ACC DAR Adapting to Climate Change in Coastal Dar es Salaam

International Workshop

TOWARDS SCENARIOS FOR URBAN ADAPTATION PLANNING

Assessing seawater intrusion under climate and land cover changes in Dar es Salaam, Tanzania

CLIMATE SCENARIOS FOR URBAN ADAPTATION PLANNING

Rome, 22 April 2013

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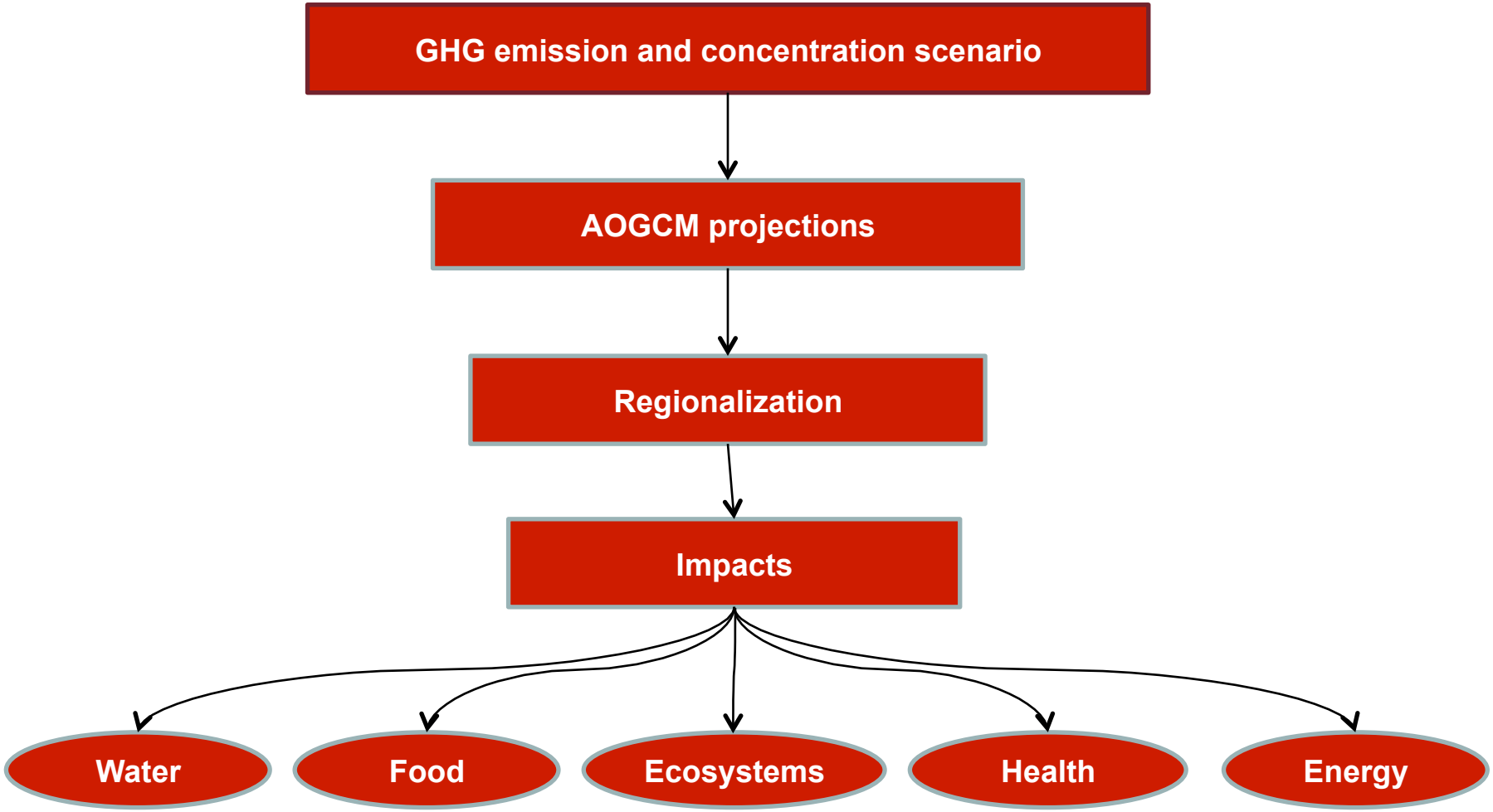
Climate scenarios

- Climate change assessments are permeated by uncertainty. This is a principle reason to recommend that adaptation assessments be anchored with an understanding of current climate risk. The major tool used to assess the impacts of future climate is the climate scenario.
- A scenario represents a plausible and simplified description of how the future may develop, based on a coherent and internally consistent set of assumptions about driving forces and key relationships.
- Scenarios may be derived from projections, but are often based on additional information from other sources, sometimes combined with a narrative storyline.

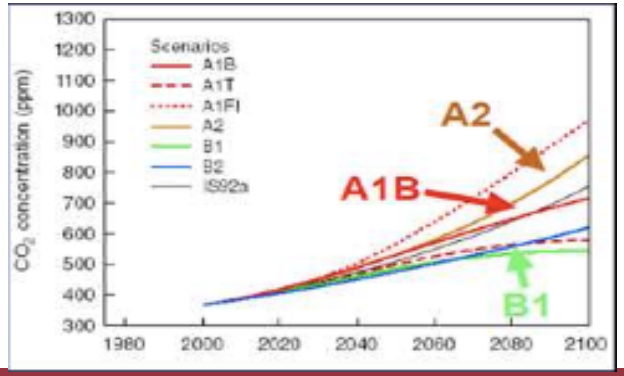
Basic elements of a climate scenario



GHG emissions and concentration scenarios

The IPCC Special Report on Emission Scenarios (SRES)

- **A1B scenario:** rapid future economic growth and rapid introduction of new and more efficient technologies, based on a balance across fossil-intensive and non -fossil energy sources. Global population peaks in mid-century and declines thereafter.
- **A2 scenario:** Economic development is primarily regionally oriented with per capita economic growth and technological change more fragmented and slower than other scenarios. Continuously increasing population.
- **B1 scenario:** a convergent world with the same global population, that peaks in mid-century and declines thereafter, with rapid change in economic structures toward a service and information economy, with reductions in material intensity and the introduction of clean and resource-efficient technologies.

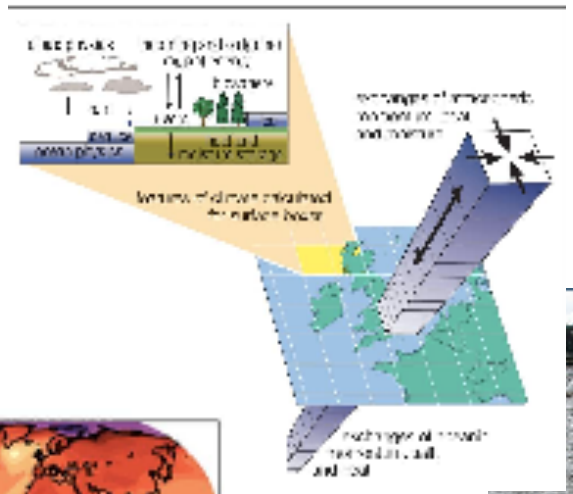


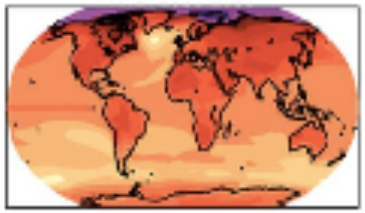
TO OBSERVE:
A: high economic growth
B: low economic growth
1: stable population
2: increasing population

--- CO_2 concentrations projections

Regionalization

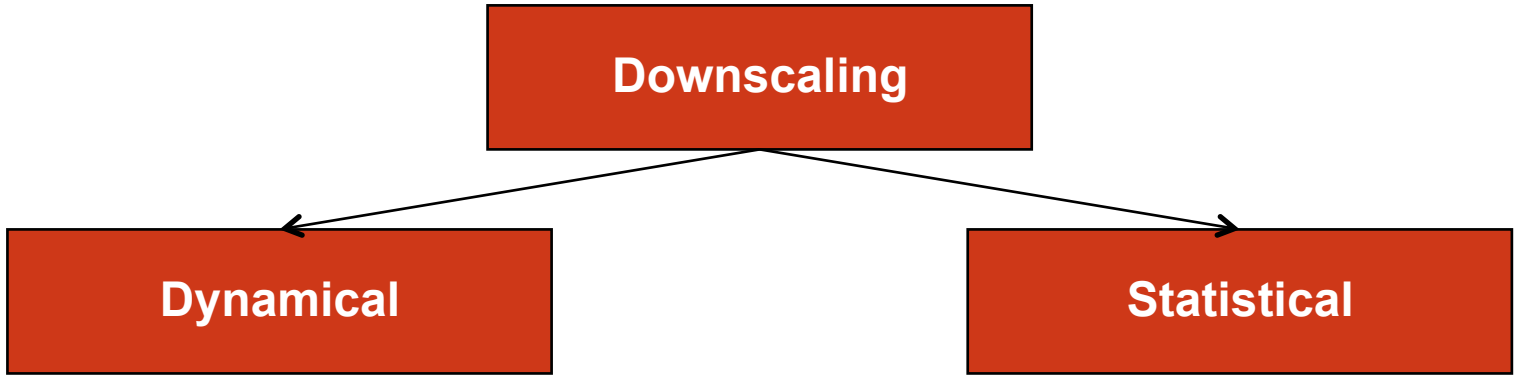
Downscaling attempts to resolve the scale discrepancy between climate change scenarios and the resolution required for impact assessment



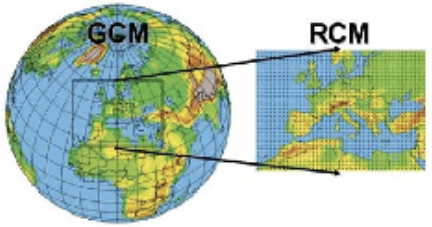


From the global (≈ 300 km)
to the local scale (1 - 25 km)

Downscaling techniques



In the last years combined approach have been developed + high resolution GCMs



Dynamical downscaling is based on the use of Regional Climate Models (RCMs)

Statistical downscaling is based on the development of a statistical relationship between large scale variables and local scale ones

THE LIFE PROJECT ACT:
Adapting to Climate change in Time

Comune di Ancona (IT)

Comune di Bullas (SP)

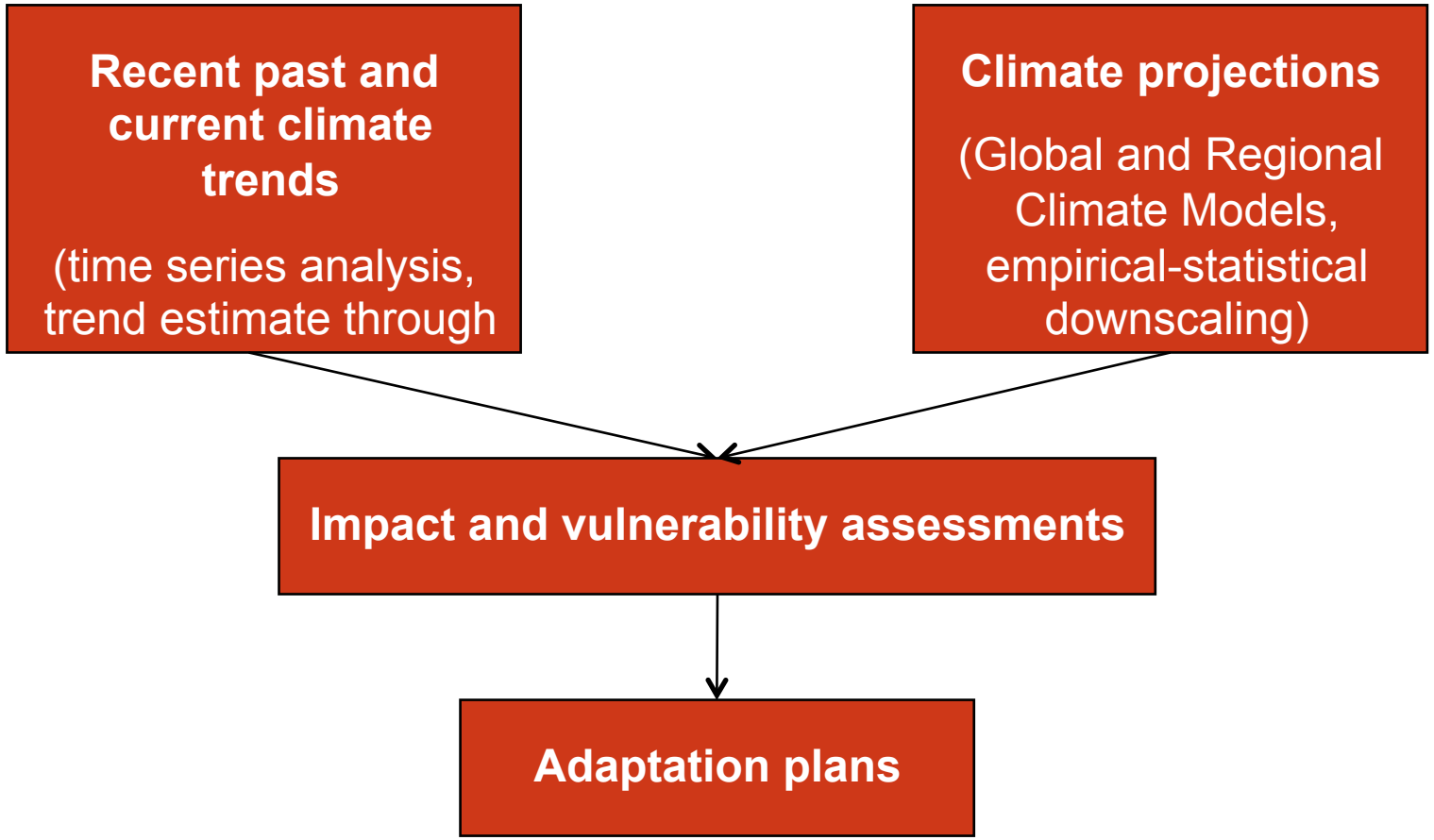
Comune di Patrasso (GR)

Forum dell'Adriatico e dello Ionio

ISPRA

MAIN OBJECTIVE: development of "LOCAL ADAPTATION PLANS" aiming at reducing the impacts of climate change and the vulnerability of three Mediterranean municipalities

Baseline climate scenario for ACT (Ancona, Bullas, Patras)



Climate scenario for the LIFE ACT project (I)

- Temperature and precipitation projections for the three target areas (Ancona, Bullas, Patras) were extracted from the gridded fields generated by three Regional Climate Models (RCMs) and two high-resolution Global Climate Models (GCMs).
- From each gridded field, the “land” grid point closest to each target area was considered.
- Data were downloaded from the websites:

➢ GCMs: PCMDI (http://www-pcmdi.llnl.gov/), Program for Climate ModelsDiagnosis and Intercomparison

➢ RCMs:ENSEMBLES project (http://ensemblesrt3.dmi.dk/), Research line: production of regional climate scenarios for impact assessments

Climate scenario for the LIFE ACT project (II)

- Projections for Regional Climate Models are available only for the emission scenario A1B (the intermediate scenario).
- Projections for Global Climate Models are also available for the A2 (pessimistic) and B1 (optimistic) emission scenarios.
- The chosen RCMs were selected according to this 3 criteria:
  - high spatial resolution
  - number of output parameters
  - easy and clear procedures for gridded data extraction.
- The chosen GCMs have the spatial resolution closer to that of the selected RCMs.

Developing scenarios for socio-economic outcomes

- Generally, a climate scenario provides an assessment of plausible trends and ranges for basic climate variables (temperature and precipitation), together with information on extremes.
- While it would be useful, it is not always possible to have models linking the entire process from climate change to socio-economic outcomes.
- For example, if only biophysical models are available, or if vulnerability cannot be adequately quantified, stakeholders may decide to identify levels of vulnerability in biophysical terms where there is an agreed consensus about the degree of vulnerability: in terms of flooding, there may be a particular water level associated with widespread damage; if only rainfall data is available researchers may quantify the rainfall amounts preceding similar levels of inundations; for agriculture, rainfall may be used as a proxy for loss of production or given levels of food security.
- In terms of sustainability, stakeholders may identify a level of crop production that they think is sustainable and assess how they may reach that target under climate change.