



CLUVA Project

Paolo Gasparini – AMRA S.c.a r.l. - Naples

amra

■ analysis and monitoring of environmental risk



Project data and context



- FP7 project EU contribution : 3 500 000 €
- 13 research partners : Africa



Gaston Berger University Sénégal



University of Ouagadougou Burkina Fasso



University of Yaoundé 1 (ENSP) Cameroon



Ardhi University Tanzania



Addis Ababa University (EIABC) Ethiopia



Centre for Scientific and Industrial Research South Africa



Project data and context



AMRA Italy coordinator



University of Copenhagen Denmark



University of Manchester UK



Technical University of Munich Germany



Helmoltz Centre for Environmental Research Germany



Euro-Mediterranean Centre for Climate Change Research



Norwegian Institute for Urban and Regional Research



Climate Change and Urban Vulnerability in Africa



Multidisciplinary & Interdisciplinary vulnerability knowledge production

The CLUVA project is an integrated effort between seven European institutions and six African research establishments.

The overall objective of CLUVA is to develop methods and knowledge to be applied to African cities to manage climate risks, to reduce vulnerabilities and to improve coping capacity and resilience towards climate changes.



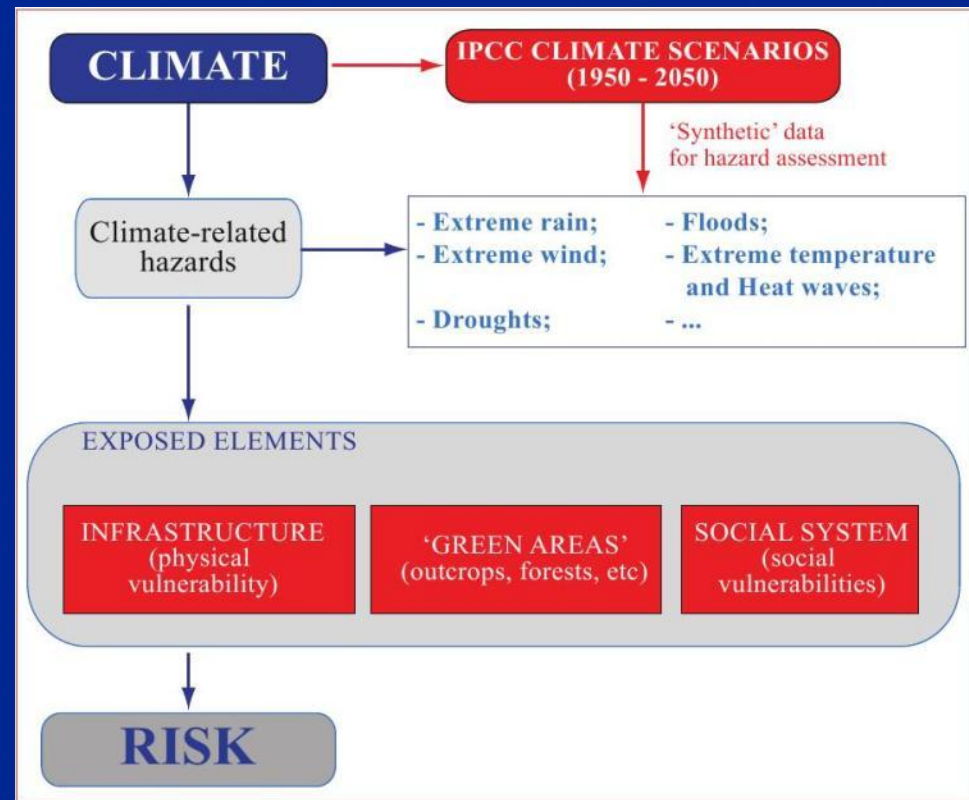
www.cluva.eu





From Climate-change scenarios to quantitative (multi) risk assessment:

- ✓ Starting from the Climate, hazards are assessed using:
 - Observed data (1960 – 2011);
 - Synthetic data produced considering three different climate-change scenarios from the IPCC (1960 – 2050)
- ✓ Different dimensions of vulnerability are considered:
 - Physical infrastructure
 - Green areas
 - Social vulnerability
- ✓ Risk assessment considering a multi-risk approach





Climate-change scenarios:

- are plausible descriptions of how the future may develop;
- are neither predictions nor forecasts. They describe several factors generally associated with climate change;
- consider the following IPCC scenarios:

RCP4.5 (AR5)

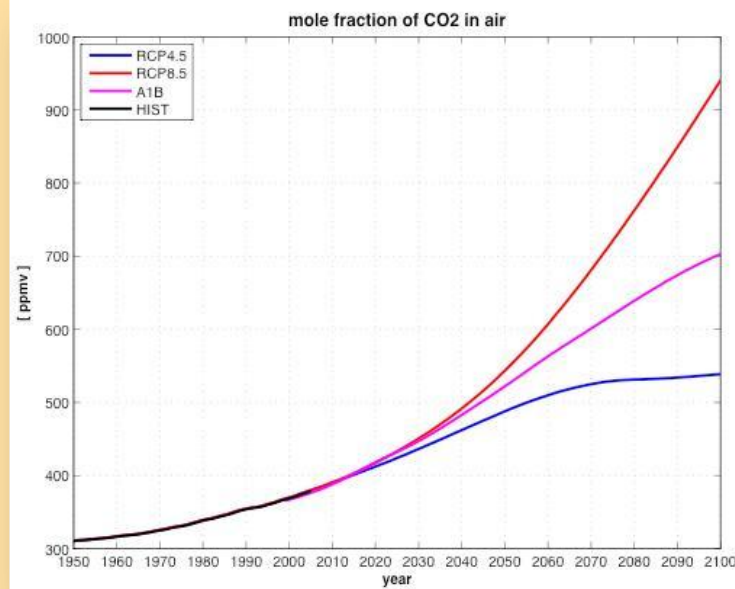
High income growth, low population growth, gain in clean energy and efficiency resulting from aggressive carbon Pricing.

A2(AR4)

Uneven economic growth. Global atmospheric concentrations of greenhouse gases increased due primarily to fossil fuel use land use change.

RCP8.5 (AR5)

High emission scenario, high population growth, coal intensive energy scenario.

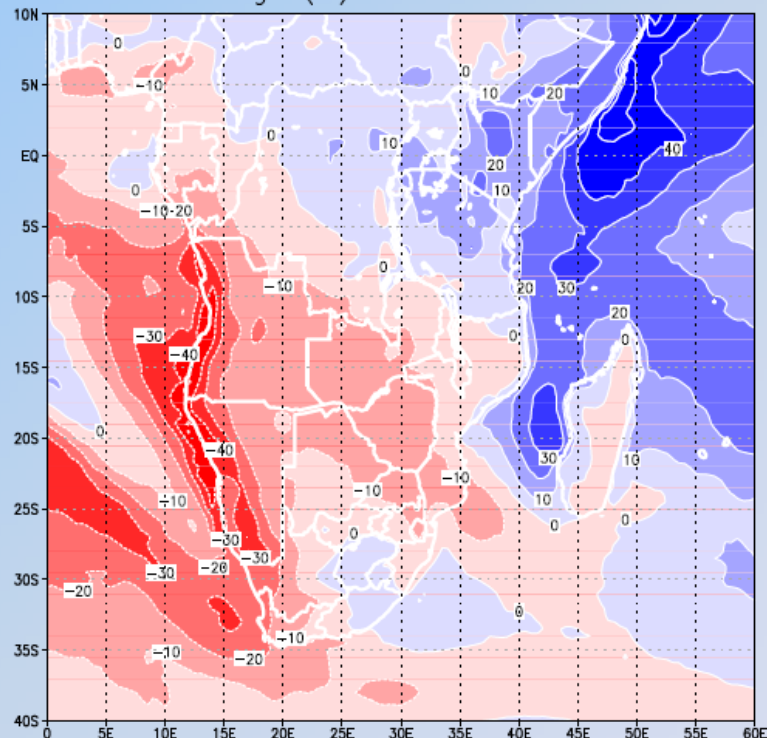




Very High-Resolution Climate Change Data

Rainfall change

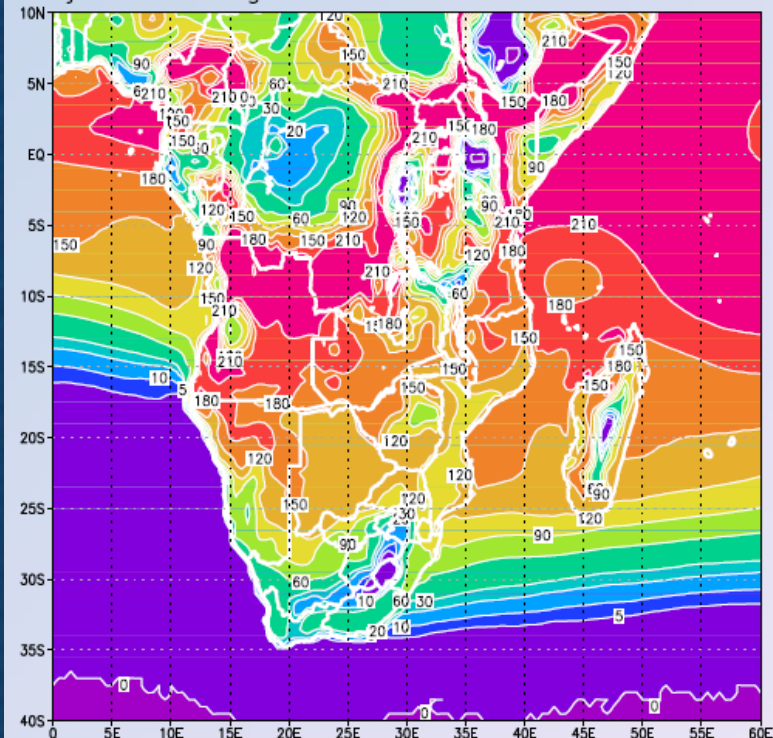
CCAM rnd change (%) 2071-2100 vs 1961-1990



Projected change in annual rainfall for the period 2071-2100 relative to 1961-1990

Temperature change

Projected change vhma 2071-2100 vs 1961-1990

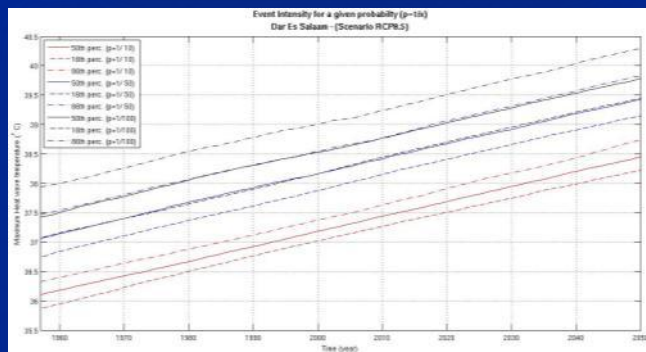
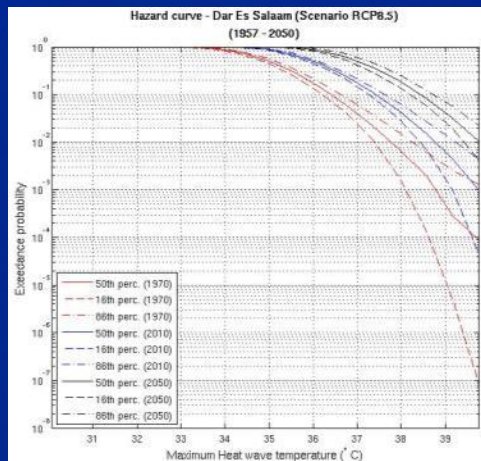


Associated change in the number of very hot days (max temperature > 35 °C)

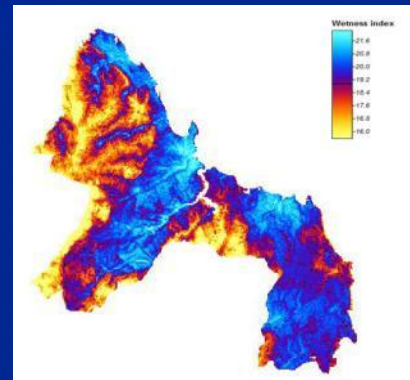


CLUVA Hazard assessment :

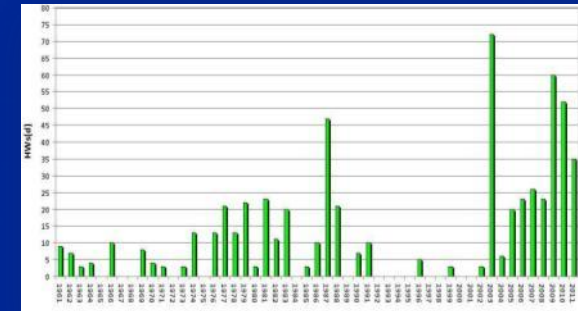
Time dependent hazard assessment
(considering Climate
change scenarios)



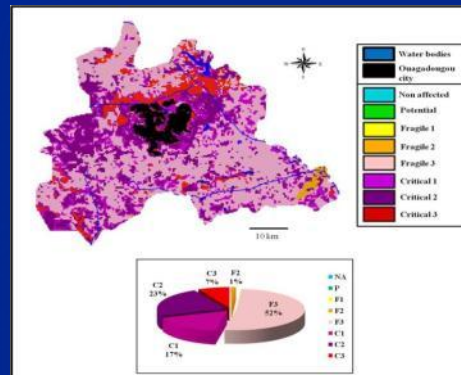
Floods



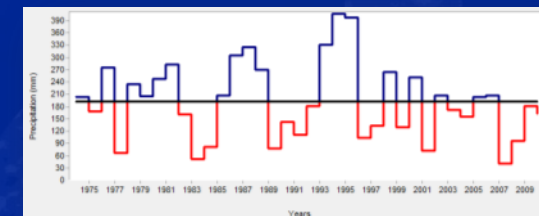
Heat waves



Desertification



Droughts

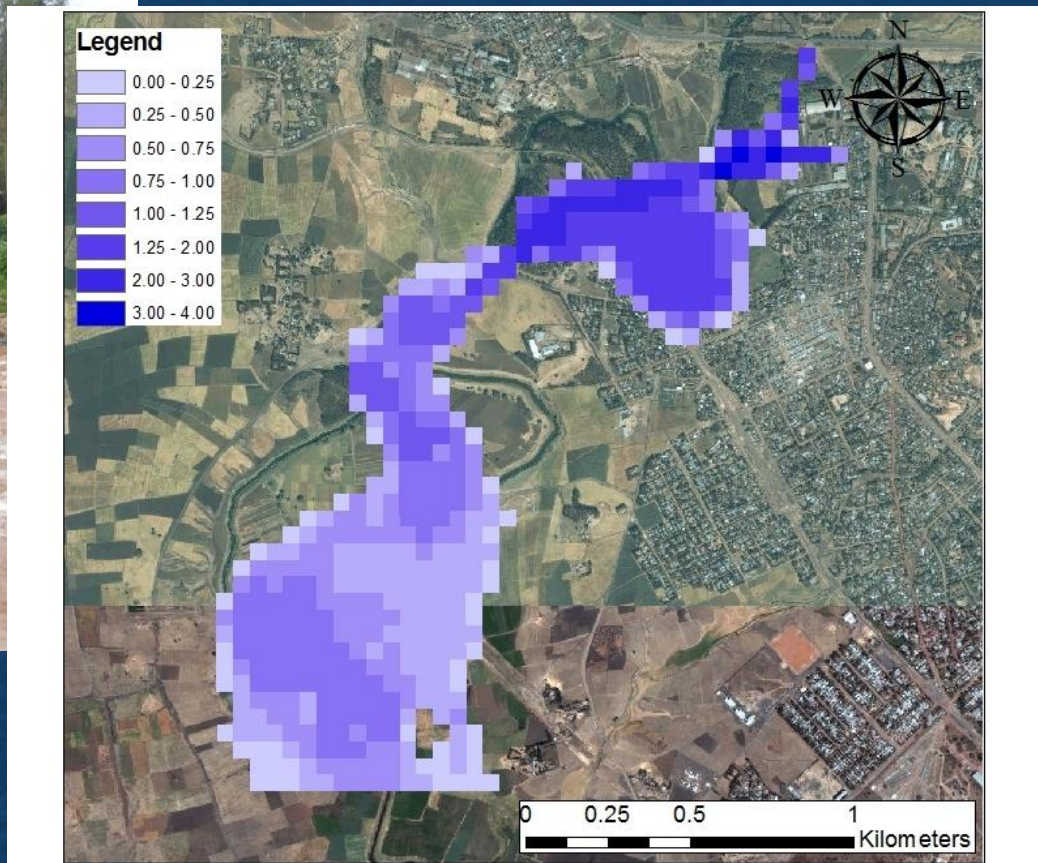




Flood Hazard Assessment

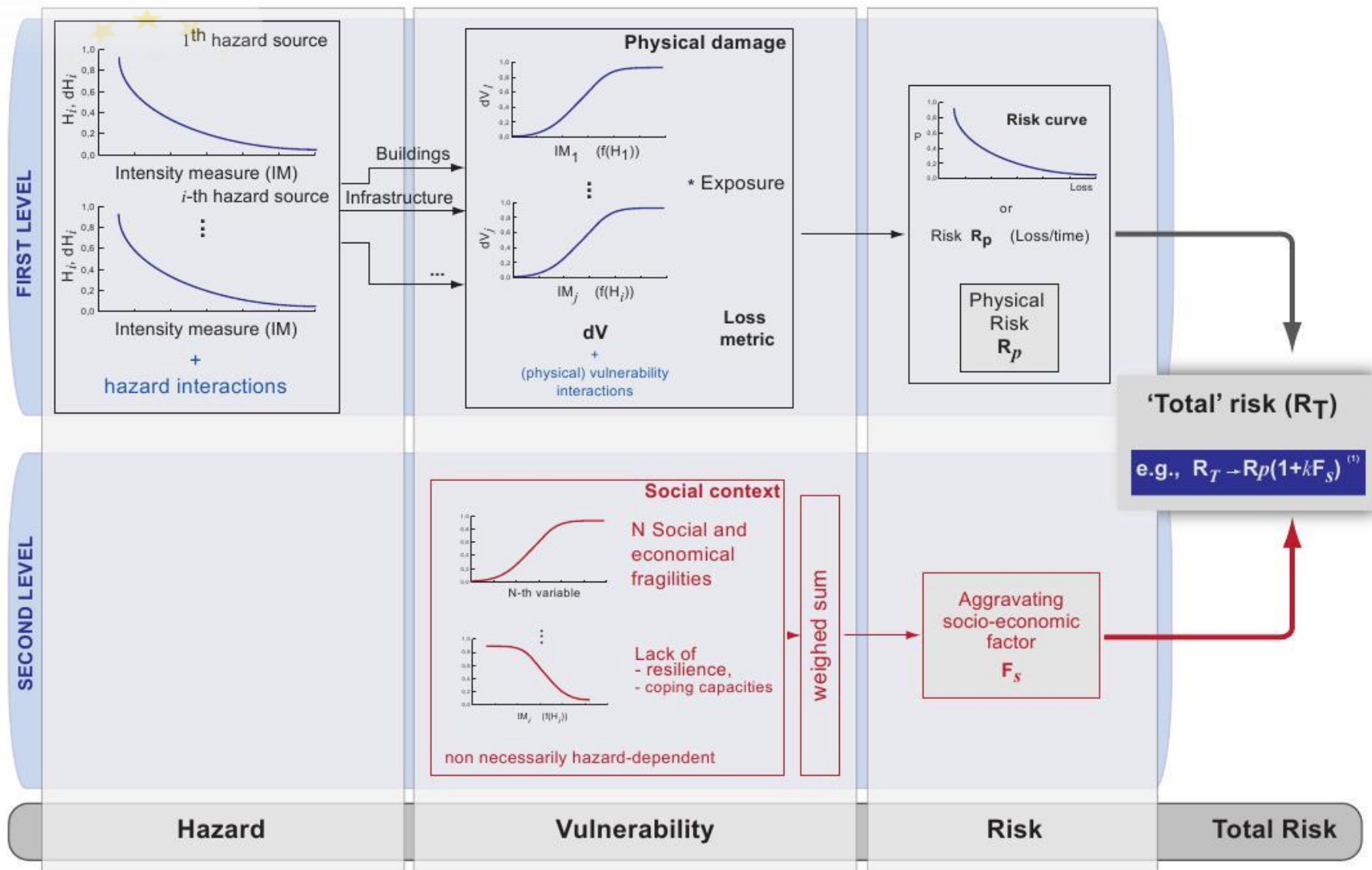


Understand the hazards and
how climate change will effect
them



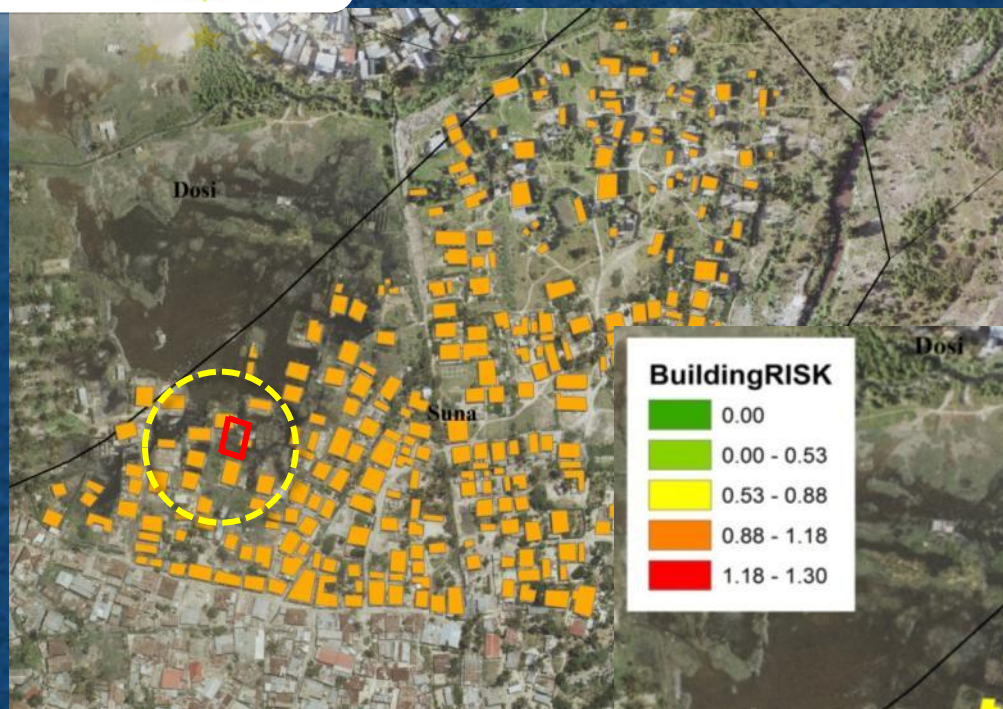


CLUVA Multi-risk framework:





Assessing Vulnerability of Informal Settlements



Analyze local
vulnerability based
on flood hazard
assessments



Development of strategies to enhance resilience of urban areas towards climate change



Understand the
governance
situation, develop
mitigation strategies

CLUVA website



CLUVA
CLimate change and Urban Vulnerability in Africa

SEVENTH FRAMEWORK PROGRAMME
Environment (including climate change)
Call: FP7-ENV-2010

THEME [ENV.2010.2.1.5-1]
[Assessing vulnerability of urban systems, populations and goods in relation to natural and man-made disasters in Africa]

[Home](#) [Introduction](#) [Objectives](#) [Partnership](#) [WP](#) [Events](#) [Publications](#) [Dissemination/Results](#) [Forum](#)

Addis Abeba

Dar es Salaam

Douala

Ouagadougou

Saint Louis

CLUVA
CLimate change and Urban Vulnerability in Africa

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CLUVA Climate Change Data Repository

Climate Change
Simulation data for the period 1981-2100

This portal provides access to heretofore of climate change simulation data. The data was generated by the Council of Scientific and Industrial Research (CSIR), South Africa, and the Euro-Mediterranean Centre on Climate Change (CMCC), Italy in the context of the Climate Change and Urban Vulnerability in Africa (CLUVA) project, co-funded by the European Commission (Grant agreement No. 246137).

[Climate Change](#) [CSIR Models](#) [CMCC Models](#)

Mainly driven by changes in the orbital characteristics of Earth around the sun, the planet's climate has been continuously changing over periods of tens of thousands of years. However, the warming that has been detected in the earth's atmosphere over the last century is occurring at a rate that cannot be explained by any known natural cycle. Main climate science has indeed reached consensus that the enhanced greenhouse effect caused by the steepening of incoming short-wave radiation, reducing long-wave radiation and the absorption of energy by enhanced levels of CO₂ and water vapor in the troposphere is the main forcing mechanism responsible for the phenomenon of global warming. The enhanced greenhouse effect strengthens the natural greenhouse effect that results from the CO₂ and water vapor occurring naturally in the atmosphere. The continuous burning of fossil fuels since the industrial revolution, and the simultaneous degradation of large forests are the main reasons for the increase in CO₂ concentrations in the atmosphere. Through the collaboration between the CMCC and the CSIR, a multi-model ensemble of six high-resolution simulations of climate and climate change will be derived (two at CMCC and four at the CSIR). That is, a multi-model ensemble of simulations of present-day and future climate will be available for each of the cities. This will be most useful to describe the range of uncertainty associated with future climate for each of the cities. The model simulations of present-day climate will be verified against observations and an associated model inter-comparison study will be performed.

With recently, many scientific reports of climate change impacts and a forecast, consensus in the future, that it is necessary to take action to counteract what will be a global warming. In the context of climate change, with a growing frequency of weather and climate extremes, the need to assess the impact of climate change and its effects on the environment, society and the economy is becoming increasingly urgent. The CLUVA project, co-funded by the European Commission, is a multi-model ensemble of simulations of present-day and future climate for each of the cities. This will be most useful to describe the range of uncertainty associated with future climate for each of the cities. The model simulations of present-day climate will be verified against observations and an associated model inter-comparison study will be performed.



Educational programs as long-term capacity building

UN HABITAT
FOR A BETTER URBAN FUTURE

TUM

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**UNITED NATIONS
UNIVERSITY**

Technische Universität München



UNU-EHS

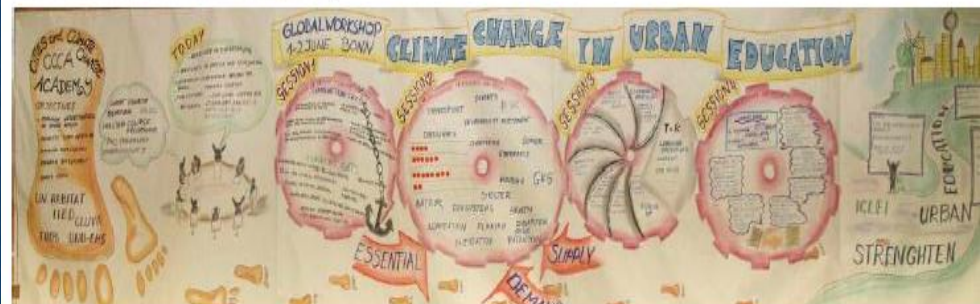
Institute for Environment
and Human Security

**Strengthening Climate Change in Urban Education
Cities and Climate Change Academy (CCCA)**

Global Workshop

Bonn, 1-2 June 2011

**Solid partnership with UN
Habitat for the elaboration of
CLUVA related modules and
integration into existing MSc
programs**





Research capacity building: workshops and training courses



CLUVA Project
CLimate change and Urban Vulnerability in Africa



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Training on the job Course
on Hazards, Risk, and Bayesian multi-risk assessment



Management of natural risks in urban areas

- RESEARCH ISSUES
- An unified probabilistic estimate of all the natural risks and their prioritization
- Climate change effects must be estimated taking into account the socioeconomic context and human feedback
- Resilience can be improved by proper urban planning
- Use of green areas and soils as hazard mitigators

A vision for the future

→ Technical issues

- ❑ Protection of strategic structures and infrastructures in European high risk areas
- ❑ Specialized decision support modules
- ❑ Low cost very dense sensor nets in urban environment
- ❑ Citizen's involvement in the protection actions
- ❑ Co-existence of centralized and de-centralized decision making

→ Social and legal issues

- ❑ Education and training
- ❑ End-to-end diffusion of information
- ❑ Solution of legal problems



***THANK YOU FOR YOUR
ATTENTION***

