Coalition for Rainforest Nations

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# A national strategy for adaptation to climate change

## Volume 3 on climate-compatible development

Confidential

# Adaptation as a component of climate-compatible development

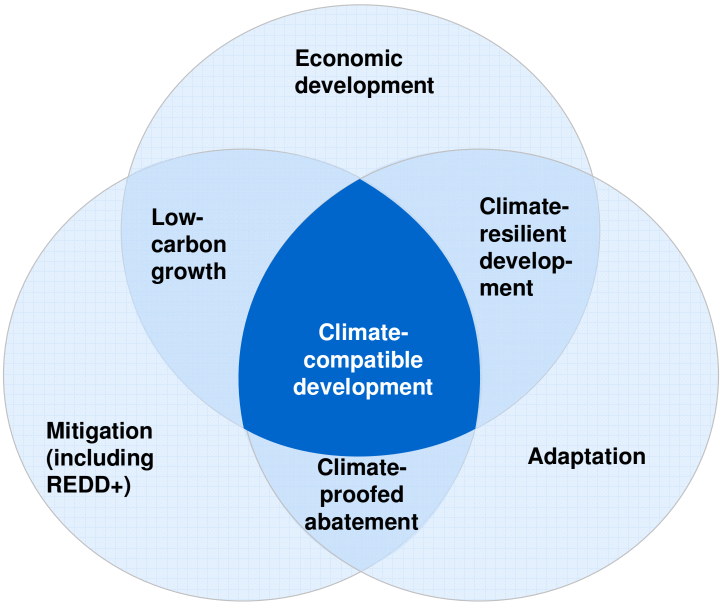
**Political and business leaders worldwide realise the need for immediate and effective action to respond to climate change.** This action may include policies to reduce greenhouse gas emissions, to curtail deforestation or to promote afforestation and other carbon sink policies. Most countries will also face enhanced risks from climate change and must adapt their societies to respond.

**At the same time, leaders have an obligation to promote economic development and improve living standards for their constituencies.** Achieving the country's and its peoples' development goals requires significant funds and binds a large share of government capacity. Climate change mitigation and adaptation compete for scarce resources and thus risk being de-prioritised if viewed as conflicting goals.

**Countries must therefore find ways of combining their development, mitigation and adaptation goals to achieve climate-compatible development (Exhibit 1).**

### Exhibit 1

**The components of climate-compatible development**



- **Economic development** means expanding opportunities to increase incomes and create jobs, ultimately leading to a better life for a country's people. This process cannot be separated from the risks and opportunities presented by climate change. The resources provided by REDD+ or other mitigation action can be invested in more efficient and sustainable technologies (e.g., in power and transport). Economies of lower-income countries are also likely to be among the hardest hit by climate change and therefore need to be made climate-proof.
- **Climate change mitigation** means taking measures to reduce emissions of greenhouse gases at the lowest possible cost. Previous work by McKinsey on this topic concluded that there is enormous potential for abatement at relatively low cost in all sectors, including energy efficiency in transport, industry and buildings; low-carbon energy sources; more efficient land use and the use of carbon sinks.[1] For rainforest countries for example, schemes for promoting Reduced Emissions from Deforestation and Forest Degradation (REDD+) enable them to be rewarded for protecting their forest.
- **Adaptation to climate change.** Many countries are already vulnerable to climate events like floods, droughts, heat waves and tropical storms. Furthermore, gradual climate change can, for example, introduce malaria to new areas and cause irreversible damage to coral reefs. Climate change could significantly aggravate these climatic risks in the medium term, even if mitigation is pushed aggressively. Adaptation measures therefore need to complement mitigation action, to protect people and local economies from the negative effects of increasing climatic risks.

**This white paper describes a methodology to address climate risk in more detail,** using a systematic approach to adaptation developed by the Economics of Climate Adaptation (ECA) working group. The paper *Developing a Low-Carbon Growth Plan* describes a framework for combining economic development with greenhouse gas mitigation**,** particularly on decarbonising development outside of the land use sectors. The paper *Developing a National REDD+ Strategy* details how to develop a plan to reduce emissions associated with land-use, land-use change and forestry.

1 McKinsey & Company (2009): *Pathways to a Low-Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve*

# The importance of adapting to climate change

**The climate poses significant risks to economies already.** Over the past 50 years, severe weather disasters have claimed some 800,000 deaths and cost over a trillion dollars in economic losses; and in the present decade, the damage wrought by such disasters has reached record levels. Developing countries have shouldered a disproportionate share of this burden. Continued economic and population growth could further expose local economies to climatic risks.

**Climate change could significantly increase those risks** and impose significant incremental losses on local economies. Case studies developed by the ECA working group report a cost of 19 percent of GDP annually by 2030, while the World Bank's *Economic of Adaptation to Climate Change* study suggests it will cost USD 75–100 billion globally per year to adapt to climate change from 2010–2050. Indirect effects compound this financial burden, such as the displacement of communities and loss of precious ecosystems. Climate change plays havoc on local economies in two ways:

- **Event hazards,** such as extreme weather events like storms, hurricanes, droughts, coastal or inland flooding and bushfires
- **Gradual shift hazards** have consequences of climate change that take shape gradually over time, such as sea level rise and salinisation, and a wide range of consequences, e.g., climate zone shifts can increase vector-borne disease transmission and alter agricultural yields.

**Mitigation is a significant challenge and opportunity, but will take decades to achieve success.** While effective mitigation measures are unavoidable to curb climate change in the long run, the models in the IPCC's (Intergovernmental Panel on Climate Change) Fourth Assessment Report (AR4) show that global warming to 2030 will be little influenced by the level of greenhouse gas emissions in the next 20 years, due to lags in the climate system. Hence, in addition to developing mitigation measures and paths towards low-carbon growth, policymakers need to adopt adaptation measures to protect their people and economies from the negative effects of increasing climatic risks in the medium term.

**This white paper lays out a systematic approach to adaptation;** it provides decision makers with a comprehensive end-to-end process to develop a robust, fact based business case for adaptation in the highly uncertain context of climate change. To achieve this, this practical methodology uses a modular approach to systematically a) put a price tag (both in economic and human terms) on the overall climate risk of today and the future to help prioritise the most urgent problems, b) identify and prioritise an actionable portfolio of adaptation measures and c) create a roadmap to implementation and an investment plan. The methodology is uniformly applicable across all countries, sectors and hazard types, even given limited availability of historical data. The implication for decision makers is that it is possible to undertake a focused, solutions-oriented climate risk assessment in a short time.

**The approach was developed by the ECA working group,** a consortium of major global non-governmental organisations (ClimateWorks Foundation, Rockefeller Foundation), public sector (the European Commission, the Global Environment Facility) and private sector organisations (Swiss Re, Standard Chartered Bank, McKinsey & Company). In addition to developing a methodology, the working group built practical experience through on-the-ground application in eight test cases, in which over 600 adaptation measures were tested with experts. Since publication, the methodology has been applied successfully in other countries.

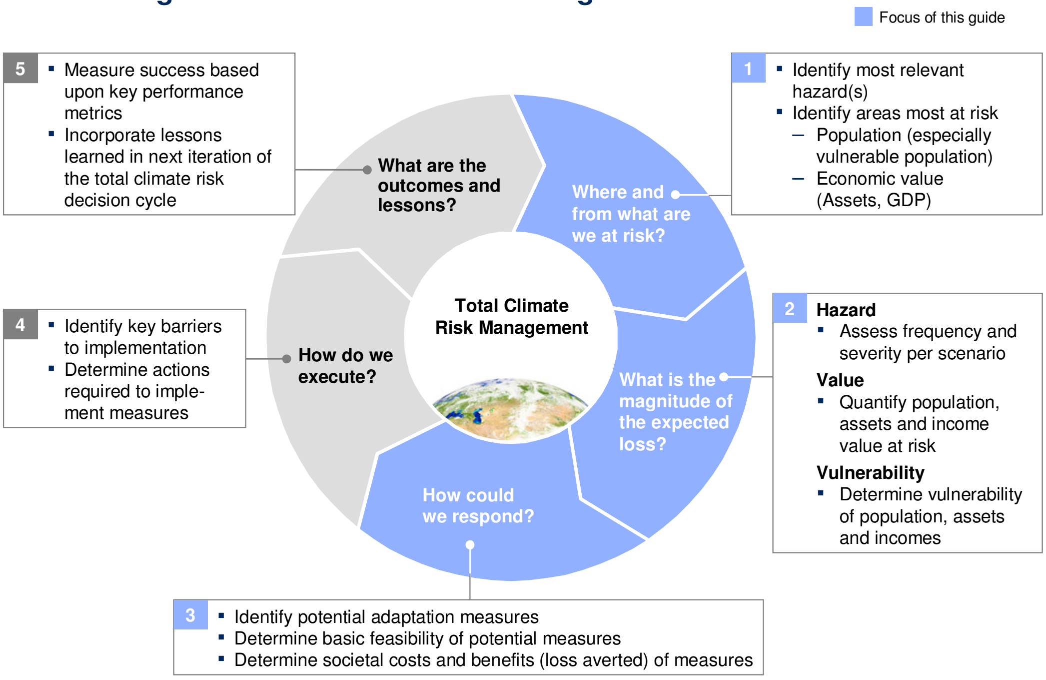
# A systematic framework for climate adaptation

The ECA working group used its collective experience and interactions with decision makers to identify two core beliefs about an effective climate-adaptation framework:

- **Decision makers should be able to address total climate risk,** both current risk and additional future risk triggered by climate change. Local decision makers must be able to assess the total losses they are likely to face in the future, in order to avert them selectively and effectively. In response, the working group developed a framework that puts a price tag on all climatic hazards across economic sectors and incorporated scenario planning to account for uncertainty in climate change and economic development.
- **Decision makers should be able to integrate adaptation with economic development** to enable decision makers to reach development goals, while accounting for current and future risks. In response, the working group focused on developing a comprehensive inventory of adaptation measures, spanning both climate adaptation and economic development. This is particularly relevant for countries undergoing or planning rapid economic development and the investment in infrastructure this entails. Local adaptation measures are then identified in a two-step process: first, a long list of measures is assessed qualitatively along various criteria (e.g., technical feasibility) and second, short-listed measures are selected based on a cost-benefit analysis.

## Exhibit 2

### Our thinking about total climate risk management




SOURCE: Economics of Climate Adaptation

The framework derived from these two principles (Exhibit 2) poses five questions, each driving a core set of analyses:

1. **Where and from what are we at risk**? Identify the most relevant hazards as well as the areas of the country, region or city that are most at risk by an overlay of the spatial distribution of population and economic value.
2. **What is the magnitude of the expected loss?** Determine what value and/or population is at stake from the risk – today and in the future – under different scenarios for climate change and economic development.
3. **How could we respond?** Build a balanced portfolio of risk mitigation and risk transfer measures based on detailed cost–benefit and loss aversion assessments.
4. **How do we execute?** Develop a holistic climate risk strategy to overcome barriers and launch fully-funded adaptation initiatives.
5. **What are the outcomes and lessons?** Measure success and conduct the risk management process periodically, adjusting strategies as climate scenarios change.

The next section outlines a detailed analytical approach to conduct the first three steps of the framework.

# A detailed approach and key success factors

## STEP 1: WHERE AND FROM WHAT IS THE COUNTRY MOST AT RISK?

Three groups of analyses need to be performed:

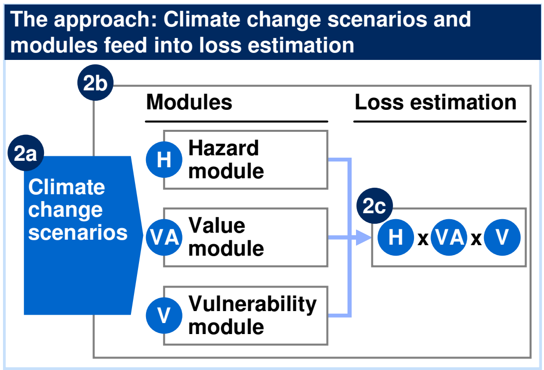
- **Step 1a – Prioritise the key hazards.** Develop a working hypotheses on the relative importance of climate hazards based on discussions with local experts (e.g., from a national disaster centre or meteorological institute) and the available historical hazard data from global databases. Validate these initial hypotheses with local stakeholders and the scientific community. In parallel, refine the estimates of frequency and magnitude of hazards based on local literature and specialised data sources. After a series of rapid iterations, prioritise the key hazards for analysis based on an agreed set of criteria. While the impact of a hazard is typically the main selection criterion, other, often situation-specific criteria could be included. Due to their geographic context, significant hazards to developing countries typically include inland flooding and climate zone shift.
- **Step 1b – Identify the geographic area of focus.** Once the main hazards are identified, the geographic areas of focus pose a design choice. Two general approaches are available: a) estimate the losses for the entire in-scope geographic area or b) limit the in-depth analysis to a specific hot spot, where

a significant amount of the hazard risk is concentrated, and scale up the results to the in-scope geography through extrapolation. Resource scarcity often drives the decision for the latter approach. Geographic hot spots are typically selected based on their historical exposure to the selected hazard, as well as on the size of their economic assets and population at risk.

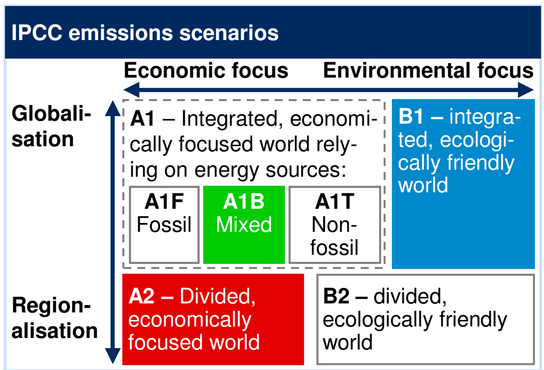
- **Step 1c – Determine the timeframe.** The period from today to 2030 is frequently used as a timeframe for climate change adaptation for two reasons: 1) the effects of climate change by 2030 become significant, with the 2007 IPCC (AR4) Global Circulation Models (GCM) projecting a mean global temperature increase of approximately 0.8 degrees Celsius across scenarios versus 1990 and 2) although far into the future, it is still within the policy window relevant to decision makers. The year 2050 is often used instead or as an extension of the initial analysis done for 2030.

## STEP 2: WHAT IS THE MAGNITUDE OF THE EXPECTED LOSS?

In this step, the expected loss of assets and the affected population is calculated under one or more scenarios for climate change and economic development. The simple, yet rigorous, approach can be applied to all hazard types and consists of three steps. First, climate change scenarios are developed. Second, the three modules feeding into the loss estimation are independently modelled. Third, the expected loss is calculated and decomposed into its contributing factors – economic development and climate change.




- **Step 2a – Develop local climate change scenarios.** A good understanding of local climate change effects is a critical input for the expected loss estimation. Furthermore, climate change can vary widely geographically. For example, Morocco is expected to experience a temperature increase of 30 percent above the global average, while that same figure is -20 percent for New Zealand. A scenario approach is best, given the uncertain nature of climate change. The IPCC emission scenarios provide a good, scientifically accepted basis, and the GCMs offer a forecast for any location and for several climatic indicators including temperature increase, precipitation change and sea level rise. Unless a specific GCM is preferred for a given geographic location, practitioners tend to work with a consensus model. Local down-scaling models are an excellent supplement, providing an additional level of detail of the effect of climate change in a local geography.



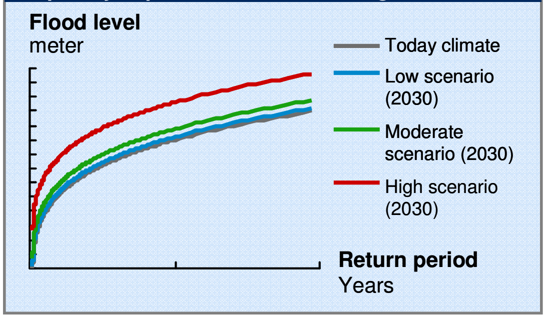

- **Step 2b – Hazard assessment, value of assets and vulnerability** modules feed into the estimation of the expected loss. As an illustration, the modules for a coastal flooding hazard are presented below:
  - ***Hazard Module.*** Climate change affects the severity and/or the frequency of natural hazards. To understand the effect of climate change, each hazard needs to be decomposed into its main drivers. Subsequently, the effect of each of the climate change conditions (i.e., temperature, precipitation, sea level) on the hazard drivers is analysed under different

scenarios of climate change. For example, global warming results in a rising sea level and as such worsens the severity of coastal flooding. A wide array of sources, such as academic research, experts and the local disaster centre, can be consulted to build accurate relationships.

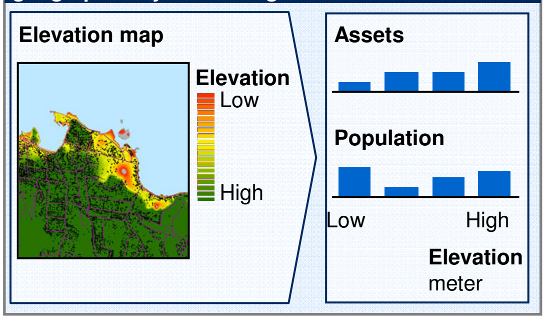
- ***Value Module.*** To understand the effect of a worsening hazard, the assets, sources of livelihood and population are mapped in detail. The resolution required depends on the hazard type – localised hazards, such as flooding, require high-resolution mapping since the reach of the hazard depends strongly on local topographic conditions, primarily elevation. High-resolution, local datasets (e.g., GIS data, census results, housing registry) containing detailed location-based information on assets and population are supplemented with global geographic databases. For other hazards, such as wind and temperature-induced hazards, the location of damage is typically less sensitive to exact topographic conditions – low-resolution mapping suffices. The following sources of value are typically included:
  - **Assets** are categorised by type and economic value. Commonly used asset types are: houses, commercial assets and public infrastructure assets. Local information is used to determine an approximate value of these assets, such as local property tax data, corporate taxation ledgers and reports of public institutions and utilities.

## Case example: coastal flooding

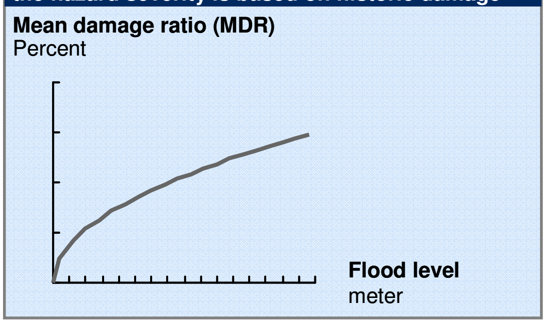
**Hazard module – impact on hazard severity and frequency depends on climate change scenario**




**Value module – assets and population are mapped geographically on risk region**



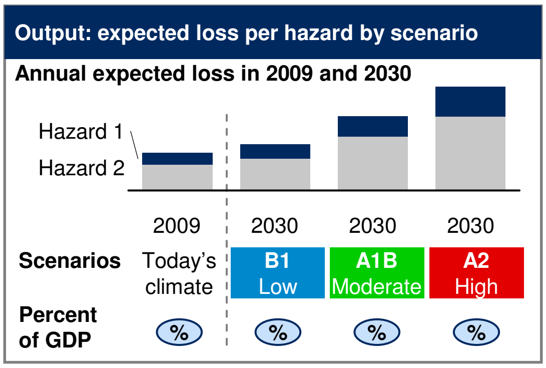

**Vulnerability module – vulnerability of assets to the hazard severity is based on historic damage**

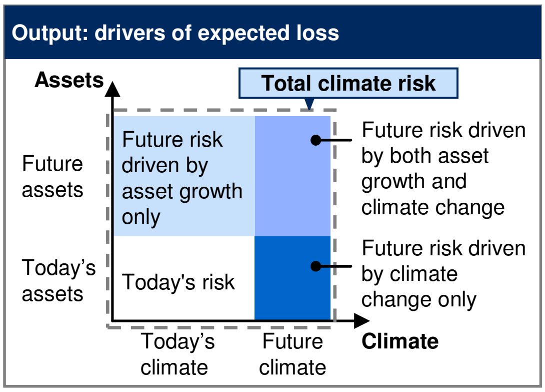


- **Livelihood** comprises the everyday sources of income of the local population, such as personal income and business revenue. Personal income taxation data as well as local company reporting can be used to attribute a value to a location.
- **Population affected** reflects the effect of the hazard on human suffering, but does not attach a dollar value. Typically, adaptation also looks at the susceptibility of specific communities.

- ***Vulnerability Module.*** The vulnerability of assets, livelihood and population to the hazard is determined using vulnerability curves. They define the percentage of value damaged by hazards for a given severity. The vulnerability curves are derived from observed historical damage as well as expert input. Their shape strongly depends on the hazard type – for example, in the case of flooding, vulnerability increases exponentially, so that a small level of flooding immediately results in a substantial portion of assets lost.

- **Step 2c – Quantify future expected loss.** Combining these three modules results in an estimate of the future expected loss under different scenarios of climate change and economic development. The output is two insightful lenses on the price tag of climate change:
  - Total expected loss today and for different climate change scenarios in the future.
  - Total expected loss for a given climate change scenario, broken down by its drivers of climate change and economic development.



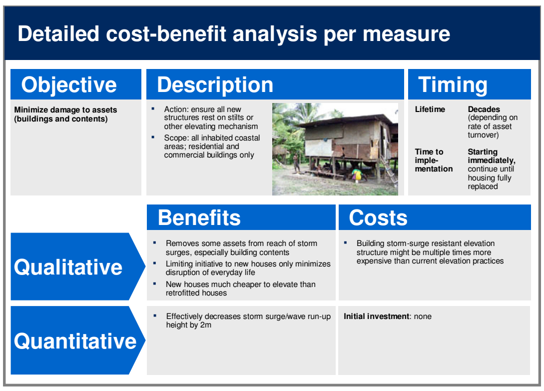
## STEP 3: WHAT MEASURES SHOULD BE CONSIDERED?

Having a granular understanding of the price tags of climate risk allows a decision maker to define an aspiration, often driven by local policy goals, for the desired exposure to hazard losses in the future. Typically, they aspire to either limit future losses to today's levels or allow for a higher level to account for economic development. Step 3 describes a five-step analysis to help decision makers develop a cost-effective portfolio of measures to achieve the aspiration:

- **Step 3a – Develop an exhaustive long list of measures,** including risk mitigation and risk transfer measures (e.g., flood insurance). Risk mitigation measures comprise infrastructure or asset based responses, technological responses and systemic or behavioural responses. Good sources for a long list of measures include the ECA case studies that tested over 600 measures, the *National Adaptation Programs of Action* of the UNFCCC and local and academic experts.

- **Step 3b – Short-list the most promising measures by screening** the long list against basic feasibility criteria. Typically, this includes an evaluation of technological feasibility, engineering complexity, cultural fit and appropriateness for local setting. In addition, filters such as regulatory fit, institutional capability and budget constraints could also be used. Two practical examples illustrate the filtering process: 1) while drainage of riverbanks and swamps has been an effective measure against malaria in Singapore and Germany, in a country covered in dense rainforests with a scattered population, a rugged landscape and multiple rivers, drainage is technically infeasible. Similarly, 2) if a coastal economy depends heavily on shipping, planting mangroves as a buffer against coastal flooding is inappropriate. The overall assessment is qualitative in nature, but should be informed by consultation with global and local experts, literature and other stakeholders.

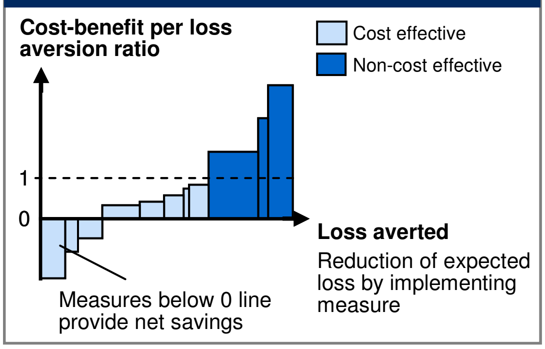
- **Step 3c – Map detailed cost–benefit analyses for shortlisted measures**. As decision makers need to optimise the use of resources under their control, cost-effectiveness is a selection criterion for implementation. A cost-benefit analysis compares the societal costs of a measure to its benefit. Specifically, this calculation requires the following inputs:



- ***Societal cost***—should include capital expenditures to erect the measure, as well as operating costs net of any savings the measure could create indirectly. The calculation of costs often requires a pragmatic bottom-up approach as comprehensive cost estimates are not available. For example, the costs of home-installed water catchments should include the costs of roofing upgrades, a storage tank, labour and maintenance.
- ***Benefit***— is defined as the value of the annually expected loss averted. Measures can affect the expected loss by reducing the hazard frequency and/or severity, reducing the value at risk or reducing the vulnerability.
- ***Discount rate***—is used to convert the future cost and benefit values back into today's dollars for a fair comparison. An appropriate benchmark rate for decisions on infrastructure is often the government's discount rate. As the cost–benefit ratio is typically highly sensitive to the choice of the discount rate, practitioners often use a range and/or apply a sensitivity analysis to the final outcome.

- **Step 3d – Develop a cost–benefit curve with all shortlisted counter measures.** Plot each measure for a given hazard according to its cost-benefit ratio and averted loss. The x-axis (loss averted) shows how much loss can be averted by the measure. The y-axis (cost-benefit) shows how cost-effective a measure is.

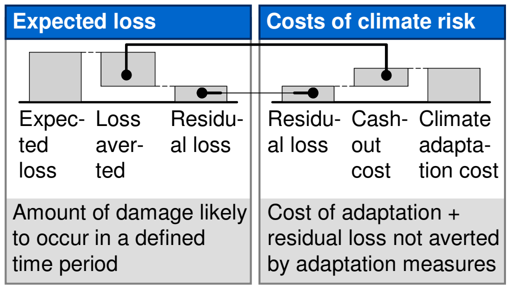
**Cost-benefit curve of adaptation measures**




  - Cost-benefit ratio less than zero: The measure pays for itself and creates additional economic value.
  - Cost-benefit ratio less than one: The measure is cost effective because the loss averted is higher than the societal costs. Experience from the ECA case studies suggests cost-effective measures cover about 40–65 percent of expected losses.
  - Cost-benefit ratio greater than one: Although the measure is not attractive based on a risk-neutral, purely economic rationale, it may be attractive to a decision-maker based on his aversion to risk. For example, a decision maker may set a threshold on the damage he is willing to accept, far beyond what can be done cost-effectively.

- **Step 3e – Develop a portfolio of adaptation measures.** The cost curve empowers decision makers with a flexible tool that can be tailored to specific local requirements. It can be used to 1) help develop an aspiration for the

**Cost-beneficial adaptation measures reduce the cost of climate risk**




desired exposure, 2) assess how much expected loss can be averted cost-effectively and 3) understand the amount of funding required. Decision makers should ensure that the portfolio addresses a location's full range of climate risks – both frequent and infrequent ones. Losses that cannot be averted cost-effectively can either be averted by non-cost-effective measures or stay uncovered. Risks with a high severity and low frequency can often not be covered cost effectively, but are ideal candidates for risk transfer measures, such as insurance.

## KEY SUCCESS FACTORS

Based on experience, we find this approach works best under the following conditions:

- **A robust basis of scientific data and economic analysis backed by a network of expert-stakeholders.** Adaptation work is scientific in nature, and this approach derives its strength from building on a largely-existing backbone of knowledge and applying it to climate change adaptation. Therefore, the close involvement of experts is necessary to guide that process and make it successful.

- **Ongoing iterations with stakeholders to build consensus around priority initiatives.** This hypothesis-driven problem-solving approach requires an iterative process with stakeholders to keep parties aligned along all steps. Failure to keep stakeholders on board may result in a lack of consensus on priority initiatives, possibly for reasons related not to the initiatives, but rather to hazard selection or expected loss estimation.

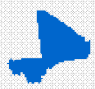
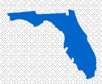
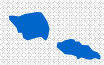
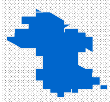
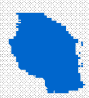
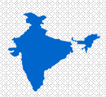
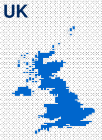
- **Active support of senior leadership from within government, especially in the treasury and the ministry responsible for environment.** The implications of adaptation – significant investments in infrastructure and technology and campaigns driving behavioural change – require broad support on a governmental level. More importantly, while adaptation measures often cut across several ministries, the treasury and ministry for environment typically take the lead to attain the necessary cooperation for successful implementation.

## ILLUSTRATIVE CASE STUDIES

Exhibit 3 provides eight mini-case studies of the practical application of the ECA approach explained in this document.

### Exhibit 3

**Economics of Climate Adaptation case studies in eight countries**

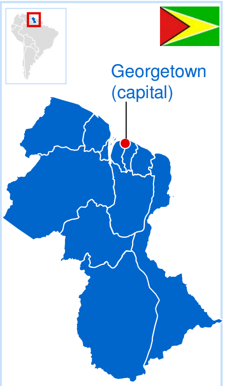
| | | | | | |
|---|---|---|---|---|---|
| **China** |  | North and North-East China, producing 25% of China's crop, will increasingly suffer **droughts**. Agricultural yield loss was estimated at 4.9 to 6.3% by 2030. Cost-effective adaptation measures could avert 50% of this and agricultural insurance, promoted by the government, another 10% | **Mali** |  | Mali is experiencing a **climate zone shift**, with precipitation and temperature gradually changing. The working team estimated the effects on biomass and livestock yield in collaboration with international research institutions such as IFPRI, ILRI. New cash crops can avert the majority of the loss |
| **Florida** |  | Florida has been hit by 30 **hurricanes** in the past 14 years. The working team had access to a rich database of 100-year historic storm data and use this, geographic asset distribution and complex vulnerability models to identify cost-efficient measures averting 40% of expected loss by 2030 | **Samoa** |  | About 70% of Samoan villages are located on the coast, making the country vulnerable to **coastal flooding and salinization**. Loss from a recent cyclone amounted to 37% of GDP. Rather than focusing on a 'hotspot', the team mapped and valued assets country-wide. Four cost-efficient adaptation measures can avert ~50% of the expected loss by 2030 |
| **Guyana** |  | Guyana has been historically prone to **inland flooding**, with the capital residing on a low-gradient river bank and partly below sea level. The first ever GIS flood map for Georgetown was constructed using more than 10 local databases. It is serving as a planning tool and to identify measures to reduce loss by 50% | **Tanzania** |  | Tanzania has been hit by six major **droughts** in the past 30 years – while GCMs predict increasing rainfall, a closer investigation suggested the Central Region would become drier. In conjunction with local medical experts and NGOs, the 2030 transmission rate was modeled for five drought-induced diseases, and measures identified to reduce it |
| **India** |  | People in **drought**-prone Maharashtra depend on agricultural yields for survival. The team used 30 year production and rainfall data to estimate future crop production, working with local and national scientists, and farmers. Cost-efficient measures avert ~50% of the loss in 2030 and weather-based index insurance for another 30% | **UK** |  | The city of Hull, UK is vulnerable to multiple hazards: **wind storms, inland and coastal flooding**. The summer 2007 flooding reaffirmed this, destroying $300m of assets. Coastal flooding makes up the majority (70%) of expected loss by 2030; the measures identified to deal with this will also generate savings from averting inland flooding |

While the methodology has been developed in great detail, the local context often requires a pragmatic approach to be successful in a short timeframe. Exhibit 4 illustrates the practical considerations the working group faced during the first three steps of the ECA case study for Guyana.

## Exhibit 4

### Practical application of the ECA methodology: Guyana case study

**Guyana**




- **Location:** North coast of South America
- **Climate:** Tropical
- **Population:** 772,000
- **GDP:** USD 3.1 billion
- **GDP per capita:** USD 4,000

**Practical considerations faced by the Working Group (WG)**

**1 Where and from what are we at risk?**

- While coastal flooding is a major hazard, WG selected inland flooding for analysis:
  - Historic analysis and local experts rated inland flooding and coastal flooding as jointly the most destructive hazards in the last 20 years
  - However, inland flooding is likely to become more detrimental because rainfall is expected to increase significantly, whereas local sea level rises are likely to be limited
- WG decided to focus geographically on Georgetown, because it comprises ~40% of population and GDP, has had 5 major floods in the last 20 years, is close to a large low-gradient river system and much of it is below sea level

**2 What is the magnitude of the expected loss?**

- WG developed a local consensus model from the 20 IPCC GCMs for different GHG scenarios, in order to have the best-available local climate change estimates
- After consultation with local and global experts WG decided to assume a linear relationship between precipitation change and inland flood severity
- In absence of a comprehensive GIS mapping (assets, population, granular elevation) on Georgetown, WG combined 10 different data sources to develop its own advanced GIS tool

**3 How could we respond?**

- WG developed a bottom-up estimate of the annual maintenance costs for a drainage system in Georgetown through interviews with local technical experts
- Estimates for loss aversion were not readily available because the adaptation measures for Georgetown (drainage improvements, building code adaptations) are unusual, so WG conducted expert workshops to modify vulnerability curves and hazard exposure
- Despite an immature local risk transfer / insurance market, WG convened an insurance roundtable with the Commissioner for Insurance to develop suitable options to reduce the expected loss through risk transfer

* * *

We hope this white paper is useful to decision makers in developing countries that aspire to increase the climate resilience of their countries and economies.

**Glossary**

| | |
|---|---|
| ACT | : Artemisinin based Combination Therapy |
| ADB | : Asian Development Bank |
| A/R | : Afforestation/Reforestation |
| BAU | : Business As Usual |
| CAGR | : Compound Annual Growth Rate |
| CCS | : Carbon Capture and Sequestration |
| CCD | : Climate-Compatible Development |
| CfRN | : Coalition for Rainforest Nations |
| $CO_2e$ | : Carbon dioxide equivalent |
| CPO | : Crude Palm Oil |
| DRC | : Democratic Republic of the Congo |
| DDT | : Dichloro-Diphenyl-Trichloroethane |
| EACC | : The Economics of Adaptation to Climate Change (report by World Bank) |
| ECA | : Economics of Climate Adaptation |
| ENSO | : El Niño-Southern Oscillation |
| EVN | : Economic Value to the Nation |
| FAO | : Food and Agricultural Organization of the United Nations |
| GCM | : General Circulation Models |
| GDP | : Gross Domestic Product |
| GHG | : Greenhouse Gas |
| GIS | : Geographic Information System |
| ICRAF | : The International Centre for Research in Agro-Forestry |
| ICE | : Internal Combustion Engine |
| IFC | : International Finance Corporation |

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| IFPRI | : Institute for Food Policy Research |
| IPCC | : Intergovernmental Panel on Climate Change |
| IRR | : Internal Rate of Return |
| IRS | : Indoor Residual Spraying |
| ITTO | : International Timber Trade Organization |
| IWG-IFR | : Informal Working Group on the Interim Finance for REDD |
| LDV | : Light Duty Vehicle |
| LLINs | : Long-Lasting-Insecticide-treated bed-Nets |
| LNG | : Liquefied Natural Gas |
| LUCF | : Land-Use Change and Forestry |
| LULUCF | : Land Use, Land-Use Change and Forestry |
| MDV | : Medium Duty Vehicle |
| Mt | : Million (metric) tonnes |
| MPI-BGC | : The Max Planck Institute for BioGeoChemistry |
| MRV | : Monitoring, Reporting and Verification |
| NSO | : National Statistical Office |
| NPV | : Net Present Value |
| PPP | : Purchasing Power Parity |
| PV | : Present Value |
| REDD | : Reducing Emission from Deforestation and Forest Degradation |
| REDD+ | : Reducing Emission from Deforestation and Forest Degradation and Enhancement of Carbon Stocks |
| RIL | : Reduced Impact Logging |
| Solar PV | : Solar Photo Voltaic |
| SFM | : Sustainable Forest Management |
| UNFCCC | : United Nations Framework Convention on Climate Change |
| WHRC | : Woods Hole Research Center |