



## **Is the Bavarian Flood Protection Policy useful to decrease the Flood Damage?**

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The history of the Bavarian flood protection policy is analyzed with the following scientific and/or policy paradigms as a background:

1. Security approach: The state should guarantee a uniform security level for all citizens.
2. Risk approach: State funds should be allocated in an optimal way to reduce the risk level of the state or a special region.
3. Vulnerability approach: Resilience of society should be increased to reduce the losses due to natural disasters.

The security approach is criticized due to an ineffective money allocation because areas with high damage potential are not better protected than those with low damage potential. Technical protection measures planned and built according to the risk approach can have negative impact, too. Literature describes the “levee effect” in which construction of levees induces additional development leading to much larger losses when the levee is eventually overtopped. More generally, the “safe development paradox” describes that increased safety induces increased development leading to increased losses.

Since the 1850s the Bavarian state has taken over the responsibility for flood protection measures from the local communities. Until the 1990s technical flood protection with dikes was the dominant strategy following the security approach. The goal of inhibiting the increase of the damage potential – a part of the risk or vulnerability approach – was indirectly mentioned in the Bavarian Water Act already in 1907: It was

forbidden to erect buildings in the flood zones to ensure the discharge during floods. This article was only partly implemented. Until 1996 flood zones have been declared at 30% of the length of the bigger rivers. After the two big floods in the Rhine valley in 1993 and 1995 flood protection policy has changed several times. The German Federal Water Act which sets a frame for the Bavarian water policy since 1957 was amended in 1996 and 2005: Flood zones should now also function as an area for water retention and inhibit the increase of damage potential. Additionally, flood protection plans should reduce the losses suffered in floods bigger than the 100-year flood. Since 1996 Bavaria has invented a standardized program to map flood zones. While the mapping procedure works quite well, big problems occurred during the legal designation process. Apart from self interests local stakeholders do not understand the changes in the overall goals of the natural hazard management. The Bavarian Water Act will be amended in 2007 to incorporate the amendment of the German Federal Water Act.

Unlike Switzerland which tries to adopt a risk approach for all natural and technical hazards the German and Bavarian flood protection policy still follows the security approach. Nevertheless, the responsible agencies act according to the risk approach in the implementation phase. For example, the Sylvensteinspeicher, a water retention dam at the upper course of the river Isar, provides a higher security level for Munich and the lower course of the river, an area with high damage potential. Although the negative effects of technical protection measures are recognized in literature, the Bavarian flood protection policy still sets its priority on structural measures. In the Bavarian flood protection program 2020 (Aktionsprogramm 2020) EUR115 million are planned for technical flood protection measures, nearly EUR3 million for the mapping and declaration of flood zones and EUR1.7 million for a better warning system. Information and education of the public is declared as normal duty of the responsible agencies. This lack of acting in line with the vulnerability approach will lead to future damage. It also causes problems as the example of the conflicts during the flood zone designation process shows.