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InsuResilience
Solutions Fund

IDF Insurance Development Forum

Understanding Climate Risks

What does it mean for San Salvador?

funded by KFW

on behalf of Federal Ministry for Economic Cooperation and Development

managed by Frankfurt School of Finance & Management
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Executive Summary

The need for climate adaptation and risk management is most pressing in low-income countries. Without rapid action climate risks will threaten development gains already achieved and affect future economic growth potential.

Climate risk modeling and analysis can provide decision-makers with the information they need to turn policies into action. These tools are already available today and can be implemented globally enabling decision makers to answer the most pressing questions they are facing today.

Results of a San Salvador case study illustrate climate risk analysis as essential instrument of comprehensive climate risk management:

- 25% of potential damages from flooding could be prevented by implementing the two most cost-effective physical adaptation measures.
- Climate risk insurance sends a strong price signal. Risk reduction by implementing the identified adaptation measures can lower the insurance premium by 35%, thus giving a strong incentive to turn adaptation policies into action.
- Additionally climate risk insurance represents an effective measure to cap future losses and provide much needed funds for post-disaster relief.

The case study reveals the complementarity of risk prevention and risk reduction. Physical adaptation investments are key to adapt to climate change. However, not all risks can be avoided. Additional financial adaptation measures such as climate risk insurance offer an effective instrument for climate risk management.

Climate risk insurance thus ensures a triple bottom line:

1 Helps to understand climate risk:

Robust climate risk analysis and models – as integral elements in the development of needs-based climate risk insurance products - help to assess the main hazards as well as to identify the assets and sectors most affected.

2 Incentivizes implementation of climate policy:

Climate risk insurance puts a price on climate risk. This incentivizes physical adaptation measures that reduce risks and thus lower insurance premium.

3 Leverages private capital for climate financing:

Climate risk insurance ensures rapid financial relief through insurance payouts mitigating the negative impacts of climate change and helping to cope with natural disasters.

The Economics of Climate Adaptation in San Salvador

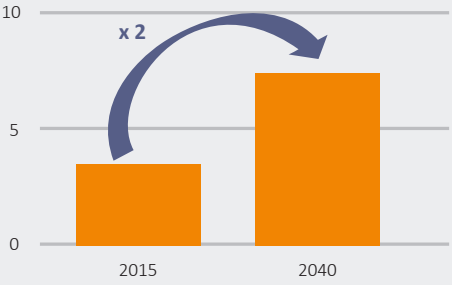
The need for climate adaptation and risk management is most pressing in low-income countries. Over the last 20 years climate-related disaster losses were four times higher for low income countries than for high-income countries[1]. Without appropriate risk reduction and adaptation measures the income of low-income countries is projected to be 9% lower by the end of the century than today even under a moderate climate change scenario[2]. Ranking among the top ten countries affected by natural disasters worldwide, El Salvador is in critical need to adapt and manage climate risks already today[3].

Applied to San Salvador[4], climate risk modeling and analysis provides an essential instrument for comprehensive climate risk management. The case study enables political decision makers to answer the most urgent questions regarding future climate risks:

1 What are the climate-related risks of San Salvador today and how will expected losses change due to climate change and economic development over the coming decades?

Being exposed to severe risks of flooding the area around the Acelhuate river in San Salvador[5] alone is facing average economic losses of more than 3.5 million USD each year. Worse still, by 2040 economic development and climate change could more than double annual expected damage to 7.4 million USD[6].

Expected annual losses due to floods
(2015 in million USD)



[1] CRED and UNISDR, 2018: Economic Losses, Poverty & Disasters 1998–2017. Brussels: CRED; Geneva: UNISDR. www.unisdr.org/files/61119_credeconomiclosses.pdf, p.16.

[2] IMF, 2017: Seeking Sustainable Growth: Short-Term Recovery, Long-Term Challenges. World Economic Outlook Report. Washington, DC.

[3] See footnote 1.

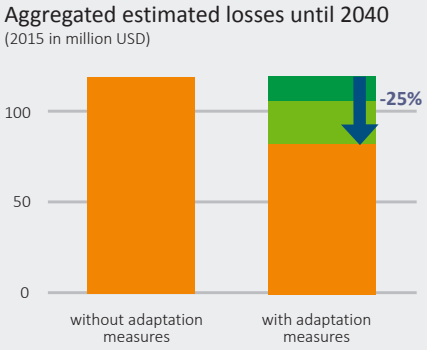
[4] Wieneke, F., & Bresch, D. N., 2016: Economics of Climate Adaptation (ECA) in Development Cooperation: A Climate Risk Assessment Approach- Supporting decision making on climate change adaptation measures, UNU, KfW. https://www.kfw-entwicklungsbank.de/PDF/Download-Center/Materialien/2016_No5_Economics-of-Adaptation_ EN.pdf.

[5] Numbers are based on 44% of the total assets studied in the ECA for ease of presentation. Results do not substantially differ for the whole study area.

[6] https://nbviewer.jupyter.org/github/CLIMADA-project/climada_python/blob/master/script/applications/eca_san_salvador/San_Salvador_Adaptation.ipynb.

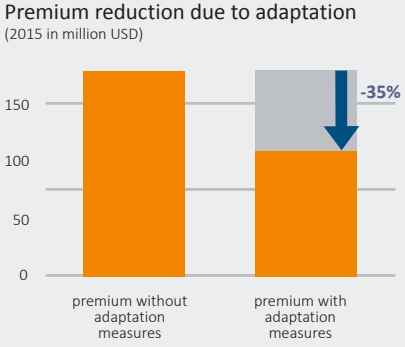
2 What actions can San Salvador take to prevent and mitigate these risks as well as reduce financial losses?

Until 2040 more than 27 million USD[7] of potential losses from flooding could be prevented by implementing the top two most cost-effective physical adaptation measures in residential housing[8]. Climate risk insurance can cover remaining future expected losses and transfers residual risks. Rapid insurance payouts of up to 22 million USD after a severe event provide financial support and liquidity to fund relief measures and swift rebuilding of infrastructure, homes and businesses.



3 Which of these actions are most (cost) effective?

Detailed risk analysis quantifies the impact of adaptation measures on risk reduction: if the two identified physical adaptation measures are implemented consistently, insurance premiums can be reduced by 35%. Consequently climate risk insurance is sending a strong price signal to turn adaptation policies into action.



The case study San Salvador illustrates the triple bottom line of climate risk insurance as it …

- supports the definition of a climate strategy,
- incentivizes the implementation of climate policy, and
- leverages private capital for climate adaptation.

Mainstreaming climate risk analysis using open-source platforms like CLIMADA and OASIS therefore promote cost-effective adaptation measures and spur decisive action.

[7] Ibid (NPV- discounted back to today's dollars using local discount rate).
[8] Avoid drainage during floods and water saving facilities in households.

CLIMADA + OASIS - open-source platforms for probabilistic risk modelling and options-appraisal

CLIMADA[9] provides globally consistent multi-hazard risk assessments on scales from country to local study regions. Using probabilistic modelling allows to estimate the expected economic damage as a measure of risk today, the incremental increase from economic growth and the further incremental increase due to climate change. The Economics of Climate Adaptation (ECA) methodology[10] as implemented in CLIMADA provides decision makers with a fact base to understand the impact of weather and climate on their economies, including cost/benefit perspectives on specific risk reduction measures.

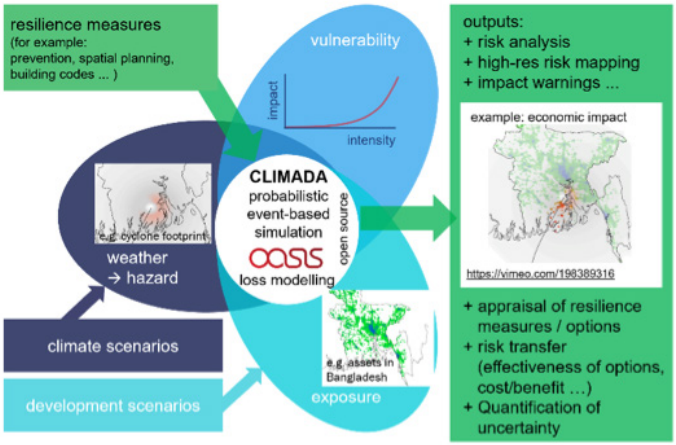


Figure 1.
In essence, CLIMADA implements the concept of risk as in IPCC (2014). CLIMADA combines hazard (e.g. a tropical cyclone wind footprint, leftmost inset), exposure (e.g. an asset distribution, centre bottom inset), and vulnerability (functional relationship between hazard intensity and impact, centre at the top) to calculate risk.

The **OASIS** LMF loss simulation module is used for financial calculations and to simulate the impact of re/insurance on losses sustained by the risk bearer[11].

[9] CLIMADA is developed at ETH Zurich, free to use, see https://github.com/CLIMADA-project/climada_python (incl. full documentation) and Aznar-Siguan, G. and Bresch, D. N., 2019: CLIMADA v1: a global weather and climate risk assessment platform, Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-12-3085-2019.

[10] Souvignet, M., Wieneke, F., Müller, L., and Bresch, D. N., 2016: Economics of Climate Adaptation (ECA)- Guidebook for Practitioners. Materials on Development Financing, UNU, KfW. https://www.kfw-entwicklungsbank.de/PDF/Download-Center/Materialien/2016_No6_Guidebook_Economics-of-Climate-Adaptation_EN.pdf.

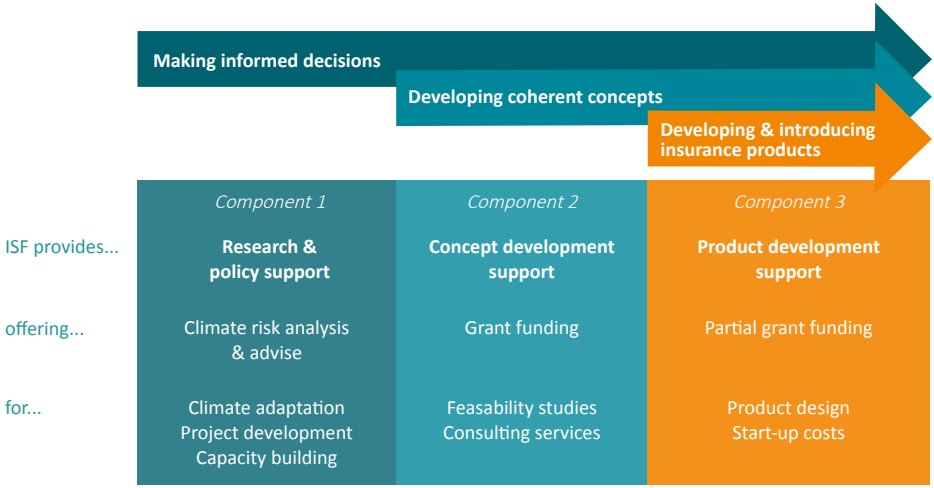
[11] The Oasis Loss Modelling Framework is an open source catastrophe modelling platform, free to use by anyone https://oasislmf.github.io/.

InsuResilience Solutions Fund

Transforming strategies into insurance products

The InsuResilience Solutions Fund (ISF) is funded by the German Development Bank (KfW) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). Managed by Frankfurt School of Finance and Management the ISF is a pivotal delivery channel of the InsuResilience Global Partnership, a joint initiative of the G20 and V20 to increase resilience amongst the most poor and vulnerable people. The ISF supports innovative climate risk insurance solutions to mitigate the negative impacts of climate change.

It offers demand-oriented and data based climate risk research and advisory on the ground. This enables the financing of comprehensive climate risk analyses such as Economics of Climate Adaptation Studies for selected geographical areas. To promote the implementation of new concepts and approaches of climate risk insurance into concrete insurance products, the ISF also supports the development and introduction of needs-based climate risk insurance products for households and businesses as well as for governments by co-financing product development costs.



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