

# *Country Risk Profile for long term planning*

*Alessandro Masoero, Lauro Rossi, Roberto Rudari*



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# What is strictly needed to measure Disaster-related indicators?

## → Loss data

Information on losses should be consistent (i.e. comparable), in space and time, among events and among countries.

- Different records → accounting methodology, statistical framework
- Geospatial distribution → models, Earth Obs. support
- Trends and frequency → probabilistic risk assessment

Complementary tools

# Monitoring Disaster-related Statistics

**First mandatory step** → loss data accounting system

- Structured database
- Harmonised damage assessment and collection methodology (up to economic loss)

**Geospatial data** and modelling approach can help in estimating damage and loss indicators combining:

- Hazard, exposure, vulnerability layers (also based on EO)

# A step further

Understand and use statistics results to address DRR policies

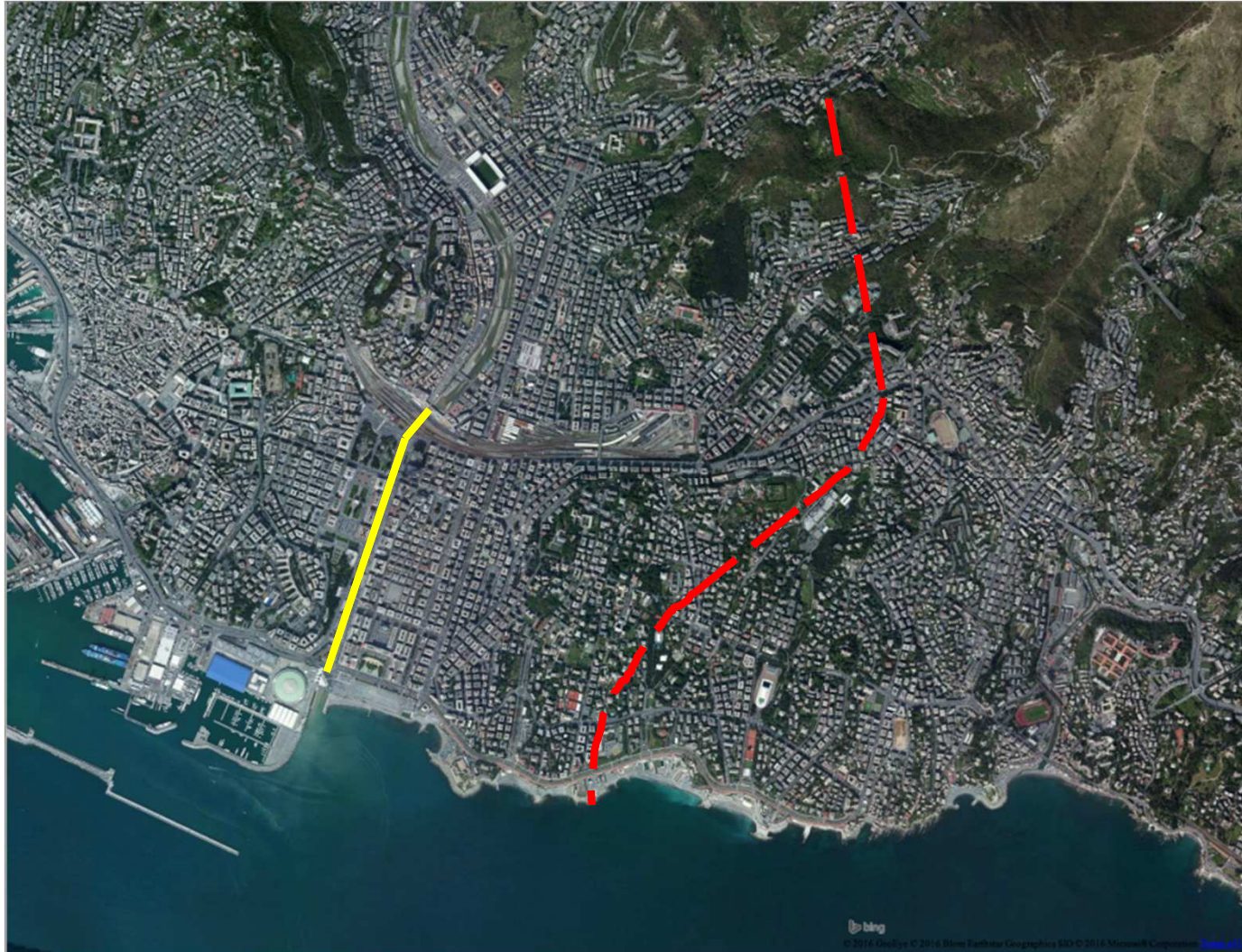
Are impacts (deaths, missing and affected people, economic loss, etc. ) decreasing?

- By 2030 (SDGs)
- 2005-2015 vs 2020-2030 (Sendai)

FINAL GOAL: measure the benefit of disaster mitigation policies

How to measure this decrease and make this two short periods comparable?

# Two real events for the city of Genoa (Italy)



Fereggiano  
diversion  
channel



Bisagno  
Culvert

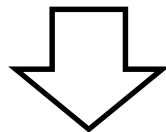
# Two real events for the city of Genoa (Italy)

Past event	Return period [years]	Economic loss, current situation [M€]	Economic loss, mitigation measure [M€]
<b>1970</b>	~ 200 yrs	190 M€	120 M€
<b>2014</b>	100-200 yrs	100 M€	14 M€

The importance of a “what if” analysis

# How to make informed decisions on mitigation measure?

- What is the average annual loss that is experienced in the country due to one or more hazards?
- How can we measure the benefit of different mitigation measures?
- Will our decisions be still valid in the future? How can we consider external constraints such as climate change and population growth?
- How can we monitor actual decrease after mitigation?



**Probabilistic Risk Assessment**

# Risk Assessment as a tool to understand Disaster-related Statistics

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



All Possible Flood  
Scenarios with different  
frequencies

X

Value and  
Vulnerability of  
Exposed Assets

=



All Possible **Loss**  
**Scenarios** with  
different frequencies

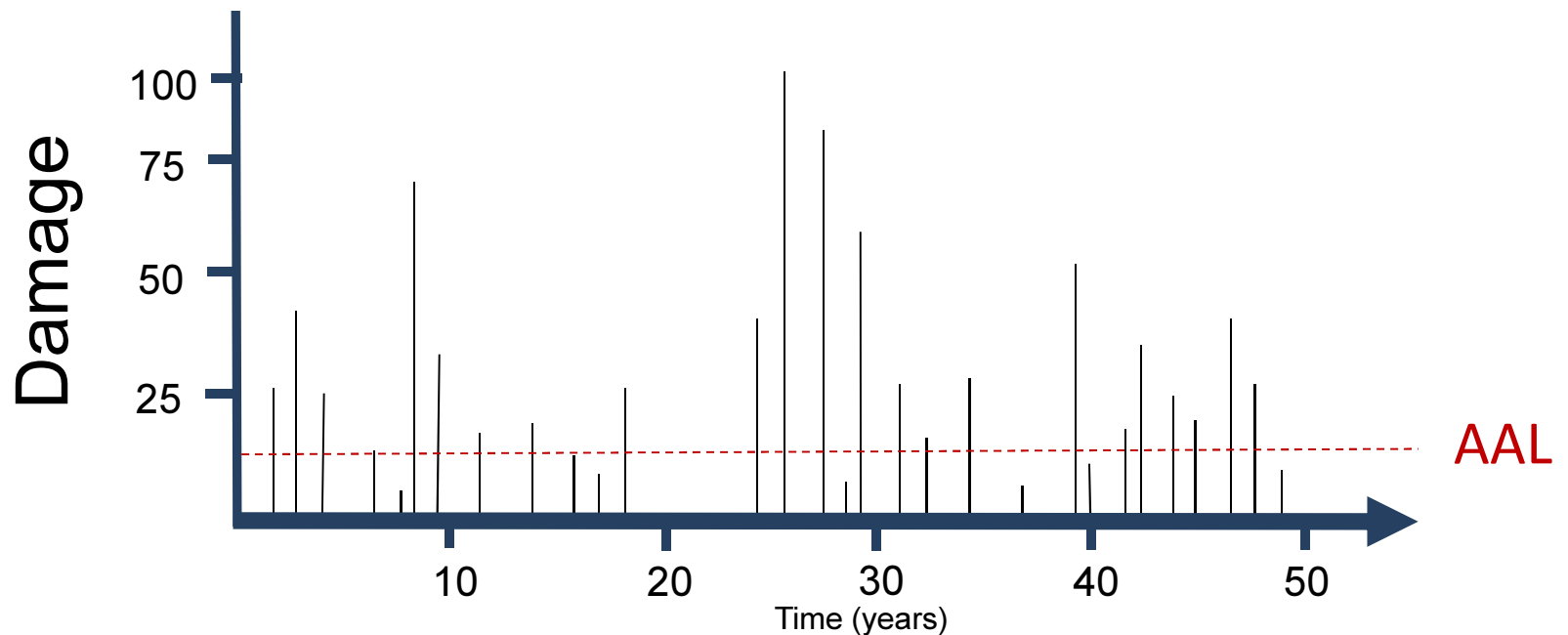
**Risk** = *Probability of an event occurring x impact of the event*

*Detailed presentation of Risk profiles generation (with PRA) for 16 African Countries on Wednesday 24th morning (Session 5). UNISDR and CIMA Project*



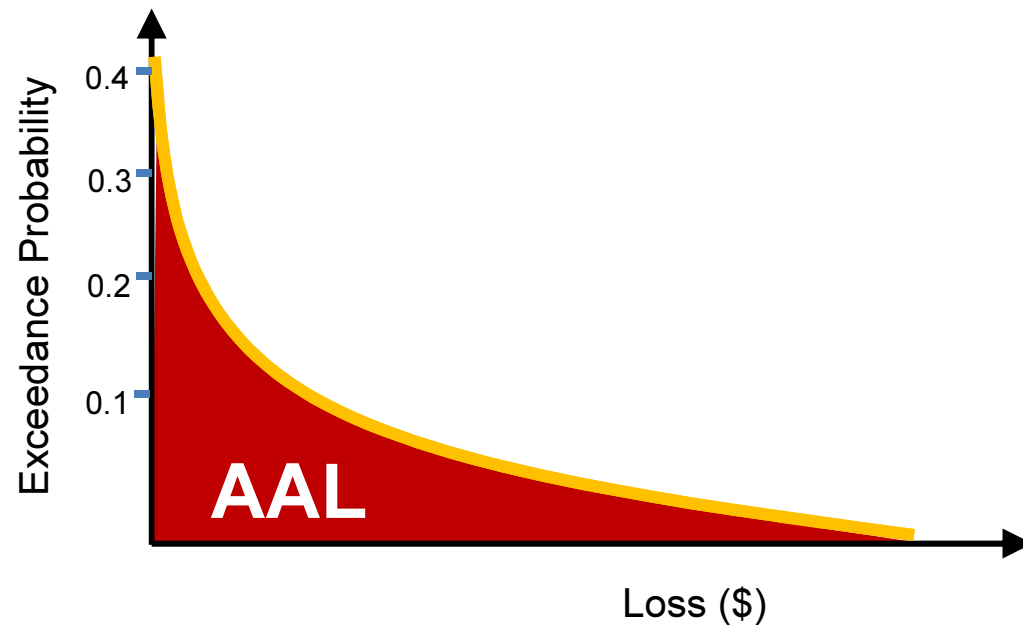
# Probabilistic Risk Assessment metrics: Average Annual Loss

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



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.

# Probabilistic Risk Assessment metrics: Loss Exceedance Curve (Risk Curve) Average Annual Loss



Aim of the PRA is to compute **informative risk metrics**, nominally LEC, PML and AAL, useful to monitor trends, place disaster loss records and evaluate DRR policies according to an extended loss frequency analysis.

# Probabilistic Risk Assessment metrics: AAL as an informative financial metric

**Average Annual Loss (AAL)** is the *expected loss per year*, averaged over many years. **AAL** is the main risk economic parameter for a country, as it indicates the total amount of losses that sooner or later are estimated to occur.

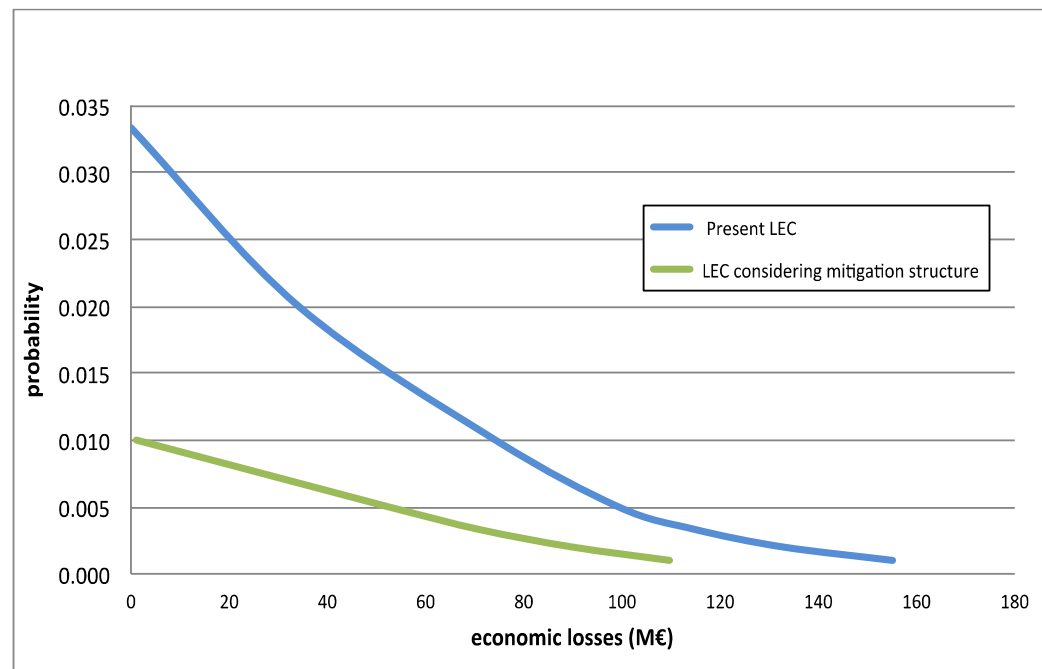
AAL in relation with other country economic metrics (e.g. GDP, reserves, etc.) can provide indication of country fiscal resilience.

For instance, an high ratio  $\frac{AAL}{social\ expenditures}$  can challenge future social development.

# Probabilistic risk assessment

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

- Climate change → hazard increasing
- Population grow → exposure increasing
- Mitigation measure → exposure/hazard/vulnerability decrease



# Key messages

- Probabilistic Risk Assessment can be a valuable tool to quantify the benefits of DRR measures (implemented or planned)
- PRA results in financial metrics that can help decision-makers defining how to prepare for disasters and how to invest in mitigation policies
- Considering a statistical time horizon, PRA methodology can encourage governments to keep investments in DRR regardless of the occurrence of a specific disaster
- A risk profile is the baseline for design investments at the Country level

*Thank you!*

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