

# SEA, Climate Change and Spatial Development

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## Introduction

Recent research shows that Climate change is supposed to affect various types of land use. Some of them are mentioned to illustrate their relevance for spatial development: Change in precipitation might lead to extreme flooding events, landslides, erosion and debris flow especially in mountainous areas, heat waves might affect urban areas increasingly, forestry and agriculture might suffer due to extended periods of drought and new diseases and threats of other calamities. Other possible effects, like the reduction of days with natural snow cover, are expected to have an impact on winter tourism and the spatial development in tourism destinations. The intensity of these possible impacts is influenced by the exposure, the sensitivity to climate change on one hand, and the adaptive capacity on the other. Future oriented spatial planning should consider this vulnerability (see fig. 1) and enhance the possible adaptation.

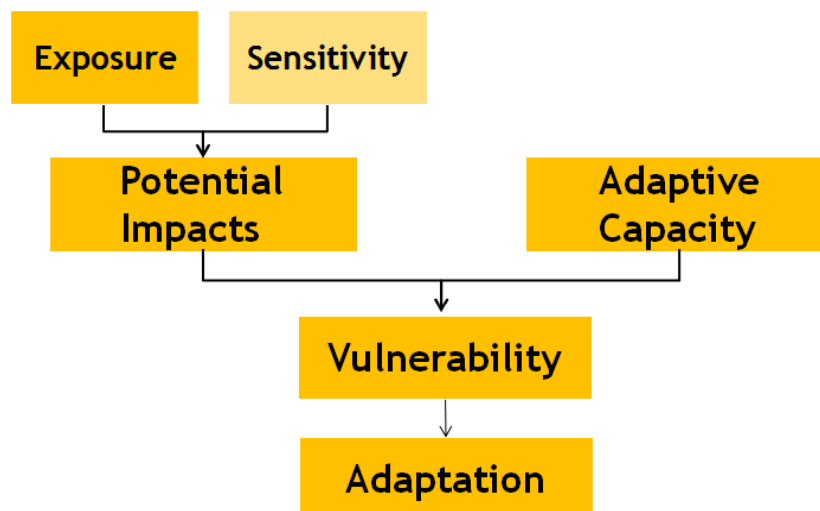


Fig. 1 after Isoard et al 2008

This framework provided the basis for a project cooperation between different alpine countries in the program Alpine Space (Umweltbundesamt 2009). But adaptation to possible effects of climate change is also a part of several other research projects and strategies dealing with new planning instruments, their implementation, or the enhancement of existing planning tools. In the Netherlands a national adaptation strategy was initiated called “Make Space for Climate!” in order to increase political will and awareness of climate change in the context of spatial planning. In Germany the main focus is on improving the instrument of landscape planning, which is attached to the communal master planning process (Heilman et al. 2008). In Austria several regions discuss the possible role that the strategic environmental assessment (SEA) might play to enhance climate change adaptation in the context of spatial planning.

In this paper we will focus on the SEA as a possible tool for adaptation on the level of the master plan for communities, because the SEA is a required tool for the community level master planning anywhere in Europe.

### **Adaptation to climate change in a master planning process**

Before discussing the possible role of the SEA, the main purpose of the community level master planning process must be explained. The master planning process focuses on the development of a community over the next 15 to 20 years by discusses the main land use changes for the future and presents an integrated concept including a tradeoff between various land use options. The judicial requirements for the decision making process and the final tradeoff have been intensified in many countries during the last decades. Spatial planning must consider many documents as a binding precondition such as hazard zoning, flooding maps, information on emissions, traffic concepts and many others. Against this background the possible contribution of master planning processes to climate change adaptation needs to be discussed.

A preliminary glance on figure 1 could gives the impression that in order to consider climate change impacts one just needs to follow the sequence of impact, adaptation capacity, vulnerability and adaptation. For some aspects of climate change, such as its effects on flooding, the model works quite well: The master planning process might consider possible new impacts by flooding. Thereafter, the community might discuss their adaptive capacity and different options of flood management such as building dams, designating areas for water retention or preventing any development in possibly affected areas.

A closer look at the various forms of land use shows, that the master plan offers limited options to deal with possible effects of climate change. While appropriate hazard zoning could prevent development in areas where landslides and debris flow might occur, it is not possible to recommend changes within a land use category, or implement a new one, such as for the purpose of documenting possible damages in a forest by bark beetles due to global warming. Neither is it possible to prescribe adaptation processes, e.g. to suggest different crops in agricultural land since it will be the same category. In other words, in the master planning process on can express only those adaptations which may lead to a change of land use categories. This would be the case, if unproductive agricultural land will be afforested due to climate change or if tourism development would offer alternative development options.

Besides this limitation, the master plan is a creative planning process which offers several opportunities to include adaptation strategies to climate change. These new strategies do not necessarily depend on exposure, sensitivity and the related vulnerability. Spatial planning defines itself as a long term strategy for the overall development of a community, also independent from possible future impacts. Adaptation via master planning has to steer future development and discuss different development options. In this process mitigation, compensation and adaptation can be combined.

The following example illustrates the creative and strategic component of any master planning process: A community in a winter sport destination may perceive an increasing vulnerability because the amount of skiable days is declining over time and winter tourism may loose its dominant role for the local economy. During the master planning process new strategies, such as conference tourism and golf tourism may be discussed. By including new land use categories (i.e. a special development zone for tourism), the community could enhance the option for new investment and new land use

structures. While the reactive approach would lead to limited options, the creative planning process could offer nearly unlimited development options.

A third difference between the traditional adaptation process (figure 1) and the creative planning process (figure 2), is the possible contribution to mitigation and adaptation by circumventing the concept of vulnerability. Actually many communities are already discussing their contribution to a climate friendly spatial policy by permitting areas for solar fields, wind turbines or bio gas plants. These important initiatives should also be considered in the discussion of master planning and climate change. Alternative energy poses already a challenge for many communities, as it needs a well balanced tradeoff with other forms of land use. In order to accommodate the requirements of master planning processes with climate change adaptation, figure 1 must be adapted.

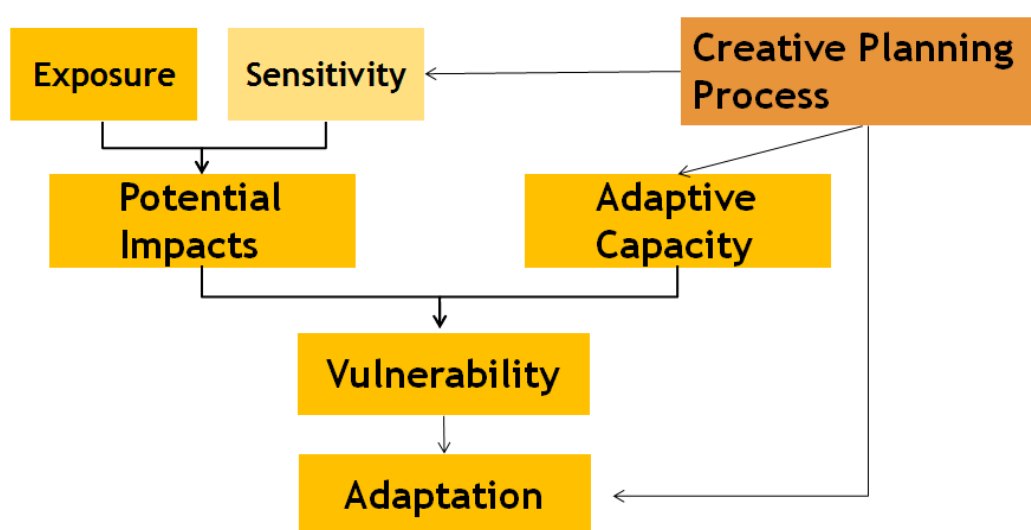


Fig.2 Creative master planning processes may contribute to adaptation and mitigation even without considering a given vulnerability.

The special contribution to adaptation and mitigation to climate change via master planning processes can be summarized as follows:

- Master planning is not able to document adaption within one land use category.
- Master planning should focus on aspects where a land use change is likely to occur.
- Master planning is a creative process and may influence both sensitivity and the adaptive capacity.
- Master planning furthermore is able to develop new spatial and conceptual strategies which may lead to adaption independent from vulnerability and possible impacts.
- Master planning offers good opportunities to combine adaptation and mitigation strategies.

Against this background we like to study what additional contribution the SEA may add to strengthen these opportunities.

## **SEA for the spatial development concept in Salzburg (Austria)**

The master planning process in Salzburg is divided into two steps. First the communities have to develop a spatial development concept (SDC). Upon its approval by the administration the results can be transferred and integrated in the community master plan (CMP). The SDC is the level where the planning and decision making process takes place, while the CMP is the legally binding document. Since the SDC is the bases for the decision making process, the government decided that the SEA should be implemented parallel to the spatial development concept (SDC).

In 2009 the provincial agency for spatial development decided to develop a new guideline, tailor-made for the new legislation and new requirements for the SDC . In this context the possible contribution to climate change adaptation was discussed and implemented in the new guideline. In the following the main goals of the new guideline are presented. The guideline was developed in cooperation with local planners, using several case studies and different governmental authorities. Contrary to other Austrian regions, Salzburg decided to give the SEA a crucial role in the local decision making process. The SEA should not only evaluate all those decisions which are already made, but also enhance the planning process by providing background information. Furthermore the evaluation should also include a critical review of the past development: why and which expectations have had no relevance in the past period, which lessons can be learned from the unexpected development.

The new guideline for the SDC and SEA considers possible influences of climate change in many different steps:

1. Consideration of climate change by evaluating the past development

The SDC is required if significant changes are planned or if the concept is out of date, which will be case if the plan is older than 20 years. Therefore the SDC requires a review of past developments. If negative impacts have occurred over the last decades (e.g. due to climate change) the new plan could implement adaptation strategies such as an enlargement of areas for water retention.

2. Consideration of climate change by evaluating new developments and strategies

Each development option must be evaluated concerning all environmental issues. In this context important adaptation and mitigation measures towards the effects of climate change can be considered, such as the maintenance of corridors for fresh air or the avoidance of settlements in flooding areas.

3. Consideration of climate change by implementing new development goals and priorities

During the last decades a strong political will to steer spatial development was missing, leading to fragmentation of landscapes, inefficient transportation infrastructure and an increasing amount of traffic. The new legal framework offers the opportunity to define spatial goals and priorities. This improvement can be used to steer spatial development and to implement adaptation or mitigation strategies at the community level.

#### 4. Consideration of climate change by defining bylaws

The SDC allows the establishment of detailed bylaws for new spatial development, regulating concerns such as density, structure, or height of housing development. These bylaws are important parameters to ensure the future quality of development zones as well as of related green space. Bylaws are an important tool to implement various mitigation measures.

#### 5. Consideration of climate change based on selected monitoring tasks

Since each community can select its own concerns for monitoring, the guideline proposes to select those issues which might be affected by climate change. This monitoring allows an adjustment of future planning processes or adaptation of regulations by bylaw.

### Conclusions

Salzburg is the only region in Austria using the implementation of the SEA as tool for truly environmental preventive planning. This form of implementation allows a consideration of climate change already at an early stage. Various adaptation strategies based on a creative master planning process (SDC process) can be assessed and implemented. The notion of evaluating past development seems to be an efficient approach to discuss planning processes with the public and to enhance the overall acceptance of adaptation processes.

### References

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