The CLIMSAVE Project

Climate Change Integrated Assessment Methodology for Cross-Sectoral Adaptation and Vulnerability in Europe

Summary of the CLIMSAVE conceptual framework for vulnerability assessment

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Introduction

A vulnerability framework has been developed that will be implemented within the CLIMSAVE Integrated Assessment Platform to enable stakeholders to identify hotspots of climate change vulnerability and discuss adaptation options. The framework does not deal with the concept of vulnerability from a general point of view, but sees vulnerability as an outcome of the components interacting within the Framework (Figure 1).

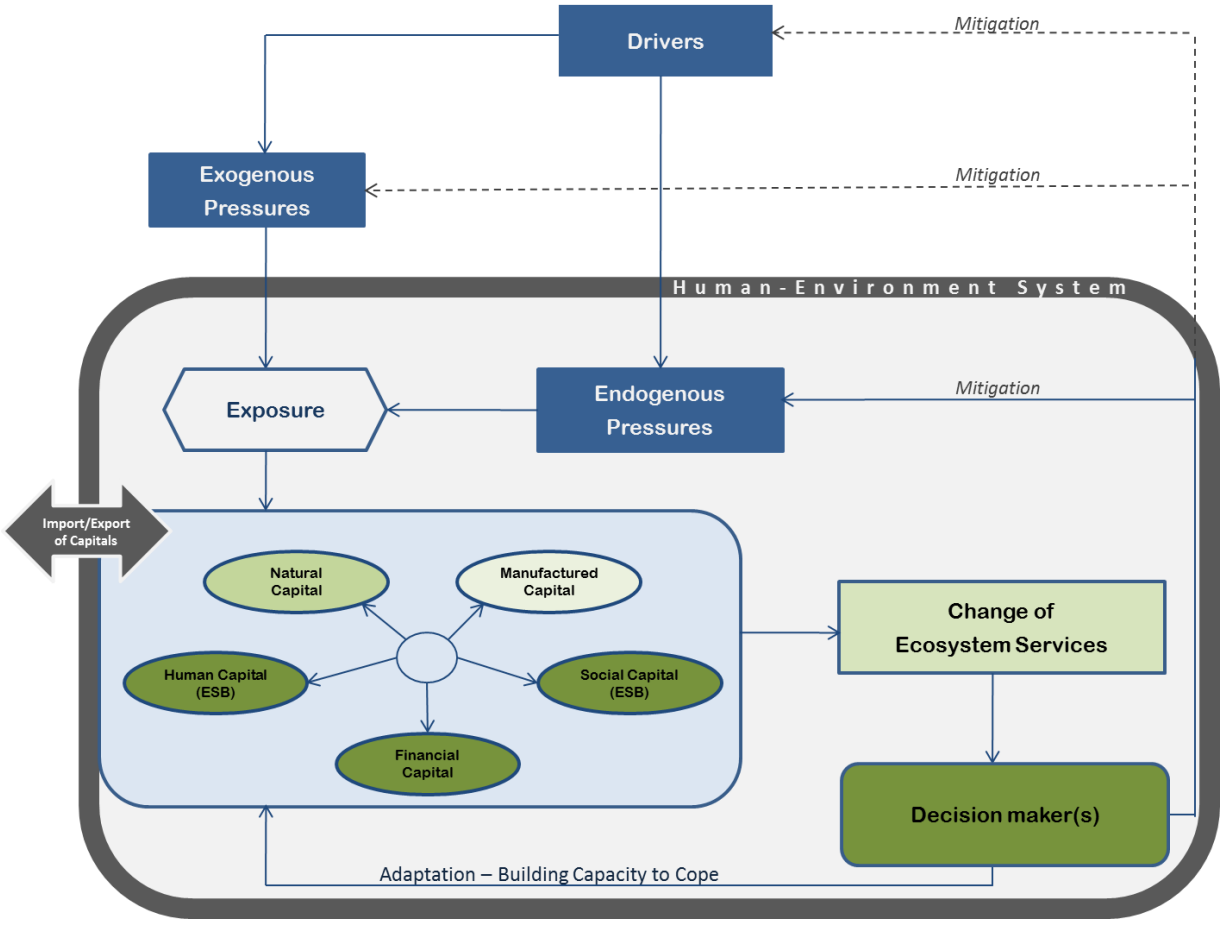

Figure 1: The CLIMSAVE vulnerability framework.

Framework components

The Framework assumes that the current vulnerability to *pressures*, such as climate change, depends on the *capacity to cope* and that this is determined by the *amount of capital* that can be used to deal with the pressures. Five types of capital are defined: natural, manufactured, social, human and financial, which are connected to each other. If coping capacity is low due to lack of capital then the quality or quantity of *ecosystem services* change and the beneficiaries of those services become vulnerable to the pressures. Faced with a change in ecosystem services, the *ecosystem service beneficiaries* (or decision-makers within the system) can *adapt* by improving their coping capacity in order to be more resilient to the pressures, or they can *mitigate* by reducing the pressures and/or drivers of change. An ecosystem service beneficiary is vulnerable, if he/she does not have enough coping capacity to manage when a change of ecosystem services takes place.

Although the diagram suggests linearity of the interactions between the components, in reality this is, of course, not the case. There will be feedbacks and the processes are dynamic. Most importantly, the amounts of the different capitals will change over time, thus changing the capacity to cope.

The blue boxes indicate drivers and pressures. The pressures act on the human-environment system but their effect on that system is moderated by exposure, which is thus included in a hexagonal box with no shading. Within the large box in the human-environment system are the five types of capital, which determine both the capacity of the system to cope with the pressures and the capacity of the system to adapt (increase coping capacity) over the longer term. Social and human capital exists within the ecosystem service beneficiaries (ESB). Changes in the amount of capital (in particular natural capital) lead to changes in ecosystem services. As a result of these changes, responses by decision-makers may be to decide to mitigate (by reducing drivers of change or pressures on the system) or adapt (by using various forms of capital). The focus of the CLIMSAVE project is on adaptation.

Application of the capitals

A practical example for the application of the capitals in the framework would be a rural village exposed to the pressure of climate change in the form of increased flood events. Humans could cope with floods by investing in manufactured capital and building a reservoir upstream of the village. Human capital in the form of skills could be used to provide better early warning systems and social capital could be used in the form of voluntary organizations that help people most exposed to move when a flood is forecast. Natural capital could be used by planting forests upstream to prevent mudslides and landslides. Thus, the capacity to cope depends on the amount of capital that can be mobilized to respond to pressures. If coping capacity is low (lack of capital) then ecosystem services (in this case the natural flood protection) change – the human environment system is vulnerable to the pressures.

Further steps

An important next step is to provide an analysis of the linkages between capitals and adaptation options. The availability of capital may constrain the choice of adaptation options, for example, the option of building sea-walls uses manufactured capital and some human capital (skills), while the option of setting up a voluntary organization to support citizens during floods builds up social capital, which is “used” but not “used up” during a flood event. A methodology for linking the adaptation options and capitals and implementing the vulnerability framework within the CLIMSAVE Integrated Assessment Platform is under development and will be reported in Deliverable 5.2.