Climate Adaptation

Powered by CLIMADA

UNIVERSITY

UNU-EHS

Institute for Environment and Human Security

MCII

Climate Adaptation from Space

Making Decisions: from Knowledge to Action

25.05.2022

Economics of Climate Adaptation

1. How do satellite imagery and remote sensing inform iterative and sustainable adaptation and risk management?

2. What tools and initiatives are available to manage risks and what can be further done for decision-makers in the most vulnerable regions to access state-of-the-art technologies?

3. How can earth observation technologies help to localize climate action and public finance for the most vulnerable?

Questions faced by decision-makers:

What is the risk exposure of different assets?

What measures can be done to reduce the exposure?

How to finance these measures, which one are cost-efficient?

Economics of Climate Adaptation

initiated by Swiss Re

ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

first „real life“ project by KFW

Recent ECA Studies

UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security

A project implemented on behalf InsuResilience Solutions Fund

managed by Frankfurt School of Finance & Management

funded by KFW

on behalf Federal Ministry for Economic Cooperation and Development

In cooperation ETH zürich

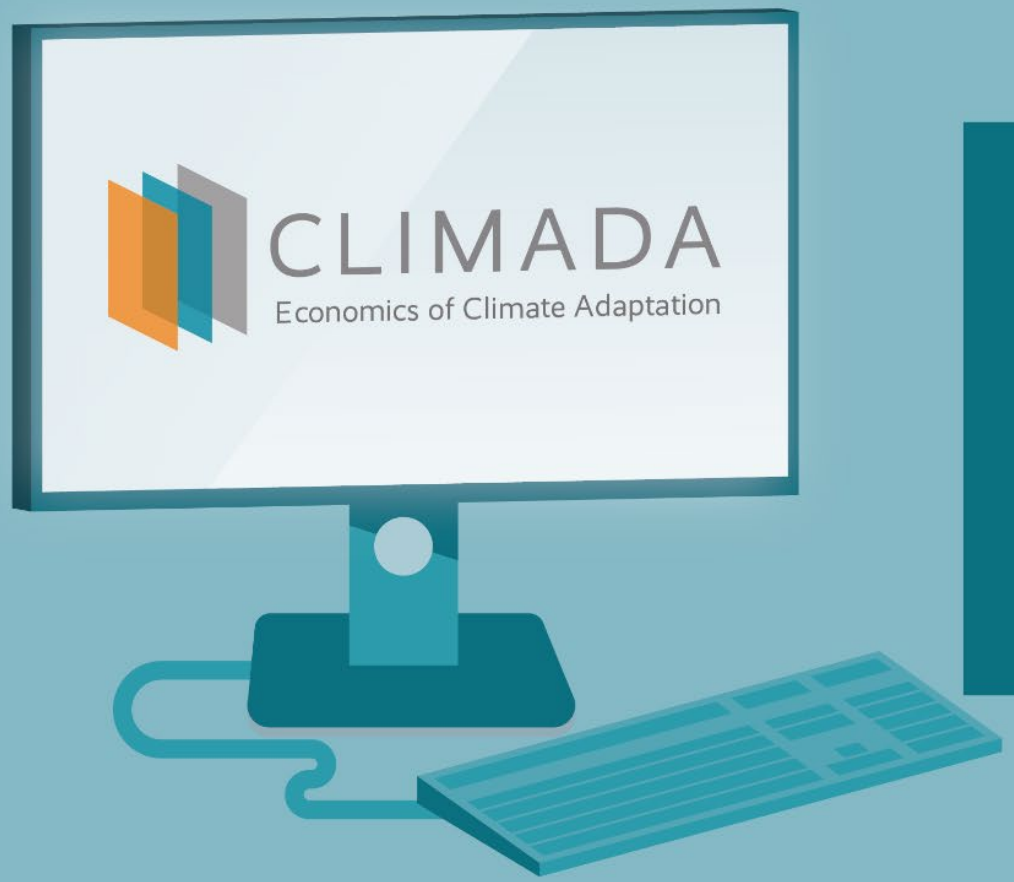
ADB ASIAN DEVELOPMENT BANK

ECA offers a

UNIQUE FRAMEWORK

for the flexible identification of cost-effective climate adaptation measures

Economics of Climate Adaptation



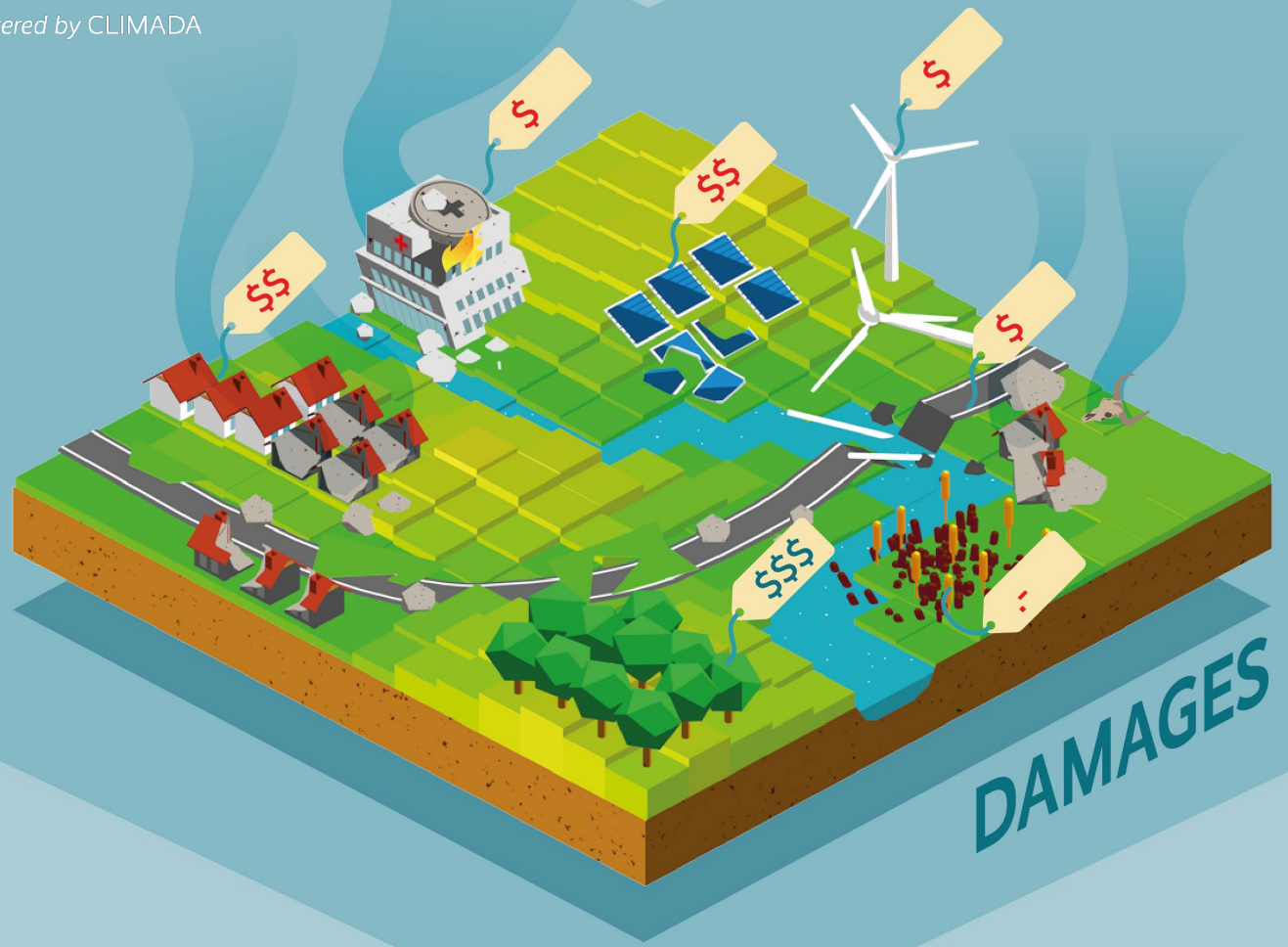
Powered by **CLIMADA**, the ECA framework links hazards, vulnerable assets and potential damages, quantifying them into monetary values.

Economics of Climate Adaptation

Powered by CLIMADA

Economics of Climate Adaptation

Powered by CLIMADA



ECA systematically evaluates and offers an optimal climate adaptation measures portfolio

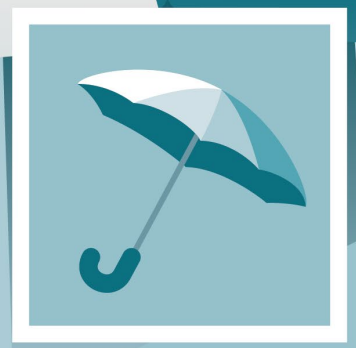
FOR DECISION MAKERS.

ECA builds a smart-mix portfolio of different adaptation measures, weighting costs and benefits of the different options to enable synergies and leverage local conditions.

Ecosystem-based adaptation

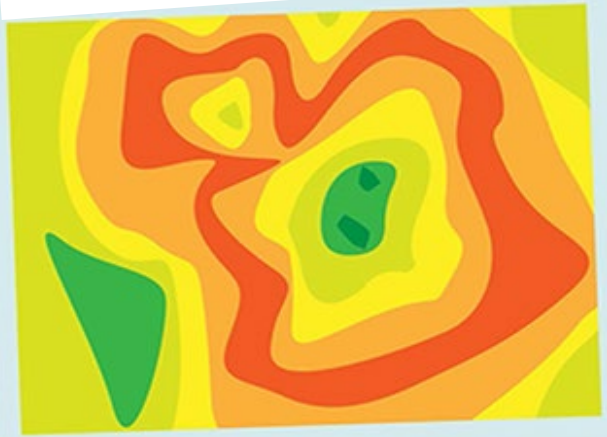
Infrastructure

Community-based adaptation

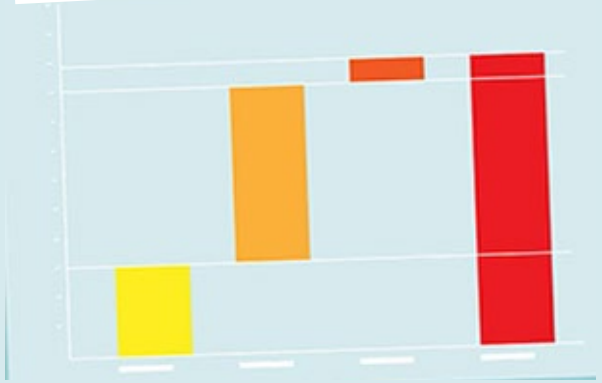


Risk transfer

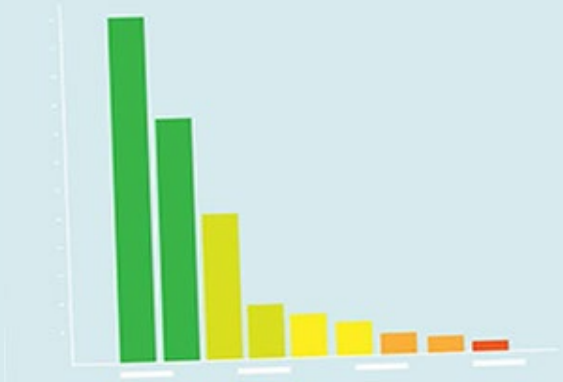
Hazard footprint and risk model



Expected economic and human losses under current and future scenarios



Cost-benefit analysis of adaptation measures



The outcomes of ECA inform climate adaptation strategies and policies,

UNLOCKING CLIMATE FINANCE.

National adaptation plans
Local adaptation strategies

International cooperation
Development banks
Global funds

ECA outcomes inform local and national adaptation strategies. The quantification of climate risk and the ranking of potential benefits align with the requirements of international funding agencies and other investors.

Economics of Climate Adaptation

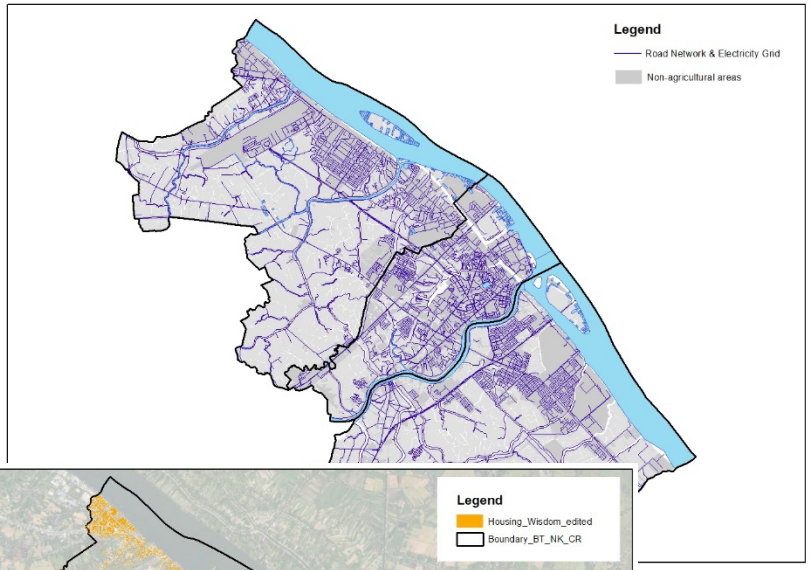
Powered by CLIMADA

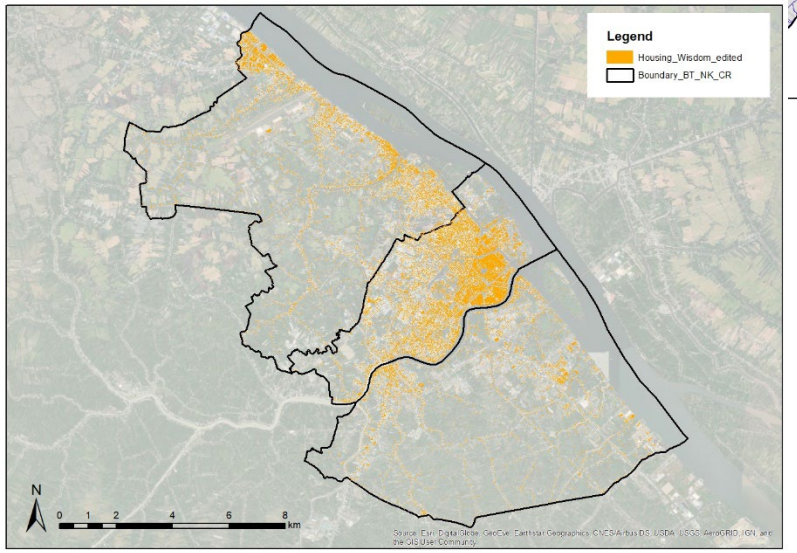
Economics of Climate Adaptation

Asset Selection and Valuation

Table 1: *Compilation of estimated values of assets*

	Heat Wave		Pluvial/ Fluvial Floods		Tidal Floods	
	Sample size	Total (m USD)	Sample size	Total (m USD)	No / area / length	Total (m USD)
People	*551 912*		167 557		80 220	
Houses	*153 424*	1 970.98	46 619	589.15	22 292	275.36
Schools	*77*	279.31	58	205.55	25	55.50
Medical Facilities	*40*	653.62	22	394.91	6	29.97
Adm. Buildings	*51*	22.52	47	21.95	12	6.19
Road network	*1 097.4 km*	937.66	1 086.2 km	930.11	731.0 km	604.36
Electricity grid	*1 097.4 km*	6.58	1 086.5 km	6.52	729.1 km	4.37
Nat. Resources	*8 512 ha*	113.61	8 551 ha	115.56	8 268 ha	111.84
Total		**1 051.75**		**2 263.76**		**1 087.61**

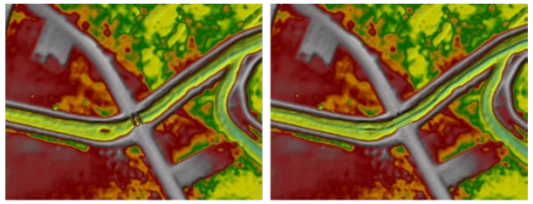




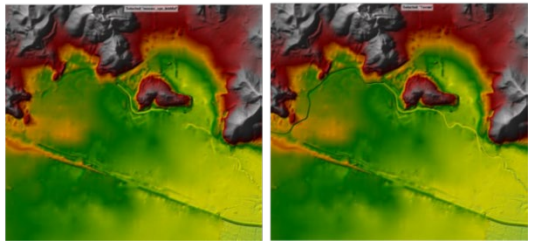
Economics of Climate Adaptation

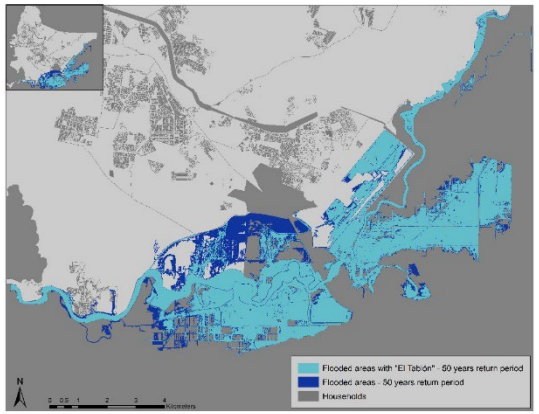
Hazard Modelling

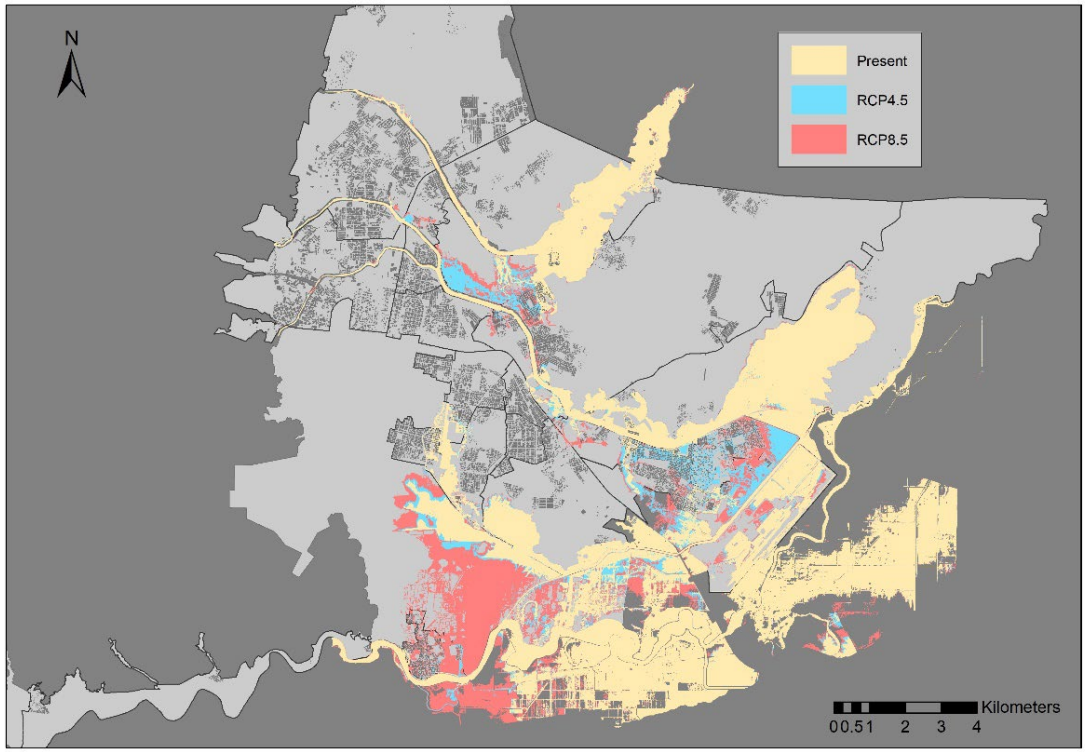
a) Before channel correction b) After correction



c) Before river bed "burning" d) After river bed "burning"



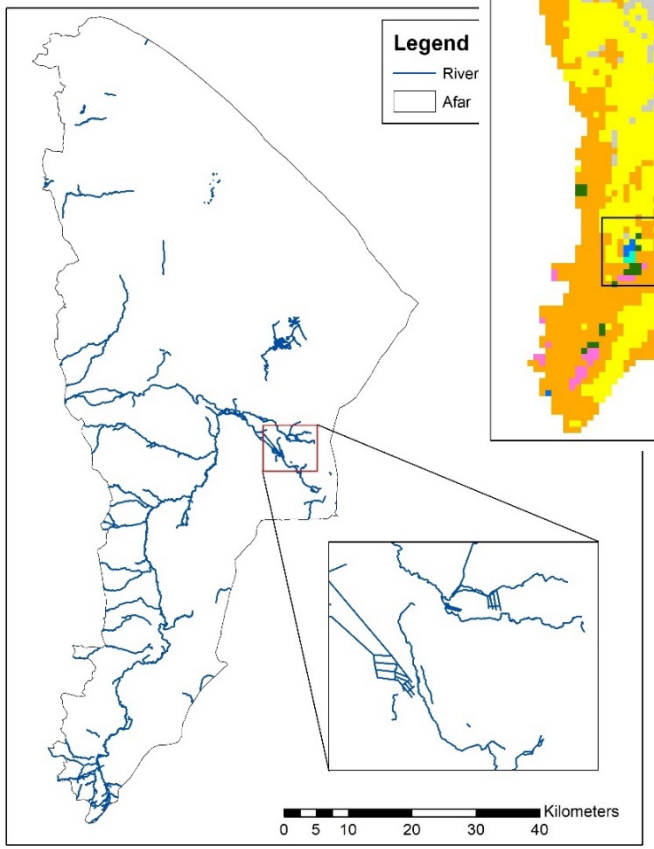


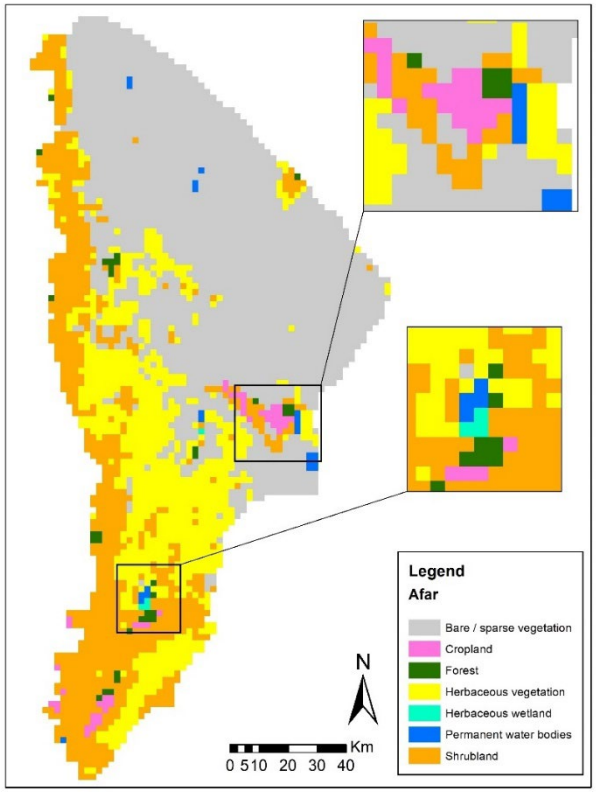


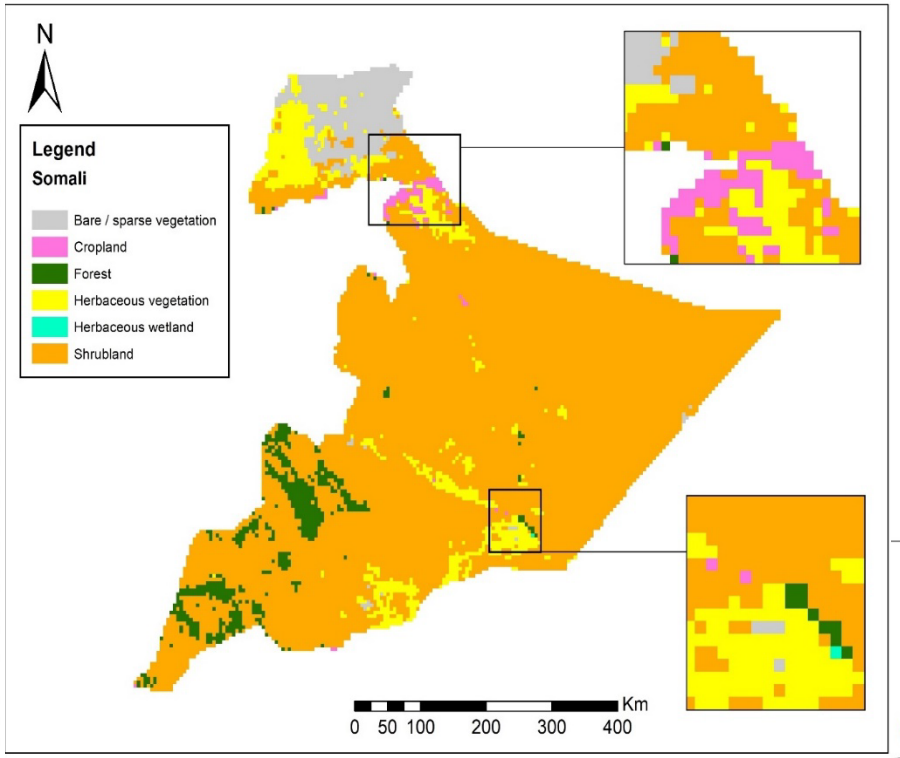
- High resolution modelling of flood intensity and frequency usinch CHIRPS. LIDAR
- Inclusion of Dam project
- Hand-over of inundation model to stakeholders

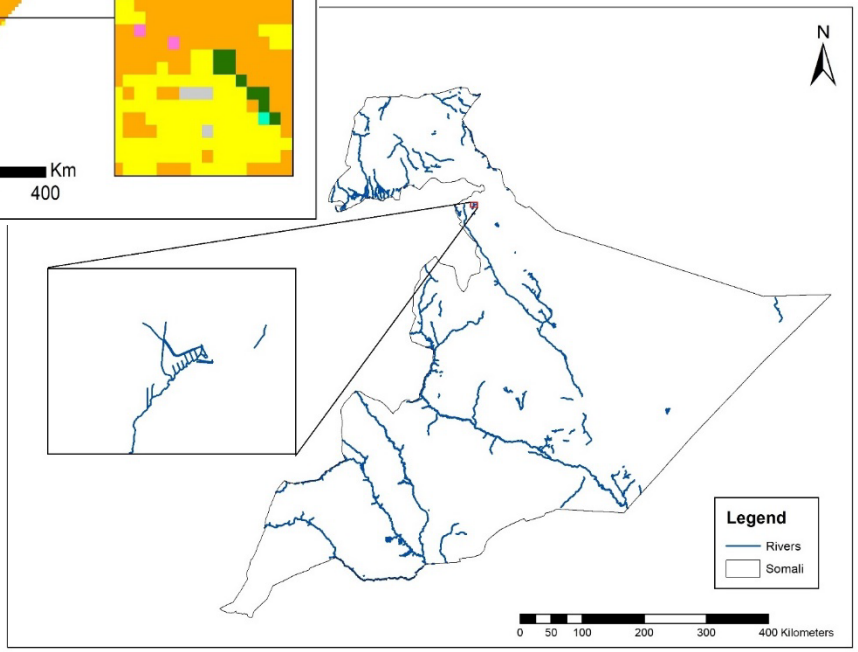
Economics of Climate Adaptation

Valuation of Ecosystems



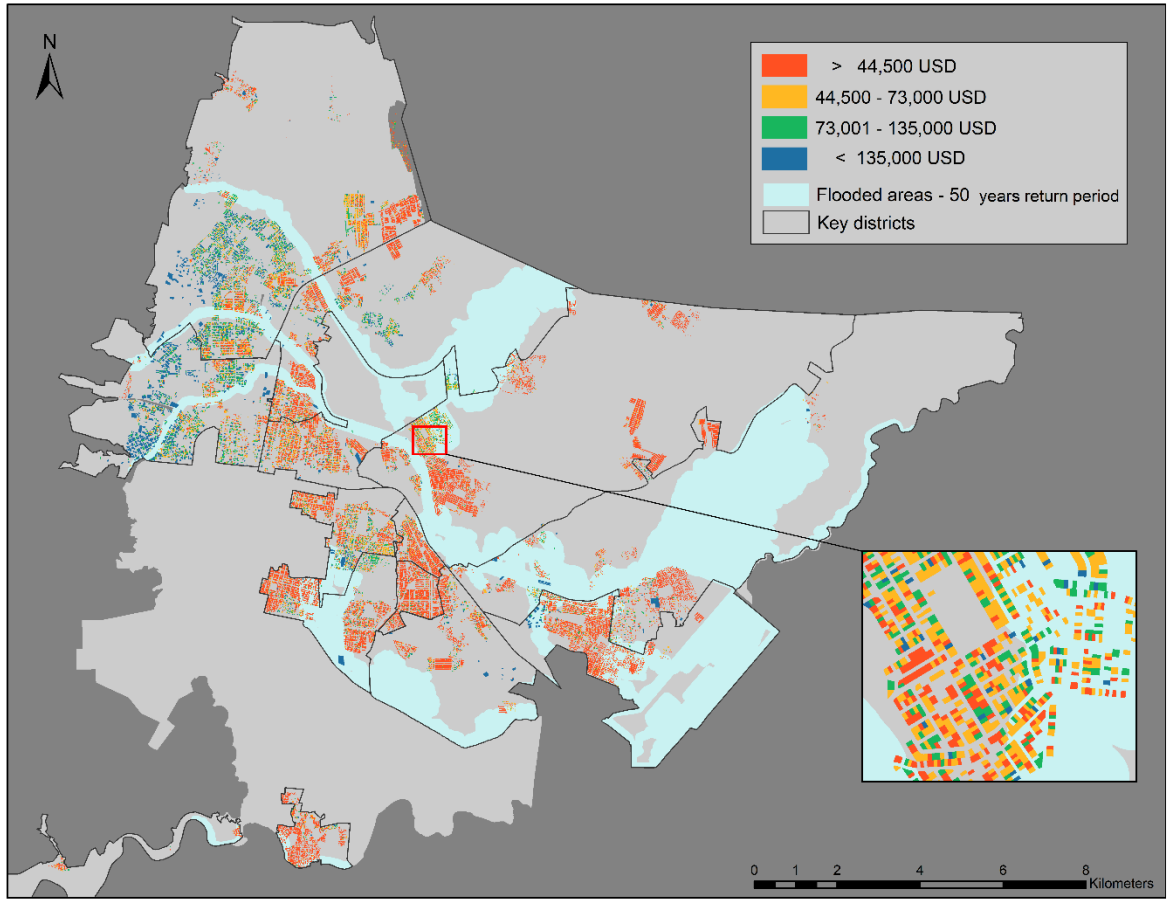




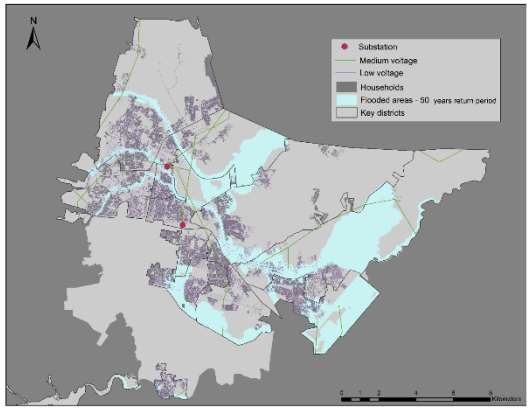


Economics of Climate Adaptation

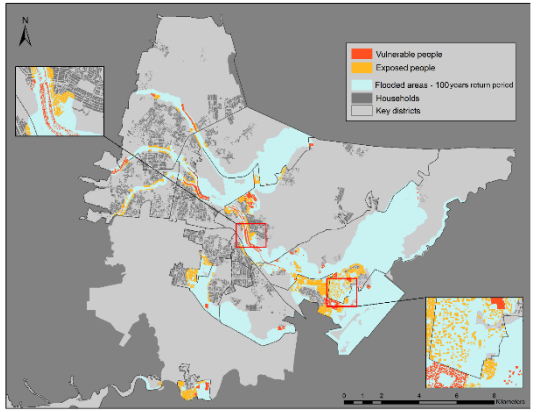
Seamless Decision making



Monetary valuation of assets
(>300 000 assets, 9 asset classes, USD5.6m total value)



Electrical grid

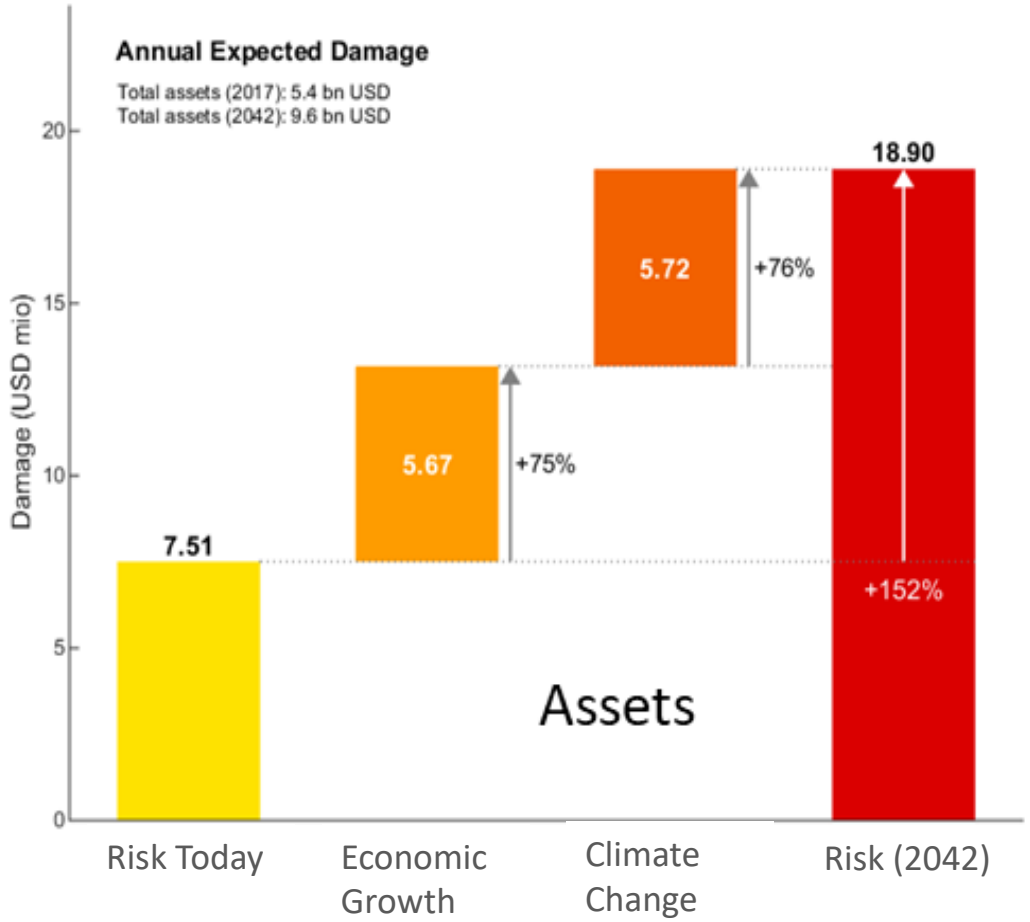


Vulnerable Population

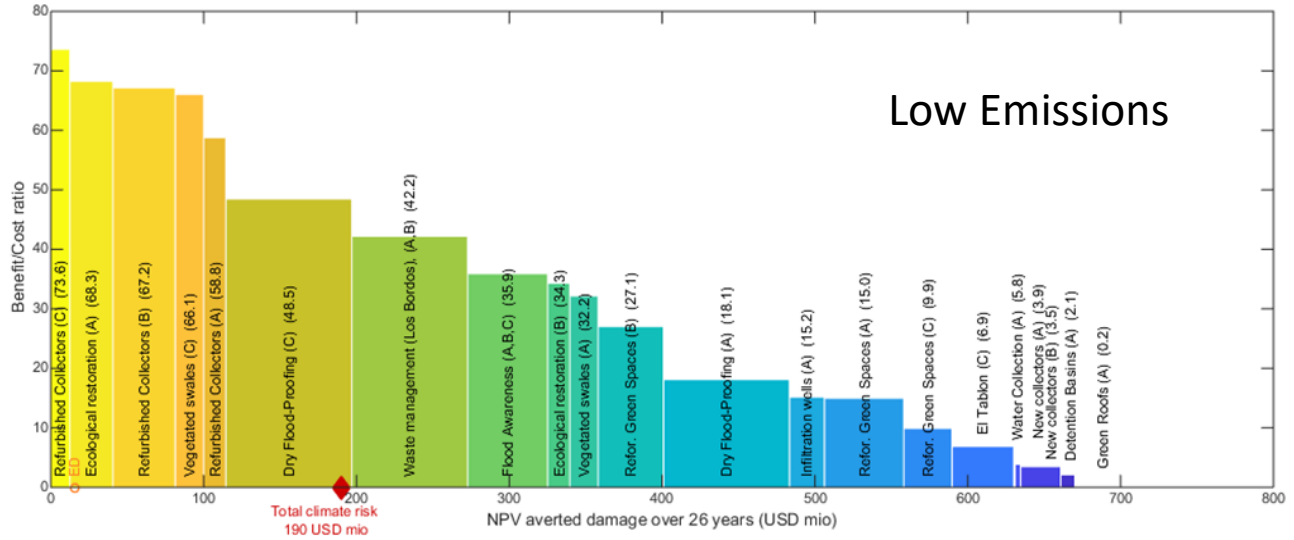
Economics of Climate Adaptation

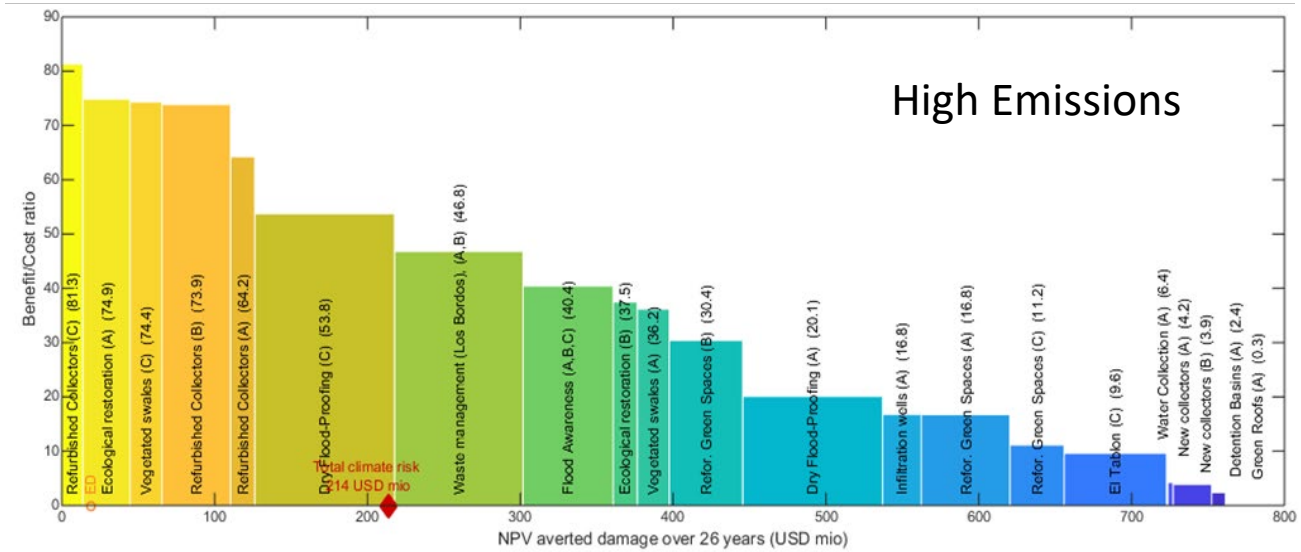
Main Results

Annual Expected Damage *(AED) in 2042 (USD m)*



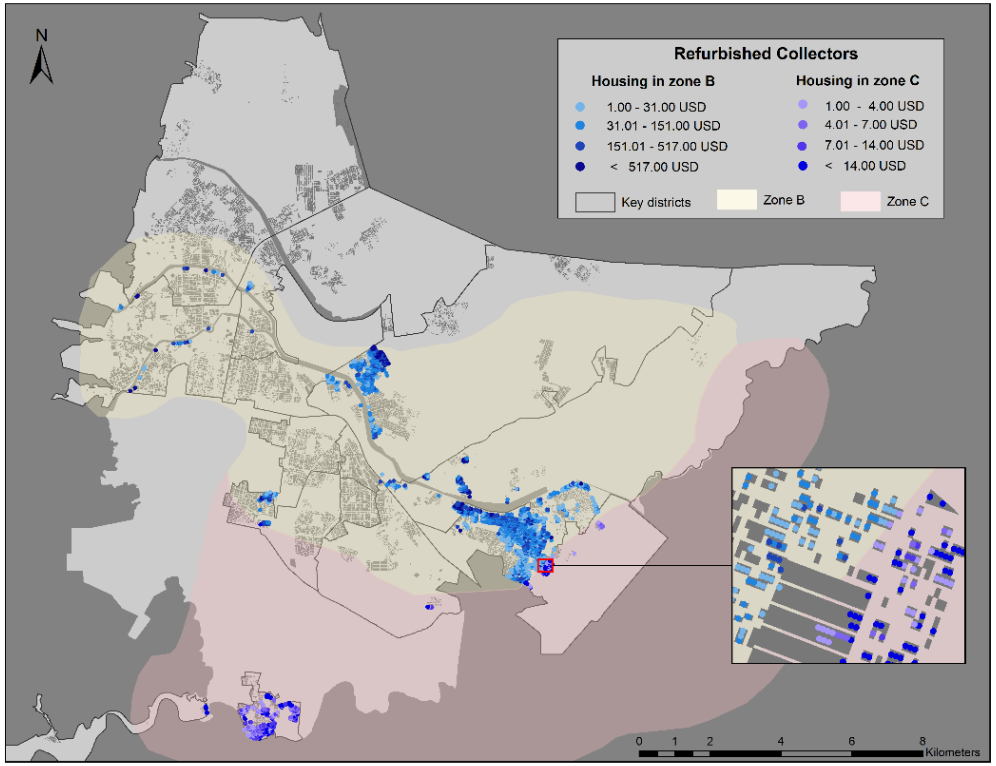
Most Effective Measures *(Portfolio for investment)*



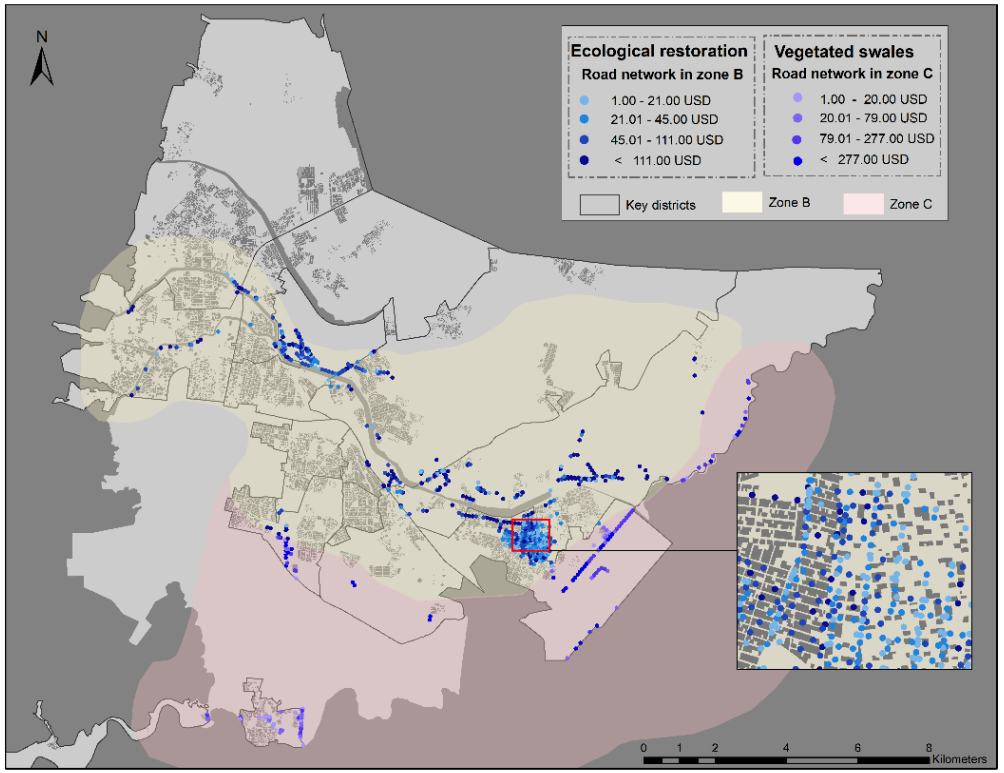


Economics of Climate Adaptation

Spatial Distribution of Benefits



Refurbished Collectors
Swales



Ecological Restoration, Vegetated

Economics of Climate Adaptation

Take-Home Messages

1. Decision-makers have a real need for **quantitative and iterative** analysis of their adaptation needs
2. Tools like ECA offers great **potential and flexibility** for unlocking climate finance
3. **Remote sensing and re-analysis** products are key to access to information in many areas
4. **Open access to data** for many countries **and disaster standards** are needed

Economics of Climate Adaptation

Powered by CLIMADA

MCII

UNITED NATIONS UNIVERSITY

UNU-EHS

Institute for Environment and Human Security

Thank you!

Contact

Dr. Maxime Souvignet

Team Lead

United Nations University (UNU-EHS)

souvignet@ehs.unu.edu