Evidence-based Risk Assessement

Experiences from the ECA methodology

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Key questions faced by decision-makers:

1. What is the **potential climate-related damage** over the coming decades?

2. **How much of that damage can be averted,** using what type of Climate Change Adaptation (CCA) measures?

3. **What investments will be required** to fund those measures, and will the benefits of these investment outweigh the costs?

inintiated by — Swiss Re / ETH

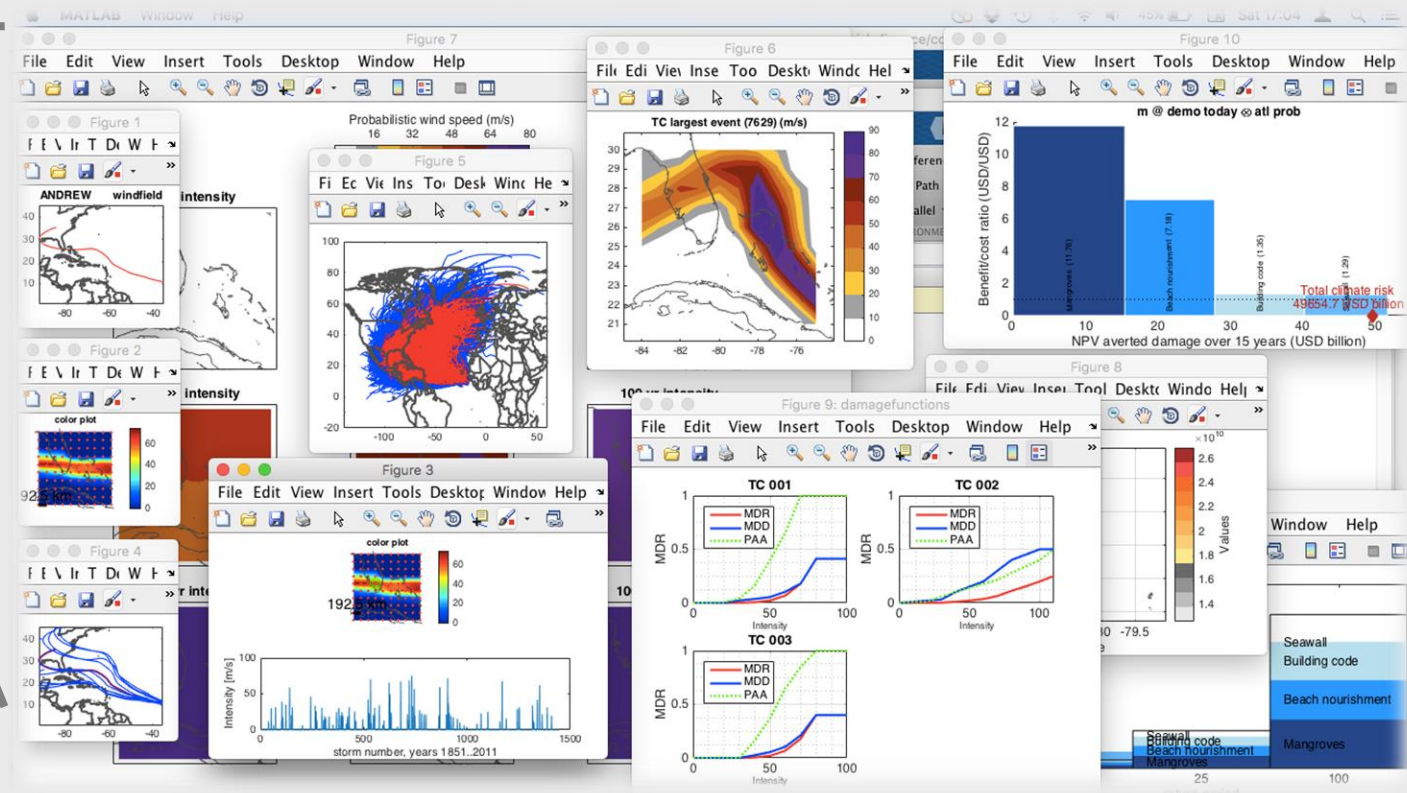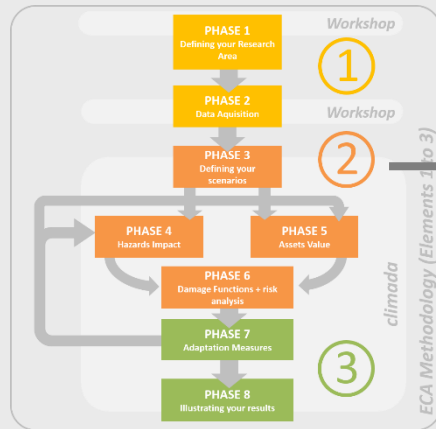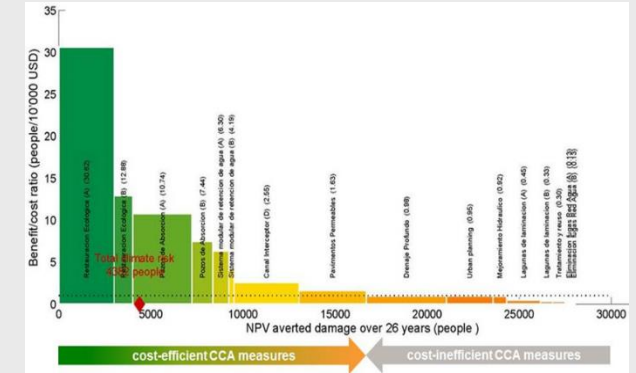first „field" projects by — KFW

first Guidebook by — UNITED NATIONS UNIVERSITY UNU-EHS Institute for Environment and Human Security

eca ECONOMICS OF CLIMATE ADAPTATION

US Gulf Coast: Hurricane risk to the energy system

New York: Cyclones and surge risk to a metropolis

Hull, UK: Flood and storm risk to urban property

China: Drought risk to agriculture

Bangladesh: Flood risk to a fast-developing city

Florida: Hurricane risk to public and private assets

India: Drought risk to agriculture

Caribbean: Hurricane risk to small islands

El Salvador: Flood and landslide risk to vulnerable people

Guyana: Flash flood risk to a developing urban area

Mali: Risk of climate zone shift to agriculture

Tanzania: Drought risk to health and power generation

Samoa: Risk of sea level rise to a small island state

Source: Economics of Climate Adaptation (ECA) Working Group, a partnership between the Global Environment Facility, McKinsey & Company, Swiss Re, the Rockefeller Foundation, ClimateWorks Foundation, the European Commission, and Standard Chartered Bank.

A full integration of Climada

The Economics of Climate Adaptation: the Smart-Mix

Smart-Mix Approach
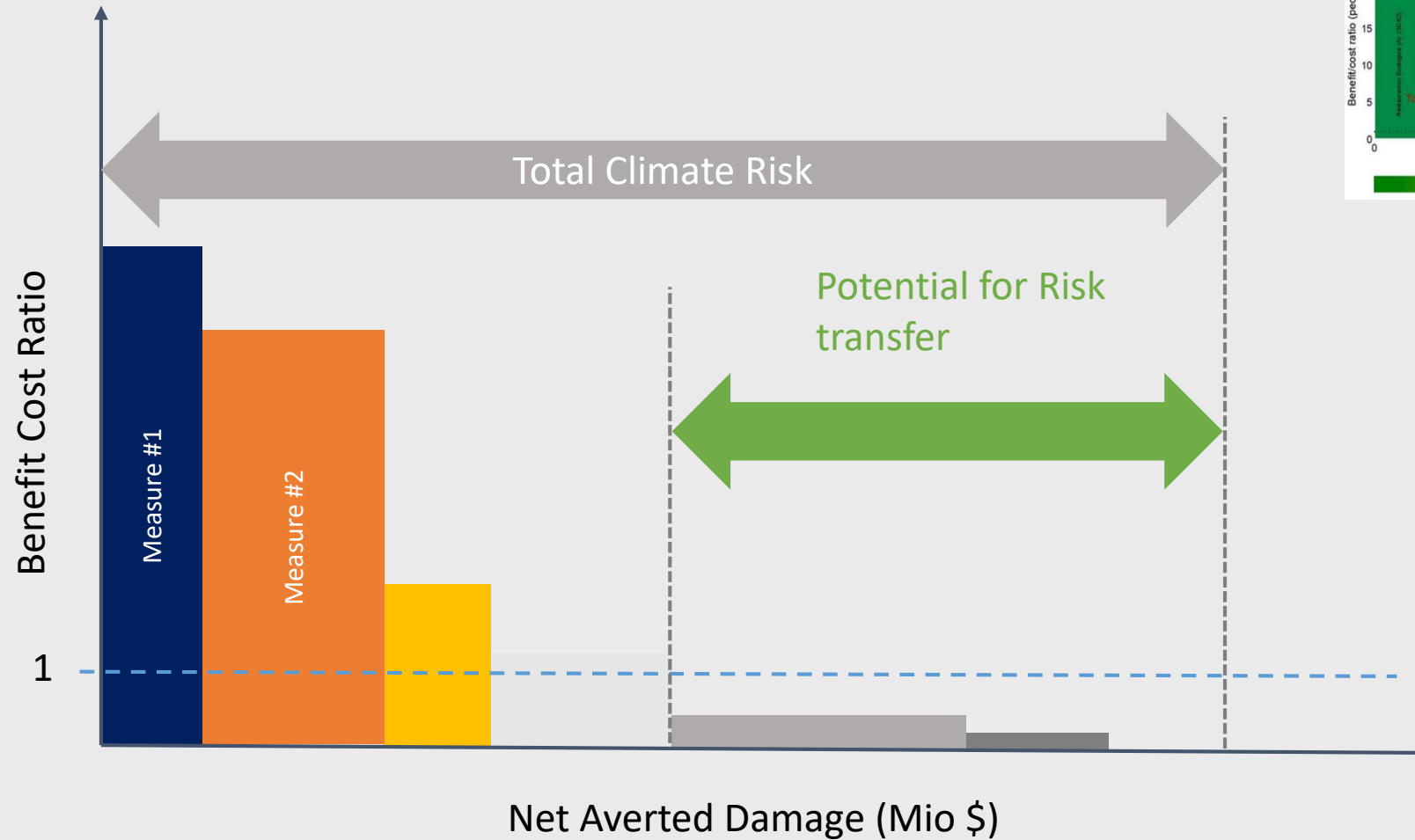
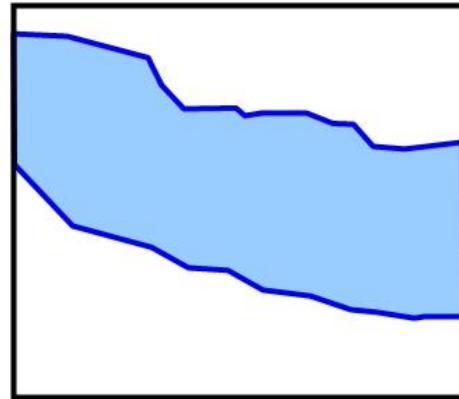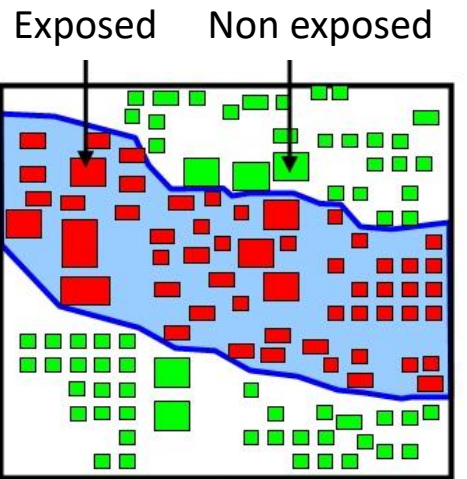# Application to urban floods in San Salvador
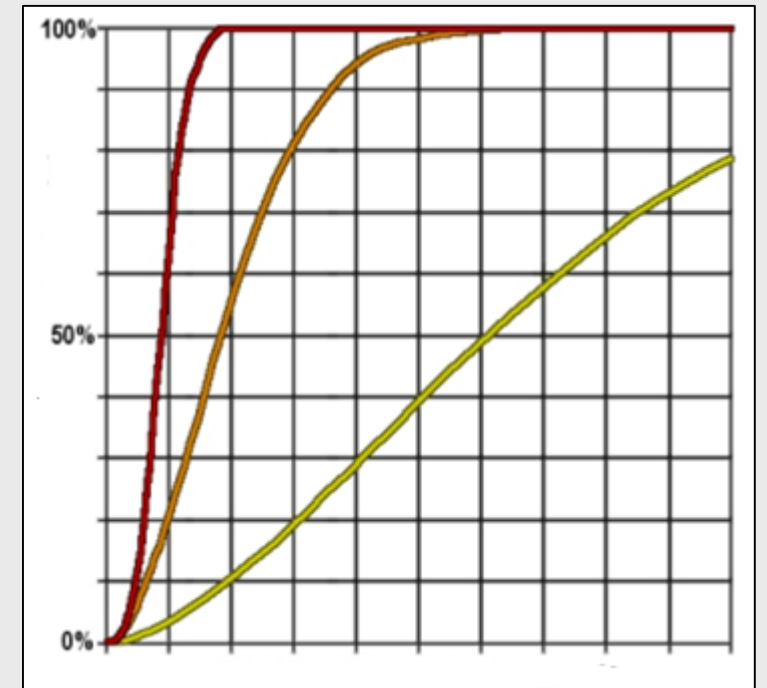
Step by step
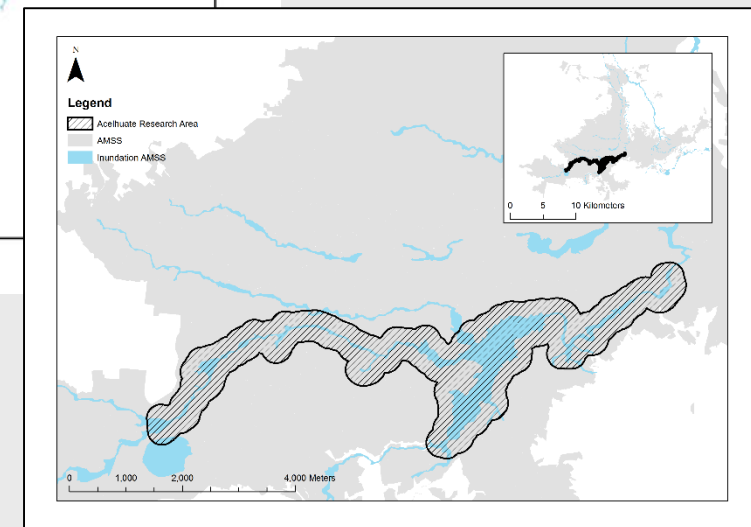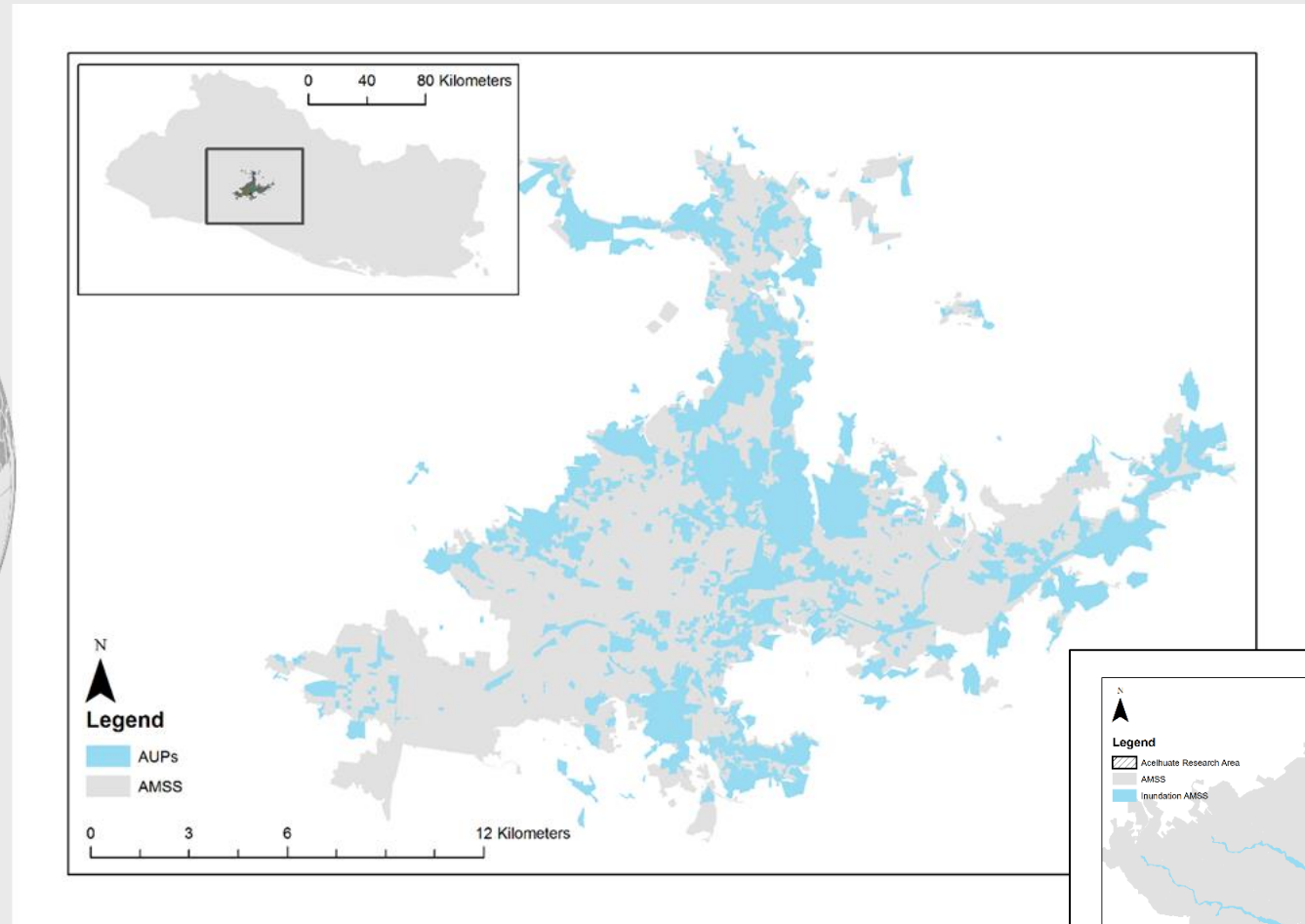
Assets
Monetary values
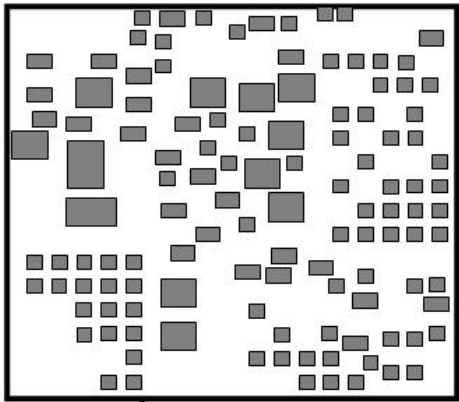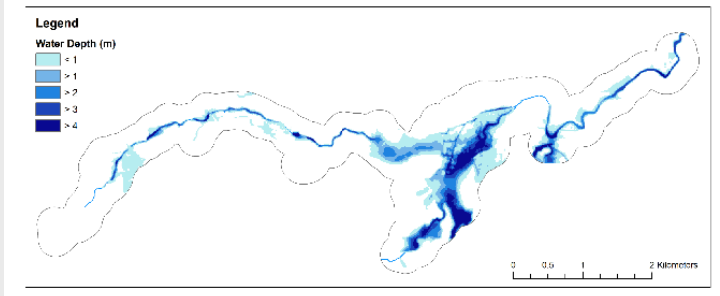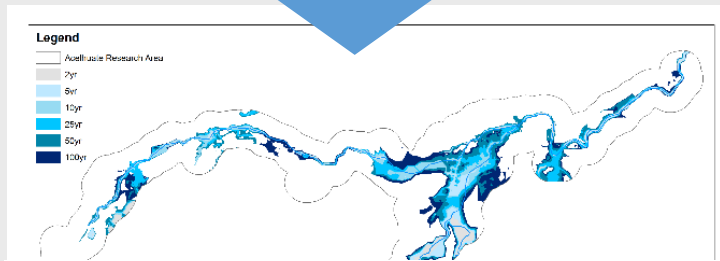
Hazards (including scenarios)
frequency and intensity

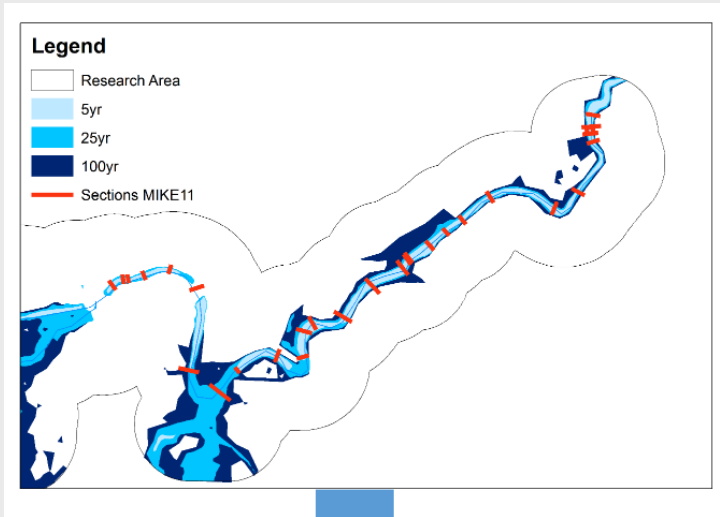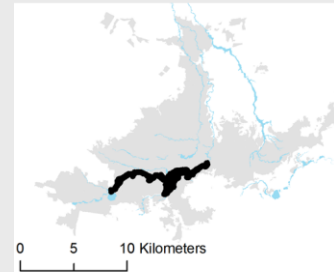**Damage curves**
Damage and hazard intensity

Exposed   Non exposed

100%

50%

0%

7

Application of ECA in San Salvador

- Hazard Modelling
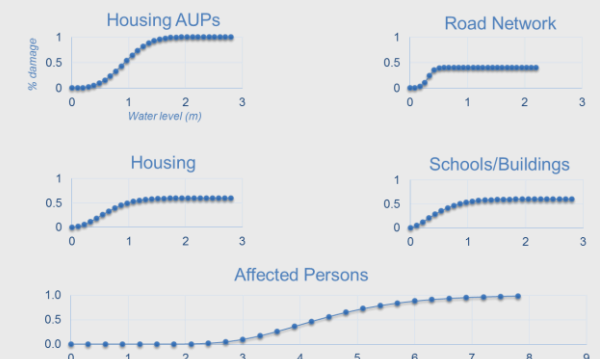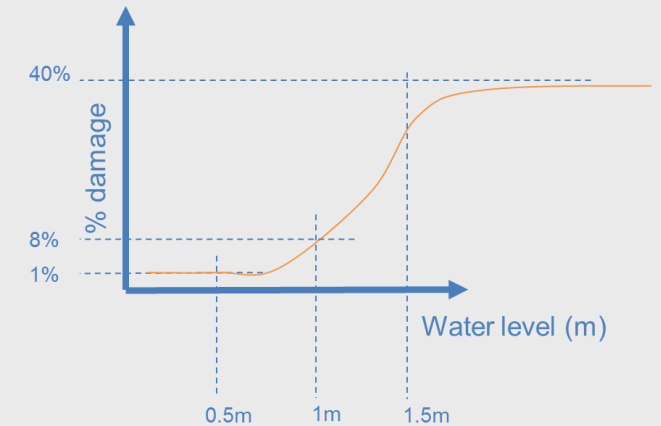- Asset Valuation
- Vulnerability curves
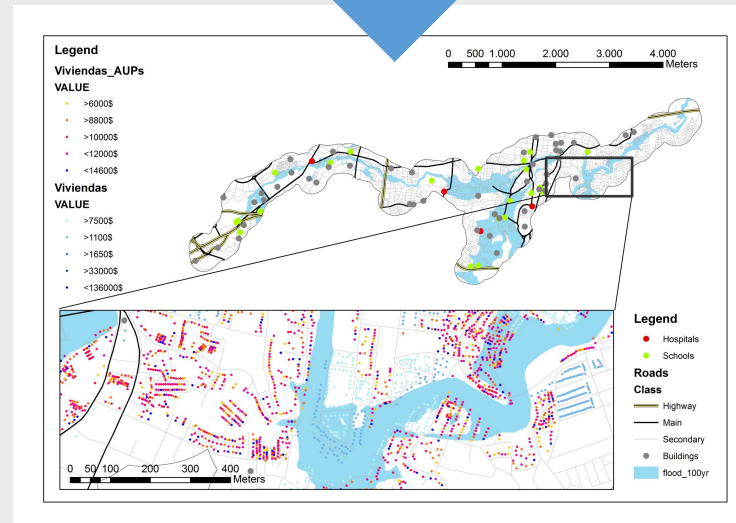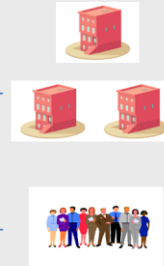
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CCA measures for flood risk considering different scenarios

The Economics of Climate Adaptation
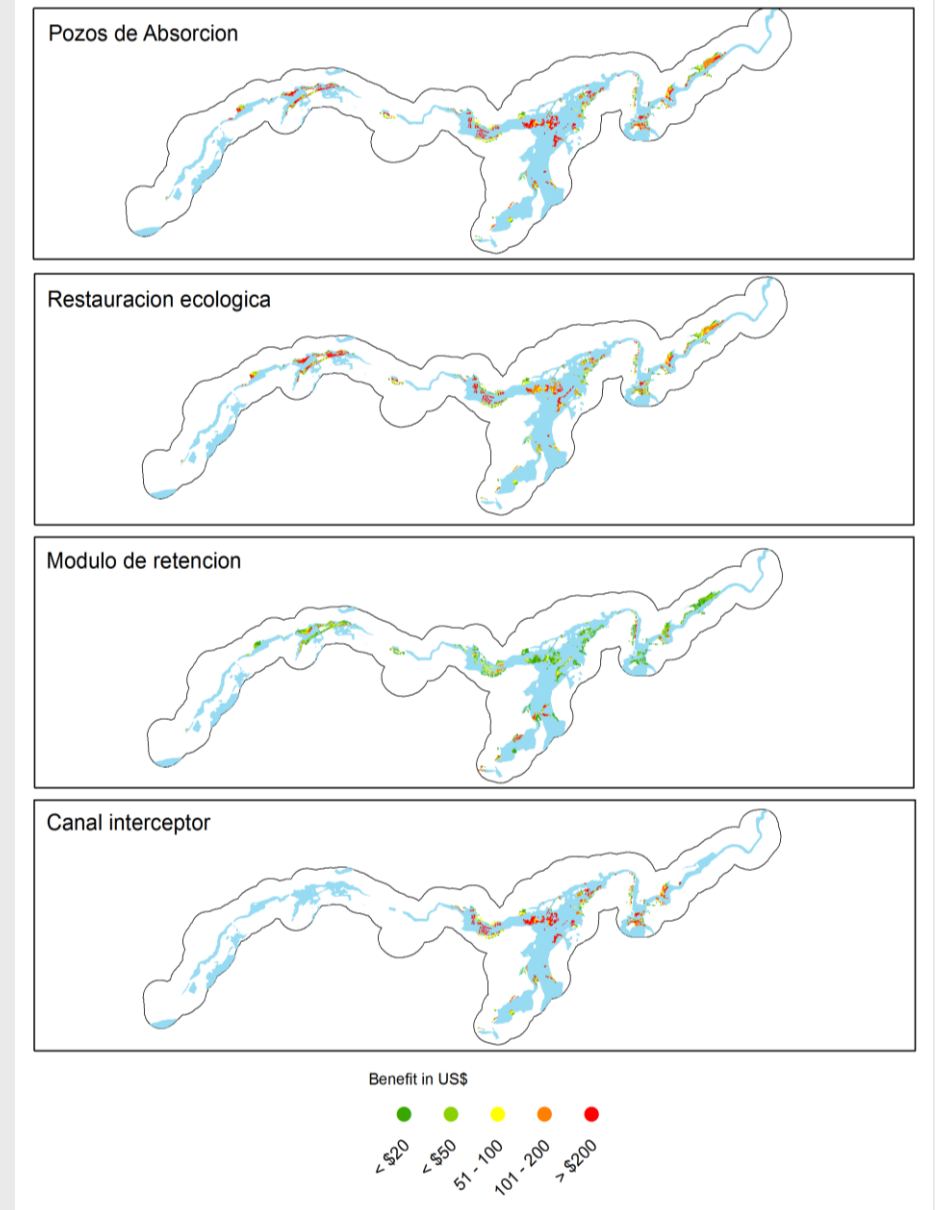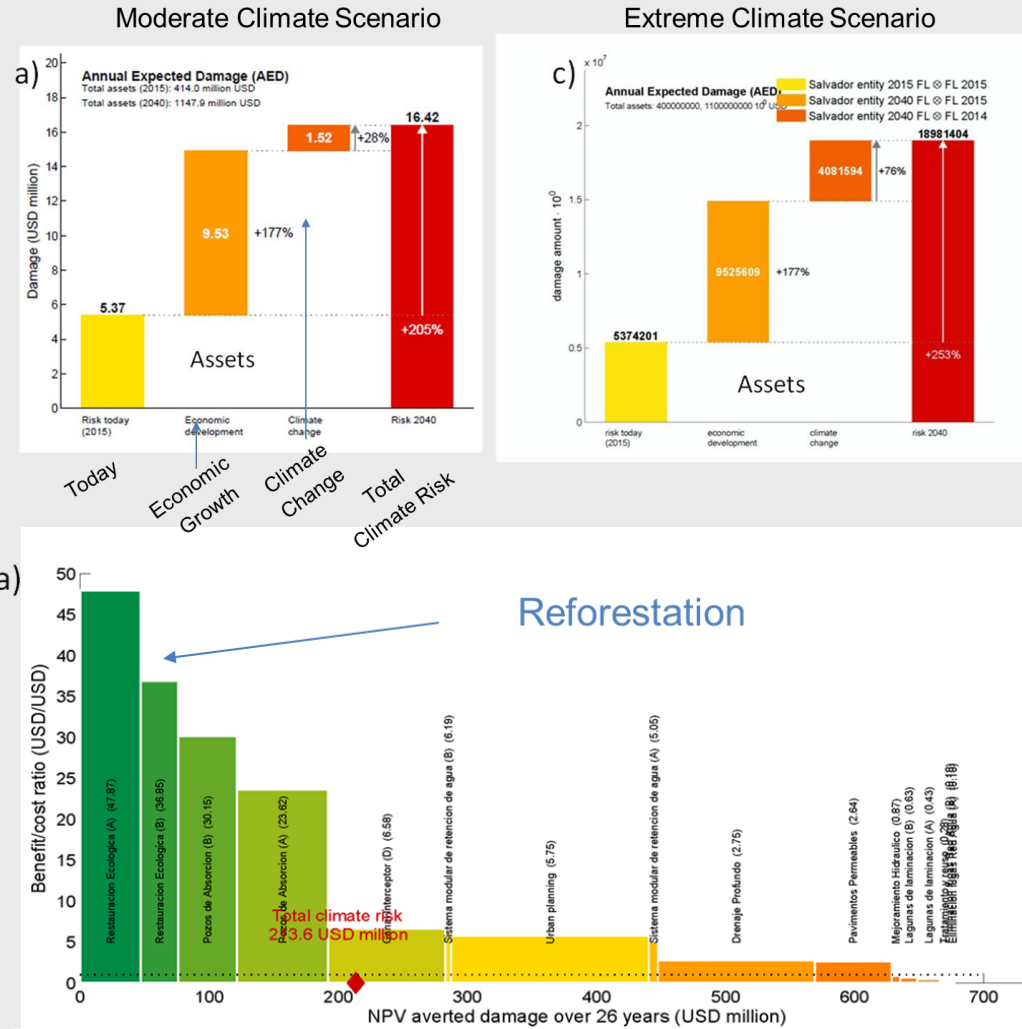
Advantages

- Provides a **scientific fact base**

- **Additional hazards** can be integrated to the original model

- **Spatial and scale flexibility** (can be applied every where and at different scale)

- Excellent **visualization** of results

Challenges

- **High level of expertise** is needed (e.g. hazard modelling, economics, etc.)

- Expertise in **MATLAB/Python necessary**

- **Uncertainties** are not explicitly quantified

Climate Risk Modelling

Up and coming

- Producing an **evidence-based assessment to foster transparency and trust in the financing** of adaptation and disaster risk management;

- **Quantifying the value added by insurance solutions** when they are integrated into the portfolio of other CCA measures;

- Providing **quick estimates of damage to guide relief mobilisation** and support early recovery;

- Potential for sustainable impact (risk profiles, cost-benefit analysis, ownership, etc.):

- **Potential for digitalisation** (machine learning, open source data integration, framework integration).

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Sönke Kreft
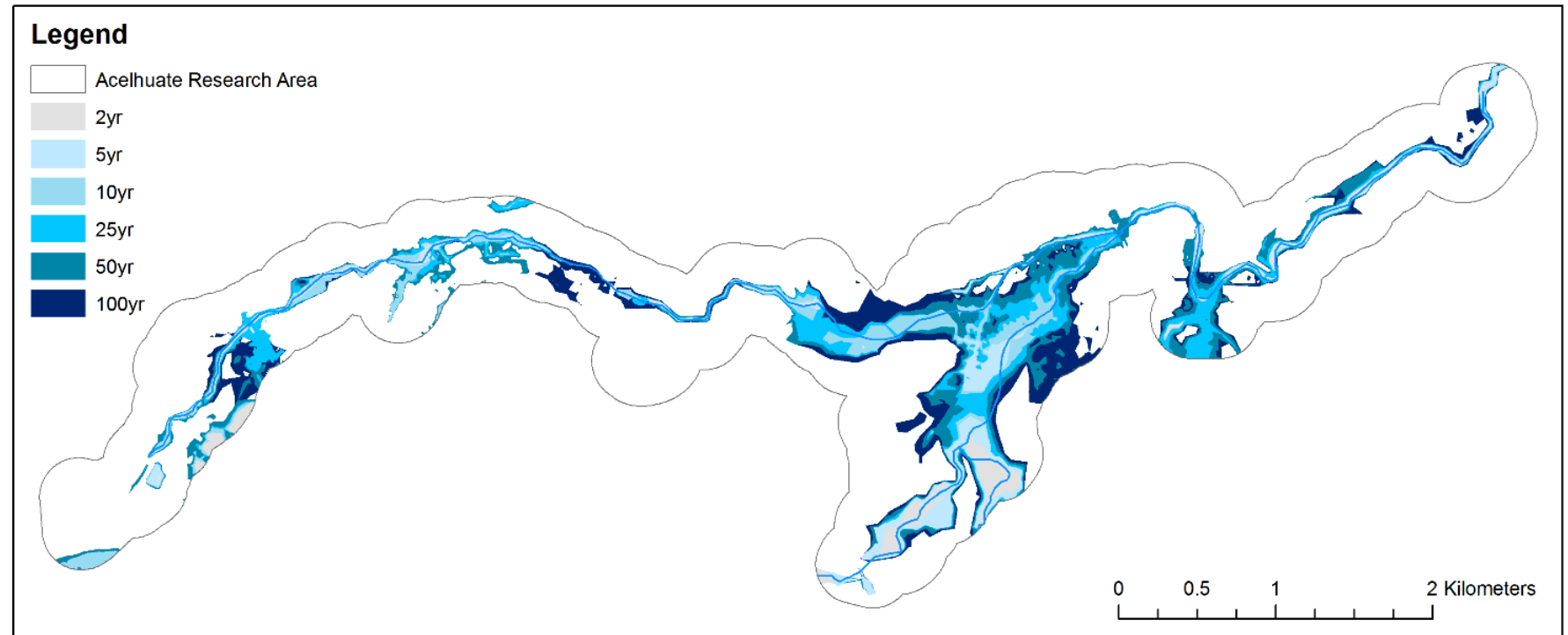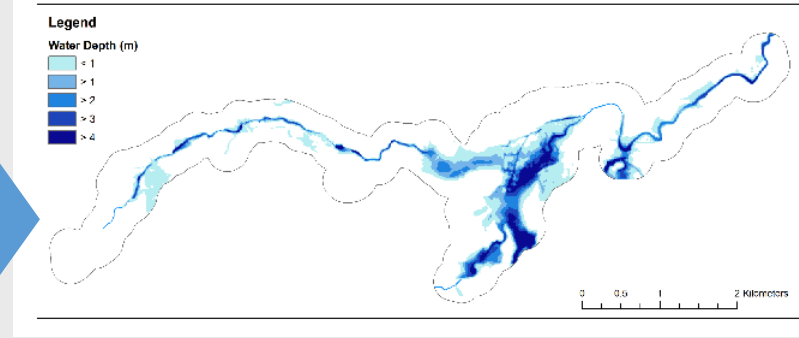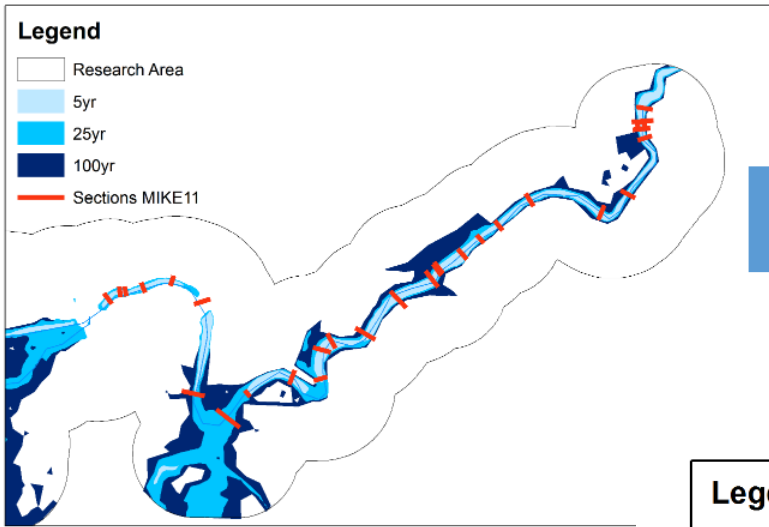
Executive Director

MCII/UNU-EHS

E-mail: **kreft@ehs.unu.edu**

www.climate-insurance.org

http://ehs.unu.edu

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Hazard Modelling

Legend
- Research Area
- 5yr
- 25yr
- 100yr
- Sections MIKE11

Legend
Water Depth (m)
- < 1
- > 1
- > 2
- > 3
- > 4

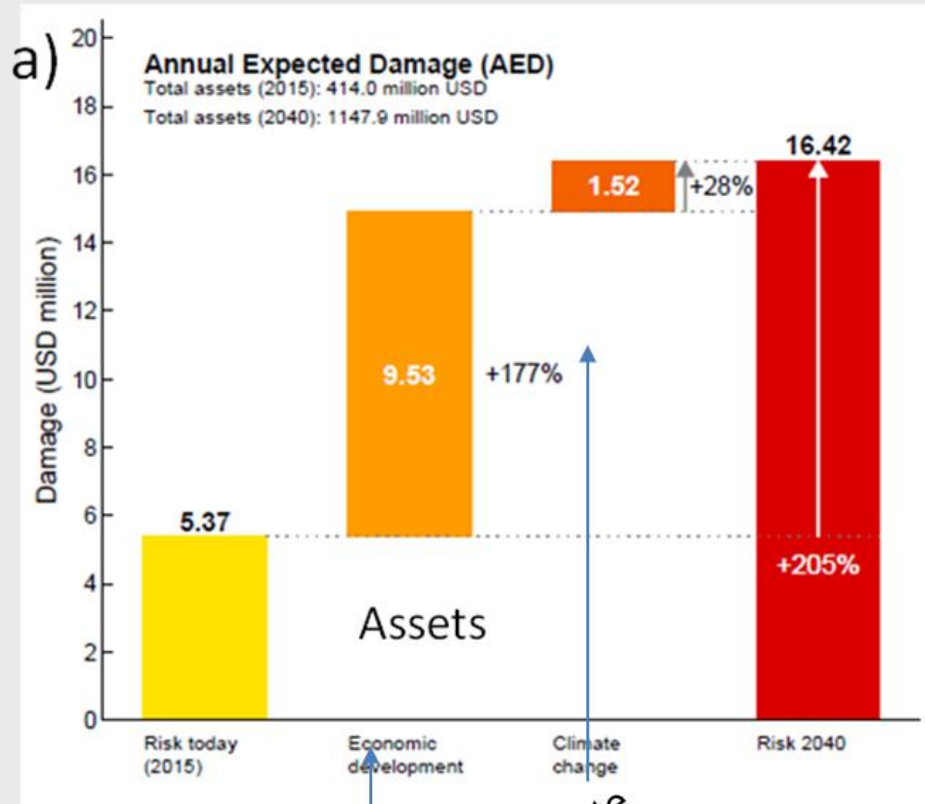**Legend**
- Acelhuate Research Area
- 2yr
- 5yr
- 10yr
- 25yr
- 50yr
- 100yr

Asset Valuation

1) Housing in AUPs
2) Housing
3) School
4) Hospital
5) Road network
6) Building

7) People in AUPs
8) People

Legend

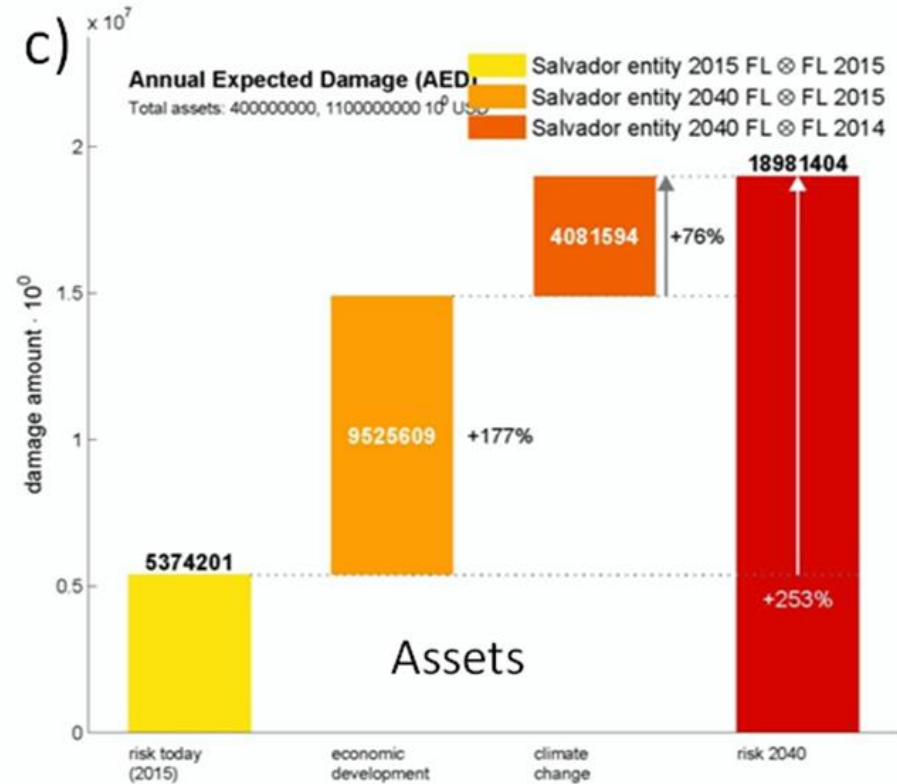**Viviendas_AUPs**
VALUE
- >6000$
- >8800$
- >10000$
- <12000$
- <14600$

Viviendas
VALUE
- >7500$
- >1100$
- >1650$
- >33000$
- <136000$

0 500 1.000   2.000   3.000   4.000
Meters

Legend
- ● Hospitals
- ● Schools

Roads
Class
- ▬ Highway
- ▬ Main
- — Secondary
- ● Buildings
- ▮ flood_100yr

0 50 100   200   300   400
Meters
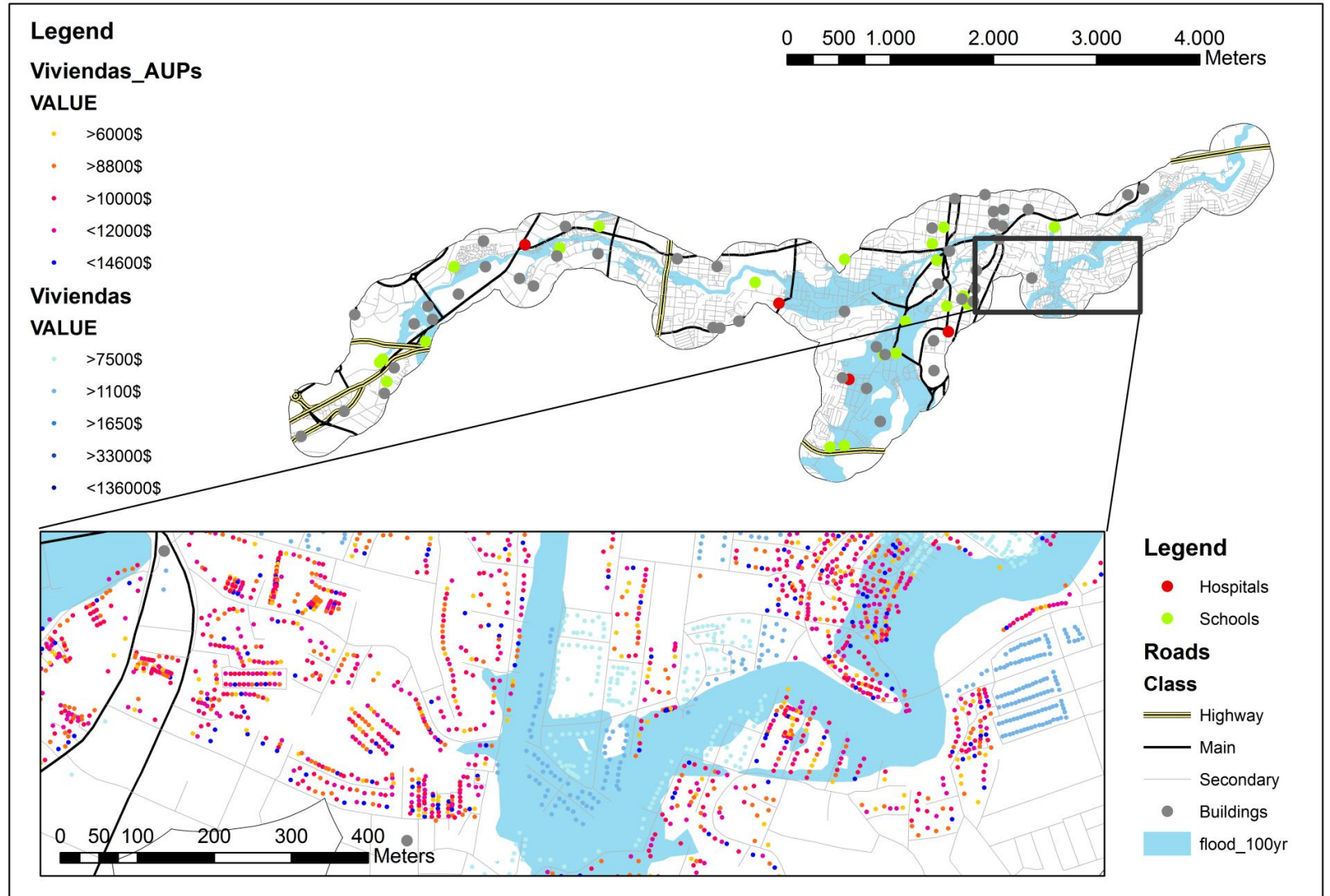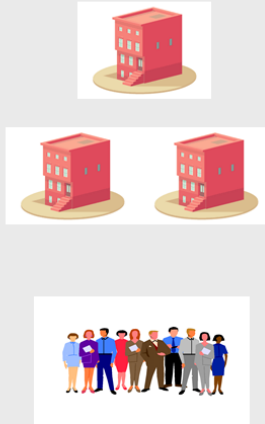
Expected Damage per Scenario

Moderate Climate Scenario

Extreme Climate Scenario

Ranking of Adaptation measures