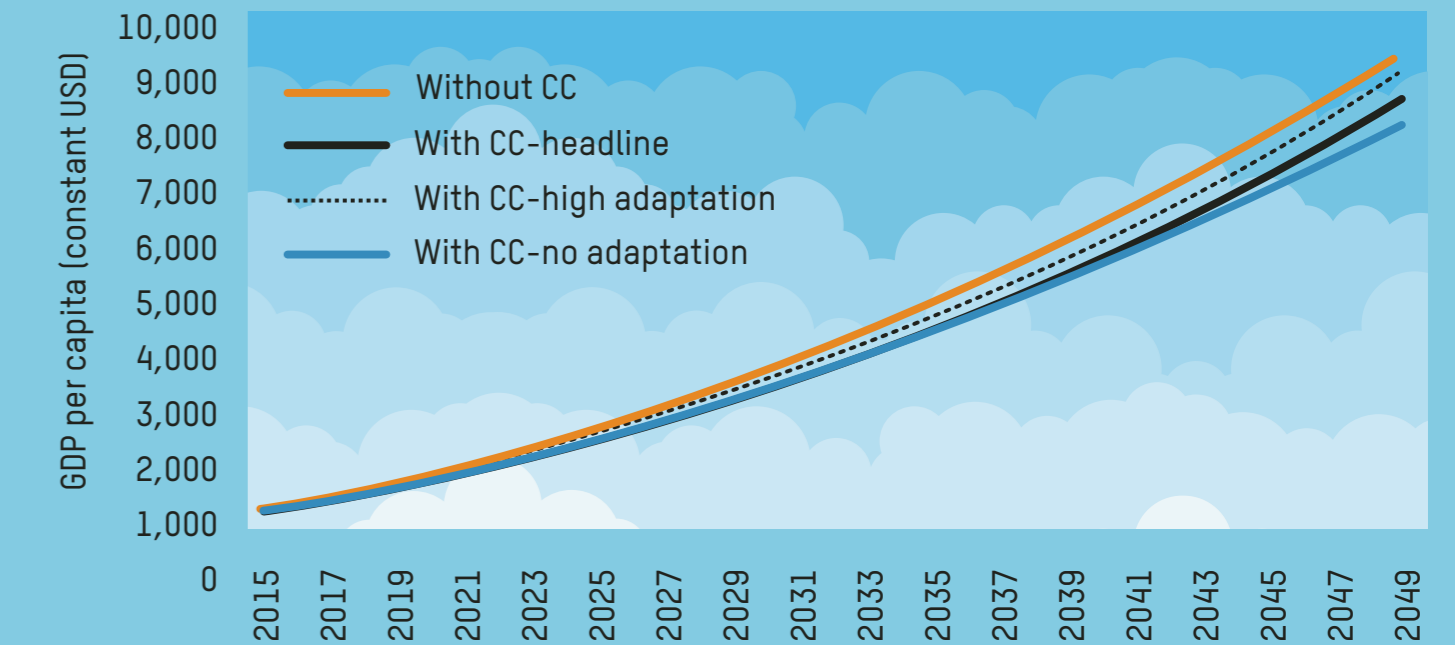


If maintained, current levels of spending on adaptation in Cambodia will help avoid 33% of the impact by 2050.

Strengthened adaptation policies could help avoid up to 66% of the impact by 2050

Although the severity of economic impact increases over time, the gradually cumulating effects of adaptation expenditure are also increasing over time, and help address a growing portion of the impact.

Modelling confirms that strengthened adaptation policies in Cambodia could avoid more than half of the remaining impact, without reducing resources devoted to traditional development activities.



The "high adaptation" scenario combines increases in adaptation spending (including international climate finance), new policies to encourage private sector adaptation (especially on labour productivity), and measures to improve cost-effectiveness (especially for climate-proofing infrastructure). Under this scenario, the average annual GDP growth rate would go from 6.6% to 6.8%.

¹ RCP 4.5 scenario, 5th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), corresponding to a mean increase in temperature of 1.8°C by 2100.