Initiating Climate Adaptation Processes for the Aachen Agglomeration

(ESKAPE „Entwicklung Städteregionaler KlimaAnpassungsProzesse“ – Development of Regional Urban Climate Adaptation Processes)

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Scope
In the ESKAPE project („Entwicklung Städteregionaler KlimaAnpassungsProzesse“ – Development of Regional Urban Climate Adaptation Processes) the spatial disparities and interactions are analyzed and concepts to integrate climate adaptation in partly common and different administrative procedures are developed. As some expected climate change effects are similar and others widely differ in the study region, spatially distinct concepts are needed.

Especially the interference of structural and spatial differences with differently developed administrative and technical capabilities have to be understood and handled to achieve satisfactory results in climate adaptation.

On the one hand, the municipalities in the Städteregion Aachen have quite different structural preconditions in terms of capabilities to finance measures of climate adaptation. The technical environments to implement climate adaptation in planning processes are also different. On the other hand there are interactions with neighbouring regions partly situated in Belgium and the Netherlands, which forms additional coordination challenges.

Area of Investigation
The agglomeration of urban areas around the city of Aachen it is situated partly in the North German Plain and the Eifel low mountain ranges. Additionally, it is situated in the border region to Belgium and the Netherlands.

It shows typical characteristics of central-european urbanized areas as it consists of several cities and towns of different sizes with various complex economic histories and varying developing processes today.

Some parts of the region are presently well developing while others still are suffering from structural problems resulting from former coal mining and abandoned industrial sites.

In the North German Plain huge areas are used for intense agricultural production, which is possible because of productive soils and higher temperatures due to low altitude and moderate precipitation. In the Eifel low mountain ranges, on the other hand, agricultural production is extensive and associated with less developed infrastructure.

Regional Climate Analysis
Data about factors influencing local climate (especially elevation and land use data) are available from local or regional administrations.

Climate data are collected and – as not yet available – accomplished using simplified (mobile) measurement techniques. A geostatistical model approach allows for identifying daytime hot spots during heat waves caused by structural problems (see left figure).

Areas with reduced nighttime cooling can be identified using cold air drainage model runs (right figure).

Regional Flood Water Management
Climate adaptation is still unevenly implemented in regional flood water management. Some (mostly more urbanized) municipalities have already carried out detailed analysis, others have not yet begun.

In the case of river floods, this is partly due to different – more or less central or peripheral - location of municipalities in river catchments (see figure).

For urban flood management, the general terrain situation may lead to quite different problems. In steep valleys, certain areas can be substantially affected, while in flat terrain extreme precipitation events lead to unexpected inundation far away from rivers.

Digital Planning Tools
In the present transition of local an regional administration towards digital planning tools, the availability of environmental data often plays a certain role. In the Städteregion Aachen, the ESKAPE project is a catalyst for the regional digital strategy.

As an example, the already existing INKAS-platform, which is designed to supply both administration and the public with digital information (see below) is going to be widely extended by detailed information layers connected to climate adaptation issues.

First Results
- First results of a regional analysis for climate adaptation application show relevant interaction of cities and different catchments. This is not only the case in questions of water management – where the interference of municipal administrations and water boards is an issue - but this for example also of relevance for areas with cold air drainage flow as one of the main potential urban cooling effects in complex terrain as well. In both cases, a regional management strategy appears to be necessary.

- In flood water management some regional structures already exist, but the interference of climate and land use change effects and the administrative planning complexity are not adapted to river catchment and surface runoff management needs.

- Cold air management is still not well implemented in adaptation strategies, but should be seen in a regional perspective similar to water management: developments in the upper part of a catchment can influence lower parts, municipal borders in this context are irrelevant. In addition, cold air tranfluences can be widespread.

- Furthermore, climate adaptation proves to be not yet integrated in digital administrative and information media. In return, as digitalization in public services is still unevenly developed, climate adaptation processes can form a motivation for intensified digitalization activities.

- In the next project phase, the present results are going to be implemented in digital planning tools.