THE NEGATIVE VALUE OF WATER RESULTING FROM THE RISK OF FLOODING: A CASE STUDY FOR THE RHINE DELTA

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We are all familiar with the argumentation that the beneficial use of scarce water provides a certain positive economic value to the water. Similarly we argue that if water causes damage or constitutes the risk of damage, we should attribute a *negative* value to the water. In this way we can bring positive and negative values of water under a common denominator. A method is proposed to calculate the negative value of water that results from the risk of flooding. Expected damage at a certain discharge is calculated as a function of potential damage (the capital present in the flood prone areas), the discharge for which dikes were designed, the configuration of dike districts and the existing flow allocation strategy. The increase in expected damage at increasing discharge can be interpreted as the marginal (negative) value of river runoff. For each discharge, the risk of flooding is calculated as the chance of occurrence times the expected damage. The total risk of flooding follows from integration of the discharge-specific risks. A rational estimate of the willingness to invest in a certain flood reduction strategy can be obtained by subtracting the newly obtained flooding risk from the current flooding risk and translate the benefit in terms of a constant flow of money units per year into a net present value. This methodology is illustrated for a number of flood reduction strategies in the Rhine basin.