Chapter 9
Contributions of Flood Insurance to Enhance Resilience–Findings from Germany

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Abstract In 2002, a severe flood caused financial losses of EUR 11.6 billion in Germany and triggered many changes in flood risk management. This chapter focuses on flood insurance, which is a voluntary supplementary insurance in Germany: it is explored how flood insurance has contributed to enhance resilience of flood-prone residents. The analyses are based on empirical data collected by post-event surveys in the federal states of Saxony and Bavaria and refer to the three pillars upon which the concept of flood resilience usually builds in the natural hazards context: recovery, adaptive capacity and resistance. Overall, the penetration of flood insurance has increased since 2002 and there is strong empirical evidence that losses of insured residents are more often and better compensated than those of uninsured despite the provision of governmental financial disaster assistance after big floods. This facilitation of recovery is, however, not the only contribution to flood resilience. Insured residents tend to invest more in further flood mitigation measures at their properties than uninsured. Obviously, flood insurance is embedded in a complex safety strategy of property owners that needs more investigation in order to be addressed more effectively in risk communication and integrated risk management strategies.

Keywords Flood losses · Recovery · Climate change adaptation
Saxony · Bavaria

9.1 Introduction

In recent years, traditional flood policies, which were heavily based on structural defences such as dikes, have been more and more substituted by integrated flood risk management which is based on the cycle of disaster management. The cycle

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usually starts when a severe event has hit a society with (1) emergency response to limit the impacts of the damaging event. It further consists of (2) recovery and reconstruction to regain the society's pre-event status; (3) event and risk analysis, and (4) planning and implementation of risk-reducing measures (e.g. Kienholz et al. 2004; Thieken et al. 2007; Samuels et al. 2009).

Frameworks and legislation with a focus on prevention like the European Floods Directive (2007/60/EU) or the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR) require that such a process starts with a systematic risk identification and analysis–without necessarily having experienced a triggering event in the recent past. The analysis is followed by an assessment and prioritisation of risks as well as (transparent) decisions on adequate and efficient measures to reduce risks and their implementation. A final step includes monitoring and reporting which may result in a reassessment of risks that might require altered or new risk-reducing measures. Risk management in this sense is seen as an iterative optimisation process (e.g. Kienholz et al. 2004; Thieken et al. 2014).

One particular characteristic of modern flood risk management is the diversification of risk-reducing strategies and measures. In urban areas, three main risk reduction strategies can be combined:

- loss prevention by adapted use of flood-prone areas, e.g. by prohibiting urban development in high-risk areas or by flood-adapted design and use of buildings in medium- and low-risk areas,
- flood control to avoid inundation of (urban) areas by (hard) engineering works and retention areas, and
- preparedness for response, e.g. by a tailored warning system and an effective emergency response plan for the city at hand.

If all preventive, protective and preparatory measures fail to prevent losses, risk transfer mechanism help to distribute financial losses from the affected region to a larger population (e.g. the whole society of the affected country), and hence, lessen the individual burden. Risk transfer systems in Europe comprise of different (flood) insurance schemes (compulsory insurance, supplementary contract, etc.), catastrophe funds or governmental disaster assistance (see Maccaferri et al. 2011, for an overview). Such measures can be integrated into a flood risk management system as preparedness for recovery.

Since flood losses are expected to increase in Europe due to climate change as well as increasing urbanisation and exposure (e.g. Jongman et al. 2014), risk transfer mechanisms are becoming more important as indicated by the European Green Paper on the Insurance of Natural and Man-made Disasters (EC 2013). However, increasing losses may also result in failing or unaffordable risk transfer mechanisms. Therefore, they should ideally be designed in such a way that they contribute to mitigate the overall losses and to enhance the overall resilience of urban societies against natural hazards. Using Germany as an example, the aim of this paper is to explore how flood insurance has contributed to the resilience of residents in flood-prone urban areas since 2002 when a severe flood hit Germany,

particularly the catchments of the rivers Elbe and Danube and thus the federal states of Saxony and Bavaria, respectively, caused an unprecedented loss of EUR 11.6 billion and triggered many changes in flood risk management in Germany (see Thieken et al. 2016a). Taking the year 2002 as a starting point, it is first questioned whether insurance coverage leads to better loss compensation and thus recovery of flood-affected residents. Secondly, it will be investigated whether and in what extent individual learning from past events takes place in insured and uninsured households, especially with regard to the implementation of damage reducing measures at the property level. Finally, the uptake of flood insurance and property-level mitigation measures by residents who have lived behind dikes and might hence feel safer than other flood-prone households will be analysed.

These analyses are motivated by the three pillars upon which the concept of flood resilience usually builds in the natural hazards context: recovery, adaptive capacity and resistance (see Thieken et al. 2014). The recovery aspect of resilience refers to the word's Latin origin "resiliere" literally meaning "to bounce/jump back". Recovery is measured by the time a system needs to return to its original state after a shock (e.g. Klein et al. 2003; Füssel and Klein 2006). The quicker the pre-event growth-path is (re-)achieved, the more resilient a community or a system is considered to be. Since the reference pre-event status is often difficult to determine, the return to an acceptable level of functioning and structure of the affected system can be used instead. With regard to flood insurance and recovery, we will analyse whether insurance coverage leads to better loss compensation of flood-affected residents in terms of the extent of loss compensation and hence speed of repair works and the residents' satisfaction with the administrative processes.

Since many systems are able to adjust to external changes, a simple return to the pre-event status is not regarded as a preferable option, since the affected system has missed to advance in its capacity to cope with shocks (e.g. Klein et al. 2003). This leads us to a further aspect of resilience that has emerged in recent years: creativity or adaptive capacity as the ability of a system to learn from past events and to adapt in such a way that it develops beyond the pre-event status. According to Dovers and Handmer (1992), this proactive understanding of resilience accepts upcoming changes in the system and aims to develop a regime that is able to adjust to new conditions. It also includes the willingness and the ability of a society to learn (e.g. Klein et al. 2003). This process is usually not restricted to past experiences, but could also include anticipated potential future changes. Accordingly, Park et al. (2013) understand resilience as the outcome of a repeated process of sensing, anticipation, learning and adaptation. In addition to risk management, resilience analysis can improve "the system response to surprises" (Park et al. 2013: 365). In this respect, individual learning from past events (and during events) is a characteristic of resilience that will be explored in this paper highlighting the role of insurance coverage when implementing property-level mitigation measures.

In contrast to this proactive understanding of resilience, there is also a reactive aspect of resilience: resistance, which is understood as the ability of a system (i.e. a city) to resist a disturbance caused by a natural event. This aspect of resilience is usually measured by the amount of disturbance the system under study can

withstand or absorb before any changes occur. Dikes, augmented design levels and improved ability to prevent dike breaches and consequent adverse effects might serve as typical examples for enhancing resilience by strengthening resistance. However, dikes generally tend to increase the safety feeling of residents living behind such structures. As a consequence, they may lessen their efforts to prepare for floods and to implement precautionary measures at the property level. Therefore, this paper also analyses whether the uptake of flood insurance and property-level mitigation and preparedness measures by households affected by dike breaches differ from other flood-affected households.

To better understand the outcomes of this resilience analysis, the flood insurance system in Germany will be introduced in the next section.

9.2 Flood Insurance in Germany

In contrast to losses caused by windstorms or fires that are covered by any building insurance in Germany, flood losses are usually only compensated if a natural hazards supplement to a building or contents insurance was signed. This voluntary supplement has been provided by property insurers in Germany since 1991 and covers not only flood-related losses, but also losses from earthquakes, land subsidence, avalanches or snow build-up (e.g. Thieken et al. 2006). The overall market penetration has risen from 19% in 2002 to 37% in 2015 (GDV 2016). There are, however, two regions in Germany with peculiarities: Baden-Wuerttemberg, a state in the south of Germany, and the territory of the former German Democratic Republic (GDR) in eastern Germany. In Baden-Wuerttemberg, flood loss compensation was generally included in a compulsory building insurance until 1994. Due to EU regulations, this monopoly insurance had to be abandoned. Currently, more than 90% of the property owners in Baden-Wuerttemberg still have flood insurance coverage (GDV 2016). In the former GDR, flood losses were covered by the household insurance. Up to 45% of residents in eastern Germany still have comparable contracts or have signed the above-mentioned supplement (GDV 2016).

To avoid negative selection, i.e. to avoid that only homeowners in flood-prone areas contract the natural hazards supplement, the German Insurance Association (GDV) set-up a flood hazard zoning system (ZÜRS) in 2001 that at first consisted of three flood probability zones: in the high-risk zone flooding occurs on average once in 10 years, in the medium-risk zone every 10–50 years, and in the low-risk zone on even rarer occasions. After the severe flood in 2002, the low-risk zone was split up into areas with flood probabilities of once in 50–200 years and areas that are flooded less than once in 200 years. The zoning system has increasingly been used to assess the insurability of a property (Thieken et al. 2006; Thieken and Pech 2015). In the high-risk zone, insurance coverage is commonly impossible, but exceptions have been made, e.g. if homeowners have implemented property-level mitigation measures (Thieken and Pech 2015).

Since official flood hazard maps have recently become available for all flood-prone urban areas in Germany due to the implementation of the European Floods Directive, the insurance-related zoning system has been updated leading to the fact that the more detailed maps reduced the high-risk areas (GDV 2016).

Due to the low flood insurance penetration rate, the suitability of the voluntary insurance against natural hazards has been intensively discussed in the recent past. The discussion started after the severe flood in 2002 when a governmental relief fund of EUR 7.1 billion was launched to finance reconstruction (Thieken et al. 2006). On the one hand, this vast governmental aid facilitated people to recover quickly; on the other hand, it provided little incentives for private investments in mitigation measures or flood insurance. It is also feared that such (recurrent) governmental intervention might ultimately lead to a market failure of the voluntary insurance. As a consequence, the introduction of compulsory flood insurance was discussed, but finally abandoned (Schwarze and Wagner 2004). After another big flood in 2013, the same debate flourished again, with, however, the same outcome although another EUR 8 billion was provided as governmental disaster assistance (Thieken and Pech 2015; Thieken et al. 2016a).

Nevertheless, the public and political debate on flood insurance in combination with recurrent damaging flood events has triggered some changes in the provision of flood insurance and governmental disaster assistance. In 2005, a damaging flood hit the south of Germany, particularly Bavaria. Again, governmental aid was provided, this time from the Bavarian state, but discussions started how the uptake of flood insurance could be fostered and how the governmental aid should interact with insurance provision and pay-outs. It was decided that only residents who could prove that flood insurance coverage had been denied should receive governmental disaster assistance. In Bavaria, a corresponding directive came into effect in 2011. In the same year, a similar directive was passed in Saxony that had been affected by flooding not only in 2002 and 2013, but also in 2006, 2010 and 2011.

In addition, risk communication was intensified to foster conclusions of flood insurance. Starting with Bavaria in 2009, the GDV launched in cooperation with the state water authorities risk awareness campaigns that informed property owners about their flood exposure and insurance options. A similar campaign was conducted in Saxony in 2012. Meanwhile, eight of the 16 federal German states have performed such a campaign together with the GDV, some already several times; in two further states campaigns are in preparation. As a further measure, the GDV supported the building certificate “Hochwasserpass” which was developed by civil and water engineers and was launched in 2014 to advise homeowners on adequate property-level mitigation measures. A survey among building insurers in 2012/2013 revealed that such measures have recently been rewarded in the insurance contracts, e.g. by providing insurance in high-risk areas or by a reduced premium or deductible (Thieken and Pech 2015).

In what follows, the interplay between flood insurance, governmental disaster assistance and properly-level mitigation will be analysed using flood-affected households from Saxony and Bavaria as examples.

9.3 Data and Methods

To analyse the three aspects of resilience among flood-affected residents in Germany data from several post-event surveys were used. The survey was first set-up after the flood of 2002. The questionnaire captured many aspects that revealed how residents coped with the flood and explained flood losses (see Thieken et al. 2005, 2007). Since then, the questionnaire has been repeatedly used in adapted versions after big flood events as well as after some pluvial floods in Germany (Kienzler et al. 2015; Rözer et al. 2016; Thieken et al. 2016b).

For this paper, only data from residents in the Freestates of Saxony and Bavaria are used. Both states were hit by river floods in 2002 and 2013 and have a different tradition with regard to flood insurance (see above). In addition, Bavaria experienced major flooding in 2005, while Saxony was affected by a major event in 2010 (and minor events in 2006 and 2011).

Figure 9.1 illustrates the share of insured residents in the post-event surveys in comparison to the market penetration according to GDV (2016). It reveals that insurance penetration (before the damaging event occurred) has increased in both federal states between 2002 and 2013. However, market penetration in Saxony is considerably higher than in Bavaria due to the different availability of flood insurance prior to 1991 (see above). Furthermore, the share of insured residents tends to be higher in the post-event surveys than in the figures provided by GDV (2016); this holds especially for Saxony (see Fig. 9.1) and indicates that negative selection is still an issue, i.e. homeowners in flood-prone areas are more likely to buy the supplementary natural hazards insurance than others.

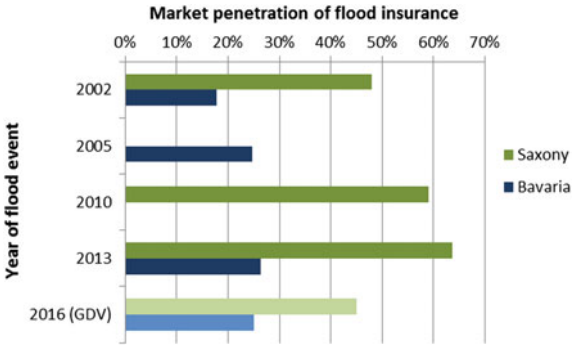

Fig. 9.1 Percentage of flood-affected residents that were insured against flood damage before the damaging flood event occurred as given in the survey data collected after the floods of 2002, 2005, 2010 and 2013 in comparison to the market penetration of flood insurance in Saxony and Bavaria according to GDV (2016)

9.4 Flood Insurance and Resilience–Empirical Findings from Germany

Post-event surveys among flood-affected residents in Saxony and Bavaria were used to investigate the behaviour of insured and uninsured households with regard to loss compensation and recovery as well as to adaptation to the flood risk.

9.4.1 Recovery

With regard to recovery, it was analysed how many insured and uninsured households received payments to compensate their repair works at damaged buildings, how well the state of their damaged and repaired home was at the time of the interview in comparison to the pre-event status and finally how they evaluated the compensation procedure. The results are summarized in Table 9.1.

Table 9.1 reveals that in all flood events a higher percentage of uninsured households did not receive payments to compensate their flood losses in comparison to insured households. Insured households that did not receive payments

Table 9.1 Share of uninsured and insured households that received no payments to compensate flood losses caused by different flood events in Saxony (SN) and Bavaria (BY), the average perceived restoration of their building at the time of the interview assessed on a scale from 1 (=the building is already completely restored/repaired in comparison to the pre-event status) to 6 (=the building is still considerably damaged), and the average satisfaction with the compensation procedure assessed on a scale from 1 (=very satisfied) to 6 (=not satisfied at all)

Flood event	State	Sample	Sample size	Share of households that received no payments [%]	Average restoration of building at the time of the interview	Average satisfaction with the compensation procedure
August 2002	SN	Uninsured	494	23	2.97	2.39
		Insured	468	10	2.74	1.92
	BY	Uninsured	354	41	2.40	2.36
		Insured	80	29	2.03	2.02
August 2005	BY	Uninsured	201	65	2.23	4.59
		Insured	68	44	2.09	2.26
August 2010	SN	Uninsured	114	53	2.38	2.68
		Insured	180	21	2.21	2.13
June 2013	SN	Uninsured	173	4	3.29	3.19
		Insured	333	3	2.77	2.48
	BY	Uninsured	163	3	3.22	2.41
		Insured	63	2	3.38	2.36

typically experienced losses that did not exceed their deductible or costs were not eligible, e.g. own working hours. The percentage of uninsured households that didn't receive any payments was particularly high for the floods of 2005 (Bavaria) and 2010 (Saxony), where only little governmental disaster assistance was provided. Due to the regional character of these floods, the federal government did not provide any disaster assistance. The state governments provided some help but were reluctant due to the cumulation of floods in recent years. Instead, they tried to foster private precaution. This attitude changed again in 2013: the governmental disaster assistance of EUR 8 Billion eventually almost exceeded the overall losses (Thieken et al. 2016b). Consequently, the percentage of uninsured households that did not receive any pay-outs was exceptionally low for the 2013-flood (Table 9.1). However, at the time of the interviews, i.e. around nine months after the flood event, not all decisions on loss compensation payments had been made. Therefore, the real share of households that did not receive loss compensation payments might be higher than is currently indicated by the survey data.

The data further reveal that the average pay-outs to insured households were considerably higher–sometimes two or three times–in comparison to the average pay-outs that uninsured households received (data not shown, see examples in Thieken et al. (2006) for the 2002-flood and Thieken and Pech (2015) for the 2013-flood). As a consequence, the average restoration of damaged buildings of insured households was always higher than the restoration of uninsured buildings (see Table 9.1), except for 2013 flood in Bavaria, where one dike breach caused heavy oil contamination and hindered repair works. Likewise, the satisfaction with the compensation procedures was higher among insured residents (Table 9.1). Altogether, the data indicate that—despite the huge governmental assistance in 2002 and 2013—insured households were compensated more often, recovered sooner and were more satisfied with the procedures. These findings are in line with previous work by Thieken et al. (2006) and Thieken and Pech (2015) that provides more insights into insured and uninsured households revealing that socio-economic characteristics as well as flood impact and damage do not differ much between these subgroups.

9.4.2 Adaptation to Flood Risks

As loss compensation is guaranteed by an insurance contract, it is often assumed that insured households do not further invest in the mitigation of flood losses. Figure 9.2, however, illustrates that this assumption is not backed by empirical data. In all six cases, insured households were better informed about flood hazards and mitigation options and had implemented equal or even more mitigation measures at the property level than uninsured residents. Figure 9.2 further reveals that the level of property-level mitigation has improved since 2002 in both regions, Saxony and Bavaria. In 2013, the level of private precaution was particularly high among insured Saxon households: around 75% of them had informed themselves

about flood hazards and mitigation options and around 45% used their building in a flood-adapted manner and used water-resistant interior decoration (Fig. 9.2). This high level of precaution is only overtopped by flood-prone residents in the Rhine catchment, of whom around 65% stated that they used and equipped their building in a flood-adapted manner (Kienzler et al. 2015).

To further investigate whether uninsured and insured households behave differently after an event, Fig. 9.3 exemplarily illustrates the percentages of surveyed households that used their home in a flood-adapted manner before and after the damaging flood event using flood insurance coverage as a further distinction. The data reveal that after the floods of 2002, 2005 and 2010 between 19 and 25% of the households have started to use their home in a flood-adapted way regardless of the existence of flood insurance coverage. After the most recent flood of 2013, this share dropped to 8–13% indicating a saturation or fatigue among flood-affected residents. This indicates that there might be a certain share of residents that cannot

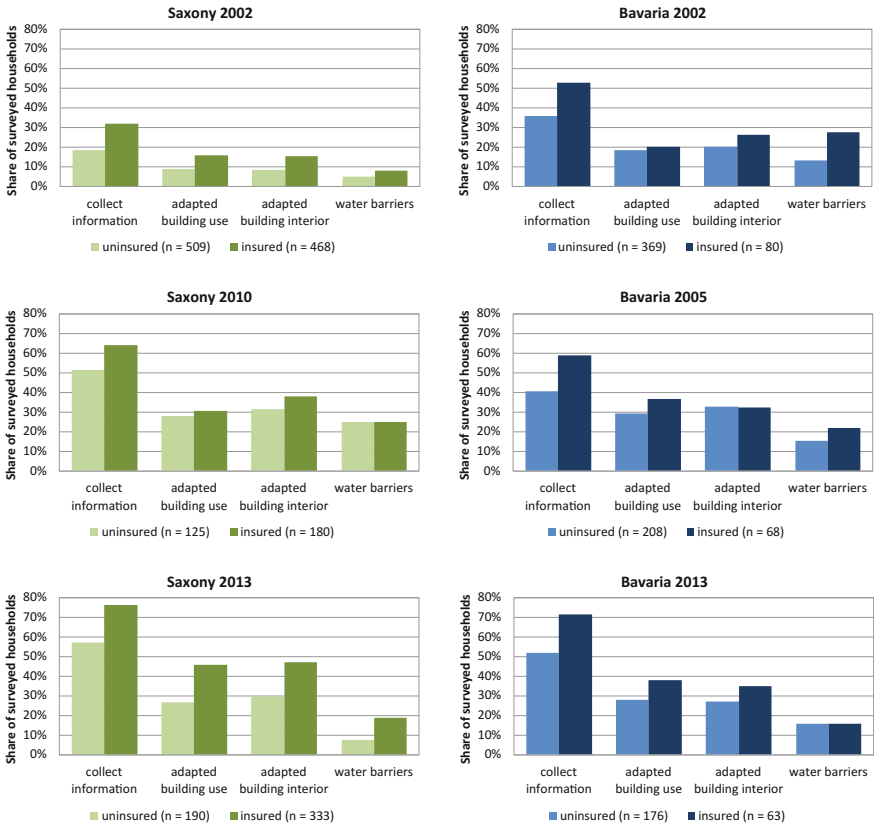

Fig. 9.2 Implementation of precautionary measures at the property level before the respective flood events, distinguishing uninsured and insured households that were damaged by the flood events

be motivated to invest in precaution. Psychological models could help to further explain these findings. It is known that some residents perceive their self-efficacy as low and develop other ways to cope with the flood thread, e.g. fatalism or ignorance (see Grothmann and Reusswig 2006; Bubeck et al. 2012). If the implementation of flood-adapted use before and after the damaging flood events is summed up, it still has to be concluded that insured households, in general, do more to mitigate flood damage than uninsured (Fig. 9.3). To fully explain this pattern is beyond the scope of this contribution. However, the results suggest that households that actively mitigate losses at the property level might assess insurance coverage as an additional layer of a safe home and not as an alternative to flood-proofing their home. More research on attitudes, personal traits and decision-making of flood-prone residents is needed to understand the whole picture.

9.4.3 Resistance

As a last aspect of resilience, it is analysed whether residents who live behind dikes and thus might feel safe show a different behaviour with regard to flood adaptation than residents who live in other flood-prone areas. For this, the data were divided into households that had been damaged due to a dike breach and households that had been damaged by other types of flooding (fluvial and pluvial floods or

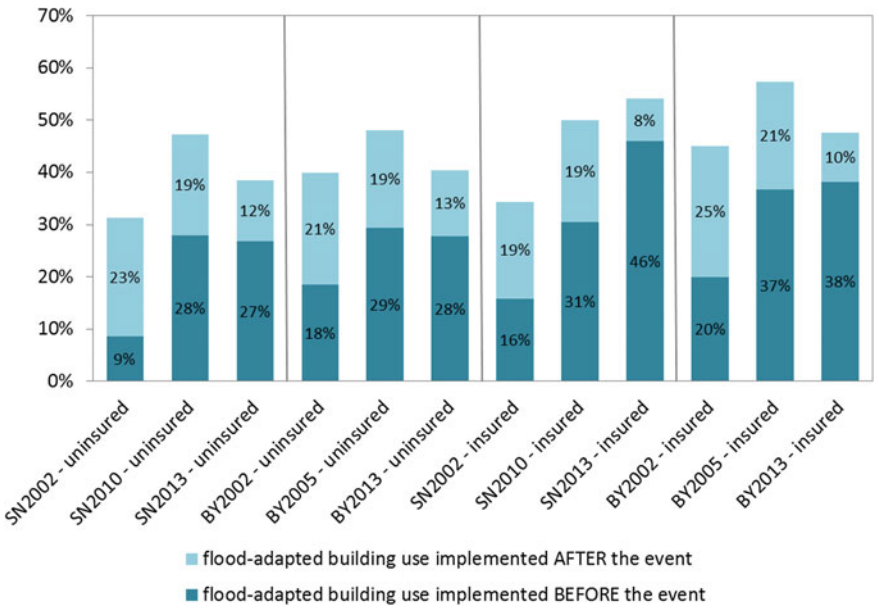

Fig. 9.3 Level of implementation of flood-adapted building use using different sub-samples from flood events in Saxony (SN2002, SN2010, SN2013) and Bavaria (BY2002, BY2005, BY2013)

groundwater flooding). Similar to Figs. 9.2 and 9.4 shows the percentages of households that undertook different precautionary measures including collection of information, contracting flood insurance and implementing adaptation measures at their properties.

Data from Saxony reveal that residents who had been affected by dike breaches were almost as well informed as other flood-affected residents. In addition, the insurance penetration was comparable. In contrast, adapting a building to the flood hazard was more popular among residents in flood-prone areas than among residents who have been living behind dikes. The implementation gap between these two groups is however closing over time: in 2013, already more than 30% of residents affected by dike breaches used or equipped their home in a flood-adapted manner in comparison to 40% of residents in other flood-prone areas. The share of Saxon households that had water barriers available was nearly equal in the two subgroups for the events of 2010 and 2013 (see Fig. 9.4, left column). It is likely

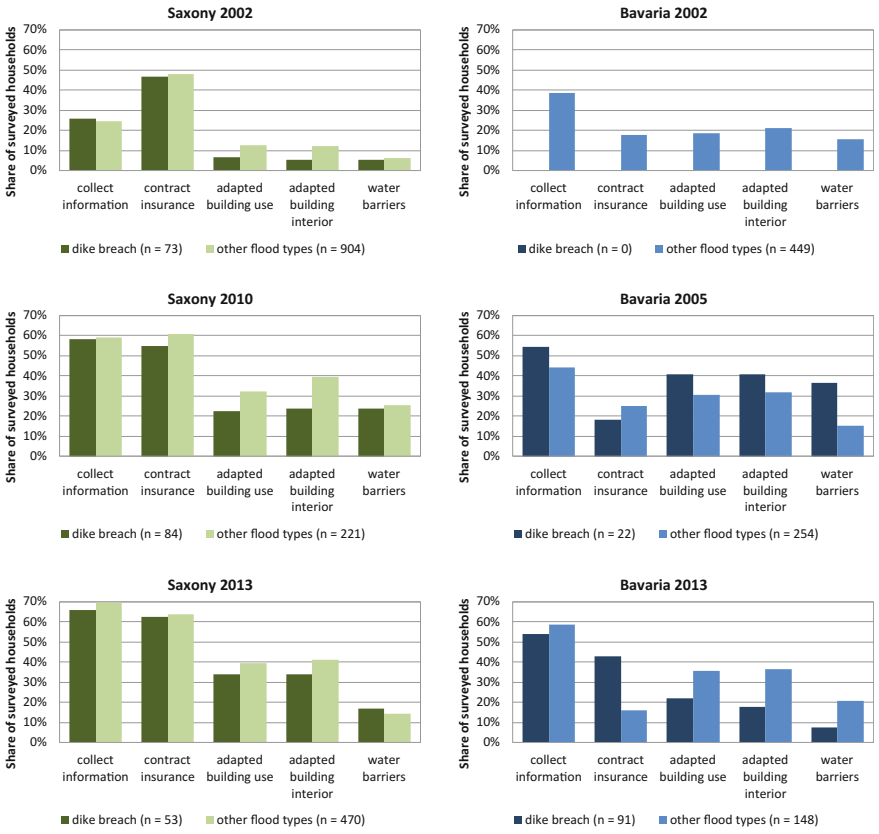

Fig. 9.4 Implementation of precautionary measures at the property level before the respective flood events, distinguishing households that were affected by inundation after dike breaches or by other types of flooding

that risk communication and the experience from the flood in 2002 with more than 100 dike breaches along the rivers Mulde and Elbe in Saxony had an effect on the safety feeling and preparedness of residents living behind dikes. Finally, recurrent flooding in 2006, 2010 and 2011 kept awareness and preparedness alive.

In Bavaria, the results are not as clear as in Saxony owing to the smaller sample sizes of residents who had been affected by dike breaches, particularly in 2002 ($n = 0$) and 2005 ($n = 22$). The results for the 2013 flood (Fig. 9.4, right column, at the bottom), however, highlight an interesting pattern: while the percentage of households that informed themselves about flood hazards and mitigation options is comparable in the two data subsets, considerably more households that were affected by a dike breach in 2013 had flood insurance coverage than other flood-prone residents. In return, they implemented less flood-adapted property measures.

Whether such patterns of private precaution are mainstreaming in the future, needs more investigation and long-term monitoring of private precaution. As a starting point, the implementation of flood-adapted building use before and after the flood events is illustrated in Fig. 9.5 (upper panel), as is the conclusion of flood insurance (Fig. 9.5; lower panel).

The analysis demonstrates that regardless of the type of the damaging flood around 20% of the affected households used their home in a flood-adapted way. Only residents affected by the flood of 2013 showed less adaptation. This may again point to symptoms of saturation or fatigue among flood-affected residents. In general, a clear distinction between the behaviour of residents behind dikes and of residents in other flood-prone areas is not easy to make: by 2013, residents living behind dikes in Saxony have shown a similar behaviour than other flood-affected residents, and the data from Bavaria are too heterogeneous for a sound conclusion.

With regard to flood insurance, Fig. 9.5 is dominated by the different uptake of flood insurance in Saxony and Bavaria. Again there is a tendency to similar behaviour of residents living behind dikes and in other flood-prone areas in Saxony, while flood insurance seems to be more frequently demanded by residents behind dikes in Bavaria. For these households, flood insurance might be judged as an affordable and cost-effective mean of precaution, whereas costlier mitigation measures are not implemented due to the low probability of a dike breach.

9.5 Conclusions

Since 2002, the penetration of flood insurance among residents has increased in Germany, although there are still considerable differences between different federal states: while flood insurance penetration is high in Saxony (>60%), it is considerably lower in Bavaria (around 25%). However, Bavarian residents living behind dikes seem to prefer flood insurance to other adaptation options highlighting insurance as an affordable precautionary option, a low-cost adaptation to possible dike failures, or in accordance with Park et al. (2013) as a low-cost response to

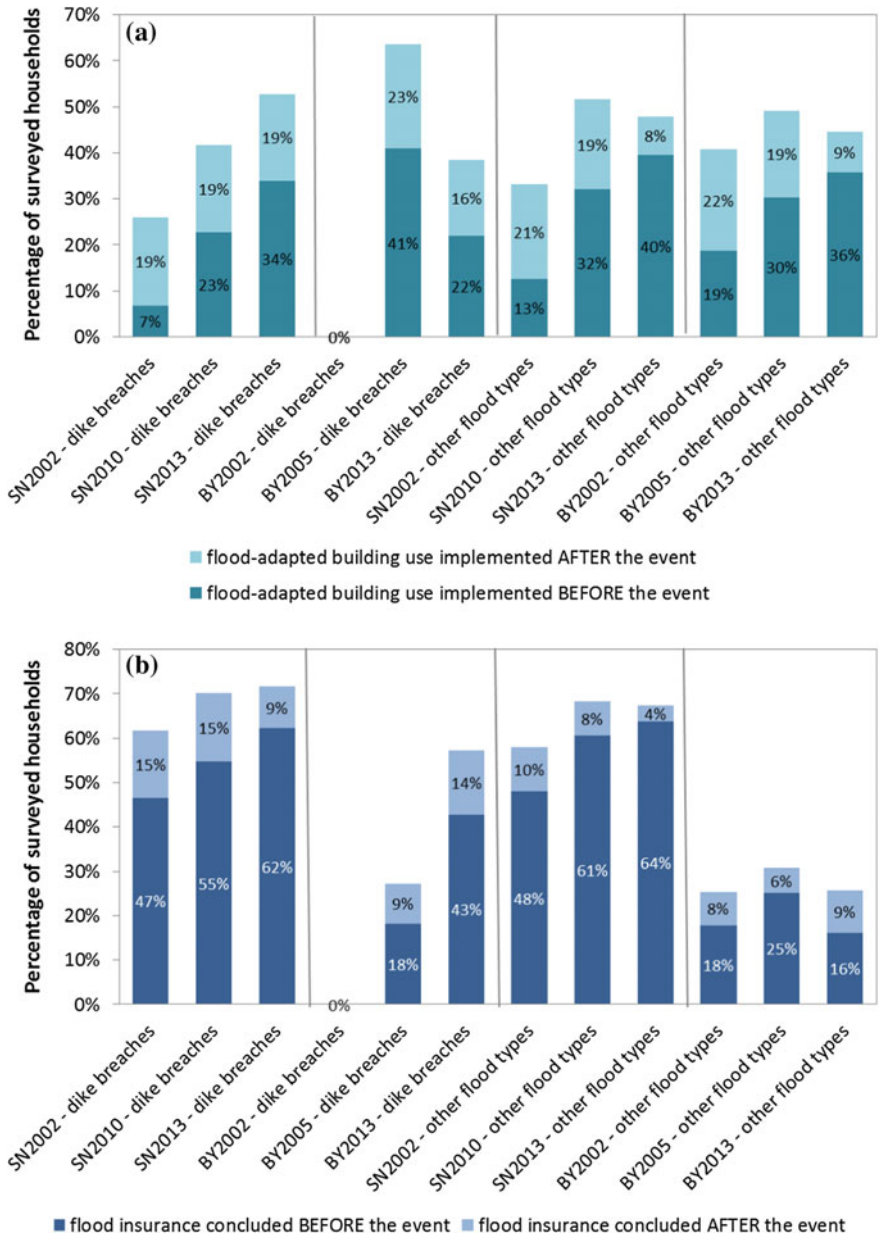

Fig. 9.5 Implementation of precautionary measures at the property level before and after different flood events in Saxony (SN) and Bavaria (BY), distinguishing households that were affected by dike breaches or other types of flooding; upper figure: flood-adapted building use; lower figure: conclusion of flood insurance

system surprises. Whether this strategy clearly differs from adaptation and resilience strategies in other flood-prone areas needs, however, more investigation. Insurance is usually not available for residents in high-risk areas that are not protected by dikes or is only provided in combination with the implementation of property-level mitigation measures. On the one hand, this indicates that insurance can be used as a mean to incentivise the implementation of property-level mitigation measure in Germany and thus to strengthen the resilience of highly flood-prone residents. On the other hand, the high (potential) losses in cases of dike breaches seem to be excluded from this mechanism, which is a lost opportunity of disaster preparedness.

There is strong empirical evidence that losses of insured households are more often and better compensated than those of uninsured despite the huge governmental disaster assistance after flooding in 2002 and 2013. In addition, insured people are more satisfied with the compensation process. However, flood insurance does not only contribute to flood resilience with regard to recovery. There is further evidence that insured residents do invest more in other flood mitigation measures at the properly level than uninsured since they regard insurance as a further layer of safety for their home. The reasons for this behaviour need more detailed analysis including psychological models and theories such as the protection motivation theory or the five-factor model of personality traits.

Still, it has to be acknowledged that the German insurance industry has done some efforts to raise flood hazard and risk awareness and to inform homeowners about mitigation and insurance options. As a consequence, German insurers consider precautionary measures now more often by incentives than they did back in 2002 which is a strong asset for enhancing the overall societal resilience. Whether this or other approaches can further foster the uptake of property-level mitigation measures and increase resilience in flood-prone areas on the longer term, needs to be seen.

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