

# Science for Environment Policy

## Flood risk management has improved in Germany

**After the 2002 floods in Germany — the country's most economically damaging natural hazard — efforts were made to develop a more integrated system of flood management.** A recent study has reviewed how those measures helped Germany to cope with the more recent floods of 2013, highlighting developments in early-warning systems and consideration of hazards in urban planning. The researchers also discuss areas for improvement, including citizen engagement and cross-border collaboration.

**In 2002 in Germany, record-breaking amounts of rainfall resulted in large inundations and over €11 billion worth of damage.** After this event, a number of weaknesses were identified in Germany's flood-risk-management system, including incomplete or entirely missing flood warnings, poor maintenance of flood-protection structures, lack of risk awareness and inadequate responses.

Afterwards, several legislative initiatives were launched, including the German [Flood Protection Act of 2005](#) and the [EU Floods Directive](#)<sup>1</sup> of 2007, which marked a shift towards a more [integrated flood-risk-management system](#). This considers both structural and non-structural means of mitigating damage.

In 2013, widespread flooding occurred across much of central Europe, particularly in Germany, where it was — in hydrological terms — the most severe flooding event in at least 60 years. This study evaluated the post-2002 flood-risk-management changes, asking whether they helped to mitigate damage from the flooding in 2013 and what else could be done to improve flood risk management.

The review, which was published in full by the [German Committee for Disaster Reduction](#) (DKKV), considered three key elements of flood management:

- **emergency response:** the immediate measures taken to limit adverse effects;
- **recovery:** actions taken after the event to repair damage and regain standard of living;
- **risk reduction:** planning and implementing measures to minimise risk, such as flood-control measures to prevent inundation and adapted use of flood-prone areas.

Each strategy was divided into specific measures, which were reviewed in detail. Sources of data included policy documents, flood-hazard maps, reports, interviews, questionnaires and case studies.

The review revealed substantial improvements after 2002, such as: more consideration of flood hazards in spatial planning and urban development, comprehensive mitigation and preparedness measures within properties, more effective flood warnings, a more coordinated disaster response, and more targeted maintenance of flood-defence systems. These led to more effective flood management in 2013 and, thus, reduced damage, the cost of which was estimated to be €6–8 billion, compared with over €11 billion in 2002, even though the 2013 flood was more severe in hydrological terms.

*Continued on next page.*

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1. Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007L0060>.

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However, there remains room for improvement, and the study's authors discuss four key areas for future focus:

### 1) More coordinated strategies for mitigating impact

Protective structures, such as dams and river defences, are important to mitigate the damage of flooding; however, as evidenced by past events, they can fail, so other management approaches should also be used and improved. These include property-level mitigation measures, such as water-resistant windows and doors, early-warning systems, robust response systems and the designation of more retention areas (basins that can be flooded in a controlled and effective manner in the time between a flood being forecast and its occurrence).

### 2) Cross-border and cross-sector cooperation

Flooding does not stop at national borders, so risk reduction and disaster response must involve geographical collaboration, as well as cooperation between stakeholders in different sectors. Issues for cooperation should be identified systematically and embedded in flood-risk-management plans.

### 3) Involving the public

Citizens are often involved too late in the planning process, the researchers say. They therefore recommend incorporating local interests, experience and knowledge in all phases of risk-management strategies.

### 4) Transparent risk transfer

The researchers suggest that the present *ad hoc* decisions on government reconstruction aid should be replaced with a transparent national 'risk transfer' system, which considers whether a property owner has insurance and combines reconstruction with risk reduction (thereby making structures more resilient to future floods). They suggest that legislation for reconstruction assistance, such as a federal loss compensation guideline, is needed.

Overall, the study concludes that flood-risk-management is an ongoing task. Its authors say risk factors — such as climate change, economic developments and land-use change — must be evaluated regularly. Risk-reduction strategies and processes should also be continually re-assessed and adapted in consultation with stakeholders. Although this study is focused on Germany, the recommendations should also be of interest to policymakers in other countries.

