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Economic aspects of flood protection enhancements

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During the last century flood protection was established for long river sections. Depending on the period of planning and intended objectives of the system, the level of protection and the used measures vary. Due to economic circumstances, rural development and land consolidation the reclamation of arable land was a major task. River development and protection of agricultural land have been enforced in addition to the protection of settlements. The landscape of river valleys changed completely. Technical channels and constructions, small river corridors without flood plains and intensive land use in the former flood plain are now characteristic for a lot of river valleys. Due to increased floods because of climate change and changed land use, imprecise assessment of hydrologic values and new construction criteria old constructions do not fulfil modern standards. Maintenance of these sections and the enhancement and redevelopment of structures is a major task in our times. Major questions of river management and flood protection are therefore: 1) Maintenance of technical structures versus river redevelopment, 2) technical flood protection or increase of floodplains for better runoff and detention 3) how to cover the costs of land use for river redevelopment.

The case of the Lower Vils valley shows very well the technical and economic dilemma of flood protection enhancement. Till the 1940ies the river Vils was developed and canalised. Levees were establish to protect villages and agricultural areas against floods. In our times the established structures do not fulfil the intended purpose and cause high maintenance costs. A study assessed the technical and economic planning alternatives to enhance the flood protection level for settled areas on the one hand side and the methods to redevelop the river systems on the other hand side. Results show that river redevelopment and the destruction of agricultural levees would fulfil two criteria at the same time: 1) Re-establish an ecologic river structure and flood plain and 2) lower water levels so that old levees could fulfil their full functionality for flood protection of settled areas. But intensive agriculture as a result of

agricultural flood protection established high prices for agricultural sites, increasing the costs of space consuming measures. Using the instruments of cost comparison method and cost-effectiveness analysis an economic optimum was identified. To optimise the solution also alternative financial instruments like leasehold and cultivation of the flood plain were taken into account and compared with conservative measures of land purchase and maintenance of redeveloped areas. The study also showed that economic valuation techniques can not only be used to compare different scenarios, but also to optimise technical solutions taking into account temporal financial effects and temporal uncertainties using different financing instruments and time steps for implementation.