



## **Assessing the long-term psychological and welfare impacts of floods using longitudinal survey data of flood-affected residents in Germany**

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Every year, floods affect millions of people globally and remain the most devastating weather-related hazard. Floods can have a wide range of societal impacts that span across space and time. Some of these impacts, such as the physical destruction of houses and infrastructure are easily visible and a commonly researched topic in the scientific literature. Other, less obvious societal impacts, such as long-term psychological effects of flood victims receive much less attention and, little is known about the process of individual recovery. In addition, insights into the welfare effects of these long-term psychological consequences are largely unknown. These two deficiencies in our understanding of the impacts of a flood possibly result in biased and suboptimal flood risk management decisions. This is because risk managers must act upon an incomplete understanding of a flood's impact.

One reason for this research gap stems from the lack of longitudinal surveys in the current literature. Longitudinal studies survey respondents at various points in time and are urgently needed, if one wants to better understand the long-term consequences of experiencing disaster events, the dynamics of individual resilience, and the related welfare effects. Here, we present the results of a three-wave survey that was implemented among flood-affected residents in Germany over period of four years. The data follows a set of households who were affected by the same flood in 2013. It is one of the first longitudinal surveys among residents of flood-prone areas.

Results show that psychological impacts are long-lasting and persistent and that individual recovery is a dynamic and heterogeneous process. Even after four years, about 20% of the surveyed residents indicate that they are still highly affected by the flood event, despite the fact that physical damage to houses and contents was repaired. By assessing the impact of these long-term psychological impacts on individual well-being, we show that they can have a considerable negative effect on welfare. The welfare effects may correspond to a loss of between 5%-10% in self-reported welfare levels. The long-run monetary equivalent of these impacts could be substantial. Additionally, the impacts on the welfare of women may be larger than for men, further supporting the gendered nature of disaster impacts.

On the basis of these results, we argue that the long-term consequences of flooding on flood-affected residents need to receive much greater attention in flood risk management. Moreover, when designing flood risk management strategies gender differences in terms of long-run impacts should also be accounted for.