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Climate Change – Requirements for Environmental Planning

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INTRODUCTION

Climate change has become a central subject in politics and society during the last few years. Many research results on the impacts of climate change on ecosystems, flora, fauna, different land-use types, landscapes and on nature conservation already exist. Above that many research projects on international and national level have just begun or will be coming up soon. But little is still known about how environmental planning is affected by climate change and what are its possibilities and constraints to contribute to mitigation of and adaptation to climate change. This article tries to give answers to those questions from a European, especially a German perspective, which should be nonetheless applicable to other regions of the world. The term environmental planning as it is used in this article comprises internationally used instruments as Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) as well as national mitigation rules and the different kinds of landscape or „nature-conservation“-planning. However, many findings can be referred to spatial and urban planning as well.

THE IMPORTANCE OF CLIMATE CHANGE FOR ENVIRONMENTAL PLANNING

Environmental planning is strongly affected by climate change due to the simple fact that changes of climatic parameters have a strong impact on all natural assets like vegetation, fauna, soil and water. Consequently, climate change leads to severe changes of ecosystems, landscapes, urban areas and therefore of the basics of human life. Even if other driving forces of landscape development, e.g. land consumption for settlements and traffic or changes of land-use patterns, will still be of utter importance, climate change shows some specific features which environmental planning has to face:

1. Up to now environmental planning has considered climatic parameters as being constant, but due to climate change they become more and more a variable. As there will be no new (relatively) stable finite state of climatic conditions in the foreseeable future, all the other natural assets will undergo a continuous change as well.
2. Uncertainties which have always been a part of any kind of planning are reinforced by climate change and its impacts. Consequently, future environmental conditions and processes can be less predicted than at present.
3. Contrary to other driving forces of landscape development, the impacts of climate changes are not steerable by societies, while, for example, land consumption for settlements and traffic could be, at least theoretically, reduced to zero.
4. The speed of human-caused climate change and the prognosis of a world population of 9 billion people in the year 2050 with its demands for housing, food and drinking water supply will not remain without consequences for environmental planning.
5. Grappling with climate change must not lead to losing sight of other driving forces causing ecological damages. These can be of even more importance than climate change, especially on regional level. The destruction of habitats and soil or the contamination of the groundwater by different land uses are only some examples. These short-term impacts are to be seen together with the lingering, but in the long run grave effects of climate change. However: Since climate change itself leads to

substantial changes of other driving forces, such as agricultural usage, it is an important factor in this context, too.

ADAPTATION OF ENVIRONMENTAL PLANNING TO CLIMATE CHANGE

Environmental planning, especially in urban areas, has to adapt itself to climate change and its impacts in different ways, regarding contents as well as the planning procedure. Some of the most important adaptation requirements will be discussed briefly in the following paragraphs.

1. New issues and tasks for environmental planning due to climate change

Water management: The problems of water supply and its fair allocation is intensified by climate change. In some European regions, for instance, considerable seasonal displacements of rainfall from the summer to the winter term with either floods or droughts are to be expected more frequently. This poses the question, how it could be achieved to withhold as much water as possible in landscapes from periods of high precipitation to be used in periods of drought. Conserving existing or creating new retention areas are natural means which should primarily be considered, but also technical measures should not be dismissed offhand. The effects of a decreasing water level and an increasing water temperature of rivers and lakes on their water quality and the limnic communities must also be taken into account. Environmental planning could contribute to solutions by defining minimum water quantities or maximum water temperatures from where the withdrawal of water should be limited.

Urban open-space planning: The planning of green and open spaces is particularly important in urban planning; therefore answers must be found to the following questions: Which are the most suitable quantitative and structural relations between built-up areas and open space to mitigate a further rise of the temperatures in city centres to guarantee good aeration and cooling? What are characteristics open spaces must contain to be able to contribute to a high quality of life in cities under climate change conditions? What plant species are especially suitable for the changing climate in the city centres? How can the increasing need of irrigation of public green spaces be ensured, with a decreasing water supply at the same time?., Answers to these problems are of special importance from a public health point of view since with increased urban heat fatalities may rise considerably.

Contribution of environmental planning to mitigation of climate change: Although an effective protection of the climate is impossible without the reduction of greenhouse gases emitted by industry, traffic and private households, and although the contribution of spatial environmental measures is relatively small, it should not to be neglected entirely. For example, SEA of spatial and land-use plans could consider to which extent new settlement structures will lead to further emissions of greenhouse gases. The vicinity to infrastructure facilities, the distance between residential and working buildings, induced traffic flows and the possibilities of public traffic transport are of special importance at this point. Above that, SEA and EIA as well, should have a close look on the question how plans and projects concern carbon sinks, such as bogs or old forests.

Environmental impacts of mitigation and adaptation measures: One important task of environmental planning is not only to contribute to mitigation and to adaptation, but also to assess the environmental impacts of mitigation and adaptation measures pursued by other land uses and political sectors. Do those measures jeopardize biodiversity, do they lead to a pollution of soil and ground water, what are its impacts on landscapes? Based on environmental assessments, possible conflicts between different environmental aims should be discussed and as far as possible be solved. If there are no solutions, clear and distinctive criteria for the decision between contradictory aims should be given. All this also applies to possible conflicts between mitigation and adaptation measures.

Human-life basis: Climate change impairs and endangers the basis of human well-being or even human existence beyond the tolerable limits of many countries, among them problems of drinking-water supply and safeguarding of food or the threat of extreme weather events such as hurricanes or floods. It is therefore one of the paramount tasks of environmental planning to make even greater efforts in the protection of the human-life basis.

2. Modifications of working packages of environmental planning

Besides causing new issues for environmental planning climate change requires modifications of its different working steps like assigning values to the state of the environment, impact prognosis and definition of measures.

Assigning values to the state of the environment: The analysis and assessment of the future state of the environment as demanded in environmental assessments (SEA, EIA) or in German landscape planning, can no longer be limited to foreseeable land-use changes and their effects, but have to include ongoing changes of the climate and other natural assets too. But how can future states be assessed if they cannot be defined exactly, yet will differ significantly from well-known and desirable conditions? Previous assessment criteria (such as the near-natural habitats) or their relevance will change and new ones will be added (e.g. the significance of areas as carbon storages or carbon sinks).

Impact prognosis: Impact prognoses are particularly relevant in environmental assessments. But they discuss mainly micro- and mesoclimatic effects of plans and projects, whereas their impacts on the global climate by emission of green house gases and on adaptation strategies or potentials have widely been neglected. This aspect has to be examined more thoroughly in the future. Above that, the assessment must take into account cumulative effects resulting from the plan or project on the one hand and climate change on the other hand. For example, this becomes significant if a biotope is not seriously impaired by the impacts of the plan alone, but by its interactions with the impacts of climate change.

Definition of measures: It is essential that medium or long-term measures cannot be based on recent site conditions alone anymore, but possible or expected future site conditions have to be taken into account as well. This will lead to problems if the present and the expected state differ in a way that leads to entirely different vegetation forms. There are no solutions to this problem yet, but they might be found in admitting natural processes in certain areas, which could show how nature itself "masters" climate change and therefore serve as monitoring areas.

3. Modifications of planning processes and procedures

Another necessity is the modification of the instruments of environmental planning, e. g. landscape planning (not so much environmental assessments). We have to keep in mind that in the light of climate change planning processes are more and more turning into "planning with uncertainties", thus no longer allowing the definition of rigid and static aims for the development of a certain region or landscape. Instead of this we have to develop a kind of planning which permits flexible answers to changing circumstances without becoming arbitrary with regard to substance, concepts and strategies.

Nonetheless uncertainties about the specific impacts of climate change do not justify any kind of inactivity, as very often knowledge about the direction of trends allows sufficient decisions. Even if we do not know the exact date, place and kind of the next flooding or hurricane, the knowledge about the increase of extreme weather events already allows precautionary measures in flood control, forest conversion and urban heat management. However, difficulties still exist concerning other problems, such as the change of biocoenoses or the development of biotopes.

Against the background of those uncertainties new criteria could become important for planning decisions and environmental assessments. To emphasize are „keeping open as many planning options as possible for the future“ „no-regret-strategies“. Therefore those decisions and projects should be avoided, which entail irreversible environmental changes or compel societies to certain paths of development, which cannot be left at all or only at great expense.

CONCLUSION

Just some of the most essential consequences of climate change for environmental planning (but also other types of spatial planning) could be shown and discussed by this article. How to respond to these consequences in every single case regarding planning contents and the planning procedure is still open; there are hardly any examples for „climate-proof planning“. This emphasizes the challenge to exchange experiences and know-how on international level.

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