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Typologies of community risk to climate change: fostering climate adaption networks

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Adapting to the effects of climate change will increasingly become a task of municipal planning and implementation in the coming years. This ranges from the consideration of increasing heat days to the retention of heavy rainfall. Climate related hazards, together with their dynamic interplay of exposure and vulnerability pose considerable adverse consequences for municipalities and need to be addressed through risk management plans. While this is understood in research and is increasingly being implemented in cities, it is found that particularly small and medium-sized municipalities often lack (1) the necessary evidence base for planning, (2) adequate capacities to engage in adaptation, and (3) practical analytical tools and informal planning instruments for adapting to the unavoidable consequences of climate change. Identifying communities that are similarly impacted and thus show comparable adaption needs can help local stakeholders in forming climate adaption networks. Here they can pool resources, develop solutions and exchange knowledge on the highly contextual challenges of climate change adaptation.

We derive cluster based typologies of communities in the German state of Baden-Württemberg, which show assimilable characteristics in climatic hazards, exposure and vulnerability. While cluster analysis is often used to differentiate patterns of climate change, few assessments have included societal variables. We therefore couple a ten-member regional climate model ensemble (RCP8.5, 1971-2000, 2021-2050, 2071-2100) with socio-economic data in so-called bivariate climate impact maps. This allows for statewide community specific conclusions on climate related risks. Statistical cluster analysis enables grouping of communities based on similar risks and adaption needs. Our approach provides a data driven basis for so-called climate adaption networks, which may foster the implementation of communal adaption efforts.