



## **The scale dependence of social and ecological vulnerability in context to river-floods in Germany**

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Vulnerability is often described as a multi-scale issue and appropriate scales and units of analysis are widely debated, yet a structural overview is lacking. While there is increasing use of the terms multi-scale, multi-level, cross-scale, dimensions, etc. in the characterisation of complex human-environmental problems, the interchangeability of terms seems to hamper a thorough understanding of the various implications of scale. Before technical solutions like scaling are sought, it is argued that a thorough understanding of the scales and units on which vulnerability phenomena occur and are conceptualised must be achieved.

Within a vulnerability assessment of social and ecological issues related to river-floods in Germany in an interdisciplinary project, the following challenges were met in relation to scales;

- the identification of the appropriate types of scale (spatial, temporal, organisational, etc) and the type of nesting of phenomena (single-level, multi-level, cross-level)
- the choice of the appropriate scale which is driven mostly by data availability, policy demand and aim of the concept
- the measurement and aggregation of phenomena

In order to develop a spatial comparison and an entry point to integrate several multi-disciplinary vulnerability assessments, vulnerability indicators are constructed. Ques-

tions around scale and units are multiple in the conceptualisation of such an assessment; however, the presentation will limit the scope to the allocation of exemplary vulnerability issues to certain scale issues, most prominently to spatial units and to analytical dimensions.

The main point is that a scale debate on a broader spectrum than just in technical spatial terms is missing in vulnerability and risk conceptualisations so far. Vulnerability assessments and scale are highly intertwined, not only in technical application but also in conceptualisation, which needs more scientific development.