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Integrated water resource and risk management via localized participatory vulnerability assessment

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Sustainable natural resources management requires interdisciplinary scientific cooperation, as well as a strong involvement and commitment of local stakeholders and decision makers. While many natural resources are potentially impacted by climate change, they are certainly affected by socio-economic development. Water balance assessments and modelling of surface and groundwater in several case studies have shown that the anthropogenic impact on these resources is often much stronger than the one of climate change. This holds also true for surface water and groundwater qualities.

Natural resources, in this case groundwater and surface water resources are to be analysed under different climate change and socio-economic development scenarios. In this way it is possible to estimate future developments of the quantities and qualities - as well as water resource management options with local stakeholders and decision makers. Different future scenarios for areas in question shall be developed in interdisciplinary cooperation and then jointly discussed and analysed with local stakeholders and decision makers in so-called scenario workshops. This participatory approach tool has proved to be very efficient to achieve an overall understanding of local vulnerabilities and risks to water resources, as well as to support the development of feasible future water resource management options.

The development of local adaptation measures to sustainable water resource management and climate change impacts requires a detailed understanding of the types of hazards affecting water resources and potential changes in extreme events. Climate change and natural hazard patterns are usually conducted on larger scales, such as catchment or provincial levels. On the other hand local risk patterns highly depend on local vulnerabilities such as the local socio-economic structures and cultures, as well as local natural conditions (geological, morphological, hydrological, etc.).

In order to successfully implement local adaptation measures it is necessary to be both, understood and accepted by the local population. In order to build up trust and good cooperation it has proved vital to integrate local stakeholders and decision makers from the beginning of a project and to conduct vulnerability assessments and the development of adaptation measures in joint efforts. Local knowledge, experiences and traditions must be respected and, as far as possible, used to understand how local vulnerabilities and risk patterns can be addressed appropriately. Tailored questionnaires support the analysis of local vulnerabilities and respective local points of views and opinions. Together with the hazard and climate change impact assessment these are used to determine localized risk

patterns affecting water resources. These risk patterns are then addressed via tailored adaptation measures for sustainable water resource management.