

ATEAM's Vulnerability Assessment

Marc Metzger, Dagmar Schröter

A shell around ATEAM's modelling framework...

ATEAM assesses the effects of global environmental change on ecosystem services. 14 models assess the effects of 4 scenarios on approximately 30 ecosystem services, divided over 6 sectors (Agriculture, Forestry, C storage & Energy, Water, Biodiversity & Nature Conservation, Mountains). Consequently, ATEAM will produce a large amount of data.

In the Vulnerability Assessment an attempt will be made to analyse the data from the different models in an integrated framework.

ATEAM's scenarios feed into the different ecosystem models. Some models exchange outputs, but they are not linked. The model outcomes feed into the vulnerability framework, which enables thorough analysis of European ecosystem services and forms a "shell" around ATEAM.

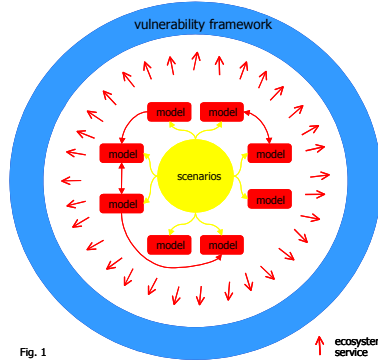
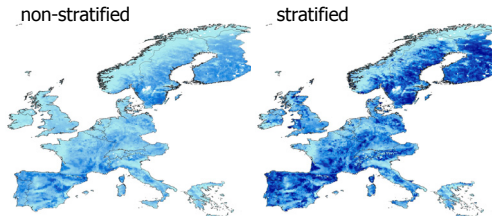


Fig. 1

...that stratifies ecosystem service provision....

It is not possible to compare changes in ecosystem services between regions with completely different environments, e.g. between Spain and Norway. Because climate is the main driver of European environmental patterns, a statistical climatic classification can be used to stratify the supply of ecosystem services across Europe.

Between the classes, maximum ecosystem service supply will differ. By dividing modelled values for ecosystem service supply by the highest value in the class a standardised stratified value can be calculated.



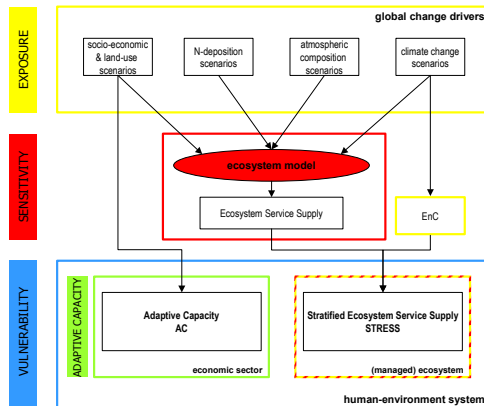
A non-stratified map of an ecosystem service, and a stratified map, which places values in the environmental context.

...quantifies vulnerability...

Scenarios of exposure to global change are composed of different socio-economic and biophysical drivers. Ecosystem models contain the rules that determine the sensitivity of the ecosystem service. The models compute maps of the quantity of ecosystem service which is supplied per grid cell. Making use of a statistical environmental classification (EnC), these maps are stratified into standardised maps of Stratified Ecosystem Service Supply (STRESS), which are used to map vulnerability.

Vulnerability is greatly affected by society's ability to adapt to the effects of environmental change. Adaptive capacity (AC) is therefore an important element in determining a region's vulnerability. Within ATEAM a generic measure of AC is calculated from socio-economic indicators.

Vulnerability indicates a change compared to an earlier moment in time. The change in STRESS, combined with AC is a measure of vulnerability.



What is vulnerability?

ATEAM's definition

The degree to which an ecosystem service is sensitive to global environmental change and the degree to which the sector that relies on the service is unable to adapt to the changes.

What determines vulnerability?

Exposure

The extent to which an area is exposed to environmental change.

Sensitivity

The degree to which an ecosystem service is affected by environmental change.

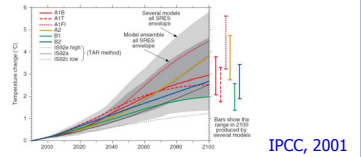
Adaptive Capacity

The extent to which society is able to adjust to changes in ecosystem services.

An example: Agriculture Sector

Exposure

It is likely that as a consequence of global warming there will be an increase in droughts in Southern Europe.



IPCC, 2001

Sensitivity

As a consequence yield loss and failed yield will occur more frequently.



Adaptive Capacity

A bundling of knowledge and new scientific research can lead to less sensitive crops and cropping systems.

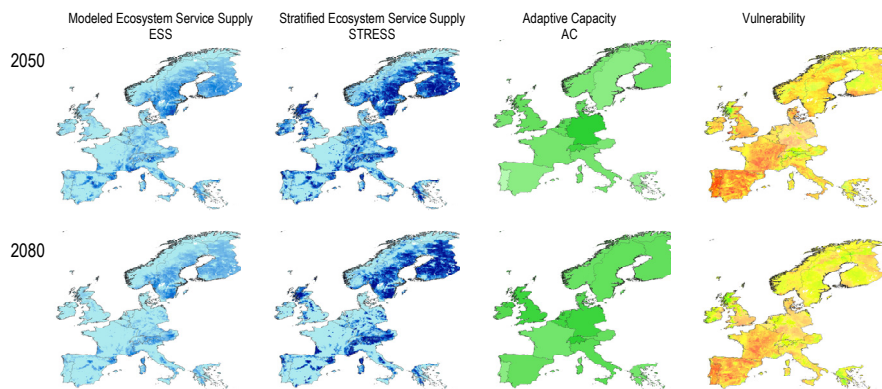


CanAdapt: a Canadian non-profit coalition which aims to catalyze agricultural adaptation and innovation.

... and will allow users to compare, analyse and map the vulnerability of European ecosystem services.

All ATEAM's results will be accessible through an interactive mapping tool. With this software it will be possible to map for each ecosystem service: the modelled ecosystem service supply, STRESS, AC and vulnerability.

It will be possible make comparisons between ecosystem services and scenarios, between regions and across times slices.



The ATEAM project is funded by the EU and led by the Potsdam Institute for Climate Impact Research. Project No. EVK2-2000-00075, 5th Framework Programme of the European Commission, 2001-2003. For more information about ATEAM: see www.pik-potsdam.de/ATEAM

For more information about ATEAM's vulnerability maps please contact Marc Metzger, Tel: +31 317-483251, Marc.Metzger@wur.nl