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## Country Risk Profiles for long term planning

Alessandro Masoero, Lauro Rossi, Roberto Rudari

Building Disaster Resilience to Natural Hazards in Sub-Saharan African Regions, Countries and Communities



## Project Goals

Understanding disaster risk is the Sendai Framework's first priority for action. The outputs of disaster risk assessment should be the main drivers of the DRM cycle.

1. Developing 16 Africa Floods & Droughts Disaster Risk Profiles
2. Enabling Local Institutions and stakeholders in DRR to use the results (Workshops)



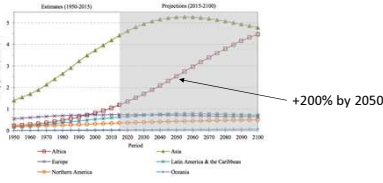
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## Why Africa?

In the future, a significant rise in both population and GDP is expected in the African Continent. It is essential to understand which factors (e.g. Climate Change) can alter or limit these developments.

UN 2017 world population prospects (median scenario)



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## EU Initiative

EU PROGRAMME "Building Disaster Resilience to Natural Hazards in Sub-Saharan African Regions, Countries and Communities", being implemented by:

- African Union Commission
- **UNISDR** → Risk profiles for 16 countries by CIMA
- **World Bank** → Risk profiles for 9 countries by CIMA
- African Development Bank

RESULTS: Country Risk Profiles, that provide comprehensive view of hazard, risk and uncertainties for floods and droughts in a changing climate, with projections for 2050-2100.

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## Risk Assessment

**RISK**

The disaster risk profiles for floods and droughts are based on Probabilistic Risk Assessment.

Risk is defined as the likelihood (i.e., probability) of sustaining a certain level of loss during a given time period.

**Risk = Probability of an event occurring x impact of the event**

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## Probabilistic Risk Assessment

Considering a large number of possible scenarios, their likelihood and associated impacts.

All possible scenarios:

- Collectively exhaustive
- Mutually exclusive

**AAL**

Since the historical records are often insufficient to represent all possible risk condition a Country might experience, **models** are used in order to simulate such possible conditions.

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## Probabilistic Risk Assessment

Risk assessment approach is able to estimate the impact on each risk component, under different conditions.

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## The impact modelling compass

Exposure mapping and vulnerability assessment

Water depth [m above ground]

Hydrologic and Hydraulic modeling and simulation

PML curve

Following the *chain of events*

- Intense Rain
- Flooding
- Damage

Climate modeling and simulation

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## Uncertainty

There are two main sources of Uncertainty:

- Primary uncertainty (including sampling variability) concerns the event generation component of the model
- Secondary uncertainty: the uncertainty in the amount of loss, given that a certain event has occurred.

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## Dealing with Primary Uncertainty

### Full Scale Weather generator

**Pros:**

- Realistic spatial temporal correlation of precip and relevant hydrologic variables
- Allows for continuous simulations
- Can include realistic patterns of CC

**Cons:**

- A limited set of events is normally available (100 yrs)
- Computationally very intensive on large areas

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## Dealing with Secondary (Epistemic) Uncertainty

### Convoluting uncertainty for each SINGLE ASSET

Each Single asset has an expected loss and a loss distribution

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## Probabilistic Risk Assessment Results

Aim of the PRA is to compute informative risk metrics, nominally the PML and AAL.

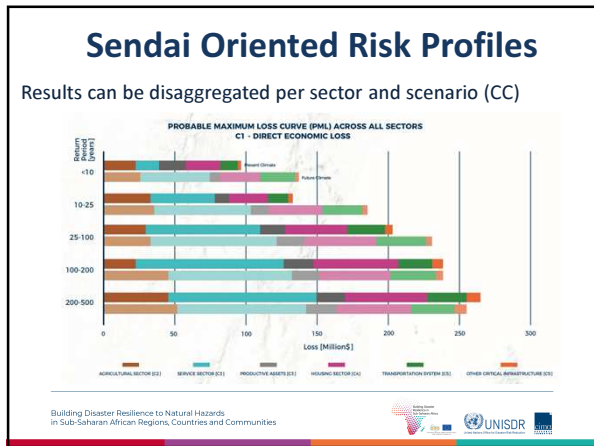
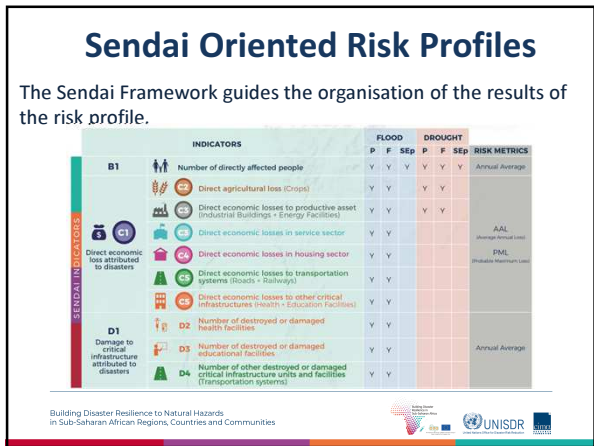
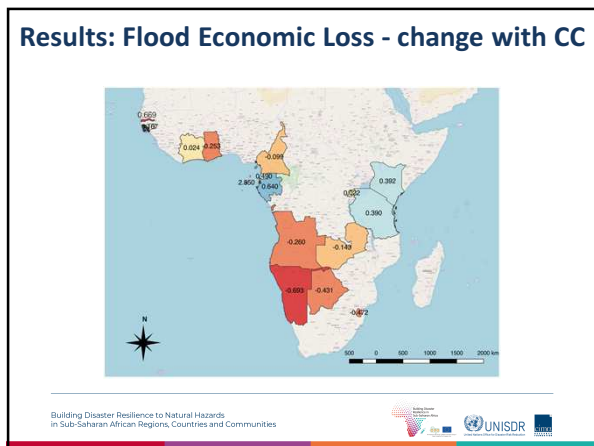
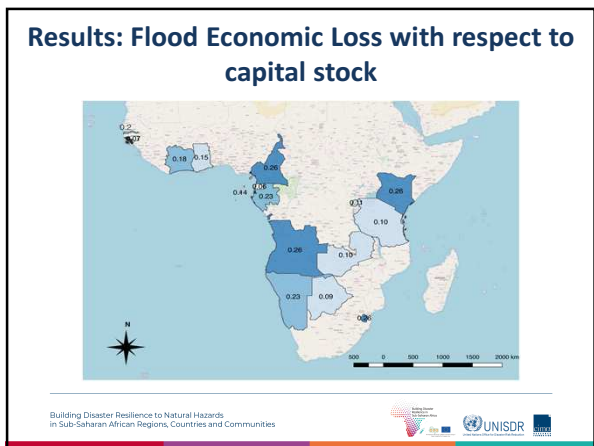
- **Average Annual Loss (AAL)** is the expected loss per year, averaged over many years.
- **Probable Maximum Loss (PML)** describes the loss that could be expected corresponding to a given likelihood, expressed in terms of annual probability of exceedance or its reciprocal, the return period.

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**Slide 11**

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**TG2** Tatiana Ghizzoni, 7/23/2018



## Key Messages

- PRA gives an overview of estimated losses, which can provide guidance to predict and plan for future losses.
- Informative economic metrics (AAL, PML) can be used to plan and prioritize investments and strategies for managing disaster risk.
- A risk profile can be the baseline for design "disaster-wise" investments at the Country level, knowing the AAL and PML a Country might face.

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*Thank you!*

[alessandro.masoero@cimafoundation.org](mailto:alessandro.masoero@cimafoundation.org)

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