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A simple methodological framework to incorporate climate change in impact assessment

Miguel Coutinho and Margaret Pereira

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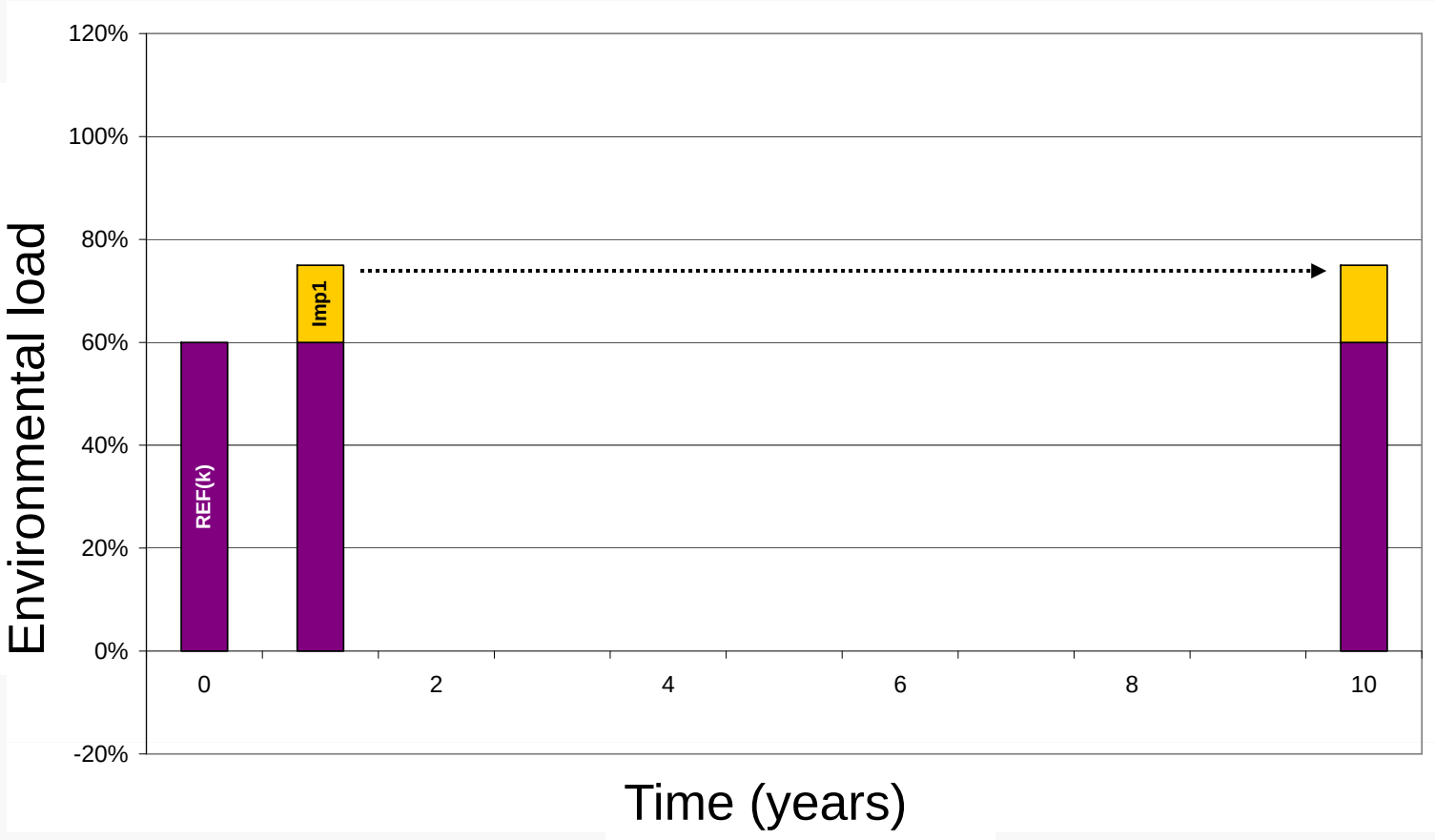
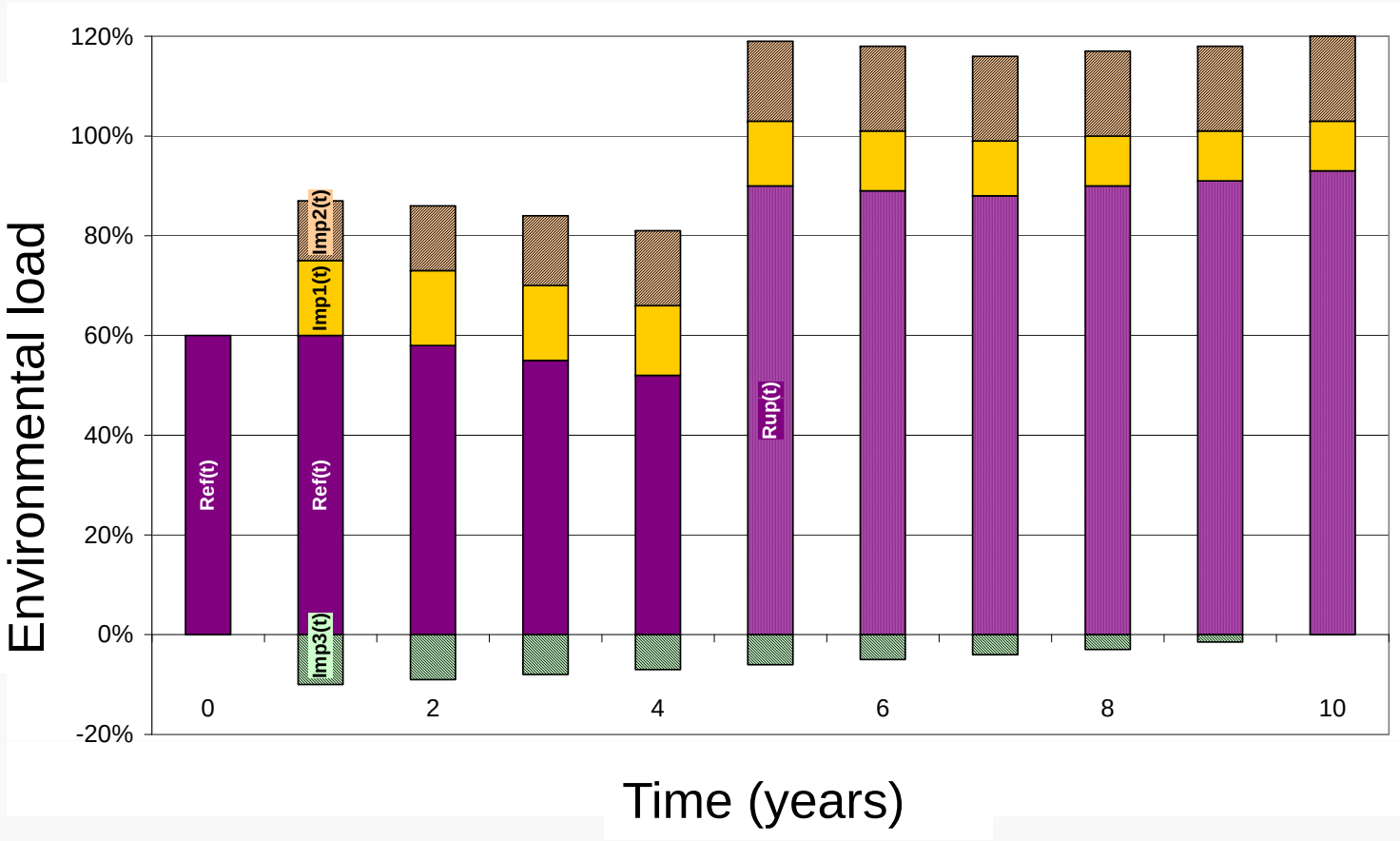
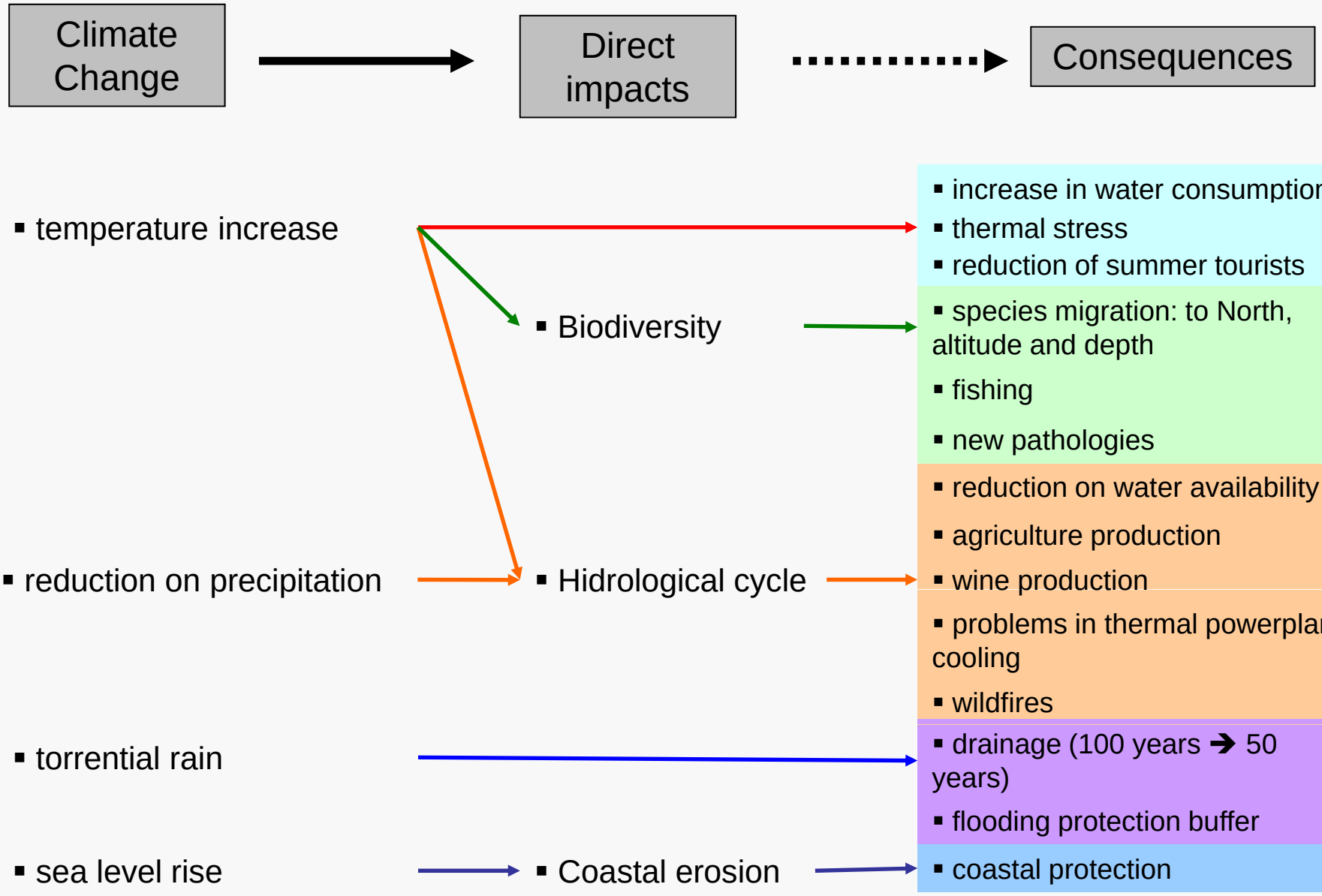
Future is my project



Future is multi-dimensional and dynamic




Climate Change
Direct impacts
Consequences
▪ temperature increase
▪ increase in water consumption
▪ thermal stress
▪ reduction of summer tourists
▪ Biodiversity
▪ species migration: to North, altitude and depth
▪ fishing
▪ new pathologies
▪ reduction on precipitation
▪ Hidrological cycle
▪ reduction on water availability
▪ agriculture production
▪ wine production
▪ problems in thermal powerplant cooling
▪ wildfires
▪ torrential rain
▪ drainage (100 years ➔ 50 years)
▪ flooding protection buffer
▪ sea level rise
▪ Coastal erosion
▪ coastal protection

How can we add Climate Change into Impact Assessment?

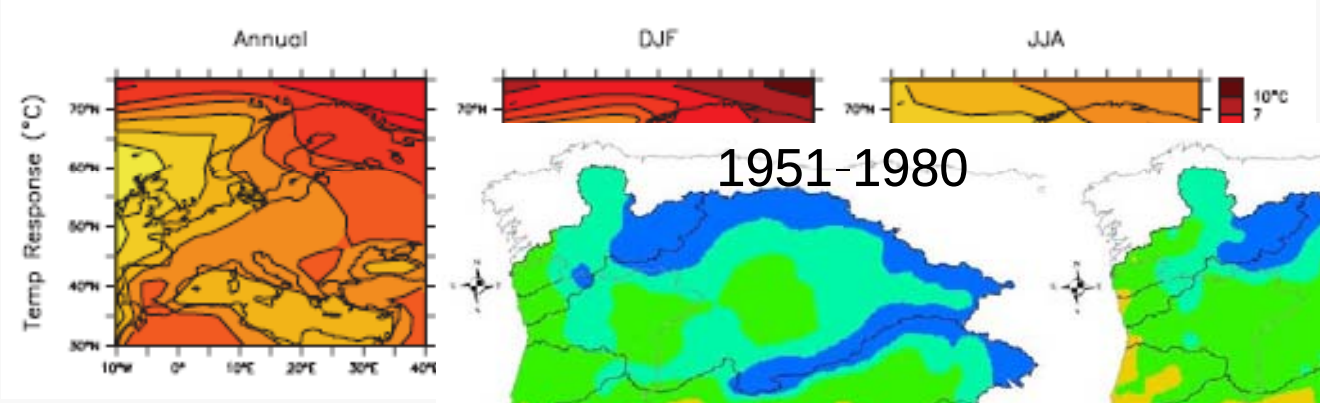
2 x 3 Methodology

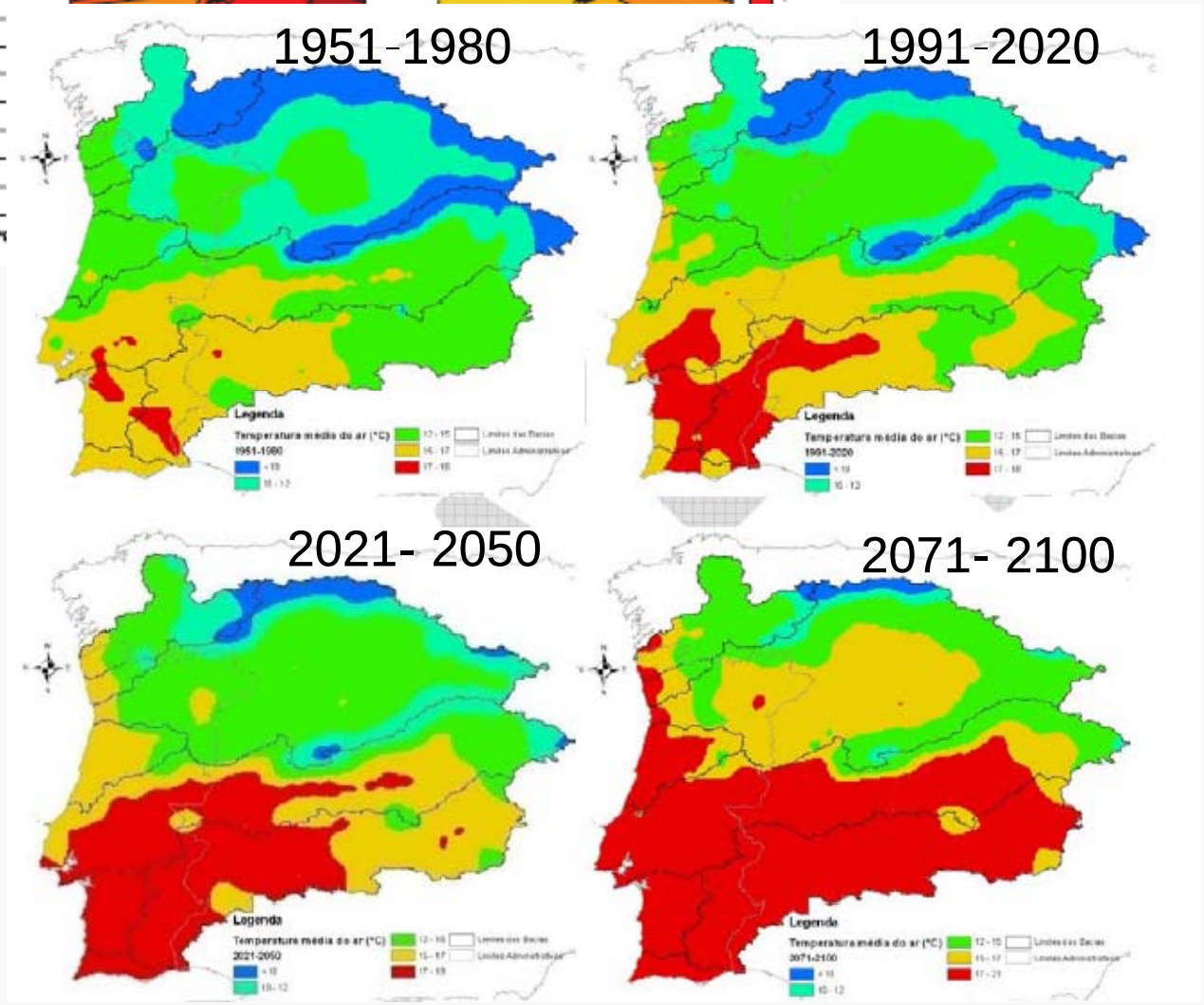
- Understand climate change
  1. Identify projected climatic changes
  2. Identify consequences of climate change
  3. Integrate this knowledge into impact assessment
- Adapt impact assessment
  4. Identify impacts of the project on climate change
  5. Identify impacts of climate change over the project
  6. Integrate this knowledge on the cumulative effects assessment
- Environmental baseline chapter
- Impact assessment chapter

Understand climate change– 1

1. Identify projected **climatic changes**:
    1. Collect information: IPCC (AR4 - 2007), national or local reports
    2. Climatic variables: temperature, precipitation, snow, sea level
    3. Temporal resolution: 2070-90 (...)
    4. Spacial resolution: sub-continental ➔ watershed

2080-99 versus 1980-99



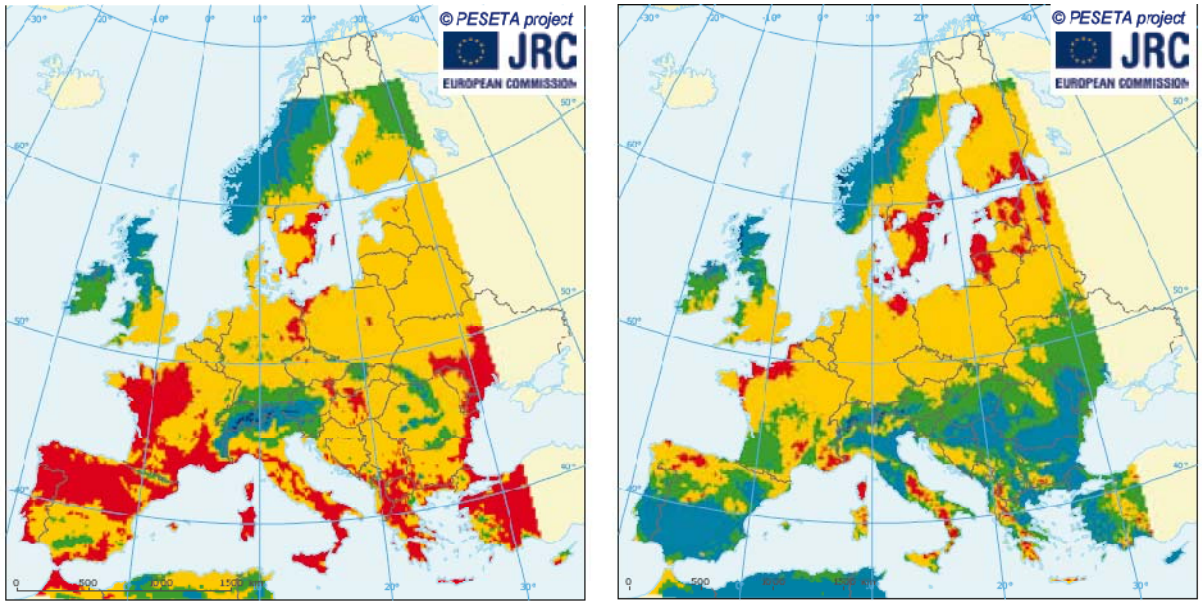


Understand climate change- 2

2. Identify indirect **consequences** of climate change
    1. Collect information: IPCC (AR4-2007), European Environmental Agency
    2. Horizontal process
    3. Environmental systems:
        1. Water resources and management
        2. Ecossistems
        3. Food procustion and forests
        4. Coastal systems and low lands
        5. Industriy, human settlement and society
        6. Health

Economic effects of climate change: tourism (EEA, 2008)

Map 7.6 Modelled conditions for summer tourism in Europe for 1961–1990 and 2071–2100



Simulated conditions for summer tourism in Europe for 1961–1990 (left) and 2071–2100 (right) according to a High-Emissions Scenario (IPCC SRES A2)

Tourism Comfort Index (TCI)

- Unfavourable (TCI: 0–40)
- Acceptable (TCI: 40–60)
- Good (TCI: 60–70)
- Very good (TCI: 70–80)
- Excellent (TCI: 80–100)

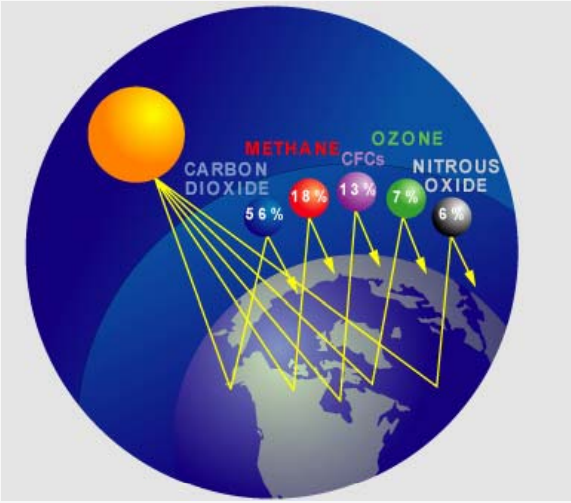
Source: JRC PESETA project (http://peseta.jrc.ec.europa.eu/docs/Tourism.html).

Understand climate change- 3

3. Integrate knowledge into impact assessment
    1. Dynamic Future(s)
    2. **Evolution of baseline without project**
        1. Give more importance to this component
        2. Several scenarios
        3. Handle uncertainties

Adapt impact assessment - 4

4. Identify impacts of the project **on climate change** (***Mitigation***)
   1. Greenhouse gas inventory: CO_2, CH_4, N_2O, others
   2. Land use: carbon offset, changes in albedo,...
   3. Energy use, transport



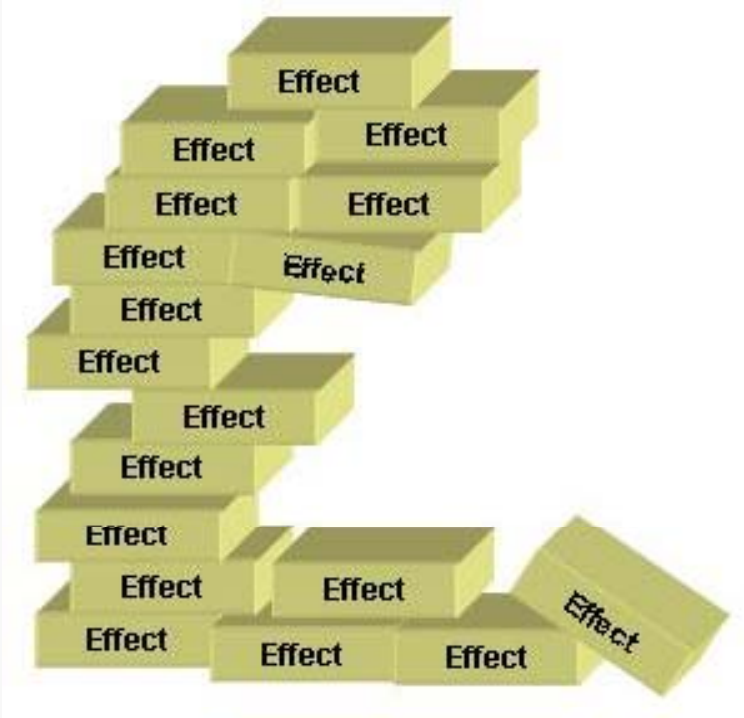
Adapt impact assessment - 5

5. Identify impacts of climate change **over the project**:
   1. Need of ***Adaptation*** measures
   2. Review of project dimensions and layout
   3. Review impact assessment

- Iterative process...
- Risk analysis?

Adapt impact assessment - 6

6. Handle **cumulative effects**:
   1. Cumulative effects (Canter and Ross, 2009)
      - Valued ecological components
      - Past, present and future actions
      - Identify link between actions and estimated cumulative effects
   2. Uncertainty



Conclusions

- Impact assessment requires detailed information on projected climate change and its consequences
  - In time
  - In space
- A new life to traditionally “minor” EIA chapters:
  - Environmental baseline evolution without project
  - Cumulative effects
- EIA will be less deterministic and must identify uncertainities
- Climate change introduces methodological challenges to impact assessment
  - Project developers
  - Consulting firms
  - IA administration
  - Public

Additional remarks

- Methodologies for climate change coincide with biodiversity interests
  - More integration
- Correlate temporal scales of project and climate changes
- EIA shouldn’t be more complex or costly...
  - Use available information

- In the long term:
  - climate change might disappear as an individual environmental factor in Impact Assessment
  - Incorporated in project engineering