

Adaptation to global change

Incorporating adaptation in integrated impact assessment

Pytrik Reidsma

Introduction and objectives

Until now, most of the measures to reduce the impacts of global change have been focussed on mitigation measures. Little emphasis has been put on defining and assessing the possible role of adaptation. In my PhD research, which started in april 2003, a comprehensible framework to employ adaptation in impact assessment will be developed.

Developing a framework for adaptive capacity

The project is closely linked to the more general vulnerability assessment of ecosystems in the EU-funded ATEAM project. Vulnerability is defined as a combination of exposure, sensitivity and adaptive capacity (AC). Within ATEAM a general concept to define quantitative, spatially explicit indicators of AC is being developed. In this approach, socio-economic indicators are combined using fuzzy set theory (figure 1). An AC indicator is calculated at NUTS2 level (regions in the EU) and extrapolated into the future.

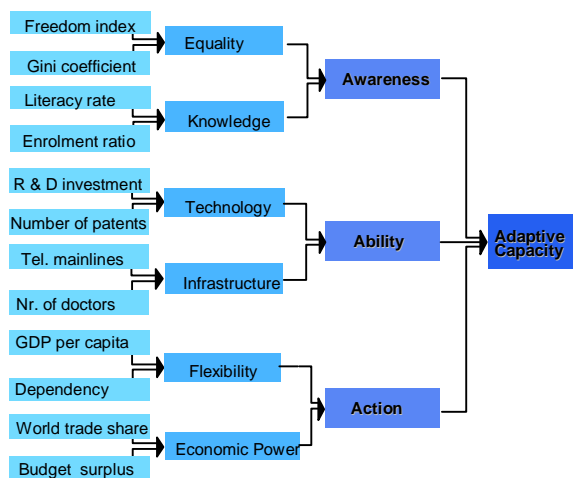


Figure 1. Indicator framework for adaptive capacity

Besides contributing to the finalisation of the indicator framework and the completion of the data, I will undertake another approach to calculate an AC indicator. A multivariate analysis for all observations of the indicators will be done, and the scenarios can be based on that.

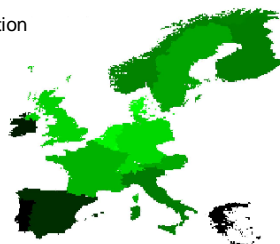
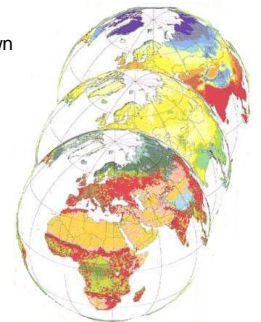


Figure 2. A preliminary map of AC (2000)

Integrating bottom-up adaptation strategies in a global impact model

Assessing the adaptive capacity of regions is a top-down approach to model adaptation. To be able to model the actual conditions and realistic responses of the systems involved, bottom-up research will be done on adaptation strategies for agricultural ecosystems and natural ecosystems.



Steps to make a framework:

- 1) Classify adaptation strategies
- 2) Review and evaluate bottom-up models, which can be relevant for adaptation assessment.
- 3) Do case studies with different models and adaptation strategies
- 4) Develop, test and improve the framework for modelling adaptation

	Autonomous	Planned
Agricultural	Alter crop species/varieties Changed sowing dates	Development of new crop varieties Crop insurance programs
Natural	Migration to suitable sites Phenotypic plasticity	Implementation of an ecological network Ex situ conservation for plants

Table 1. Examples of adaptation strategies

This framework should be applicable within IMAGE (Integrated Model Assessment of the Global Environment). IMAGE simulates the whole chain of human activities, emissions, concentrations, climate change, impacts and responses. So far only mitigation responses are included, adaptation is neglected. The framework I will develop in this PhD research should be able to bridge the specific bottom-up approaches and more generic top-down approaches, such as IMAGE, to model adaptation.

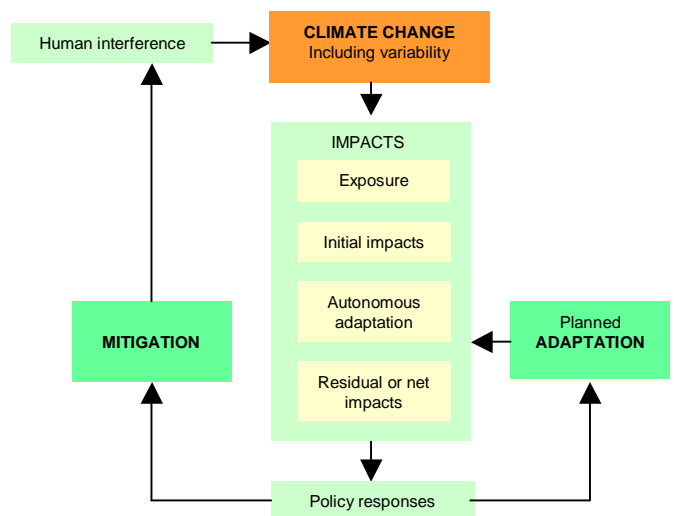


Figure 3. Places of adaptation in the climate change issue