



# Social vulnerability and the 2002 flood

## *COUNTRY REPORT GERMANY (MULDE RIVER)*

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## SUMMARY

This report represents a major milestone of FLOODsite Task 11. It presents and summarises the findings of a questionnaire survey carried out in five research locations of the Mulde catchment (Germany) in 2005 (N=404), among them the small town Eilenburg and the villages Erlln and Sermuth. All these settlements were heavily affected and, in part, completely inundated by the 2002 August flood. While focussing on social vulnerability, the report applies both an event- and a phase-sensitive approach with regard to the 2002 flood from a bottom-up perspective of the people affected.

In a first step, social vulnerability is understood as a specific form of social inequality in the context of a so-called disaster. In a twofold sense, it is a relational concept: Firstly, being vulnerable always means being vulnerable to something (e.g. to flooding), hence the specific circumstances need to be carefully taken into account. Secondly, and even more important, talking about (potentially) vulnerable groups always implies (but is rarely made explicit) that other social groups, usually on the opposite side of a certain continuum (be it income, qualification or professional status) are not regarded as vulnerable. However, in both cases these are hypotheses which need to be tested for every single event under investigation.

In a second step of approaching social vulnerability, we applied, refined and operationalised the definition by Blaikie *et al.* (1994, 9). They understand vulnerability as “the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard”. In our point of view, the strength of this approach is to be found in its consideration of both the social and temporal dimensions of a disaster. Instead of emphasising characteristics of the natural or technological hazard itself or the exposure (structures, buildings etc.) to the hazard, it focuses on the question of how communities and social groups are able to deal with the impacts of a natural hazard. Hence, it is not so much the susceptibility of entire communities or certain groups to a specific hazard that is of interest, but their coping capacity in the different and at the same time overlapping phases of an event (anticipation, resistance and coping, recovery and reconstruction).

However, while applying this logic of structuring the questionnaire data, we did not forget about “non-social” aspects of vulnerability. Therefore, also certain event characteristics (such as speed of onset), context-specific conditions (functioning of warning system and evacuation measures, daytime, location) as well as certain parameters which might gain importance in the course of a flood (e.g. tenure) were taken into account where necessary by discussing the empirical evidence.

The report is structured as follows:

- Chapter 1 gives an introduction to main concepts (vulnerability, social capital and risk construction) and the research locations;
- Chapter 2 describes the methodological approach in detail;
- Chapter 3 provides an overview of the sample’s socio-demographic and socio-economic structure;
- Chapter 4 focuses on the emotional, social and material bonds of the respondents to the area (with particular emphasis on social networks as a potential source for coping during and after a disaster);
- Chapter 5 extensively discusses the behaviour of the respondents before, during and after the last major flood event in the area (2002);
- Chapter 6 deals with issues of risk perception, preparedness as well as the perceived responsibility for public and private mitigation measures and discusses all this with respect to risk constructions;
- Chapter 7 summarises the findings with specific reference to social vulnerability and formulates open questions.



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# 1. Introduction

## 1.1 Objectives of Task 11

The purpose of the sociological research within the Integrated Project **FLOODsite** is to better understand the impact of floods on communities and the latter's capability to respond during, and to recover from, such events. The concept "community" comprises two distinct meanings: it refers, firstly, to a locally based group of people (e.g. a village) and, secondly, to social networks of individuals belonging together because of specific interests and objectives as well as of ties based on kinship or positive emotions. Community-based approaches to flood mitigation aim to build the capacity of local people to respond quickly and effectively. Understanding how communities cope in flood events, how they respond, how they behave, etc. is valuable information to share with those yet to be impacted and with time to prepare, as well as with those agencies responding to flood events. Thus, the major objectives of **FLOODsite** Task 11 are (i) to characterise types of communities with regard to their preparedness, vulnerability and resilience related to flood events; (ii) to understand the driving forces of human behaviour before, during, and after floods; and (iii) to learn lessons from case studies in Germany, Italy and the U.K.

The outcome of these efforts will provide a better understanding of the role of subjective and intersubjective perceptions and situational interpretations, pre- and post-disaster preparedness as well as the capability and capacity of communities to recover from a hazardous event. Since **FLOODsite** is a project developed and dominated by natural scientists and engineers, it should be pointed out that our approach differs from mainstream flood research: We strongly focus on a **bottom-up perspective**, i.e. the residents of flood-prone and, in most cases, recently flood-affected areas. Their points of view in many respects differ from experts' evaluations with regard to the way flood risk management should work on several scales.

This report represents a major outcome of **FLOODsite** Task 11. It summarises the main findings of three in-depth analyses at the regional level in the river catchments Vereinigte Mulde (Germany), Adige (Italy) and in England and Wales (U.K.). The report consists of three parts:

- **Part A: Country Report Germany (case study Mulde)**
- **Part B: Country Report Italy (case study Adige)**
- **Part C: Country Report U.K. (case study England and Wales)**

The structure of the Country Reports is as far as possible similar, although some research questions are focused on in more detail in certain sections, because they arose out of the specific context of the respective case study. All Country Reports have a common introduction setting out the theoretical background of the basic concepts (Chapter 1.2). After a description of the research locations and the methodological approach, main empirical findings are presented. It has to be taken into account that Part A and B are based on primary empirical investigations within the framework of the **FLOODsite** project, while Part C mainly builds upon secondary analyses of data stemming from other research projects.

The Country Reports represent the first milestone of our analyses. The next step will focus on cross-national comparisons and lessons to be learned from the different experiences.

## 1.2 Theoretical approaches and main concepts

In the following chapter, the most important concepts of our analyses will be explained and defined. These are (social) vulnerability, social capital (including social networks) and risk construction. All of them stem from rather distinct strands of the social sciences and are only exceptionally brought together in disaster research, especially in the classical sociological tradition (e.g. Quarantelli and Dynes 1977; Drabek 1986; Quarantelli 1987; Kreps 1989; Dynes and Tierney 1994; Quarantelli 1998; Tierney *et al.* 2001). However, we will lay down some good reasons for their interrelatedness. Further context-specific concepts will be introduced in the course of the single Country Reports (Parts A, B and C).

### 1.2.1 Social vulnerability

Vulnerability has been defined as the major topic of FLOODsite Subtheme 1.3. However, this is not the only reason why it deserves some conceptual consideration. More important is that within just a few years, “vulnerability” has become a buzzword applied in distinct contexts in order to describe and explain almost everything. Some years ago, Weichselgartner (2001, 88) presented 24 more or less different definitions of vulnerability. He categorised them into three approaches: vulnerability as exposure to risks or hazards, vulnerability as social response and vulnerability of places (*ibid.*, 87; with reference to Cutter 1996).

“Official” FLOODsite terminology refers to the first conceptualisation. Vulnerability is defined as the “characteristic of a system that describes its potential to be harmed. This can be considered as a combination of susceptibility and value” (Language of Risk 2005, 27). With its focus on potential or actual damage due to a hazardous event, this describes a very common and widespread understanding of vulnerability from the point of view of natural scientists, engineers, disaster managers and economists (for the latter: Messner and Meyer 2006). From a social science perspective, namely, sociology, geography and political science, however, this framing of vulnerability has some severe shortcomings: First of all, it does not explicitly take into account people’s behaviour, their assumptions, their knowledge and non-knowledge or processes of sense-making. Secondly, the definition does not pay attention to the temporal dimensions of a disaster, its emergence out of and rootedness in daily routines, which in their own are related to the political context and conditioned by policy choices (Sarewitz *et al.* 2003).

In order to avoid (further) conceptual confusion in this multi-faceted debate, in the following we restrict our efforts to a concept of **social vulnerability** building mainly upon approaches from sociology and geography. This goes back to a central notion of the term—its emergence “as a concept for understanding what it is about the condition of people that enables a hazard to become a disaster” (Tapsell *et al.* 2005, 3). Also in the reports, our focus will be on the social dimension of vulnerability. However, we are fully aware that the impact of a flood depends not only on social aspects but also on event characteristics (such as flood depth, duration, contamination, speed of onset etc.), context-specific conditions (functioning of warning system and evacuation measures, dike-breaches, daytime, location) as well as certain parameters which might gain importance in the course of a flood (e.g. type of housing, having handicapped or permanently ill persons in the household etc.). Therefore, if necessary we will also pay attention to these “non-social” aspects of vulnerability.

Social vulnerability can be defined, in a first step, as the specific social inequality in the context of a disaster (be it technological or “natural”).<sup>1</sup> This conceptualisation is surely in line with the origin of the discourse in empirical studies on disastrous famines (O’Keefe *et al.* 1976; Susman *et al.* 1983) and is fostered by today’s prevalent approach in research practice—which entails an operationalisation by means of indicators and indices in order to “measure” vulnerability (examples are given in: Blaikie *et al.* 1994, 9, 13, 132–4; King and Mac Gregor 2000; Buckle *et al.* 2000; Tapsell *et al.* 2002; Cutter *et al.* 2003, 246–9, 252; for an overview: Tapsell *et al.* 2005, 11–7). However, so-called “demographic”

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<sup>1</sup> This understanding is, of course, not obligatory. In the literature one also finds conceptualisations of “social vulnerability” recalling the idea of potential for loss (e.g. Weichselgartner 2001, 87; Cutter *et al.* 2003).

or “taxonomic” approaches ignore the situativeness of vulnerability (Wisner 2004, 184–8). The underlying hypothesis of such studies is the existence of a strong positive correlation between socioeconomic status and vulnerability or, to put it with Blaikie *et al.* (1994, 9): “as a rule the poor suffer more from hazards than the rich”. It needs to be stressed that most “classical” vulnerability indicators (age, income, formal qualification, gender, race etc.) are basically indicators of social inequality in general and therefore of social vulnerability with respect to hazardous events in the life-course other than only those caused by “nature”.<sup>2</sup>

Such an approach of strictly “measuring” vulnerability has both strengths and weaknesses (e.g. Adger *et al.* 2004; Kasperson and Kasperson 2001). Surely a central advantage relates to the implications for policy: It puts the issue of natural hazards and vulnerability on the public agenda or into the “heart of government thinking” (Benson 2004, 159). Additionally, indicators and indices are transferable to other contexts and allow for cross-regional or cross-national comparison. Moreover, they can be fed into complex, even interdisciplinary models in order to explain flood impact. Not surprisingly, the weaknesses are strongly related to the aforementioned points. When applying indicators and indices which were developed in one cultural context into another one, it is not only the question of whether the respective data are available but, much more important, whether seemingly identical variables measure “the same”.<sup>3</sup> A good example in this context refers to tenure: While in some cultures renting a flat is considered as a sign of lower social status, in others (e.g. in Switzerland or in Germany) this causal relationship is as strong as might be predicted—rental housing is widespread also among middle- and partly even upper classes. Hence, home-ownership does not mean the same in different cultural backgrounds. It is therefore necessary to develop a context-sensitive concept and respective indicators of social vulnerability—this is what we mean by the “situativeness” of vulnerability. Otherwise, researchers run the risk of stereotyped approaches (Handmer 2003, 57), in the end of which they rather approve their own prejudices instead of critically assessing the concepts applied and data analysed.

In our point of view, a worthwhile **working definition** was developed by Blaikie and his colleagues. By vulnerability they mean “the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard” (Blaikie *et al.* 1994, 9). This definition highlights both the **social and temporal dimensions** of a disaster. Instead of emphasising characteristics of the natural or technological hazard itself or the exposure (structures, buildings etc.) to the hazard, it focuses on the question of how communities and social groups are able to deal with the impact of a natural hazard. Hence, it is not so much the susceptibility of entire communities or certain groups to a specific hazard that is of interest but the coping capacity, hence active behaviour, in a very general sense (Green 2003).<sup>4</sup> Moreover, this definition takes into account the long-term character of a disaster and the significance of human behaviour in the different phases of such an event.

Although this definition also has some shortcomings (as we will discuss later on; see Part A, Chapter 5.1), we will apply it because of its genuine sociological character. But in order to make clear that we will not be interested in atomised individuals but rather in people who in mutual social relationships create intersubjective sense, trust, knowledge and interpretations, there is a further concept that deserves our attention: social capital.

### 1.2.2 Social capital and social networks

Just like vulnerability, social capital is a term currently widely used and discussed (but only recently also in hazard research: Dynes 2002; Nakagawa and Shaw 2004; Kirschenbaum 2004; Bohle 2005; Pelling and High 2006). What is more, the concept “has become one of the most popular exports from

<sup>2</sup> Hence, this problem is by no means restricted to developing countries—a point that is stressed by Dixit (2003, 167).

<sup>3</sup> They will never do. Methodologists discuss this problem under the keyword of “interpretative equivalence” which is regarded as a key methodological criterion of cross-national comparison (Steinführer 2005, 97).

<sup>4</sup> In parts of the literature, this emphasis on capacity instead of susceptibility is rather linked to the concept of resilience (Adger 2000; Handmer 2003, 56, with reference to the UN International Strategy for Disaster Reduction; Tapsell *et al.* 2005, 4). Therefore, resilience and vulnerability are often discussed in a mutual (conceptual) relationship (Buckle *et al.* 2001; Gallopín 2006).

sociological theory into everyday language”, despite the fact that it “does not embody any idea really new to sociologists” (Portes 1998, 2).

Although only rarely reflected upon, the concept of social capital stems from at least two distinct strands of thought: sociology of social inequality and political sociology. The first conceptualisation goes back to Bourdieu (1986; similarly Coleman 1990, 302) who conceived social capital as “resource of individuals”. The second and much more influential perspective, which emphasises the role of social capital as collective asset, is mainly connected to Putnam’s idea of (not) “bowling alone” (Putnam 1993 and 2000).<sup>5</sup> Bourdieu (1986, 248) defines social capital as the “aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition”. These resources are based on the affiliation to one or several social groups. It is both the quality and quantity of these social relationships and the resources (further social, but also economic and cultural capital) which can be mobilised via this network which makes up the social capital of an individual. This is an important difference to Putnam who conceptualises social capital as a collective good of a community indicating its respective level of “civicness” (for a critical appraisal: Portes 1998, 18–20).

Despite all the differences, in both conceptualisations **social networks** play a crucial part. Social networks form an important nexus between the individual and social structures. Therefore, network analysis is interested in the “in-between”, i.e. in the structure, quantity and quality of social relations as units of analysis (Burt and Minor 1983; Schenk 1983; Pfenning 1996). In the context of floods and other hazardous events, one might assume that social networks function as resources for information, material compensation, emotional support and physical help and are something exclusively “positive”. However, network theorists provide ambiguous hypotheses concerning the actual role of social networks in different situations. There is, first of all, the “**strength-of-weak-ties**” hypothesis (Granovetter 1973, 1983) which holds that heterogeneous social networks—resting in various social and local contexts—have more and in particular more diverse information about a certain topic (in its original application referring to labour markets and getting a job) than a dense network consisting of persons who are similar in various socio-economic and socio-demographic dimensions. With respect to coping with floods and their consequences, a variety of information channels (hence: networks of weak ties) might help an endangered person to assess a hazardous situation more appropriately than a network built upon strong ties. Then, also the coping behaviour might be more adequate.

But, secondly, there is also evidence for the “**strength of strong ties**” meaning that dense networks of people in a similar situation are exploited as a resource. Frequently interacting (i.e. densely connected) persons are more likely to share similar information, attitudes and beliefs (with a similar approach: contagion theory; Scherer and Cho 2003). The most prominent examples in this respect are networks of innovation (Burt 1987) or—from the realm of urban sociology—the emergence of ethnically segregated neighbourhoods in big cities and of ethnic entrepreneurship which built upon the strong ties of kinship and cultural-linguistic similarity, respectively (Portes 1998, 12–3). When transferred to floods, on the one hand such networks might be obstructive in the immediate pre-phase of an extreme event since they could hinder the reception of diverse and possibly even ambiguous information.<sup>6</sup> But, on the other hand, they are able to create an immediate flow of resources in the entire period of a disaster (information, physical and emotional support, economic capital etc.).

Without denying older traditions in disaster research which strongly focused on communities (Barton 1969; Erikson 1976; Couch and Kroll-Smith 1991; Mitchell 1996), there are some good reasons for dealing with social networks (and social capital) instead of focussing on communities in their ambiguous meaning of being both locally based and socially constructed. Kirschenbaum (2004, 96) points out that traditional community-based approaches usually defined their object of research by taking physical and geographical borders as a matter of fact instead of referring to subjectively defined borders and

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<sup>5</sup> Since there are different asset-holders (individual or collective actors) involved, Bohle (2005, 66–8) distinguishes an individualist (works in the tradition of Bourdieu and Coleman) from a collectivist perspective (studies following Putnam; similarly Portes 1998).

<sup>6</sup> With respect to the anticipation phase, there is also some empirical evidence for shared risk perceptions among densely knit persons (Scherer and Cho 2003, 265–6).

cross-local networks.<sup>7</sup> But regardless of whether communities, social capital or social networks are in the focus, it is apparent that most disaster research is interested in the recovery phase and the effects the disastrous event has on social cohesion and community relations (Beggs *et al.* 1996; Sweet 1998; Nakagawa and Shaw 2004). Only a few authors deal with the role of social networks and social capital in earlier stages (Barton 1969; Hurlbert *et al.* 2000; Kirschenbaum 2004).

In this report, social capital will be used in a non-romantic manner (which is one of the criticisms related to Putnam). Thereby, we will follow principal conceptual ideas of both Bourdieu and Putnam, hence taking into account social capital as an individual resource (i.e. related to the various social networks a person creates and belongs to and the economic, social and cultural resources they provide) as well as a collective asset (i.e. a community resource for which trust and shared norms are basic requirements).

At this point we also want to introduce our notion of **local knowledge**. Usually, in the discourse on natural disasters it is agreed upon that this form of knowledge is a valuable resource for mitigating the impact of a hazard, since the local population developed specific strategies over time for coping with crises (Blaikie *et al.* 1994, 64–9). We will incorporate this dimension into our analysis, by focusing on the constitution of this form of knowledge in the interaction with the physical as well as the social environment. In this respect, local knowledge is a form of knowledge, which was developed and tested in the local environment and which is therefore held as highly reliable and accepted. However, the operationalisation of “local knowledge” by means of a standardised questionnaire is hardly possible in a meaningful manner. Therefore we approach this dimension via social networks and their spatial arrangements suggesting that exclusively or predominantly locally based networks continuously create and recreate local knowledge.

Social networks as defined above predominantly refer to informal ties people have to friends, neighbours and kin. However, in the context of a disaster threatened residents usually have to deal also with representatives of organisations, such as fire brigades, municipal authorities, the Red Cross, the police, the army etc. Therefore, when analysing trust (e.g. as regards information announcing a disastrous flood about to come) and the like, also the distinction between **formal and informal networks** according to Matthiesen (2005; with a slightly different terminology) makes sense. Formal (Matthiesen: “hard”) networks are “strategic cooperation structures within formal-institutional structures and systemic functions, with clearly defined strategic goals, explicit benchmarking processes (milestones) and [...] with a defined end (death of network)” (*ibid.*, 10). In the following, all those governmental and non-governmental organisations are subsumed that are part of official disaster protection efforts. The network has a clearly defined beginning (in Germany for example Warning stage 1), a clearly defined end (termination of the disaster declaration) and encompasses such different institutions as the regional government, the municipality, the police, the army, in Germany the THW (*Technisches Hilfswerk*; Federal Agency for Technical Relief), as well as non-governmental organisations such as the local fire brigades and various aid agencies (Streitz and Dombrowsky 2003). Informal (Matthiesen: “soft”) networks consist of family-members, friends, neighbours and colleagues. They are defined, above all, by “intensified communication processes and shared tacit/explicit components of knowledge” (Matthiesen 2005, 9). Hence these networks are more or less identical with the social capital as defined above.

### 1.2.3 Risk construction

Although in Task 11 the concept of “risk perception” is prominently positioned (namely in its title), in the course of the work we became more and more convinced that it has some conceptual shortcomings. Although the term is quite well established in the scientific community, we decided to replace it with risk constructions. There are many reasons for doing so, four of which we want to point out in the following discussion.

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<sup>7</sup> This is, by the way, one of the key criticisms with regard to community studies as a whole (for a general evaluation: Stacey 1969).

Firstly, risk perception implies a **simple cause-and-effect model** in the sense that an individual perceives physical stimuli and reacts upon them. However, as the “traditional” literature on risk perception was able to show in the course of its intellectual development, the issue under investigation is far more complex: “To speak of ‘perceived risk’ in the same manner we speak of ‘perceived length’ makes no sense” (Brehmer 1994, 83), since a mental construct (e.g. “probability \* consequence”) cannot be perceived.

The second argument relates to the **historical development of the discourses** on risk perception and vulnerability. The discourse on risk perception was mostly advanced in psychology by the so-called Oregon Group around Fischhoff, Lichtenstein and Slovic (Psychometric Paradigm). Its intention from the very beginning was, firstly, to show that risk is above all a “subjective” construct (and not an “objective” one), secondly, to point out that so-called lay-people have a different risk perception than experts, and, thirdly, to analyse the cognitive structure of risk judgements by employing multivariate statistical analyses such as factor analysis, multiple regression etc. (Slovic *et al.* 1974; Fischhoff *et al.* 1979; Slovic 1987 and 1992). Another “school”, which may be called rather sociological and/or cultural in its orientation to risks, emphasized the intersubjective *modi* of constructing risk. Risk perception in this perspective is defined by norms, value systems and cultural idiosyncrasies of groups and societies. A simple juxtaposition of individual/subjective and scientific/objective risk perceptions is no longer possible thereby, since every group, thus also scientists are biased by certain assumptions, norms, values and beliefs (Douglas and Wildawsky 1982; Johnson and Covello 1987; Hoekstra 1998). In 1992, the volume “Social Theories of Risk” (Krimsky and Golding 1992) appeared as a collection of essays by sociologists and other social scientists who, in the following years, contributed, together with a growing cluster of colleagues, to enlarge the debate with natural scientists, also increasing the visibility and “legitimacy” of social studies of science and technology (among many others, Nowotny *et al.* 2001; Jasanoff 2006; Renn 2007). Also, attention grew on issues of complexity and indeterminacy (e.g., Lash *et al.* 1996; Wynne 1992), with relevant contributions from ecology and ecological economics (Kay 2001; Gunderson *et al.* 1995; Gregory 2002; Gregory and Wellman 2001). A key point of attention became the distinction between **risk and uncertainty** (Funtowicz and Ravetz 1993), the former being quantifiable through the application of standard assessment techniques, the latter being characteristics of contemporary scientific problems and requiring new instruments of analysis as well as novel management approaches (De Marchi 1995; De Marchi and Ravetz 1999). When Ulrich Beck’s book was published in English (Beck 1992; first in German in 1986) the time was ripe for a debate with many voices, contrary to a decade earlier, when Short’s appeal in his presidential address to the American Sociological Association (Short 1984), remained largely unheard.

Particularly the Psychometric Paradigm was also prominent in research on natural hazards (Slovic *et al.* 1974; White 1974) and uncovered some valuable empirical findings, such as the central paradox of technical flood protection measures: while expenditure on flood control was rapidly increasing after the 1927 Mississippi flood, the monetary flood damages were also rising (White 1973; Barry 1997). However, the underlying assumption is quite simplistic as Watts states: The research paradigm is based on an “assumption of individual purposeful rationality expressed through a tripartite cybernetic structure: (a) hazard perception, (b) recognition of alternative-adjustments, (c) choice of response” (Watts 1983, 240). As a result, individuals are understood as rationalistic atoms, defined by imperfect knowledge and acting in a societal space that is without structure and institutions. Watts concludes that maladaptation in this context is simply a function of insufficient knowledge, distorted perception and inflexible decision-making (*ibid.*, 241).

Therefore we think it is of importance to keep in mind both the development of the field on risk perception as well as the “radical constructivist” moment of the conceptualization of risk perception inherent in Cultural Theory when one relates it to the concept of vulnerability, since most vulnerability researchers are not interested in this debate. There is even a strong opposition to questions of interpretation and perception, since particularly vulnerable people of a society are simply not in a position to take the necessary steps to mitigate or prevent the occurrence of a disaster (Oliver-Smith 2002). The concept of vulnerability is based on a realist assumption to the effect that the causes eventually resulting in a disaster are socially produced; the event itself, however, is not constructed; it is rather understood as “real”. The debate about vulnerability is predominantly interested in social, economic and



political structures and processes, since these “hard” factors are seen as the driving forces defining the vulnerability of certain groups; questions of perception and interpretation, particularly when conceptualized in a narrow sense as mostly done in hazard research, are seen as subordinate.

However, in recent years there has also developed a counter-discourse to the rigid understanding of vulnerability. Critics point to the problematic assumption of the “vulnerability view”, since it assumes people who are held as vulnerable are weak, passive and, in a certain sense, deviant (Hewitt 1997; Boyce 2000; Bankoff 2001). Therefore some scholars underline the importance of incorporating the **perception of people, their capacities and interpretation** of their own situation in empirical studies. The reasons these scholars do so are, however, not analytical; they are above all normative, since they try to empower people (Delica-Willison and Willison 2004) in order to find a way of how to integrate both societal structures and individual actors within one theoretical framework. Nevertheless, it seems important to point towards the difficulty of overcoming the duality of a constructivist and realist view on risks and disasters. In the wider sociological debate Anthony Giddens’ theory of structuration is surely such an attempt to reconceptualise the dichotomy of agency/structure and objectivity/subjectivity (Giddens 1986); however, the empirical applicability of this theory is an exercise exceeding the intentions of the work in FLOODsite Task 11.

This relates to the third argument: The term “risk construction” chosen in the title of this section highlights our understanding of risk. Risk is neither objectively given nor predetermined by social structures such as income, age, class etc., nor is it simply a matter of individual cognitive operations. Risk is **socially constructed** in the sense that norms and values as well as belief systems influence and possibly define it. Thus in this context, we want to depart from most conceptualizations of vulnerability which agree that vulnerable conditions are produced by social structures but which, however, would reject that the concepts risks and disasters themselves are socially constructed. Nevertheless, in our opinion the *modi* of construction have to be taken into account. We therefore draw upon the work of Berger and Luckmann (1967). In their ground-breaking work on the “Social Construction of Reality” the authors lay down a theory, which allows for incorporation of, on the one hand, the inter-subjectively constituted life-world of people and, on the other hand, the objectified reality of everyday life (*ibid.*). The authors emphasize that the construction of reality proceeds by no means arbitrarily, since over time social actors develop typifications of each other as well as of each other’s actions, and these typifications eventually become habitualised into reciprocal roles. Reality is finally objectified when these roles and typifications are made available to other members of the society, which means they are institutionalised. These institutions appear as objectively given, since they transcend the individual and particular concept for action (*Handlungsentwurf*), although they are embedded and reproduced by individual actions, since the process of institutionalization is executed in interactions among human actors.

Institutions are evolving when different actors are confronted with a recurring problem, which is solved more or less routinely (e.g. floods). They are typical solutions for recurring (and accordingly typified) societal problems of action. Therefore institutions are relevant for a sociological analysis; they point towards what is considered as important in a society, they uncover in a more general sense the respective societal system of relevance. The development of insurances during the 13<sup>th</sup> century and their stepwise spreading in the sphere of maritime trade during the 14<sup>th</sup> and 15<sup>th</sup> centuries is such an example (Ewald 1989; Bonß 1995), pointing to the coverage of certain requirements of safeness and security.

At this point, we want to introduce the final argument for talking about risk constructions: FLOODsite Task 11 ultimately aims at a **cross-cultural analysis**. Usually, such investigations are either pursued in the tradition of the Psychometric Paradigm or in line with Cultural Theory (Horlick-Jones *et al.* 1998; Caulkins 1999; Renn and Rohrman 2000; Rohrman 2000; Sjöberg *et al.* 2000; Marincioni 2001). However, understanding the construction of risk in the outlined manner allows us to take into account rather subjective definitions of risk but also to focus on the institutionalised construction of risk. This seems to us to be a fruitful design, allowing an approach towards cross-cultural comparison, which does not rest on the level of superficial results and which does not overemphasise rigid interpre-

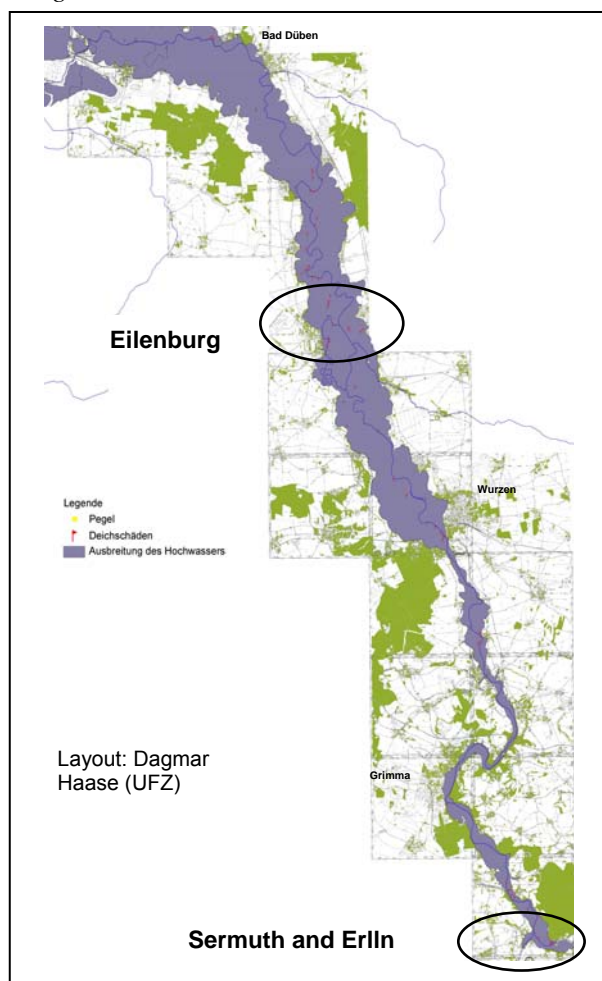
tations of social structures, but rather takes dissimilar institutionalisations of risk in different societal contexts into account.

### 1.3 Characteristics of the Mulde research locations

The selection of the research locations in Germany (Mulde basin) and, at the same time, in Italy (Adige region) was one of the first steps of analysis. The entire process took more than half a year. The locations were selected according to certain criteria which were identified and agreed upon among the partners of FLOODsite Tasks 11 and 10. The main variables for the selection of communities were flood type, flood recurrence, and community size. They were expected to have an influence on the vulnerability of local communities.

- **Flood type:** The focus was laid upon flash floods, but also plain floods with a very fast onset resembling flash-flood situations were considered.
- **Flood recurrence:** In order to carry out meaningful empirical analyses, locations where major flood events occurred in recent years were chosen.
- **Community size:** Both towns and villages were considered in order to take into account different types of settlements.

Fig. 1.1: Flood extension in 2002



The research locations for the German case study are all based in the **Saxony** section of the river basin of the **Vereinigte Mulde**, i.e. the region between Sermuth (Southern part of the river basin) and near Dessau/Bad Dübener (close to the confluence with the Elbe). Hence we did not include the mountain sections (Erzgebirge/Ore Mountains; Zwickauer and Freiburger Mulde). In the southern part of the area considered (Sermuth to Wurzen), the Mulde basin is hilly and the valleys are rather narrow. In contrast, between Wurzen and Bad Dübener lowlands prevail, resulting in a lower stream velocity. Although the Vereinigte Mulde is a plain flood example, the characteristics of the disastrous event in the upstream areas of the Vereinigte Mulde in 2002 were similar to that of a flash flood (almost no preparation time, rapid discharge etc.; for another case study in this area Hagemeyer 2004).

According to the criteria mentioned above, the villages **Sermuth** and **Erlln** and the small town **Eilenburg** were chosen for analysis (Fig. 1.1). All sites were heavily flooded in August 2002. Before going into more detail, we want to introduce some context-specific issues for a better understanding of the social, political and economic circumstances characterising the region. Moreover, also the structure of the official disaster protection in Germany has to be taken into account and will therefore be shortly outlined.

**Eastern Germany** (of which Saxony is a part) has been in the process of **post-socialist transition** since 1990. While the political structures during real socialism were characterised by a high degree of centralisation (also with respect to disaster protection), with German reunification in 1990 the entire system was transformed into a federal structure in all respects. Beside, and in spite of, large-scale public funding in a variety of affairs (modernisation of infrastructure, urban renewal, social insurance etc.), eastern Germany has been characterised by high structural unemployment (about 20%) throughout the 1990s as well as in the period after 2000. This resulted, among others, in a massive out-migration to western Germany. Taken together, a process of “shrinkage” mainly with regard to population numbers emerged which was both due to rapidly decreasing fertility rates and negative migration balance as well as their interdependencies. In our research locations, this development is particularly feasible in Eilenburg.

*Fig. 1.2: Coat of arms of Sermuth*



The village of **Sermuth** is located right at the confluence of the Zwickauer and the Freiburger Mulde which is also part of the local coat of arms (Fig. 1.2). Behind Sermuth, the name of the river is Vereinigte Mulde. In Sermuth as a whole there live about 600 inhabitants.<sup>8</sup> The empirical investigations were carried out in two out of three Sermuth districts which are Kleinsermuth and Großsermuth with approximately 400 inhabitants. The third area, Kötteritzsch, was left out since it was not affected by the flood.

The village is divided by the Zwickauer Mulde (with the confluence nearby), both old farmyards and new buildings are to be found close to the stream. Other parts of the village are situated in upper areas. Sermuth belongs to the municipality of Großbothen which in 2005 had a population of about 3,500. Since 1990, the village has lost 9% of its inhabitants. Both natural and migration development are characterised by negative balances. The age distribution is given in Table 1.1.

*Table 1.1: Age distribution in Sermuth*

| Age        | <30 y.<br>(n=185) | 30 – 39 y.<br>(n=94) | 40 – 49 y.<br>(n=101) | 50 – 59 y.<br>(n=89) | 60 – 69 y.<br>(n=87) | 70 + y.<br>(n=84) |
|------------|-------------------|----------------------|-----------------------|----------------------|----------------------|-------------------|
| Proportion | 29%               | 15%                  | 16%                   | 14%                  | 14%                  | 13%               |

*Source: Data of the community Großbothen (2006), own calculations*

*Fig. 1.3: Erlin: Living behind the dike*



**Erlin** is located at the end of a single one-way road just behind the dike (Fig. 1.3), providing the impression of an “autarchic” community. The village consists of 33 properties and has 92 inhabitants, among them some artists who make the location somewhat more famous in the region than similar places. In the early 1980s, Erlin was portrayed by Gerhard Weber whose photographs were recently published (Weber and Grüneberger 2000), making the village known “as far away as in New York”, as the local website describes this rare circumstance. Erlin belongs to the community (*Ge-*

*meinde*) of Zschadrass. In 2005, there lived almost 3,500 inhabitants. Also Zschadrass lost a considerable part of its population after 1990 (7%), due to both negative natural and migration balances. Since detailed data only for Erlin are not available, Table 1.2 displays the age distribution for Zschadrass.

<sup>8</sup> All numbers in this chapter (except when stated otherwise) are based on information provided by phone or in writing by the respective local authorities in October 2006.

*Table 1.2: Age distribution in Zschadrass*

| Age        | <30 y.<br>(n=1,015) | 30 – 39 y.<br>(n=485) | 40 – 49 y.<br>(n=648) | 50 – 59 y.<br>(n=468) | 60 – 74 y.<br>(n=553) | 75 + y.<br>(n=282) |
|------------|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------|
| Proportion | 29%                 | 14%                   | 19%                   | 13%                   | 16%                   | 8%                 |

*Source: Data of the community Zschadrass (2006); own calculations*

Erlln was completely inundated by the 2002 flood (see also below). The water level was 85 cm above the dike level. One million Euro are invested at present in order to renew (and raise) the old dike (by 95 cm) and to erect a second one. The village itself was reconstructed. Already at first glance, it is obvious that Erlln heavily benefited from the millions of public and private money which went into the flood area immediately after the 2002 event. The (only) one road is completely new, and the village for the first time was equipped with a sewerage system.

In contrast to the villages of Erlln and Sermuth, **Eilenburg** is an urban. The old town of Eilenburg (heavily destroyed in the last days of World War II) and its six small rural (administratively incorporated) districts Hainichen, Wedelwitz, Kospa, Pressen, Zschettgau and Behlitz have a population figure of currently 17,500. This means a decline of 19% in comparison with 1990. One of the main reasons for the negative population and economic development of Eilenburg was the closing down of the biggest industrial enterprise in the town, the Eilenburger Chemiewerk ECW (chemical industry). Table 1.3 provides an overview of the current age distribution.

*Table 1.3: Age distribution in Eilenburg*

| Age        | <30 y.<br>(n=5,008) | 30 – 39 y.<br>(n=2,160) | 40 – 49 y.<br>(n=2,994) | 50 – 59 y.<br>(n=2,200) | 60 – 74 y.<br>(n=3,487) | 75 + y.<br>(n=1,602) |
|------------|---------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------|
| Proportion | 29%                 | 13%                     | 18%                     | 13%                     | 20%                     | 8%                   |

*Source: Data of the municipality of Eilenburg (2006); own calculations*

Approximately two thirds of all buildings in Eilenburg are detached and semi-detached buildings. The other third are apartment buildings. Since one of our major concerns is with social vulnerability, it has to be pointed out that neither in Eilenburg (nor the two villages) ethnic minorities are living.

In the 2002 flood, the historic centre, the industrial site of the former ECW and the residential district **Karl-Marx-Siedlung** (in the report usually referred to as KMS), close to the ECW and built in the floodplains from the 1920s onwards, were inundated due to several dike breaches (see also below, Fig. 1.6). The research was carried out in Eilenburg centre (including Karl-Marx-Siedlung/KMS) and Hainichen. However, not only KMS, but most parts of the city of Eilenburg are situated within the floodplain. The historic centre is located on an island surrounded by the Mühlgraben River as well as the Mulde River. Therefore large parts of the city are protected by dikes and flood defence walls, which were supposed to be renewed in the summer of 2002. However, at the very day the construction work was supposed to start and the head of the district authority was present to officially announce the beginning of the building operations, the dikes collapsed due to the rising river. Nevertheless, the pre-flood planning efforts gained new importance, since comparatively quickly after the 2002 flood the municipality was able to start rebuilding the dike constructions around the city.

*Fig. 1.4: Flood protection wall in Eilenburg*



Today, Eilenburg not only has one of the most costly flood defence systems in Saxony, but its reconstruction is also the most advanced in the region. Thus, different measures such as the back-spacing of dikes at a bottleneck, the heightening of a bridge for widening the water passage below as well as flood protection walls, improved and heightened dikes are applied (Fig. 1.4). In the self-portrayal of the municipality in the Internet, these different measures lead to the statement: “In 2009, Eilenburg will be flood-safe as far as is humanly possible.”

The **2002 flood** in central Europe was triggered by a so-called Vb weather situation. This means that warm and humid air comes from the Mediterranean Sea, passes east of the Alps northwards and meets a body of cooler air. A stationary low pressure area is developing causing heavy precipitation, which was amplified in this case by orographic barriers such as the Sudeten and Ore Mountains as well as the Bavarian/Bohemian Forest (*Bayrischer Wald/Böhmerwald*). As a consequence, large parts of the catchments of the Elbe River experienced heavy rainfalls between 6 and 13 August 2002. In Zinnwald-Georgenfeld, for example, on August 12 a precipitation per day of 312 mm/m<sup>2</sup> was measured, which is the highest value per day measured since the beginning of the routine weather recording of the German Weather Service (*Deutscher Wetterdienst/DWD*; DKKV 2003, 28).

Within a few hours the situation along the tributaries of the Elbe was out of control. Particularly the Vereinigte Weißeritz, which left its river bed in many locations, caused inestimable damage in Freital as well as in the capital of Saxony, Dresden. The situation was similar along the Freiburger Mulde. Here the flood rose within a few hours. Therefore the villages of Erlln and Sermuth, which are located in the hills (flood loam and loessy sediments) close to the confluence of the Freiburger and the Zwickauer Mulde, were rapidly approached and inundated by the flood. In **Erlln**, the dike broke at three locations. Due to its specific geographic situation, the village was completely isolated and accessible only by air (helicopters enabling evacuations) or by water. In **Sermuth**, the dike was inundated. In both locations, the flooding of the buildings started in the very early morning of August 13.

However, also along the Vereinigte Mulde the 2002 flood situation differed from previous flood progression, since the 2002 wave flowed down the Mulde considerably faster and steeper than during previous events (1974 and 1954; Fig. 1.5). The lines in Fig. 1.5 also give a first hint of the situation in **Eilenburg**, which is situated in the Saxon lowlands characterised by a broad valley filled with Holocene flood loam sediments. The water gauge at Golzern is the reference point for predicting the flood situation in the city of Eilenburg.



Fig. 1.5: Hydrological characteristics of the Mulde floods of 1954, 1974 and 2002 (gauge Golzern)

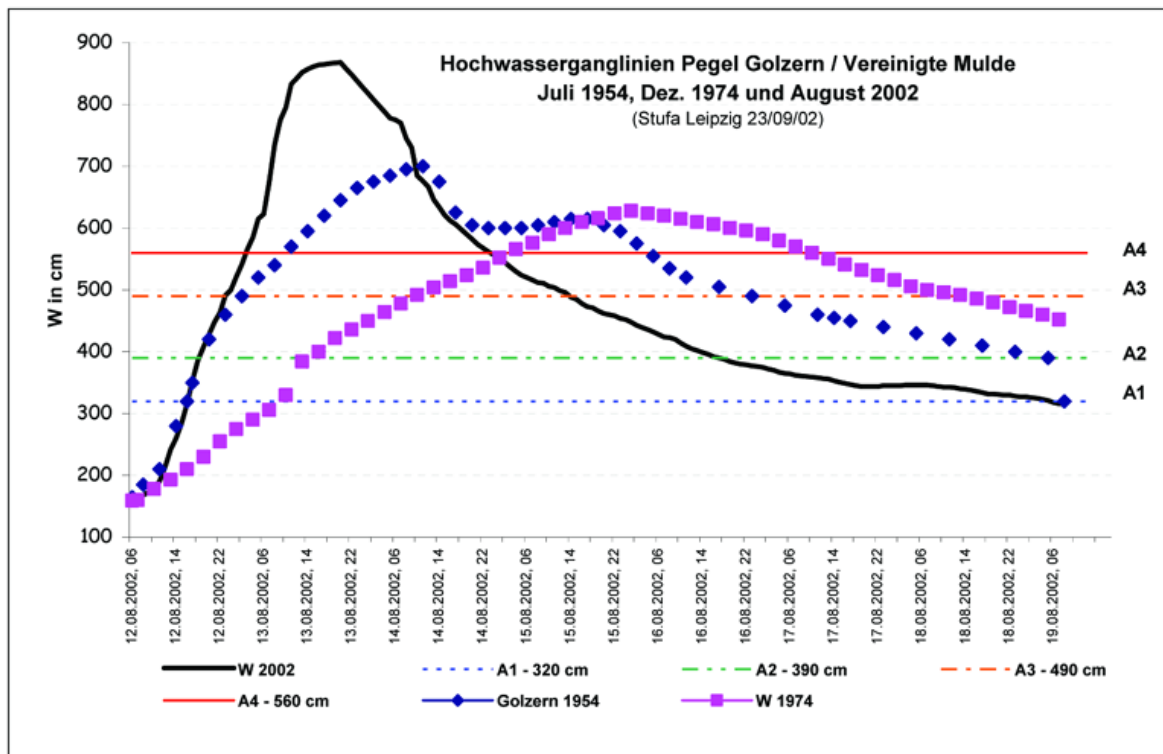
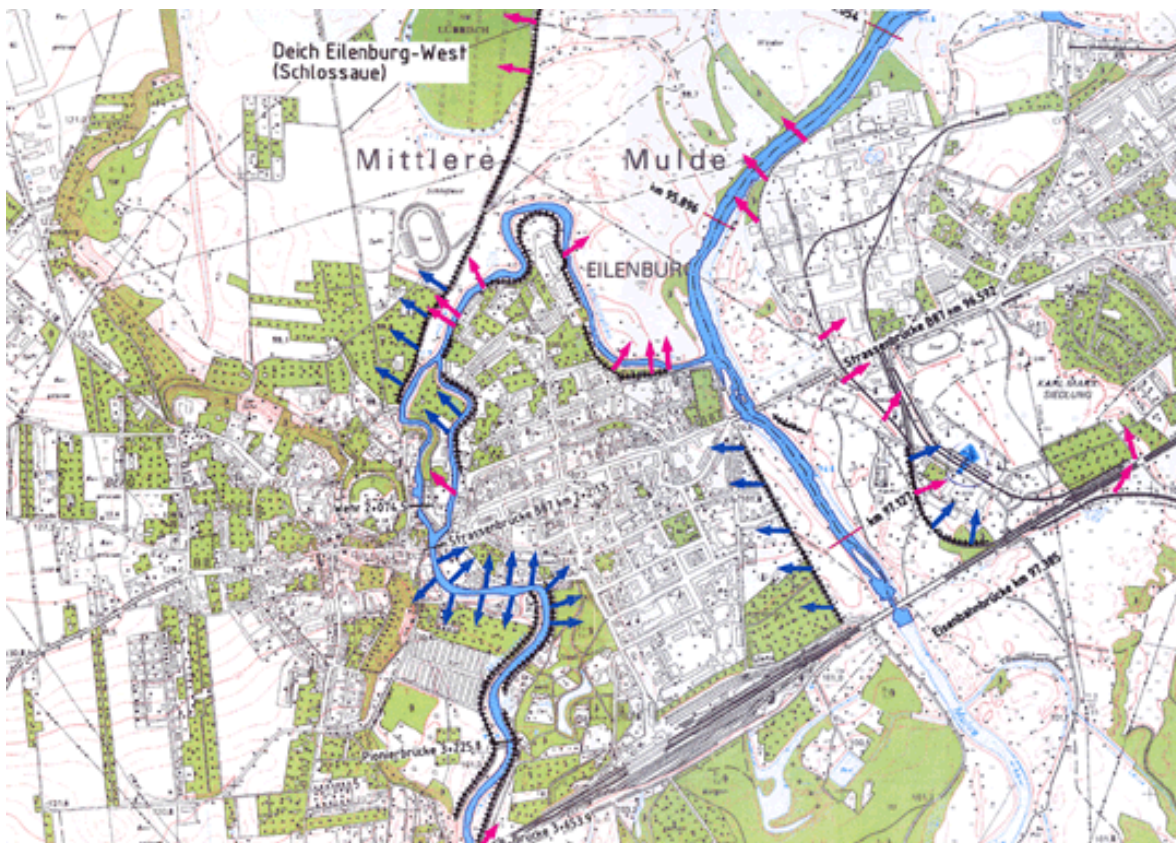


Fig. 1.6: Dike breaches in Eilenburg during the 2002 flood



Source (both Figures): Häußler and Leihe 2006

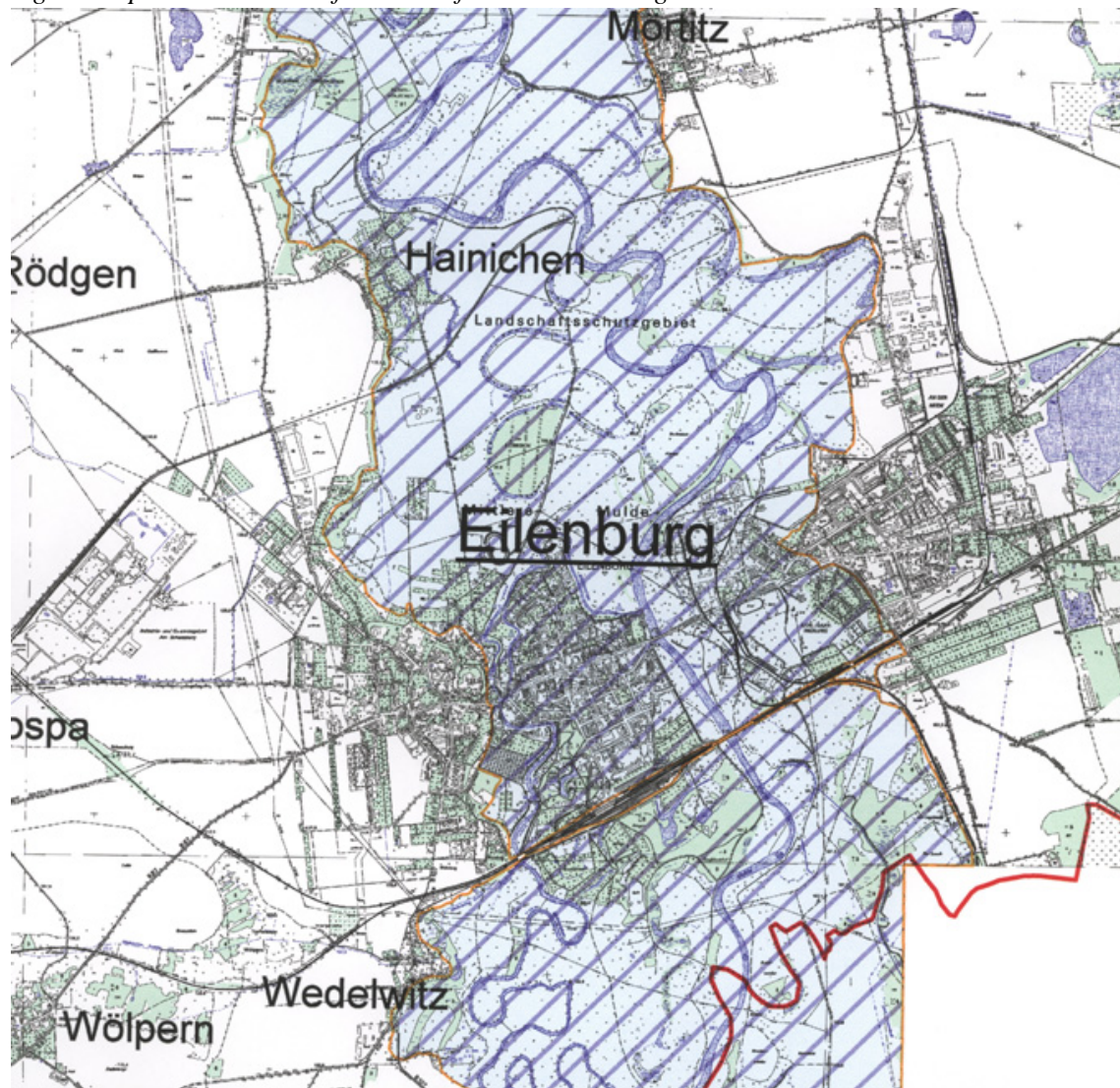


The city of Eilenburg, in contrast to the villages of Erlin and Sermuth, had some time to evacuate. Important for the execution of the evacuation was the fact that the decision-makers of the municipality were relatively well prepared for such an event, since they elaborated evacuation plans prior to the flood, on which they could rely shortly before the flood. The call for evacuation was uttered after the “crisis meeting” around 6 a.m. (August, 13). The flood was expected to inundate the city around 10 a.m., it happened, however, around 4 p.m. The dikes around the city broke at 18 places (Häußler and Leihe 2006; Fig. 1.6).

It is important to point out that Eilenburg is divided by the Mulde in two parts. As Fig. 1.7 shows, during the 2002 flood the city was therefore separated. Crossing the river was for some days impossible due to the high water level. Additionally, hardly any communication was possible during the first hours and days of the inundation since the power supply collapsed and the mobile phone network was overloaded.

In Eilenburg, about 7,500 people had to be evacuated mainly from the districts centre and KMS. Directly affected by the flood were 1,350 dwellings and 300 business enterprises. As for municipal property, the flood caused **damages** valued at 47.6 million EUR, for Eilenburg as a whole the estimation is **200 million EUR**. However, no loss of life occurred (all numbers according to: Häußler and Leihe 2006).

*Fig. 1.7: Spatial extension of the 2002 flood in Eilenburg*



*Source: Häußler and Leihe 2006*

But it needs to be taken into account that the history of the 2002 flood in Germany is also one of a very high degree of **reimbursement**. This topic will be dealt with in more detail in Chapter 5.4.2.

In Table 1.4, the most important characteristics of the research locations with respect to their general structure and the 2002 flood are summarised.

*Table 1.4: Main characteristics of the Mulde research locations with special respect to flooding*

|   | <b>Eilenburg</b>  | <b>Sermuth and Erlin</b>   |
|---|---|--|
| <b>(a) Flood type</b>   | plain flood (lowlands)  | plain to flash flood (hilly area, stretch valleys)   |
| <b>(b) Flood frequency</b><br>(rarely = less than once in ten years, sometimes = up to once in ten years) | rarely – sometimes<br>(flood frequency 25–50 years;<br>extreme floods in 1771, 1954, 1974, 2002)  | rarely – sometimes<br>(flood frequency 25–50 years;<br>extreme floods in 1771, 1954, 1974, 2002)   |
| <b>(c) Community size</b>   | - 18,000 inhabitants (whole town),<br>approximately 7,500 affected by the 2002 flood  | - Sermuth (part of Großbothen):<br>around 600 inhabitants<br>- Erlin (part of Zschadrass): around 100 inhabitants  |
| <b>(d) Type of community</b>  | - small town at the Vereinigte Mulde,<br>which divides the town<br>- Karl-Marx-Siedlung/KMS: located<br>in the floodplain (rest of town outside<br>the floodplain), dating from 1920s,<br>later expansions in 1960s and 1970s | - Sermuth: village at the confluence<br>of the Freiberger und Zwickauer<br>Mulde Rivers<br>- Erlin (administratively belonging to<br>Zschadrass): very small village |
| <b>(e) Last major flood event</b>   | - in 2002 (particularly city centre and<br>Karl-Marx-Siedlung/KMS)  | - in 2002  |
| <b>(f) Mean annual rainfall</b>   | - ca. 700 mm  | - ca. 700 mm   |
| <b>(g) Previous investigations/<br/>media interest</b>  | - investigations: none<br>- media interest: medium  | - media interest: low  |
| <b>Further information</b>  | - in the region: most severely af-<br>fected locality in 2002<br>- large flood prevention scheme in<br>preparation (official slogan: “the<br>town will be safe”)  | - heavy damage: some houses de-<br>molished after the 2002 flood   |

*Source: authors' compilation*

## **1.4 Disaster protection and warning system in Germany**

According to Article 70 of the German constitution, defence against dangers is the duty of the *Bundesländer* (federal states). The Federal Government supports the states in the event of a capacity overload. It is important to keep in mind that there exists not a single agency being responsible for **disaster protection**, since different organisations are involved in civil protection both from the public sector as well as from the private and municipal sectors.



From the public sector the following organisations need to be mentioned:

- local fire brigades (which exist as both professional and voluntary organisations),
- Bundesanstalt Technisches Hilfswerk (Federal Agency for Technical Relief; THW),
- Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (Federal Agency for Population Protection and Disaster Mitigation; BBK), which among others operates the Deutsches Notfallvorsorge-Informationssystem (German Information System for Disaster Prevention; deNIS)

From the public private and municipal sectors come the following organisations:

- Arbeiter-Samariter-Bund (Workers' Samaritan Federation; ASB),
- Deutsche Lebens-Rettungs-Gesellschaft (German Society for Live Saving; DLRG),
- Deutsches Rotes Kreuz (German Red Cross; DRK),
- Berg- und Wasserwacht (Mountain and Sea Rescue Service),
- Johanniter-Unfall-Hilfe (Johanniter Emergency Service; JUH),
- Malteser-Hilfsdienst (Malteser Emergency Service; MHD)

Similarly, the warning is not in the hand of a single agency, as many different actors are involved. While in non-federal systems the chain for decision-making (involving its segments registering, forecasting, warning and responding) usually does not work well at all (Handmer 2000), in the German case it becomes even more complicated. Many different actors at different scales are involved who seldom communicate (typically) with each other. However, since a detailed overview is not necessary for an understanding of the local level, we will quickly introduce the most important features of the **warning process for the municipalities**.

By law (*Hochwassermeldeordnung*), there are four different steps foreseen during this process all of which are announced by the *Untere Wasserbehörde* (Lower Water Authority):

- **First stage:** It is based on a constant analysis of the meteorological and hydrological situation. At the local level during this phase of the warning, the alarm plans are routinely checked and the utilisability of the equipment is controlled.
- **Second stage:** At the local level, the dikes along the river as well as endangered buildings are now systemically observed. Additionally, the operational readiness of the responsible staff and the flood protection material is controlled.
- **Third stage:** At the local level, the dikes are constantly monitored and possible mobile preventive safety measures are put into place. Additionally, a task force (*Einsatzstab*) is established consisting of people who are given responsibility during the crisis. Furthermore, special communication channels are installed and further man power for a possible active flood defence is concentrated.
- **Fourth stage:** At the local level, the organisations responsible now have to prepare everything for a possible evacuation of the population. Additionally, man power and material are concentrated for flood defence.

If the final stage of warning is no longer sufficient to handle the situation, the regional district officially declares a **disaster**.

This short introduction already reveals some crucial aspects with regard to the size of the community as well as the speed of flood onset: Principally, smaller communities, which are less equipped with organisations from either the public sector or the private and municipal sector, as well as communities prone to rapidly developing floods, are much less able to respond to sudden changes than bigger locations, which are possibly prone to slow rising floods. The chosen research locations **Eilenburg (districts centre, Karl-Marx-Siedlung/ KMS and Hainichen), Sermuth and Erlln** are ideal examples of the different aspects influencing the outlined reaction capacities. Eilenburg represents a city which is vulnerable to a slowly rising river, but at the same time is equipped with many different organisations from the public sector. Erlln and Sermuth in contrast are vulnerable to a faster rising flood and have no such organisations, with the exception of Sermuth's fire brigade. Therefore it is to be expected that, for the latter communities, it is much more difficult to respond to flood hazards (for some evidence for this assumption, though with regard to megacities in contrast with small towns: Cross 2001).



## 2. Methodological approach

Preparation for the empirical investigations started as early as winter 2004/2005. By means of interviews with decision-makers and documentary analyses, the research locations were selected and the main fieldwork—a standardised questionnaire survey and in-depth interviews with affected residents—was set up. In the course of 2005, most efforts were directed towards developing the questionnaire which needed to meet several demands, not least the one of being appropriate for cross-cultural comparison. In November and December 2005, the questionnaire survey was conducted in all research locations simultaneously. In-depth interviews with residents started almost at the same time and were mainly carried out in spring 2006. The mixed-method approach applied will be described and critically assessed in more detail in the course of this chapter.

### 2.1 Face-to-face interviews

By October 2006, we conducted approximately 30 semi-structured interviews with different people both at the local and the regional level. 20 interviews were taped and afterwards transcribed. Most interviews were carried out with residents of Eilenburg. This limitation of the sample was among others also due to pragmatic reasons, most importantly our access to the community as well as a high degree of open-mindedness there.<sup>9</sup> Moreover, since Eilenburg is the only urban research location, the variety of institutions there is much higher than in the villages. We interviewed for example the head of the local zoological garden as well as the business manager of the municipal housing company. However, it is planned to conduct further interviews also in Erlln and Sermuth in the course of the next steps of analysis.

Generally, face-to-face interviews with decision-makers need to be distinguished from those with affected people. Decision-makers are predominantly people employed at the municipality, the regional government, or organisations such as the fire brigade, Technisches Hilfswerk (Federal Agency for Technical Relief; THW) or Red Cross. These interviewees were either directly involved in the emergency phase during the 2002 flood and (or) in the reconstruction phase after the flood (e.g. flood forecasting, flood defence, evacuation, shelter provision, reconstruction etc.).

It seems important to emphasize that we consciously do not apply the word “**experts**” for describing the decision-makers, since most of those interviewed experienced an event like the 2002 flood for the first time in their (both personal and professional) lives. They had almost no experience and knowledge about the practical implications of such an event and in most cases reflected upon this in the interviews. Their expertise is mostly based in other fields such as economics, planning etc. With respect to floods, in many cases they were less experts than the assumed “lay-people” (residents) were. Nevertheless, these people had to take decisions, since either the institutional setting or the rapidly changing situation during both the emergency phase and the post-flood phase put them, not always intentionally, into such a position. Therefore, many of the interviewed persons had to act under conditions of uncertainty and non-knowledge.<sup>10</sup> Only a few people are to be considered as “experts” in the strict sense that their knowledge and experience is certified with regard to so-called disasters (Collins and Evans 2002). These are, for example, leading employees of the fire brigades and the THW as well as of the regional administration (*Landkreisamt*) which is responsible for disaster protection.

Additionally, we interviewed affected residents as well as citizens that gained specific knowledge throughout their lifetime, i.e. people who, due to their status, role or experience, have a deep knowledge of the subject under investigation and/or the relevant social context.

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<sup>9</sup> A further reason for this selection was that a PhD thesis on the significance of knowledge and non-knowledge in the course of the 2002 disaster in Eilenburg is, in connection with Task 11, also in preparation. The thesis will, in its empirical parts, mainly be based on these interviews.

<sup>10</sup> In one case, the 2002 flood even changed the hierarchy of such an institution fundamentally: the person interviewed came, according to her, into the leading position *because* of her management and decision-making capabilities during and after the disaster.

Both types of interviews were defined by different intentions. Therefore, their design differed, as will be outlined subsequently.

### *2.1.1 Semi-structured interviews with decision-makers*

The aim of the interviews with the decision-makers was twofold. Firstly, we wanted to gather information in order to get a first picture of what happened shortly before, during and after the 2002 flood. In this sense, the interview partners were informants. Secondly, we were interested in the decision-makers' personal views on this event. In this respect, it is the perspective on the disaster which is of interest for the analysis. This **two-fold orientation** to the interviews made it necessary to have a very clear outline of questions (which was ensured by carrying out semi-structured interviews), but also to give the interviewed person the opportunity to develop their personal perspective on the flood. Therefore, we provided the interviewed persons with a specific set of open questions that enabled them to give a detailed picture of the flood; at the same time we emphasized that their perspectives are of importance for our analysis. The open questions focused on the following aspects:

- The position and function within the respective organisation as well as the interviewee's daily duties and responsibilities,
- The immediate event of the 2002 flood, i.e. how they experienced the flood when they recognized that an enormous flood might come, how they personally and professionally were prepared for such a flood, which mistakes were made in their point of view before, during and after the flood,
- The aftermath of the flood, mainly to what extent the interviewees still have to deal with the event, what they learned from the flood and which knowledge they gained during the entire process.

When it became obvious that a specific topic was not of interest, we left it out.

On which basis were the interview partners **chosen**? In a first step, the central decision-makers were identified at the local level. These are, primarily, employees of the municipality. They were contacted and asked whether they were interested in collaboration. After they agreed to this, we introduced them to the main objectives of **FLOODsite** and held first informal conversations. These meetings were mostly not taped, not least because the main objective of this step of the research was to build up a respectful and trustworthy relationship with the decision-makers that allowed us to also address critical questions. This seemed of importance, since after the flood severe critique was voiced about the failures at the organisational and institutional level of disaster protection (v. Kirchbach *et al.* 2002; Streitz and Dombrowsky 2003). In most cases, one or two meetings preceded the actual interview. At the local level, we tried to conduct repeated interviews with decision-makers to both document developments within the municipality and to get deeper insights by addressing questions that came up in the course of other interviews or during the first steps of the analysis.

### *2.1.2 In-depth interviews with affected residents*

The aim of the interviews conducted with residents who were directly or indirectly affected by the 2002 flood (n=11 by October 2006) was to give them time and opportunity to develop their opinion regarding this event. We were not so much interested in information or facts but rather in their interpretational descriptions of the flood. Therefore the interviews were not structured. The interviewees could develop their own emphases and views on the issues they held as important; only the topic—the 2002 flood—was provided. Usually, the narrations lasted between 30 and 90 minutes. They were taped and transcribed word for word.

The interviewees were selected in three different ways: Firstly, respondents of the survey were asked when we collected the questionnaire (see below, Chapter 2.2.2) whether they are interested in participating in a personal interview concerning the flood. Secondly, we directly addressed people who seemed to have specific knowledge about the flood or about the locality. Finally, a snow-ball sampling was applied: After an in-depth interview, we asked whether the informant knew of members of his own family, friends, colleagues or neighbours that could be interested in talking about the flood.

## 2.2 Questionnaire survey

The questionnaire survey was conducted in the city of Eilenburg, in Sermuth and in Erlln between 24<sup>th</sup> November and 4<sup>th</sup> December 2005.

Originally, we intended to carry out complete investigation of all the households that were possibly affected by the flood in the different research locations. This issue appeared rather easy with respect to the rural and quasi-rural locations (Erlln, Sermuth, Hainichen and KMS/Karl-Marx-Siedlung), but was more difficult for the city centre of Eilenburg. In a first approach, we therefore addressed only households located in the flooded areas having their dwelling at ground-level. However, after the first day of the fieldwork it turned out that the fluctuation among the renters was considerably higher than expected and that many of the flats on the ground floor were either not occupied (very often due to damage by the flood) or inhabited by people that moved in after the 2002 flood. Therefore, the survey was expanded to all households in the area (Eilenburg centre) regardless of the floor but restricted to people affected. However, it was required that the household settled within the limits of the flooded area. In order to assure a random sample at the level of the individual respondent, the “last-birthday” method was used, i.e. the questionnaire was to be filled in by the person in the household who had celebrated his birthday most recently (Binson *et al.* 2000, 54).

### 2.2.1 Construction and piloting of the questionnaire

The design of the questionnaire developed in close collaboration with our Italian and English partners and was the main research output of the first 18 project months.<sup>11</sup> After central topics were identified and agreed upon (possibly of interest for the empirical analysis) at a Task 11 meeting in April 2005, each FLOODsite partner developed questions for the respective area of interest. This work was based upon an extensive review of the relevant literature and interviews with decision-makers and qualified informants. It is important to point out that the concrete questions and answer categories were first developed in the respective mother tongue. In our case, German was the language used for the source questionnaire, which was then translated into English and discussed with the partners of Task 11. This process took much more time than originally planned but inter-cultural communication (both with respect to different languages as well as to distinct national research traditions) is actually very demanding. However, we aimed at coming as close as possible to the ideal of “interpretative equivalence” which refers to the equivalent meaning of certain concepts in different national and/or cultural contexts (Steinführer 2005, 97). Since the Mulde case study was prepared as a self-administered survey, we had to assure for the German questionnaire a particularly high degree of comprehensibility.

The questionnaire was structured into **seven main parts** (Appendices II and III). The first covered general questions focusing on the biographical and emotional bonds of the respondent to the research location as well as on social capital both with regard to a collective and an individual perspective. Therefore, in this part also questions about the perception of solidarity and trust in the community, activities in local associations as well as the individuals’ social network questions were asked. The second section focused extensively on the 2002 flood. We asked questions about the experience of the 2002 flood, warning and evacuation, the physical impact, about consequences as well as support and information that people received after the flood. The third part was focused on both public and private flood protection and precautionary measures in the view of the local residents, while the fifth part focused on general perceptions of flood protection. In this context, questions about responsibility, effects of different measures and information policies were asked. The sixth section addressed some long-term consequences of the flood, and the seventh part asked questions about the socio-demographic structure of the respondent’s household as well as about his own professional background.

The questionnaire combined **closed and open questions**, the former serving “quantitative” and the latter “qualitative” (content) analyses (see also below, Chapter 2.3). Thus, a mixed methodology was adopted even with respect to the questionnaire: Closed questions imply pre-understanding on the part

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<sup>11</sup> The German and Italian questionnaires as well as the translations into English were delivered by project month 20 as first Research Output (RO 11.1; see also Appendices II and III).

of the researcher; open questions allow for subjective interpretations and additional remarks by the respondents.

Prior to the survey, the draft questionnaire was tested in a **pilot study**. Ten questionnaires were distributed among socially and demographically different test persons, mostly from the research locations, in order to check the comprehensibility and effectiveness of the questionnaire and its logic. Consequently, several questions needed to be revised. The final questionnaire contains 71 main and two additional questions referring to the interest of the respondents to receive information about the results of the survey, and whether they want to add aspects that were not covered by the questionnaire. The cover page provided information about the institutional and project background of the survey. On the following page, the context and purposes of the study were explained and the confidentiality of the data was assured.

### **2.2.2 Preparation, realisation and response rate of the survey**

Based on many years of survey experience gained throughout quite a few empirical investigations, which were conducted by sociologists at the UFZ, for the Mulde case study elements of both oral and self-administered surveys were adopted. In general, the approach is rather simple (though not very common): After being informed about the survey, the residents of the respective locations are handed the questionnaire by assistants and asked to complete it themselves. After a few days, the questionnaires are collected. From former investigations we knew that this methodology, on the one hand, guarantees very high response rates and, on the other, that it is not as expensive as other survey forms. But even more important is the circumstance that addressing the respondents personally provides valuable information and insights about the field to be studied already during the fieldwork.

The survey took place between end of November and beginning of December 2005. 13 interviewers were involved, including five researchers from the UFZ. The assistants were either experienced interviewers or students of the social sciences. In a training session prior to the survey, all the collaborators were informed about the purpose of the research project, the content and structure of the questionnaire, and the survey procedure in detail. Moreover, they were instructed about data confidentiality and provided with 60–70 questionnaires, a map of their respective area and some accessory items (e.g. name tag, survey lists and identification).

Since good organisation in advance leads to significantly higher willingness among the residents to cooperate, much effort was placed on comprehensively informing the inhabitants in the areas concerned. For this purpose, some of the main media were used: the municipal gazette of Eilenburg, *Amtsblatt der Stadt Eilenburg*, as well as its equivalents in Erlln and Sermuth. Additionally, information about the survey was distributed via the most widely read daily newspaper in the region, *Leipziger Volkszeitung*. A few days before the start of the survey, all these newspapers carried a press release providing information on the survey, its background and purpose. In Erlln, a meeting of the entire community took place when the survey was about to start. At this meeting, the new flood protection measures for the village were explained by the engineering firm in charge. We used this forum to personally announce and explain the reasons for the questionnaire survey. Finally, one to two days before the official start of the survey, the interviewers provided all households in the research locations with an information flyer which was either thrown in the mailbox (detached and row houses) or, in the case of multi-storey buildings, hung out.

Altogether 983 households were contacted within a three day period, the vast majority of them in Eilenburg. It has to be emphasised that due to the time in the year (early dawn) and despite the relatively late personal distribution of the questionnaire (we started around 5.30 p.m.), some respondents were either not inclined to open the door or not yet at home from work. However, more than 56% of the present households were willing to participate in the survey. Only 15% explicitly refused to take part, mainly citing lack of interest (7%). Other residents were either not affected (5%), had no time (2%), or gave other reasons (2%). About 30% were not at home (Table 2.1).

*Table 2.1: Main figures documenting the questionnaire surveys in the Mulde area*

|                            | Research location |         |           | Total |
|----------------------------|-------------------|---------|-----------|-------|
|                            | ErlIn             | Sermuth | Eilenburg |       |
| Households contacted       | 31                | 89      | 863       | 983   |
| Households present         | 23                | 77      | 592       | 692   |
| Direct refusals            | 0                 | 5       | 141       | 146   |
| Questionnaires distributed | 23                | 72      | 451       | 546   |
| Questionnaires completed   | 19                | 57      | 340       | 416   |
| Analysable questionnaires  | 19                | 57      | 328       | 404   |
| Response rate <sup>1</sup> | 83%               | 79%     | 73%       | 74%   |
| Return rate <sup>2</sup>   | 61%               | 64%     | 38%       | 41%   |

<sup>1</sup> With respect to the number of questionnaires distributed

<sup>2</sup> With respect to the number of households contacted

Source: FLOODsite survey 2005

Altogether 546 questionnaires were distributed. Most respondents agreed to complete them within a week. After this time some households refused to cooperate retrospectively and some inhabitants could not be reached again, despite several attempts. 416 questionnaires were collected out of which 12 were insufficiently completed. Hence, 404 questionnaires can be included in the data analysis, amounting to a net return rate of 74% which has to be regarded as a very good result. Generally, the response rates in ErlIn and Sermuth were better than in the Eilenburg.

### 2.2.3 Assessment of the representativeness and the methodology

The method of trying to contact all households that were possibly affected by the flood ought to guarantee a sufficiently large and representative section (in terms of the main socio-demographic indicators) of the total population. However, as already explicated in Chapter 1.3, it is very difficult to give an exact statement about the **representativeness** of a sample in comparison with the total population due to the specific data situation in Germany in general. Since there has been no census for more than 20 years, each administrative unit (boroughs, towns, districts, *Länder*) has its own statistics with more or less precise figures. In the following, both Internet sources (municipal homepage, website of the Statistical Office of Saxony) and information we received by means of phone contacts are used.

Detailed small-scale data are only available for Sermuth and Eilenburg. The gender proportion in **Sermuth** (including children who were not addressed by the survey) is 48% men and 52% women. In the survey this ratio is 55% to 45%. This can be regarded as a relatively good result, since we knew from former survey experience that in small towns and rural areas there is always a risk of a gender bias in favour of male respondents. This was one of the reasons why we applied the criterion of the “last birthday” for the final choice of the respondent at the level of the household. As for age distribution, an imbalance in favour of the older generations needs to be emphasised. While the cohorts younger than 40 years make up just 9% in the sample, they are 31% in the entire population. It is, on the contrary, mainly the group of respondents between 50 and 59 years (31% versus 17% in the population) as well as the people of 70 years and more who are overrepresented (26% versus 16%).

Although the data situation for **Eilenburg** is comparatively good, even in this case some major restrictions need to be pointed out: Firstly, the survey was carried out only in those urban areas which were actually affected by the 2002 flood, hence in the city centre, in Karl-Marx-Siedlung (KMS) and Hai-nichen. It is estimated that about 7,500 inhabitants (43%) were directly affected by the flood. Most of

them live in these three parts of Eilenburg. But the public data we can refer to do not provide separate population numbers for the single municipal districts. Secondly, detailed information is only available with respect to gender and age. As for gender, in Eilenburg as a whole (again also including children) there live 49% men and 51% women. The questionnaires were filled in by 53% men and 47% women (excluding six cases where the questions were answered by the entire household). Here, the same conclusion like in Sermuth can be drawn. With respect to age, the results are not as good since residents less than 40 years are underrepresented also in the Eilenburg sample (16% versus 33% in the whole population). The opposite is true for people aged 60 or more: While in Eilenburg as a whole they make up 34%, among the respondents they are in the majority (52%). The cohorts between 40 and 59 years are almost present in the sample as in reality. However, since we have no detailed data for the three districts we included in the investigation it is difficult to finally judge the quality of the sample. From our knowledge about the local situation, we assume that our data are somewhat more representative than the crude comparison with official statistics suggests: The three districts are rather different with respect to their household structures (predominantly older people in the city centre, families in Hai-nichen and KMS). This is also mirrored by our data (see below, Chapters 3.1 and 3.2). Moreover, that the younger people are underrepresented in the survey is very typical for the situation in eastern Germany since many people of working age commute to economically more prosperous areas and are present in the location where they have their first residence only during the weekends. This might be also true for students studying in Leipzig or Dresden who are still officially registered at their parent's home.

The empirical investigation once more confirmed the **high quality** of the **methodology** applied. There are only few questionnaire surveys that yield such high response rates with a comparable expense of money and time. The questionnaire, albeit long and complicated, proved to be understandable and manageable for the respondents. As a negative aspect, a cross-cultural misunderstanding needs to be mentioned: For many questions, the answer category "don't know" was given. This was due to the intention to make the German and the Italian questionnaires as comparable as possible. However, we did not pay sufficient attention to the different methodologies applied: face-to-face in Italy but self-administered in Germany. Hence in the Adige case study "don't know" functioned above all as a residual category in the case the respondent really was not sure, whereas in the Mulde case study it was an equal category among others. Sometimes the respondents rather willingly chose this category instead of really "deciding".

### **2.3 Combining "quantitative" and "qualitative" data**

The face-to-face interviews (both with decision-makers and with residents) provided a sort of data rather different from those of the questionnaire survey. However, this is typical of a mixed-method approach in the social sciences as applied here. For the time being, we treat them more or less separately: The semi-structured interviews with experts served in the first instance for gathering information in the field, the 2002 flood and the present situation. Many of them were necessary for developing the questionnaire. A different intention was behind the in-depth interviews with residents, as explained in Chapter 2.1.2. There we wanted to get a subjective (and intersubjective) picture of perceptions, evaluations, justifications and actual behaviour. In the following report, we will only casually refer to these interviews, because their analysis will take much more time. However, sometimes they can already now provide further substantiation of a certain argument.

However, also the questionnaire survey produced a specific kind of "qualitative" data, since open questions were integrated. The answers provide valuable further information with respect to the 2002 flood (e.g. about precautionary measures, ad-hoc actions after having received the warning, flood causes or mistakes made) and will be incorporated into the data analysis. In this context, we could make use of a relatively new programme for the statistical analysis of qualitative data which was de-



veloped at the University of Marburg (MaxQDA; Kuckartz 2005).<sup>12</sup> By means of MaxQDA, categories and, subsequently, also new dummy variables can be created which are transferable to SPSS, the statistical programme we applied for the “quantitative” data.

## **2.4 Summary**

Despite the shortcomings with respect to statistical representativeness mainly referring to the age structure (which, however, could not even be determined in detail), the samples for the single research locations are valuable small-scale data which can only be created by means of a methodological approach as the one described here. Even the best-informed decision-maker will never substitute or cover the various views and opinions of the social and demographic groups a household survey covers. We regard the affected residents as experts of their life world and, therefore, also of experts with respect to the 2002 flood, although their flood expertise is probably in most cases the result of this experience. As real experts, they are also interested in what they did: 86% answered that they would like to be informed about the results of the questionnaire survey.

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<sup>12</sup> For the time being, the programme is available in German, English and Spanish ([www.maxqda.de](http://www.maxqda.de)). Therefore, our Italian colleagues who had similar open questions in their questionnaires could not use it.



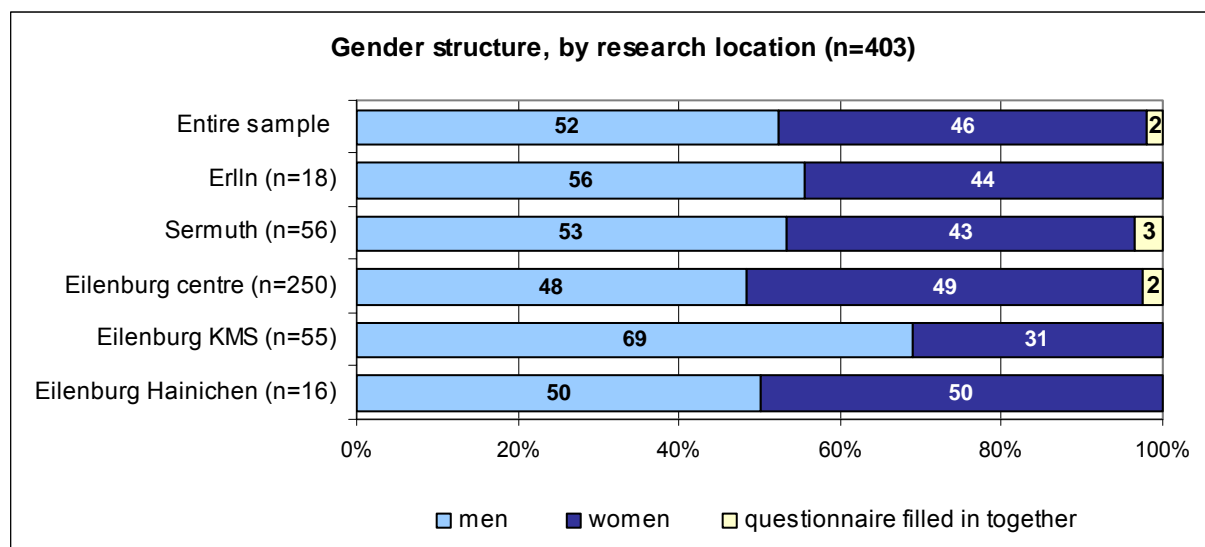
### 3. Demographic and socio-economic structure of the questionnaire sample

The questionnaire survey was conducted in several places of the Mulde catchment (Chapter 1.3). In order to take the differences between the areas into account, in the following description of the demographic and socio-economic structure of the sample the single research locations will usually be displayed and discussed separately. In some cases another criterion will be used: settlement type. We will distinguish an urban location (Eilenburg centre) from rural and quasi-rural areas (all other sub-samples).

#### 3.1 Gender and age

The **gender structure** of the entire questionnaire sample (N=404) is relatively balanced. 52% men and 46% women took part in the survey. 8 mainly older households (2%) filled in the questionnaire together which mirrors the high subjective relevance of the topics for the respondents. Also with respect to the single locations, in most cases a balanced structure could be realised, with the exception of Sermuth and in particular Eilenburg's district Karl-Marx-Siedlung. Despite the random criterion used ("last-birthday method"; Chapter 2.2), predominantly men felt addressed by the survey (Fig. 3.1). We assume traditional household structures and a respective internal division of labour as the main reason for this prevalence of men.

Fig. 3.1: Gender structure



Source: FLOODsite survey 2005

The **age structure** is very uniform. The respondents are on average 57 years old (standard deviation 12.5 to 17.5) with only slight and non-significant differences between the locations (Fig. 3.2). ErlIn and Hainichen experienced some in-migration by younger households in recent years (see below Chapter 4.2) which is also reflected by the lower mean age of the respondents. However, the small size of these two sub-samples needs to be taken into consideration. Fig. 3.3 demonstrates that among the older age cohorts mainly men filled in the questionnaire, while among the younger respondents women predominate.

Fig. 3.2: Mean age of respondent

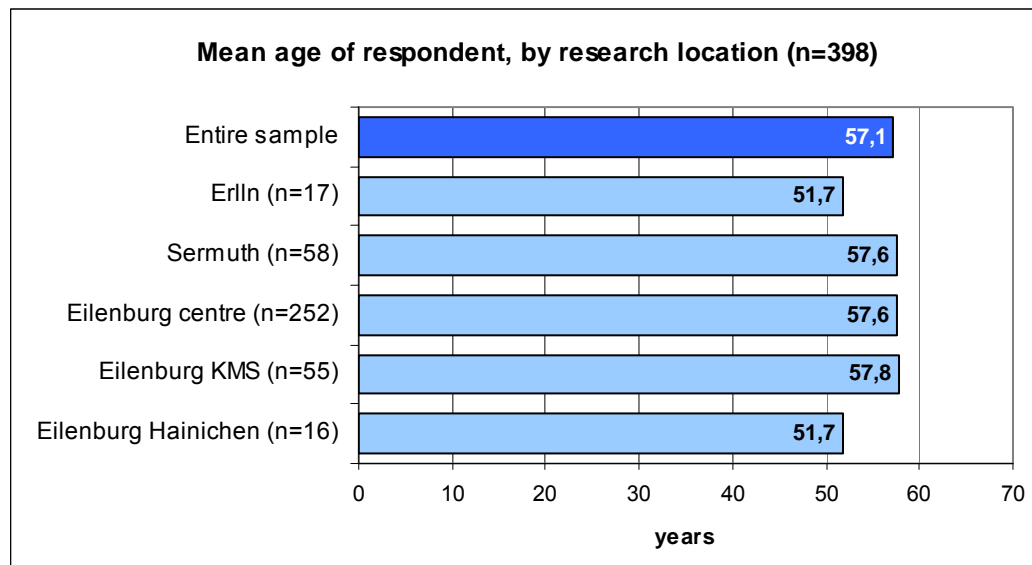
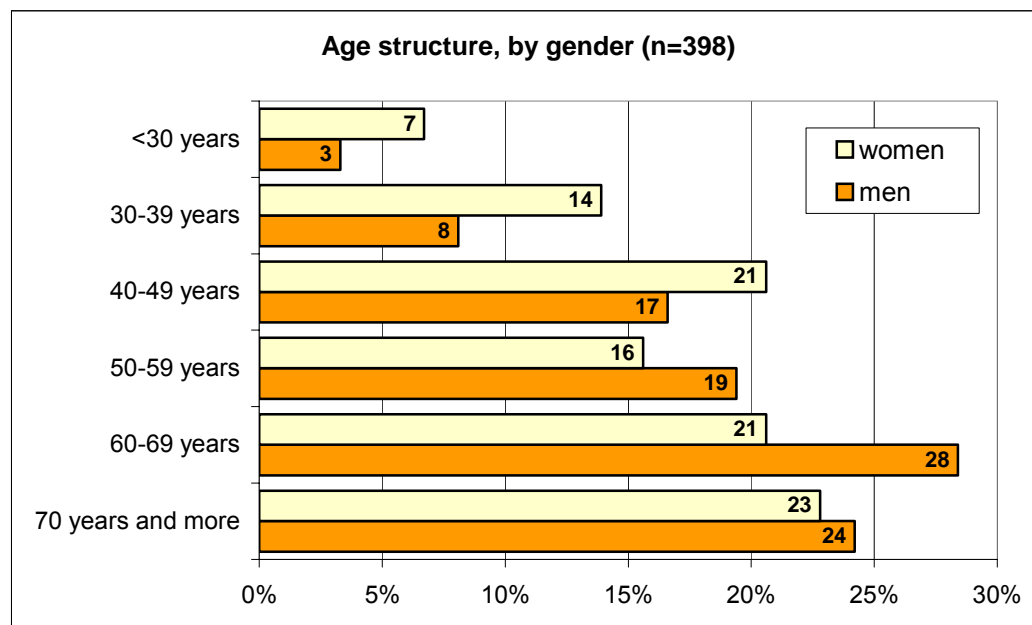


Fig. 3.3: Age structure

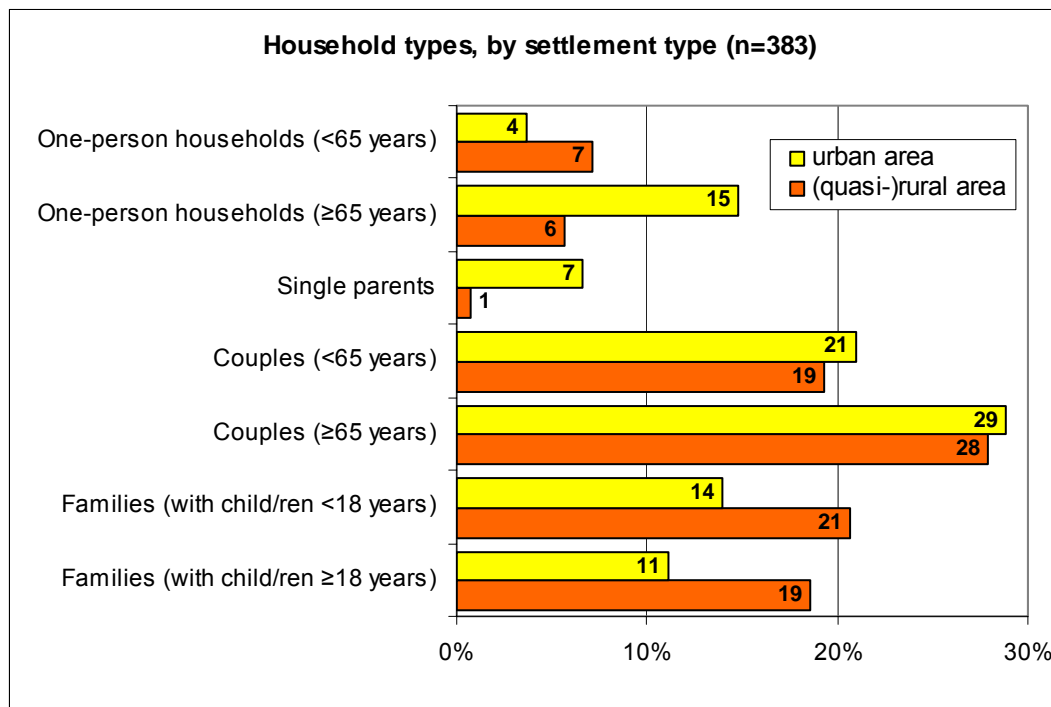


Source: FLOODsite survey 2005

### 3.2 Household structures

While with respect to age the sub-samples appeared rather similar, a closer look at the **household types** reveals some urban-rural differences (Fig. 3.4). But first some general remarks: The high mean age of the sample is mirrored also by the structure of the households of the sample. Most strikingly, the very small percentage of younger household types (such as singles and cohabiting couples without children) needs to be highlighted. Only 15 respondents younger than 40 years live in either of these household types. Therefore, they are classified in only two groups applying the age of 65 (the official German retirement age for men) as a separating line. Also families with dependent children (under 18 years) make up just 16% of the entire sample. Older cohabitation households form the biggest group (29%). Due to the mass out-migration of predominantly younger cohorts in recent years, this demographic structure is typical for East German regions outside the big cities.

Fig. 3.4: Household types

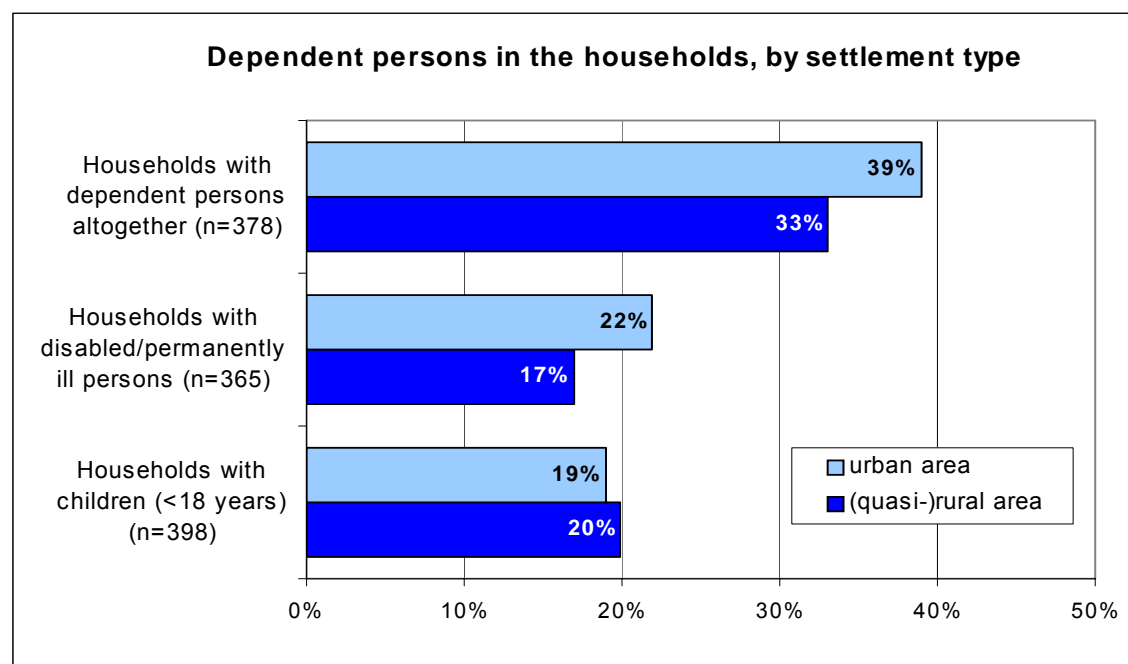


Source: FLOODsite survey 2005

The urban settlement type (Eilenburg city centre) and the (quasi-)rural research areas differ mainly with respect to the share of one-person and family households. Families (both with children younger and older than 18 years) are to be found much more often in the villages and Eilenburg KMS than in the centre of Eilenburg (39% vs. 25%). In the latter area, the household structure is more balanced with older couples predominating. One reason for these differences between the two settlement types is to be found in different building and property structures: While detached houses in owner-occupancy prevail in the rural and quasi-rural locations (see also below, Chapter 4.3), Eilenburg city centre is dominated by older one- and two-person households living in rental dwellings. However, both spatial milieus are specific: Especially for Eilenburg the small-town character is predominating—typical “urban” household types (such as young cohabiting couples or singles) lack almost completely. This finding contributes to the general impression of a high degree of social homogeneity of the sample.

When thinking of a sudden case of emergency (such as the 2002 flood), then one might assume that for the ability of a household to react in an appropriate way, its structure is crucial. Especially **households with dependent persons**—understood as either children under 18 years and/or disabled and permanently ill persons, respectively—are presumably more vulnerable than households in which every person can rely on her-/himself. In the sample, more than one third of the households (37%) belongs to this group since children or ill/disabled persons are to be found in about every fifth household (n=77 and 73, respectively). 11 respondents (3%) live with both types of dependent persons. Fig. 3.5 differentiates these households further by settlement types, indicating only small and non-significant differences.

Fig. 3.5: *Dependent persons in the household, by settlement type*



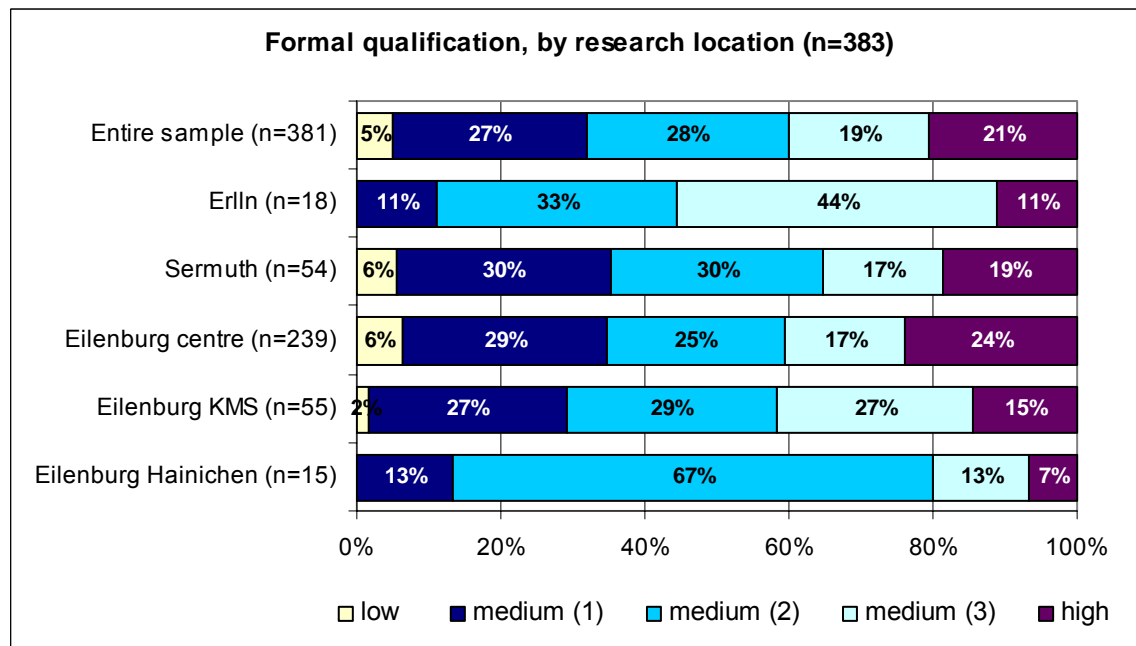
Source: FLOODsite survey 2005

### 3.3 Socio-economic stratification

One analytical tool to describe and interpret the social structures of contemporary modern societies is Bourdieu's distinction of economic, cultural and social capital (in English: Bourdieu, 1986). While economic capital comprises all forms of income and assets with a monetary value, cultural capital relates to formal and informal qualification, capabilities and skills. Social capital is made up of personal relationships to others which allow for access to resources (Chapter 1.2.2). Both cultural and social capital can be transformed into economic capital—hence it forms the basis of all other capital sorts. In this chapter, we will deal with economic and cultural capital while its social counterpart is discussed below in Chapter 4.3.

We want to start with cultural capital which in the survey was operationalised via **formal qualification** (which is a rough but widely acknowledged indicator). In German socio-demographics, it is common to distinguish between school-leaving certificate and higher education. For Fig. 3.6, they were merged into five groups representing low, medium and high formal qualification. The medium category was further divided into three sub-categories, otherwise variance was negligible. The typical example of the first category is a person who left school with 8–9 years of schooling and did not finish a vocational training afterwards (n=19). The groups of medium qualification comprise the majority of the skilled workers in the sample, partly with higher qualification, such as master craftsmen (n=284). The third group is made up of respondents with higher professional qualification (usually university or technical college degree; n=78). 6% (n=23) have not finished qualification yet or did not give an answer. Fig. 3.6 shows that the majority of the respondents have at their disposal a medium-level qualification. The lowest category is negligible (maximum 6%), whereas between 7% (Hainichen) and 24% of the respondents (Eilenburg centre) dispose of a certificate of higher education. While one might expect that age makes up for most of the differences (due to the far-reaching spread of higher education in the past decades), this assumption cannot be proven: although the first two groups are on average the oldest ones (59 and 66 years old), it is the medium category where respondents are of lowest age (mean 50 years), while the two groups with higher qualification are on average 54 and 55 years old, respectively.

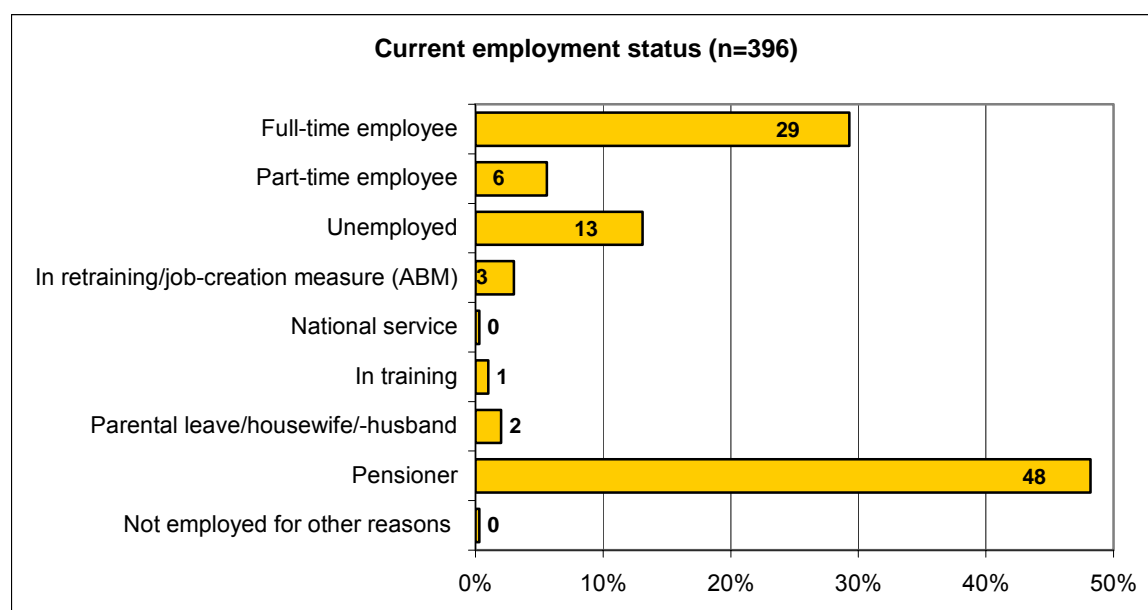
Fig. 3.6: Formal qualification



Source: FLOODsite survey 2005

Formal qualification is assumed to be a crucial predictor of the position one can reach in **professional hierarchies**. There is indeed a relatively strong relation between these two indicators of social status (Spearman's Rho 0.57;  $p < 0.01$ ). Most of the respondents were or are currently in a position with only a limited range of decision-making authority (one way of interpreting a "low" professional position; Hoffmeyer-Zlotnik 1993). The majority of them were/are either skilled workers (31%) or clerks in lower positions (*einfache Angestellte/Beamte*; 26%). But more noteworthy is the relatively high share of unskilled and semi-skilled workers (11%). White-collar employees with a higher position (*mittlere/leitende Angestellte/Beamte*) make up one fourth of the sample, 9% are self-employed.

Fig. 3.7: Current employment status (1)

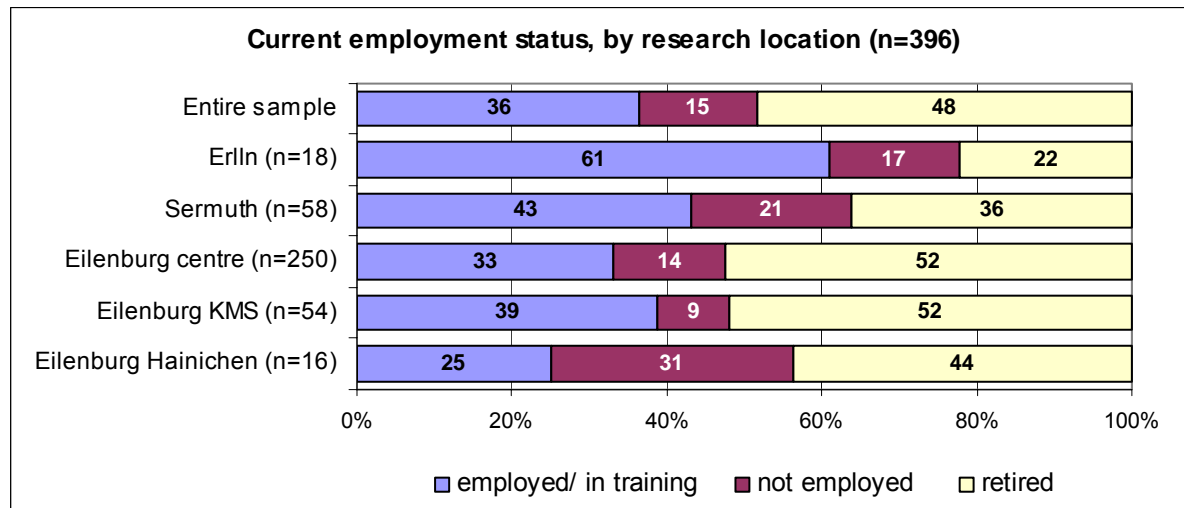


Source: FLOODsite survey 2005

By the age structure of the sample (and the economic situation in eastern Germany, which is characterised by a high structural unemployment) it can be explained that **only a minority** (35%) of the respondents is still **economically active** (Fig. 3.7), either in full- or part-time employment. Almost half of the interviewees have already reached the age of retirement (48%). 16% are either unemployed or in temporary job-creation measures. Only 1% are students or apprentices.

Since certain groups (persons on parental leave or national service etc.) are rather small, in Fig. 3.8 only three categories are displayed. All persons in employment (full- and part-time as well as people in public employment measures) are merged in one group, just like all respondents not employed for several reasons. The large group of pensioners is singled out as a third category.

Fig. 3.8: Current employment status (2)



Source: FLOODsite survey 2005

In light of Fig. 3.8, the picture becomes more differentiated. As already apparent from other indicators discussed above, the two Eilenburg areas (city centre and KMS) are those with the highest share of pensioners. In contrast with all other locations, the majority of the Erlln residents are economically active. The highest share of respondents who are not in employment (most of them unemployed) are to be found in Hainichen. But both for Erlln and Hainichen the small sample size has to be taken into account.

One might expect from this profile of labour-market positions that **household incomes** (the only indicator to measure economic capital in the survey) exhibit a tendency towards the low and medium range. In order to interpret the income distribution in the sample (14% missing values; n=57), a comparison with the Saxon Micro-Census (a representative survey of 1% of all households living in the Land Saxony) is displayed in Table 3.1. The data from the most recent Micro-Census (2006) relate to the situation of the households in April 2005, hence relatively close to the period of fieldwork. Other data concerning this issue are not existent. From Table 3.1 it becomes obvious that the monthly incomes for both one- and multiple-person households are indeed lower than on average in Saxony. Almost two third of the one-person households are to be found in the two lowest categories (with an income of less than 1,000 € per month). However, since the categorisations in the survey and the Micro-Census are not identical and since the sub-sample is rather small (n=52), these deviations might be incidental. With respect to multiple-person households (n=294), mainly the difference between the highest and the lowest incomes is apparent. While in the sample low incomes (less than 1,000 €) make up 10% of the respondents, in Saxony as a whole only 5% of all multiple-person households are in this group. The opposite holds for earnings beyond 2,600 €: only 10% of the respondents, but 23% of all Saxon households belong to high-income groups.



*Table 3.1: Monthly household income, by household size, compared with Saxon Micro-Census (%)*

|                                      | One-person households |                      | Multiple-person households |                      |
|--------------------------------------|-----------------------|----------------------|----------------------------|----------------------|
|                                      | Survey<br>(n=52)      | Micro-Census<br>2006 | Survey<br>(n=294)          | Micro-Census<br>2006 |
| <b>less than 500 €</b>               | 13.5                  | 12.9                 | 2.7                        | 0.4                  |
| <b>500 – &lt;1,000 €<sup>†</sup></b> | 50.0                  | 32.4                 | 8.8                        | 4.8                  |
| <b>1,000 – &lt;1,500 €</b>           | 28.8                  | 43.9                 | 29.9                       | 22.6                 |
| <b>1,500 – &lt;2,000 €</b>           | 1.9                   | 7.4                  | 24.5                       | 28.2                 |
| <b>2,000 – &lt;2,600 €</b>           | 3.8                   | 1.9                  | 22.8                       | 21.4                 |
| <b>2,600 – &lt;4,000 €</b>           | 1.9                   | } 1.4                | 8.8                        | } 22.5               |
| <b>4,000 € and more</b>              | 0.0                   |                      | 2.4                        |                      |

<sup>†</sup> Micro-census categorization: 500 – <900 €

Sources: Statistisches Landesamt Sachsen 2006, 671 (own recalculations); FLOODsite survey 2005

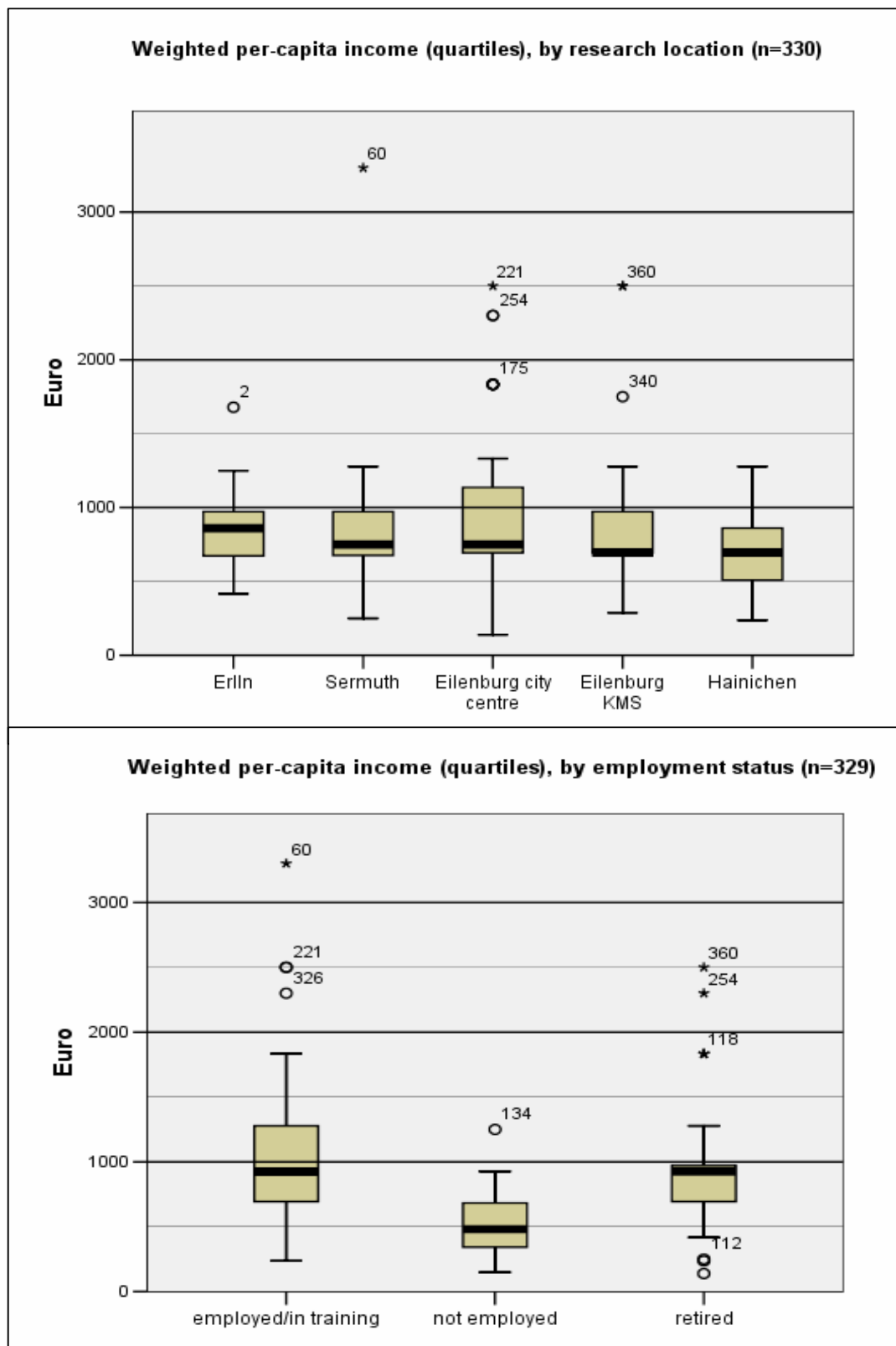
Since in the survey it was asked only for household earnings, in a further step of analysis they were transformed into **per-capita incomes**, with specific weights for single household members (see remark below Fig. 3.9). Since due to the great variations (extreme values) average values are not very meaningful, in Fig. 3.9 income distributions are displayed by quartiles—in the first part differentiated by research location, in the second by employment status. Missing values account for 18% which, however, is a good result with respect to the rather “delicate” income question.

In four **locations**, 50% of the respondents do not have more than 750 € at their disposal (indicated by the thick line in the box). Only in ErlN, the location with the highest share of people economically active, the median is higher (861 €). Again, in four out of the five research areas (this time with the exception of Eilenburg city centre), 75% of the respondents (the upper line of the box) earn less than 1,000 € per month. However, the only significant income variance ( $p < 0.05$ ; 2-tailed) is to be found between Eilenburg city centre and Hainichen.<sup>13</sup> Yet, the latter sub-sample is rather small. One can summarise that income variances between the five research locations is negligible and, therefore, a treatment as one sample (like in Table 3.1) is justified. The range of incomes is highest in Eilenburg city centre just like the number of extreme values with above-average earnings.

More meaningful than distinguishing the research locations is the analysis of incomes depending on the **relationship to the labour market** (Fig. 3.9; second part). While it is not surprising that earnings of people in employment and in training, respectively, have the broadest range (upper and lower line), the similarity of the 50%-value of economically active and retired respondents might astonish. This can be explained, however, with the rather generous pension-policy in reunified Germany during the 1990s and the usual double-income career of East Germans in the post-war period. Therefore, in a pensioners' household consisting of two persons, usually both partners dispose of a pension. In contrast with this, wages have been stagnating for some years now and are on average still significantly lower than in western Germany. In comparison with these two groups, the unemployed (and for other reasons not employed) are worst off. They earn on average (median) only half of the income of the two other socio-economic groups (481 € vs. 927 and 929 €, respectively). With the exception of one single respondent, none of the unemployed gains more than 1,000 € per month. Hence, together with the above mentioned one-person households (with less than 500 €) and the multiple-person households (less than 1,000 €)—and partly overlapping with them—the unemployed belong to the most vulnerable groups in terms of regular income, which was the only economic indicator applied in the survey.

<sup>13</sup> Mann-Whitney u-test; a Kruskal-Wallis h-test (for all sub-samples at once) reveals no significant variance at all.

Fig. 3.9: Weighted per-capita income



*Explanation:* boxplot: lower/upper line = 1st/4th quartile; box = 2nd and 3rd quartile (thick line indicating median); numbers above box = extreme values (with case numbers); weighting: first adult 1.0, each further adult 0.8, each dependent child 0.68 (Strengmann-Kuhn 1999, 383; adapted); significances: Eilenburg centre vs. Hainichen ( $p < 0.05$ ), people not employed vs. economically active and retired respondents ( $p < 0.001$ ; Mann-Whitney U-test)

*Source:* FLOODsite survey 2005

### 3.4 Summary

In this section, the main results concerning the socio-demographic and socio-economic structure of the sample will be summarised. Moreover, hypothetical implications with respect to social vulnerability (which will be taken up again in Chapter 7) are discussed.

The overwhelming impression of both the sample and, in particular the biggest sub-sample of Eilenburg (centre and KMS), is that of a high degree of **demographic and social homogeneity**. This applies first of all to the age of the respondents. The sample is relatively old which of course brings about consequences both for further horizontal (e.g. demographic) and vertical dimensions of social inequality (socio-economic stratification). Older one- and two-person households predominate in the entire sample, but they are especially typical for the urban settlement type which is represented by the respondents living in Eilenburg centre. In contrast with this, families are more typical for the rural and quasi-rural areas which can be explained by different building and property structures (see below Chapter 4.3).

But while age also explains the very high proportion of pensioners, it is not the only reason for the sample's relative social homogeneity. Also the predominant workers' milieu (especially in Eilenburg) has to be taken into account—reflected e.g. by the high share of people with a medium-level of formal qualification, the traditional household structures (core families, couples in “empty-nest” phase, older one-person households) and the predominantly low and medium incomes.

What does this mean for the assumed **social vulnerability** to flooding of the people living in the flood-prone areas of the Mulde River? As already discussed in Chapter 1.2.1, large parts of the literature suggest that social vulnerability (as the capacity to cope with and respond to a disaster) is enhanced and diminished, respectively, by certain socio-economic and socio-demographic characteristics. Based on both the literature cited above and on the conviction that these characteristics are highly context-dependent, in Table 3.2 a few—from our point of view meaningful—socio-demographic and socio-economic indicators of vulnerability to flooding are summarised and the hypothetically most vulnerable groups with respect to specific dimensions of social inequality are highlighted. Instead of developing an index, at this stage of the investigation we prefer these (more or less) one-dimensional indicators because merging them into one single index might lead to a mutual neutralisation of the different indicators.

Furthermore, we regard households who have to take care of **dependent persons** (children, permanently ill relatives) as hypothetically more vulnerable than those without, because mobility restrictions might negatively harm the capability of this household to react in an adequate way, especially at the very moment of the disaster. The dimension of **gender** is indirectly touched thereby, since it is mostly women who take care of children and the elderly. However, gender is a rather ambiguous category with respect to disaster vulnerability. Women are, on the one hand, regarded as more vulnerable due to lack of resources/power, they spend more time at home and, as already mentioned, care for dependent persons. On the other hand, they are ascribed more coping-capacities due to their usually greater commitment to family work and kin relations (Blaikie *et al.* 1994, 133; cf. also Enarson and Morrow 1998; Fordham 1998; Fothergill 1996).

The dimensions **unemployment, low formal qualification and low income** in social reality often overlap. People belonging to either of these categories are assumed to exhibit a higher degree of vulnerability to disasters (Tapsell *et al.* 2002, 1520; Cutter *et al.* 2003, 246–7). This might be due to a lack of knowledge concerning a disastrous event about to come (i.e. both with respect to mere “facts” but also referring to the problem of how to gain information and how to apply it), but also with a lack of resources to cope with the event as well as to absorb the losses resulting from a disaster. But as for other dimensions, also this one is ambiguous, since one can argue that also people in employment (who make up only a minority of the respondents, as shown above) with their belongings are in a certain sense relatively “more” vulnerable—simply because they are not present at the moment of the immediate crisis. Hence, it is impossible for them to reduce at least *ad hoc* their material vulnerability (by taking some valuables or rearranging the interior of their home).

*Table 3.2: Hypothetical indicators of social vulnerability and their frequencies in the sample (1)*

|   | Total number<br>(share) | Locations with ...                            |                                 |
|---|-------------------------|---|---------------------------------|
|   |                         | ... highest share                             | ... lowest share                |
| <b>Old persons (65 years or more)</b>                                 | 162 (41%)               | Eilenburg centre (44%)<br>Eilenburg KMS (42%) | ErlIn (16%)                     |
| <b>Very old persons (75 years or more)</b>                            | 57 (14%)                | Eilenburg centre (17%)<br>Sermuth (16%)       | Eilenburg KMS (2%)              |
| <b>Households with dependent persons</b>                              | 139 (37%)               | ErlIn (41%)                                   | Sermuth (22%)                   |
| <b>People with low formal qualification<sup>+</sup></b>               | 103 (32%)               | Sermuth (35%),<br>Eilenburg centre (35%)      | ErlIn (11%),<br>Hainichen (13%) |
| <b>Unemployed people</b>  | 52 (13%)                | Hainichen (25%)                               | Eilenburg KMS (9%)              |
| <b>People with very low income (weighted per capita)<sup>++</sup></b> | 66 (20%)                | Eilenburg centre (18%)                        | Hainichen (40%)                 |

<sup>+</sup> Values 0-3 of merged scale (highest school-leaving certificate plus professional training/higher education; scale from 0 (no degree) to 8 (highest degree); note that category "low" (in Fig. 3.6 above) refers only to values 0-2 of this scale (n=19)

<sup>++</sup> Value of first quintile for entire sample (600 €) taken as upper limit

Source: FLOODsite survey 2005

Hence, without discussing these issues in the necessary length, it becomes obvious that already these apparently indisputable indicators are rather ambiguous in their hypothesised effects concerning the social vulnerability to flooding. In Chapter 7, this topic will be taken up and discussed in more detail.

## 4. Local attachment and its social and material foundations

In this chapter, local attachment and its social and material foundations will be explored (sections 4.1–4.3). We will focus on social capital mainly in the form of informal networks and the material bonds to the location. In the last paragraph (4.4), indicators of vulnerability resulting from these issues will be derived and discussed, analogous to the approach in Chapter 3.4.

### 4.1 Local and regional attachment in general

**Local attachment** relates to the emotional bonds of an individual to a certain place (Fried 2000). These might be rather strong ties in the case of one's hometown and place of birth, respectively, or fairly weak bonds, e.g. for a commuter in his/her secondary place of residence. Local attachment—also referred to as place identity (Proshansky *et al.* 1983)—develops in time, which is both historical (local, societal) and individual (life-) time. At certain places with a characteristic built, social, and cultural environment, people experience public events (e.g. disastrous floods) and their very personal affairs (births, deaths etc.). Hence, such events are related to the specific place and will be (re)constructed by local narrations and become part of the local memory. But in the first instance, people-place relations are made up of or mediated by social and material bonds. The social dimension of local attachment comprises all kinds of personal networks to family members, friends, neighbours, associates and acquaintances as well as to “functional” persons, such as doctors, landlords or teachers. With material bonds, mainly property and real estate are meant which imply both possession and obligations. The distinction is, of course, an analytical one—social networks also transfer material goods (e.g. money), and material property is often related to the history of one's family, hence it has a social dimension. In Table 4.1, main survey indicators (operationalisations) of what we mean by “social” and “material” bonds are given.

Table 4.1: Social and material dimensions of local attachment: indicators in the FLOODsite survey

|   | Social dimension | Material dimension |
|---|------------------|--------------------|
| Network of people with whom important matters are discussed | X                | (x)                |
| Membership in local associations                            | X                |                    |
| Home-ownership  | (x)              | X                  |
| Other kinds of property in the area                         |                  | X                  |

Source: authors' considerations

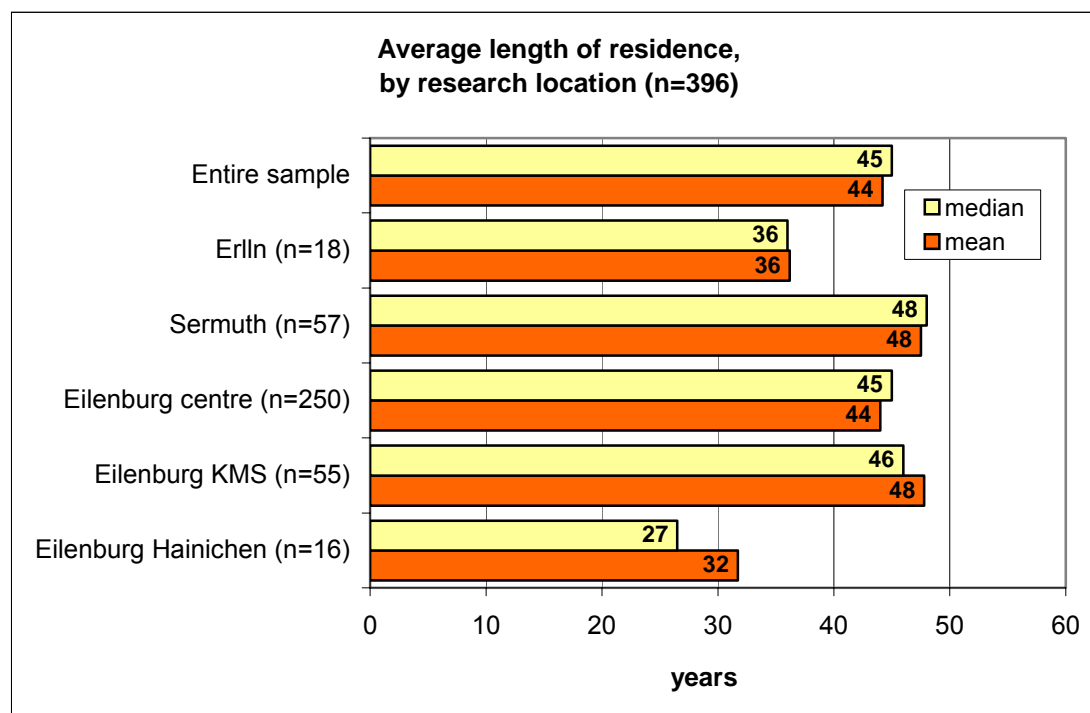
Eastern Germany underwent a far-reaching process of post-socialist transition from 1990 onwards. Legal, political, economic and social circumstances changed rapidly and dramatically. Both intra- and inter-regional mobility increased significantly. Established social networks changed, broke up or were rearranged. While intra-regional and intra-urban mobility in the first instance served to improve individual housing conditions, migration beyond the region was predominantly caused by the lack of jobs and constant high unemployment everywhere in eastern Germany. As already shown in Chapter 1.3, also Eilenburg (the largest research location in our investigation) lost a significantly high proportion of its inhabitants in the past 15 years.

Therefore, it is only at first glance surprising that—when considering the sample as a whole—half of the respondents (49%) have lived in the respective village or town their entire life time. The mean **length of residence** is 44 years (median: 45 years; Fig. 4.1). This finding can be explained by the geo-

graphic location and the socio-economic situation: The villages are fairly remote from big cities, and the small town of Eilenburg is characterised by a structural lack of jobs and has no institutions of advanced vocational or professional training. The negative migration balance of the town is mirrored by the data—the people gone cannot be surveyed anymore, and in-migration was rather an exception in recent years.

But a site-sensitive look reveals a few small-scale differences: The rural Hainichen (now belonging to Eilenburg) as well as Erlln have been changed by some in-migration in recent years as noted above (Chapter 3.1). While Hainichen benefited from intra-regional migration (all of the new residents had been living in the same district before), Erlln also attracted people from other parts of Germany. While three of the four newcomers in Erlln are between 30 and 40 years old and therefore contributed to a rejuvenation of the village, the in-migrants to Hainichen belong to both younger and older cohorts. Hainichen is also the only research location in which statistical mean and median of the length of residence (Fig. 4.1) differ, thus making the in-migration in the past years even more evident (while the mean length of residence is 32 years, 50% live on average 27 years in the neighbourhood). However, in both cases (Erlln and Hainichen) once more the small sample sizes need to be taken into account.

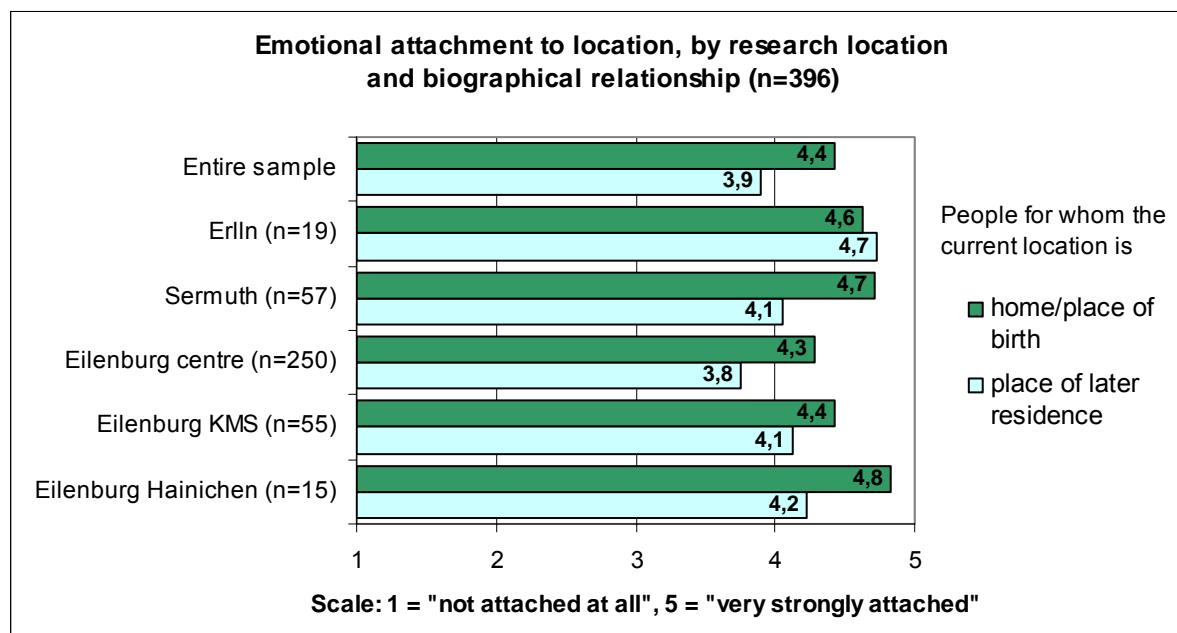
*Fig. 4.1: Length of residence*



Source: FLOODsite survey 2005

The findings of Fig. 4.1 make us expect strong positive sentiments towards the area where most of the residents were brought up. This issue will be explored in the following by means of different indicators. First of all, we asked rather straightforward for the **degree of personal attachment** to the place of residence and the area in general. The general hypothesis formulated above—a strong emotional relationship—is proven both for the entire sample and the single research locations. The respondents feel on average strongly or very strongly attached to their place of living, both in the case of being home during their entire life and for people who in-migrated at a later point in time of their life (Fig. 4.2).

Fig. 4.2: Local attachment



Mean difference significant for entire sample/Eilenburg centre ( $p < 0.001$ ) and Sermuth ( $p < 0.05$ ; T-test)

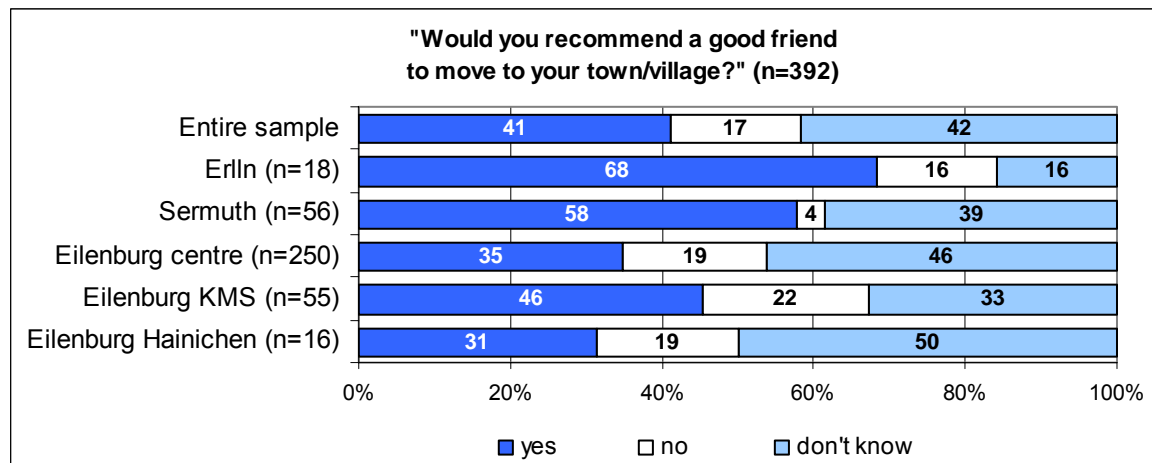
Source: FLOODsite survey 2005

But Fig. 4.2 also signals that there are differences in local attachment, depending upon whether the town and village, respectively, is the hometown (place of birth). But when regarding other socio-demographic dimensions, only few contribute to a deeper understanding. All age-groups are highly attached to their place of residence with only slight variations between the groups (neither being a linear relation). Formal qualification also makes no difference with respect to personal attachment. The only variation can be attributed to gender: Men feel more sentiment towards their residential location than women ( $p < 0.05$ ; T-test), but this difference is valid only in Eilenburg centre and KMS. Parts of this difference might be explained by the fact that in these two neighbourhoods 51% of men but only 44% of women were born in Eilenburg (not significant).

A further indicator is less related to the individual respondent. Instead, the so-called “good-friend” question (a standard indicator in UFZ surveys for many years asking whether the respondent would advise a good friend to move to his place of residence) expresses, from a subjective perspective, a very general assessment of the town or village, independently of probable current worries. The exact wording is given in Fig. 4.3, just like the variations between the research locations.

From Fig. 4.3 it becomes obvious that the supporters (“yes”) and those with reservations (“don’t know”) are about the same size. Explicit refusal is typical only for a minority of the entire sample. But the general picture hides the significant variance between the single research locations. The most positive relationship can be found in Erlln (similarly as in Fig. 4.2). It is mainly the residents of Eilenburg (especially those of the quasi-rural location of Hainichen) who are much more critical about their town than the villagers, although it is rather indecision than a negative assessment, since those rejecting such a theoretical recommendation make up the smallest group (about 20%). The low degree of affirmation by the Eilenburgers is certainly also due to the economic situation of the town, which is as bad as in many other places in eastern Germany (where we found even lower proportions of recommendations to the “good friend” in various surveys in the past years). This argument does not apply for Erlln and Sermuth which predominantly serve as places of living with the place of work outside these two locations.

Fig. 4.3: “Good-friend” indicator



( $p < 0.01$ ; Chi-square test)

Source: FLOODsite survey 2005

A further indicator—the **perceived solidarity among the residents** from the point of view of the interviewees—is rather difficult to interpret. It can be read as a feasible indicator of **social capital** in the sense of Putnam, hence at the level of the community. On average there is a strong tendency towards the mid-value, i.e. the respondents neither attribute to their fellow citizens a strong solidarity (“people are helping and supporting each other”) nor does “everybody mind his own business”. Again, the villagers of Erlin and, to a lower degree, Sermuth are more positive about their location than the interviewees in the different neighbourhoods of Eilenburg ( $p < 0.01$ ; T-test). Especially Hainichen is rather badly evaluated (with only 13% of respondents confirming the existence of social capital in the above mentioned sense to their village) Thus, the general tendency of local attachment already discussed is once more confirmed – with Sermuth and Erlin receiving the most positive assessment and Hainichen being relatively negatively evaluated. The two Eilenburg districts KMS and centre are in a medium position. Moreover, there is a correlation between one’s own emotional attachment and perceived local solidarity: People with strong emotional bonds in general tend to give a more positive evaluation about other community members than those with a low attachment. However, there are great differences between the single research locations. With respect to the entire sample, standard socio-economic and demographic variables do not explain the variance. Also, the distinction between place of birth versus place of later residence does not contribute to a deeper understanding. In the next two sections, we will shift our attention to the importance of social bonds in the community (networks, local commitment) and of material bonds (owner-occupied property) for local attachment.

## 4.2 Informal networks as social capital

In empirical research, data on informal social networks are only exceptionally collected via self-administered surveys, since the relevant indicators are regarded as rather complex. However, we knew from earlier experience that a relatively easy name indicator in combination with some explanatory variables concerning the persons named will also work when applying the methodology described in Chapter 2.2. From the wide range of opportunities, we chose a slightly modified version of the so-called Burt indicator as applied in the U.S. General Social Survey (GSS; Burt 1987, 296, 331), which asks for persons with whom important personal matters are discussed.<sup>14</sup> By such an indicator, a so-

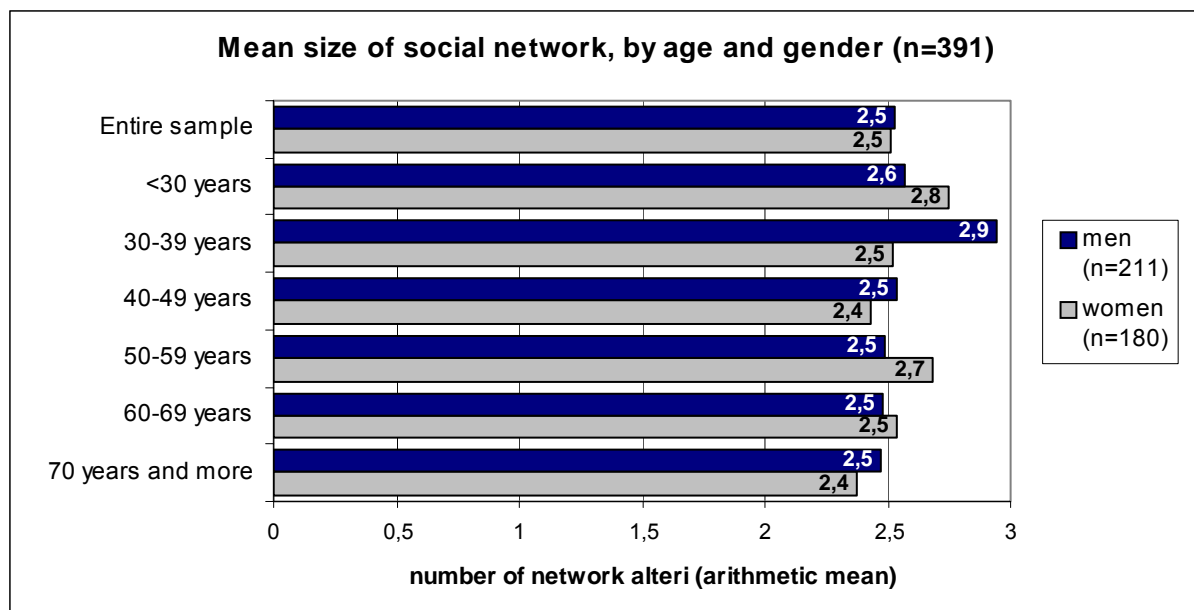
<sup>14</sup> The exact wording in the Mulde survey was as follows: “Sometimes there are situations in life when you don’t want to make decisions on your own, or there might be an important question to be answered where you need advice from somebody. We would like to know who the people are with whom you discuss your concerns. Please nominate three persons who are important to you with respect to the above mentioned points. Please consider only people who are not living in your household” (question 8).



called ego-centred network is generated, i.e. a network seen from the perspective of one specific member of the network (the respondent, also called *ego*) without asking the network partners (*alteri*) about their perception of the relationship (for a similar approach in the context of disaster research: Hurlbert *et al.* 2000, 605).

In contrast with the GSS, the **number of persons** to be nominated was restricted to three in order to keep the questionnaire manageable which, of course, decisively influences the results. 75% of the respondents reported the maximum number of *alteri*, 10% no person at all (including those who did not answer the entire question complex, hence including missing values for whatever reason). The mean network size is 2.5 (median: 3; always computed without *ego*). Network sizes of men and women do not differ from each other. The same holds true for networks of residents of urban versus those of rural and quasi-rural locations (in either case: 2.5). Age makes a small difference, with younger people having greater networks than the elderly. However, the correlation is rather weak (Pearson's  $r = 0.09$ ;  $p < 0.05$ , one-sided) and, as apparent from Fig. 4.4, not linear. The hypothesis that older people have smaller networks is only confirmed by the fact that the age group 70+ indeed has the on-average-smallest number of *alteri* (2.4 vs. 2.6 for all others; not significant). However, the required nomination of just three people certainly restricts the explanatory power of the parameter network size. What is more, indicators of social status (formal qualification, professional status, income) do not account for any variance—the picture is one of low diversification, at least with respect to the quantitative dimension of the ego-centred networks.

Fig. 4.4: Size of social network



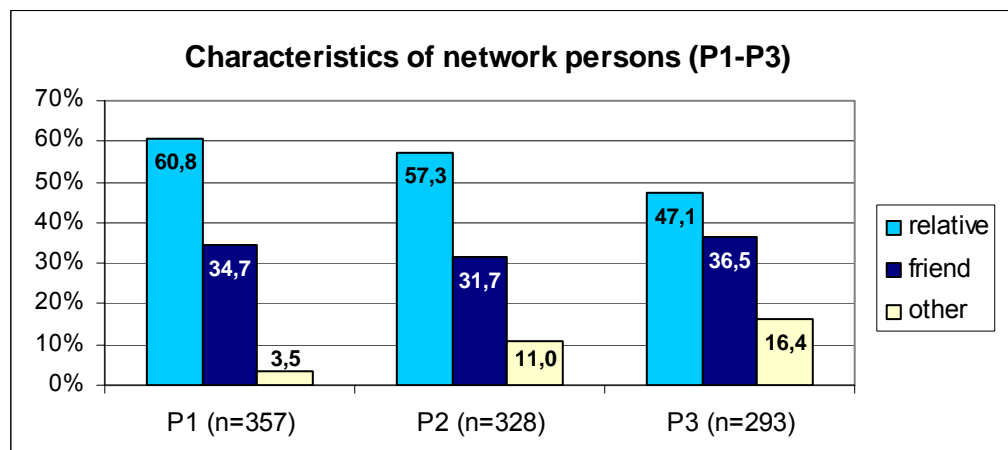
Source: FLOODsite survey 2005

But more significant—also, hypothetically with respect to the role of social capital before, during and after a hazardous event—is the **network's quality** which will be discussed now. Since the significance of social networks for pre- and post-flood situations as well as for coping with the immediate event was but one topic of the survey, only a very limited number of network parameters could be asked for: the kind of relationship of *ego* to the *alteri* (kin vs. non-kin, suggesting hypothetically more binding/compulsory versus less binding/compulsory relations), the spatial distance to these persons and (to be

treated below in Chapter 5) the kind of support received in the course of the 2002 flood. All these indicators contribute to an at least minimal understanding of the quality of the social networks.<sup>15</sup>

Altogether 543 relatives and 335 friends were generated by the applied name-generator. 100 others (mostly work associates, but also neighbours etc.) represent only a minority of these social networks. Therefore, most of the network **relationships** are **based on kinship** (Fig. 4.5). Especially Person 1 (P1) and 2 (P2) are predominantly taken from the circle of kin. Unfortunately, our restricted network indicator set does not allow us to determine these relationships in more detail (e.g. first or second degree relationship). But also friends are important contact persons to discuss issues that matter. However, this result is not very surprising—due to the question (the so-called name generator as quoted above) social networks of trust, hence of strong emotional ties (“core network”; Hurlbert *et al.*, 2000) are generated. Moreover, colleagues and neighbours, to whom one develops such intense relations, will probably be taken for friends and hence change their original role. But it is evident from Fig. 4.5 that non-kin and non-friends are more important in the larger network (beyond the three most important persons) of which we have only limited knowledge due to the quantitative restriction used in the question.

Fig. 4.5: Characteristics of network persons

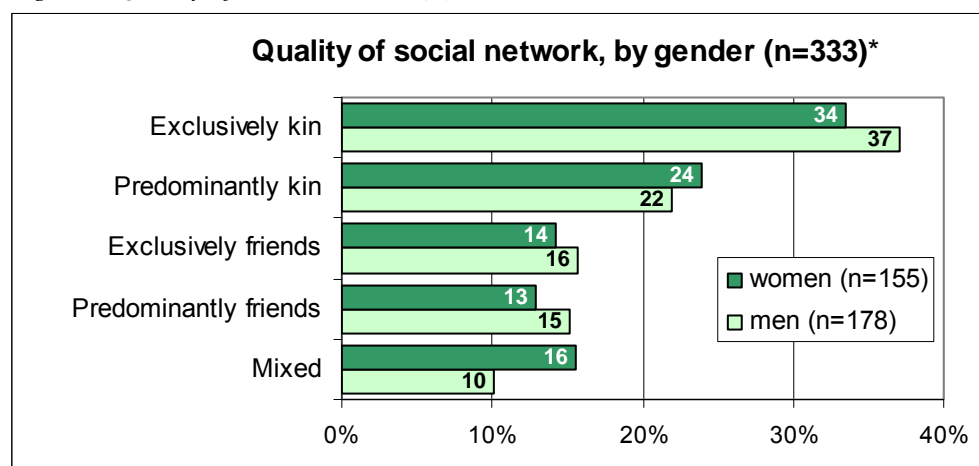


Source: FLOODsite survey 2005

But the strength of social network analysis relates to its focus on the structure of social relations, not on individuals. One of the parameters of such networks is their **heterogeneity**, hence the nature of the entire network: does it consist of people from only one context (e.g. kin) or is it a mixed network relating persons from different worlds? Fig. 4.6 gives evidence about the character of the “real” networks generated (excluding the 27 interviewees who named only one person outside their household with whom they usually discuss important matters). About half of the social networks are homogeneous: 35% consist exclusively of kin, 15% of friends. The other half are mixed networks, although most of them are dominated by either kin- or friend-based relationships. Gender variance is small, with the only exception that women can rely more on heterogeneous networks than men.

<sup>15</sup> For a meaningful social network analysis further parameters need to be considered, among them gender, intensity of the relations (frequency of contact) and their multiplexity (the kind of support they provide, e.g. material, emotional and/or physical help, information etc.) as well as network density (whether the *alteri* know each other or not). However, none of them was—due to restrictions with respect to the length of the questionnaire—integrated in the Mulde survey. From a methodological point of view, in particular the missing density question is unfortunate. Hence we will implicitly have to take for granted that at least some of the persons nominated by the respective respondent know each other, because only then is it a “network” in the true sense of the word.

Fig. 4.6: *Quality of social network (1)*



\* All cases where only one person was nominated (n=27) were not included.

Source: FLOODsite survey 2005

The question of **network quality** is closely related to the issue of heterogeneity. 55% of all networks are predominantly or exclusively based on kin, 28% more or less consist of friends, 17% are mixed networks. Taking into account only the first two types, the differences between urban and (quasi)-rural locations are only small and not significant: While in the former, 65% of the respondents have at their disposal predominantly or exclusively kin-based networks (35% predominantly or exclusively friends), the ratio for the latter is 70% to 30%. As to be expected, the networks of older age-groups (from 60 years onwards) consist to a very high degree of kin, but already people of 40 years or more rely in their majority on predominantly or exclusively kin-networks (Table 4.2). This difference in network quality might be meaningful, especially with respect to post-flood recovery, because the different networks are to be expected to deliver different kinds of support (e.g. material vs. immaterial). A first conclusion which can be drawn from these analyses, fitting into the overall picture of a certain age and social bias in the region, is that of a **predominant traditional structure of social networks**.

Mixed and other networks (n=61; e.g. consisting of solely neighbours or of one friend and one relative in the event of two persons nominated) are not covered by Table 4.2. A closer look at them does not reveal any specifics, beside the fact that they are more typical for older age groups (50 years and older).

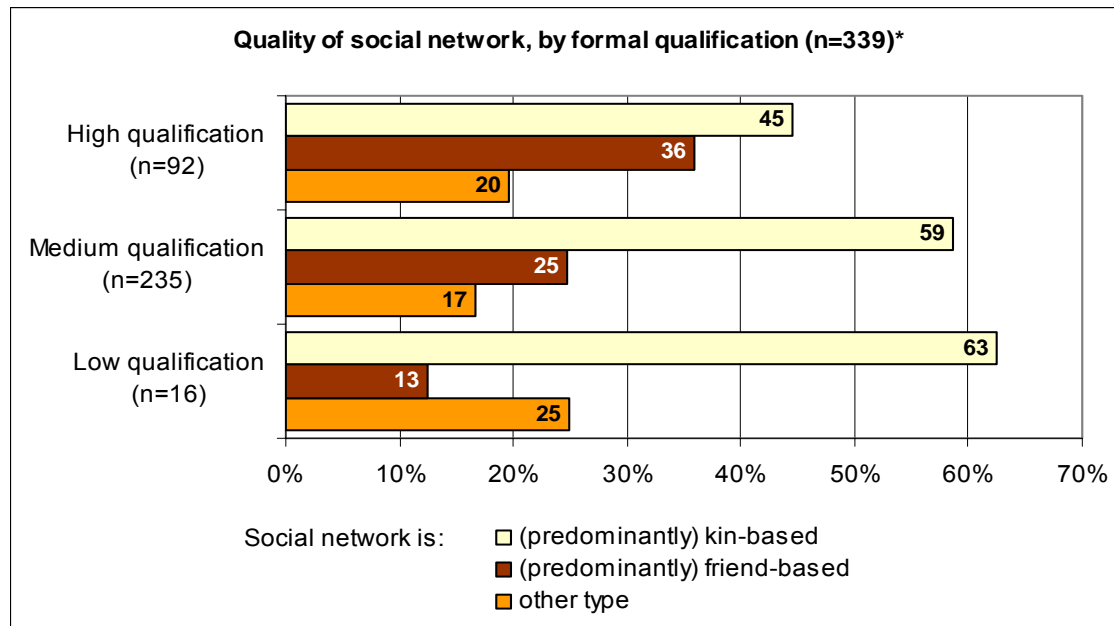
Table 4.2: *Main types of social networks, by age groups (n=296)*

|                          | (Predominantly) friend-based network | (Predominantly) kin-based network |
|--------------------------|--------------------------------------|-----------------------------------|
| <30 years (n=15)         | 47%                                  | 53%                               |
| 30–39 years (n=36)       | 53%                                  | 47%                               |
| 40–49 years (n=50)       | 32%                                  | 68%                               |
| 50–59 years (n=49)       | 43%                                  | 57%                               |
| 60–69 years (n=71)       | 25%                                  | 75%                               |
| 70 years and more (n=75) | 24%                                  | 76%                               |
| All                      | 33%                                  | 67%                               |

Source: FLOODsite survey 2005

The only independent socio-structural variable which matters for network quality is **formal qualification** (Fig. 4.7). Respondents with a low or medium formal qualification tend to a greater degree to have networks consisting exclusively or predominantly of kin than people with high qualification, (63% and 59%, respectively, vs. 45%) while the relationship between friend- and kin-based networks among people with higher qualification is more balanced (36% and 45%, respectively). When comparing only these two types of networks, the variance is significant ( $p < 0.001$ ; Mann-Whitney U-test). Fig. 4.7 displays also mixed and other types of social networks, which exhibit no clear pattern with respect to formal qualification.

Fig. 4.7: *Quality of social network (2)*



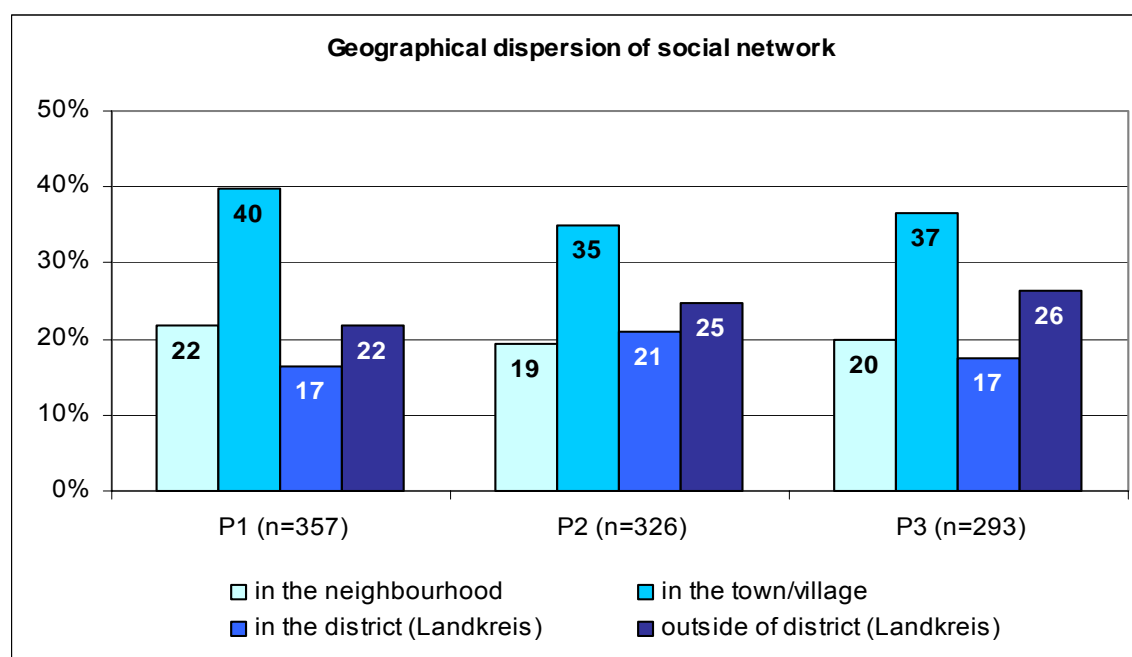
\* All cases where only one person was nominated (n=27) were not included.

Source: FLOODsite survey 2005

A further crucial parameter is the **geographical dispersion** of the *alteri*. In the context of flood and other hazardous events, this network characteristic might be important in all the phases of a flood because the vicinity or remoteness of the most important friends and relatives might make a difference with respect to: (i) information in the anticipation phase (when e.g. neighbours have the same media at their disposal but outsiders receive probably also contradictory information), (ii) resistance and coping (all people nearby sharing the same problems and network persons from outside simply not getting into the flooded area) and (iii) recovery (neighbours have the same losses and traumata not able to help but remote friends might probably help neither; for the phases see in more detail Chapter 5.1).

First of all, we asked where the people forming the social network of the respondent are living (Fig. 4.7). More than half of all persons nominated (and the majority of all three network partners) are living at least in the same town or village as the respondent, with about one third of them even in the immediate vicinity. This means for the flood 2002, which will be in the focus of the following chapters, that all of these *alteri* had to cope with the same hazardous situation, which in some cases might ease the subjective strains, but in others restrict the access to alternative information and to support. Between 22% (P 1) and 26% (P 3) of the persons whom the respondents trust in the way described live outside the rural district (*Landkreis*) Delitzsch (Fig. 4.8). As a rule, kin-based networks have a greater geographical range (which certainly can be explained by mass out-migration of younger people looking for jobs in western Germany in recent years). Friends tend to live more in the vicinity.

Fig. 4.8: Geographical dispersion of social network



Source: FLOODsite survey 2005

In order to say something about the quality of the network (rather than about the individual ties), we created an *Index of vicinity* ranging from 1 (all *alteri* live in the same building) to 6 (all *alteri* live outside the district/Landkreis; n=360; mean and median 4.3, standard deviation 1.1). This new variable can be dichotomized in two ways (Table 4.3). One fourth of the respondents have a network of exclusively locals (n=99; 24%) at their disposal, implying that in a hazardous situation they share more or less the same information and problems which would mean “weakness of strong ties”. But when applying a less strict criterion, i.e. when taking into account networks which are either exclusively or predominantly based in the same town or village, then the ratio changes considerably with about the half of all respondents (n=208; 51%) having their contact persons in the vicinity.

Table 4.3: Geographical heterogeneity of the social networks (N=404)

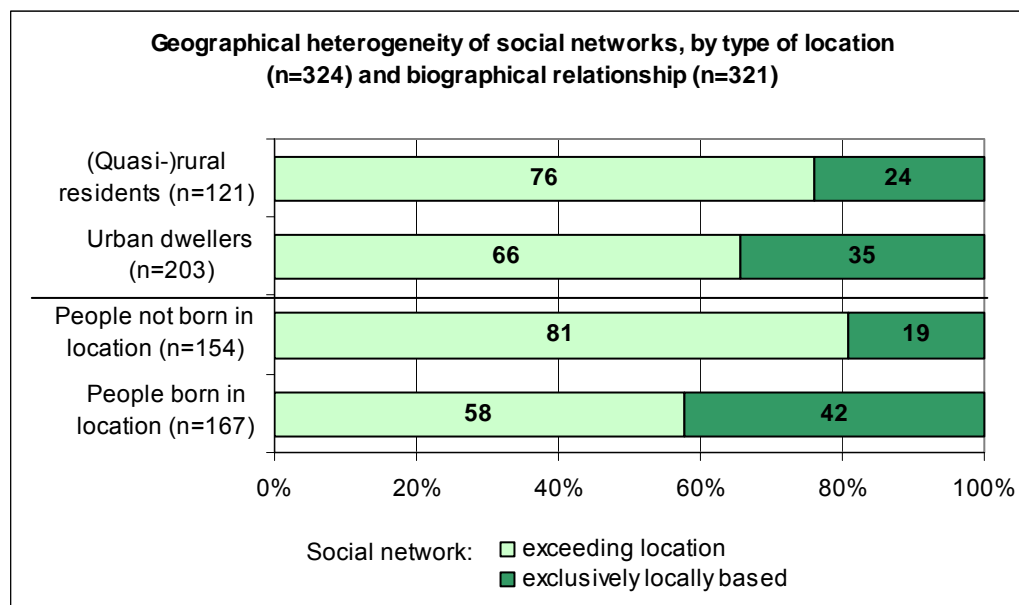
|   | Number of cases | Percent |
|---|-----------------|---------|
| <b>Local vs. geographically more scattered social network</b> |                 |         |
| - exclusively local network                                   | 99              | 24%     |
| - network also containing people from outside the locality    | 225             | 56%     |
| - missing   | 80              | 20%     |
| <b>Main geographical quality</b>                              |                 |         |
| - (predominantly) local network                               | 208             | 51%     |
| - (predominantly) non-local network                           | 141             | 35%     |
| - missing   | 55              | 14%     |

\* Including people with no network at all (no or only one person nominated; n=66).

Source: FLOODsite survey 2005

When testing different independent variables, just a few results deserve to be mentioned. With respect to formal qualification, it is only the very small group of people with low qualification ( $n=16$ ) who have at their disposal a predominantly local network, while respondents with medium and high qualification have a rather balanced social context in a geographical sense. Gender does not explain any difference. Predominantly or exclusively local networks prevail in all age groups (except the cohort 40-49 where the ration is balanced), especially among the youngest ( $<30$  years) and oldest (70 years and more). More meaningful proves to be professional status: Only among retired persons, local networks predominate (66% vs. about 50% among employed and unemployed;  $p<0.05$ ; Chi-square test). The networks of urban dwellers are to a higher degree locally based than in the rural and quasi-rural locations ( $p<0.01$ ; Chi-square test; Fig. 4.9) which can be interpreted as a result of the greater amount of opportunities in an urban environment, which also includes choice of friends and the like.

Fig. 4.9: Geographical heterogeneity of social networks

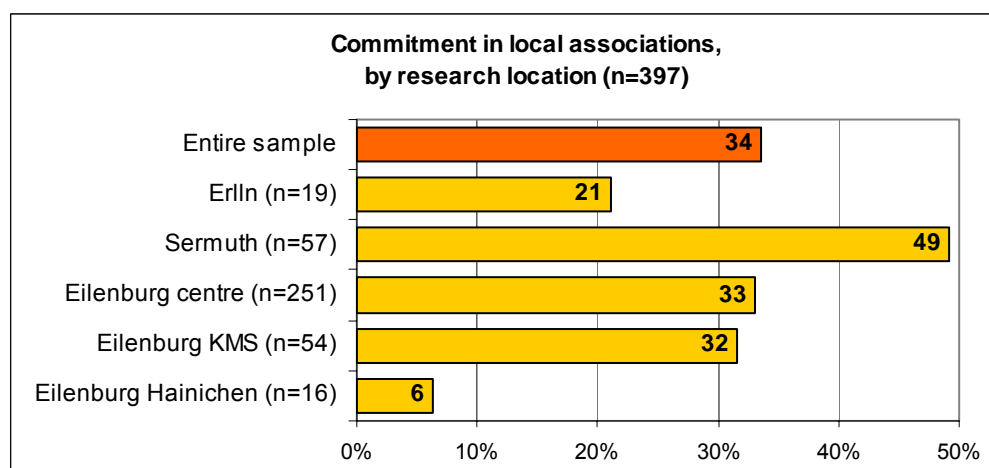


Source: FLOODsite survey 2005

When having a closer look at the respondents with **exclusively local networks**, no socio-demographic or socio-economic specifics can be revealed. They differ from all others in only one respect: To a much higher degree, *ego* tends to have spent his entire lifetime in the current location (Fig. 4.9). In our conceptualisation, such local networks are places where local knowledge is created and recreated—whether also with respect to floods, will be explored in Chapter 5. They also contribute to place attachment: Emotional ties to the location are significantly higher among respondents whose networks are exclusively local (4.4 versus 4.1 among people whose networks are geographically more scattered;  $p<0.01$ ; T-test).

However, social networks are not restricted to the strong ties as measured by the Burt indicator. They are also created in the context of **local associations**, such as, for example, gardeners associations, political parties or sports clubs. One third of the entire sample is engaged in at least one such association (26% in one, 6% in more than one). But the variance among the different research locations is considerable (Fig. 4.10). It is not the urban location with its higher number of opportunities but the rural Sermuth, where people are most committed in voluntary associations. Hainichen is once more on the opposite end of the continuum, thus echoing the results of the analysis about local solidarity (see above, Chapter 4.1).

Fig. 4.10: Commitment in local associations



Source: FLOODsite survey 2005

The majority of the people who are active in local associations are members of a sports club (69%). This holds true for the entire sample (Table 4.4). But also in Eilenburg centre and KMS the level of commitment is rather high: Beside sports clubs (n=26 and n=7; respectively), the residents of Eilenburg centre often hold an allotment (n=17), while in KMS people take part in the neighbourhood association (n=4). However, as far as we know the situation in Eilenburg, the ratio of people dedicating time and effort in an association of property **allotment holders** is much higher. Having an allotment and spending almost each weekend there in the summertime, is much more part of the local milieu than this figure expresses. There is indeed another indicator signalling that this impression is not wrong. In a later part of the questionnaire, we asked whether the interviewees own property in the area (other than a home). In Eilenburg centre, 75 respondents (29%) answered to own "agricultural land/gardens". It can be assumed that in most cases this relates to an allotment (and not a field), but the fact of being in an association of allotment holders is subjectively less important and was therefore not reported in the question analysed here.

Table 4.4: Participation in local associations (n=126; multiple answers possible)

|                                  | Number of cases | Percent |
|----------------------------------|-----------------|---------|
| Sports clubs                     | 58              | 46%     |
| Association of allotment holders | 19              | 15%     |
| Association of the elderly       | 18              | 14%     |
| Fire brigade, Red Cross          | 12              | 10%     |
| Church                           | 5               | 4%      |
| Neighbourhood association        | 7               | 6%      |
| Others                           | 32              | 25%     |

Source: FLOODsite survey 2005

40% of the male respondents, but only 26% of the surveyed women, dedicate their time to a voluntary association of the kind nominated in Table 4.4 ( $p < 0.01$ ; Chi-square test). Age also plays a role, but the relationship is not a linear one: While people of 70 years and older form the group with the lowest commitment (25%), also people between 30 and 49 years (who are usually economically active) are to a lower degree members in a local association than younger and older respondents, respectively. Again, local attachment is significantly higher among respondents who are members in local associations (4.3 versus 4.0;  $p < 0.05$ ; T-test).

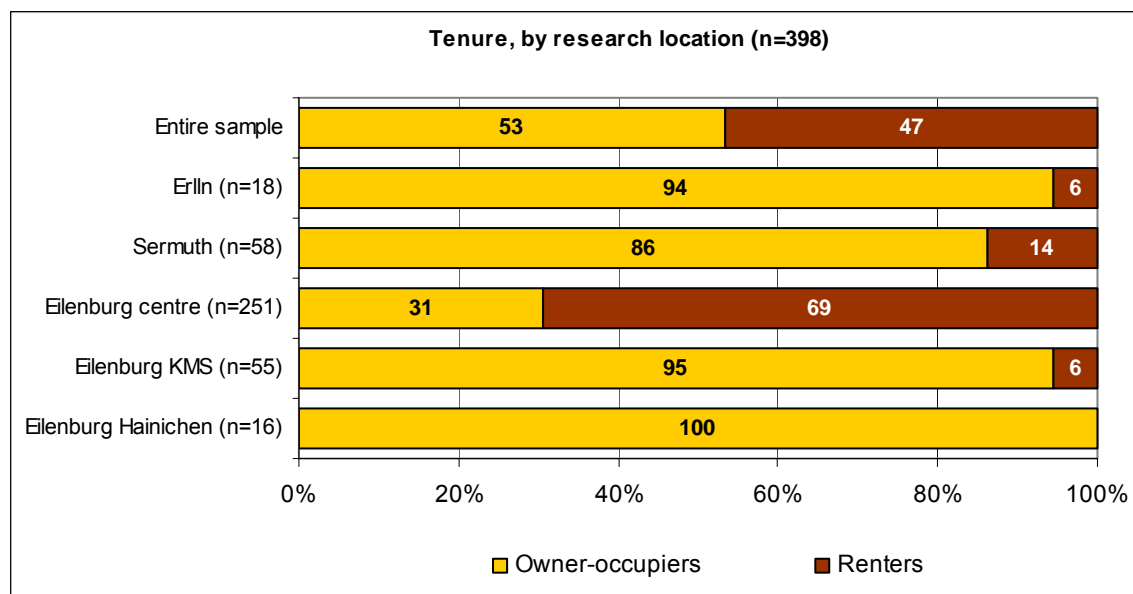


With respect to flooding, it needs to be pointed out that just 2% of all respondents (hence not only of those who are committed in one or two associations, as displayed in Table 4.4) are members of a **local fire brigade** (n=9). Nobody takes part in exercises of the **THW** which is the most important disaster agency in Germany. However, when taking into account also the wider family (asking whether somebody from the respondent's family is a member of the fire brigade or the THW), then every tenth household reports a respective membership (36 participate in local fire brigade and 5 family members are in the THW). Commitment is highest in the rural locations of Erlln and Sermuth (26% each) and lowest in Eilenburg (centre: 6%, KMS: 2%). From these data it can be concluded that among the respondents there is very little "technical" (or practical) knowledge with regard to disasters.

### 4.3 Material bonds

In contrast with our original expectations, only half of the respondents (53%) are **owner-occupiers**, while 47% live in a **rented dwelling**. This result is due to the large proportion of renters in Eilenburg, especially in the city centre. Therefore, it is necessary to display the results separately for the single research locations (Fig. 4.11). Although all other places are rural areas (or "quasi-rural", such as Eilenburg KMS), also in Sermuth 14% (n=8) live in rented flats. From our fieldwork we know, however, that among these respondents there are some who before the 2002 flood have lived in their own house in other villages nearby, but since their home was destroyed or became uninhabitable they also changed tenure in the aftermath of the 2002 flood.

Fig. 4.11: Tenure



Source: FLOODsite survey 2005

This tenure pattern also delivers a reasonable justification for the distinction between urban and (quasi-)rural locations introduced in Chapter 3: All rural (and quasi-rural) locations are characterised by a very high degree of owner-occupation, usually in detached or semi-detached houses (54% and 19%, respectively). The city-centre of Eilenburg is "urban" in the sense that renting (as a common style of housing tenure in Germany) is widespread. These dwellings are predominantly located in apartment buildings (76%). Local attachment is significantly higher among owner-occupiers than among renters (4.3 versus 4.0;  $p < 0.05$ ; T-test). But there are almost no differences in tenure with respect to the housing biography: People who live in the respective location their entire lifetime exhibit almost the same tenure pattern as those who moved to the place at a later point in time.



Although the survey was also conducted in rural places, other **kinds of property** only play a part with respect to agricultural land and gardens (83% of 130 respondents with further property in the area). Since most of these interviewees live in Eilenburg centre we assume, as already stated above, that in most cases these are allotments.

#### 4.4 Summary

Not least to a long personal biography in the current location, the sample is characterised by a strong local attachment, mainly in the rural and quasi-rural locations (Table 4.5, which also displays some of the main socio-demographic and socio-economic indicators discussed in Chapter 3 separately for the two settlement types). The positive sentiments towards the current place of residence are typical for all age groups and independently of the level of formal qualification. The only variations found are due to gender (men feel more strongly attached), home-ownership and whether the village or town is also the place where one was born. The situation is somewhat different from a more general perspective: with regard to the overall evaluation of the place of residence the respondents formulated more objections, mainly in Eilenburg. This can be explained by the severe economic and demographic situation of this “shrinking” town.

Informal social networks and the commitment in voluntary associations were the main indicators of **social capital** the survey was interested in. It was shown by evidence that both contribute to local attachment. The social networks of the respondents are, almost independent of age and settlement type, mostly kin- and locally based, hence they are predominantly of a **traditional character**. Only people with a higher degree of formal qualification tend to have more friendship-based and geographically scattered networks. One of our main hypotheses is that these networks of “strong” ties provided important resources (both material and immaterial) in the course of the 2002 flood. In other words: we assume that they have potential for real strength and reliability, which will be challenged in a crisis like the disaster we will explore in more detail in the following chapters.

Table 4.5: Main characteristics of the residents of the two settlement types

|   | Settlement type “rural”<br>and “quasi-rural” | Settlement type “urban” |
|---|--|-------------------------|
| Mean length of residence  | 45 years                                     | 44 years                |
| Mean age  | 56 years                                     | 58 years                |
| Mean household size   | 2.5 persons                                  | 2.3 persons             |
| Households with dependent persons   | 33%  | 39%                     |
| Home-ownership rate   | 92%  | 31%                     |
| Local and regional attachment (mean value; scale 1=not at all attached, 5=very strongly attached) | 4.0***                                       | 4.4***                  |
| “Would you advise a good friend to move to your village/town?”                                    |  |                         |
| - yes   | 52%  | 35%                     |
| - no  | 14%  | 19%                     |
| Mean network size   | 2.5 persons                                  | 2.5 persons             |
| Commitment in local associations  | 33%  | 34%                     |

\*\*\* p<0.001 (Mann-Whitney U-test)

Source: FLOODsite survey 2005

A crucial structural factor for both local attachment and (perceived) responsibility for precautionary measures (for example) before and after a disaster like the 2002 flood is **tenure**.<sup>16</sup> In contrast with many other indicators (Table 4.5), there is indeed a great variance in the sample which is mainly due to different settlement structures. While the only “real” urban location in the sample (Eilenburg centre) is characterised by a high proportion of renters, in rural areas (Erlln, Hainichen, Sermuth) and quasi-rural locations (Eilenburg KMS) owner-occupation prevails.

As for social vulnerability, the same approach as in Chapter 3.4 will be applied, but this time with respect to social capital (Table 4.6). As outlined above, we assume that social networks are of crucial importance in all phases of the disaster for providing information as well as physical, emotional and financial support. Therefore, people without such a network at all and those without such a network “at hand” in the immediate situation (hence those whose *alteri* are all living rather remote), are hypothetically more vulnerable than others. However, one can also expect residents who can solely rely on other locals to be relatively more vulnerable in a situation like the 2002 flood, because it is very likely that his or her *alteri* are also affected and hence not able to provide necessary support or different information.<sup>17</sup> And finally, this also includes people with only weak emotional bonds to the area (which, however, might have their reasons in lacking social networks, a short period of residence or missing material bonds).

*Table 4.6: Hypothetical indicators of social vulnerability and their frequencies in the sample (2)*

|  | Total number<br>(share) | Locations with ...                             |                  |
|--|-------------------------|--|------------------|
|  |                         | ... highest share                              | ... lowest share |
| <b>People without social network<sup>+</sup></b>   | 66 (16%)                | Erlln (21%)                                    | Hainichen (6%)   |
| <b>People with exclusively local network</b>   | 99 (25%)                | Hainichen (31%)                                | Erlln (16%)      |
| <b>People with network <i>alteri</i> exclusively from beyond the district (<i>Landkreis</i>)</b> | 36 (9%)                 | Eilenburg centre (12%),<br>Eilenburg KMS (12%) | Hainichen (none) |
| <b>People with low local attachment</b>  | 16 (4%)                 | Eilenburg centre (16%)                         | Erlln (none)     |

<sup>+</sup> No or only one person of trust nominated

Source: FLOODsite survey 2005

<sup>16</sup> When carrying out a similar survey in 2004 in another village in the Mulde basin which was heavily affected by the 2002 flood (Bennewitz), it was very difficult to convince renters to take part in the survey. Usually, they regarded the flood as not being their “cup of tea” (Hagemeier 2004).

<sup>17</sup> In a first version of this table, we also included, as a potentially more vulnerable group, those who observed a low degree of solidarity in the village or town where they live (n=85; 22%). It was then thought of as an operationalisation of social capital as collective asset, i.e. in the sense of Putnam. However, due to its methodologically difficult nature, we finally decided not to include it. Firstly, it was the only indicator not related to the individual but to the local community from the perspective of the single respondent. Secondly, and even more important, perceiving a low degree of solidarity in the community in 2005 (when the survey was carried out) can already be a result of the 2002 flood and not a precondition of vulnerability to this event.

## 5. The experience of the 2002 flood

### 5.1 Conceptual approach and hypotheses

This chapter analyses how people experienced the Mulde flood 2002 by means of several social-science methods applied three and a half years later. The circumstance of this time interval has to be permanently borne in mind and critically reflected upon in the course of the interpretations. The following chapter draws a representative picture of what happened before, during and after the flood. The investigation usually starts at the level of the entire sample. By testing a range of independent variables (for an overview see Appendix I) as well as hypothetically meaningful indicators of social vulnerability (introduced in Chapters 3.4 and 4.4), the main basis for the group-specific discussion of social vulnerability (Chapter 7) will be established.

Our basic understanding of **vulnerability** has been delineated in Chapter 1.2.1. Specific emphasis will be placed on the social and temporal dimensions central to the above quoted definition of Blaikie *et al.* (1994), i.e. on the capacities and actual behaviour in the different phases of the 2002 flood. The typology of Blaikie *et al.*—anticipation, coping, resistance and recovery—which will be, slightly adapted, applied in the following is similar to conventional classifications of disasters (e.g. preparation, response, recovery, and mitigation) and is used here as a heuristic to start codifying the empirical material. However, while using this typology we realised that its coping concept is not very precise.<sup>18</sup> Since the definition is at least implicitly suggesting that anticipation, coping, resistance and recovery take place subsequently, coping does not mean the long-term handling but rather ad-hoc reactions to a hazardous event. This is not in line with the predominant psychological understanding of coping referring to longer time spans (e.g. for chronically ill persons).

Moreover, it has to be pointed out that we do not understand the phases as concrete and mutually exclusive entities. On the contrary, the different **phases overlap** and blend into each other (Neal 1997). To assume that an “objective” phase reconstruction would be possible is misleading anyhow, since the respondents answered the questionnaire after a fairly long time interval. Of central interest for the analysis are, on the one hand, how people perceive the different phases of the 2002 flood *ex post* and, on the other, which actions they took before, during and after the event. But in order to present the results, a pseudo-phase structuring has to be adopted while their actual overlapping is taken into account. The phases are characterised in the following way:

- **Anticipation** includes the entire time-span before the crisis itself. The situation reaches from the vague idea of a potential flood (operationalised here by applying long-term precautionary measures and general preparedness) to the flood warning, call for evacuation and ad-hoc activities (e.g. taking documents and securing valuables). The crisis is not yet “there” but the behaviour is increasingly directed towards it. The degree of situational uncertainty about how to interpret the situation is high (De Marchi 1995). We will be interested in the questions concerning how the residents received the information that a flood was threatening them, how they perceived the warning and call for evacuation, and which measures they took immediately afterwards.
- **Resistance and coping** are necessary from the very moment onwards when the potential hazard is transformed into the actual disaster (operationalised via the physical impact of the flood). While the crisis is for sure now, uncertainty still rules with respect to flood impact, the next steps to be taken and the time horizon. How the affected people deal with the immediate situation is what we (and probably Blaikie *et al.*) mean by “coping”. One crucial question will be which networks the residents relied upon and which networks provided which types of support.
- **Recovery and reconstruction** are related to the post-flood situation. Here we are mainly interested in the perceived long-term consequences of the flood. Again, the question concerning which

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<sup>18</sup> This criticism does not only apply to the concept of coping. None of the phases which are distinguished by Blaikie *et al.* (1994) is precisely defined or at least described in more detail. Moreover, in later parts of the book, further concepts are introduced without explaining them (e.g. relief and reconstruction instead of “recovery”; *ibid.*, 195).

resources people relied upon during this phase will be a crucial one. Finally, satisfaction with the compensation after the flood and the preparation for a next possible flood will be discussed.

It becomes obvious from this conceptualisation, that we do not understand the flood disaster as a linear event with a clear beginning and an apparent end, as most phase-models suggest. We rather want to emphasize the **circadian nature** of disasters. Particularly the post-disaster situation may be understood as a “window of opportunity” for an integration of mitigation efforts into the recovery and reconstruction phase (Felgentreff 2003; Kuhlicke and Drünkler 2004a, 2004b).

Before the analysis, the following **hypotheses** were developed:

- Owner-occupiers are more inclined to adopt precautionary measures than renters (both before and after the flood).
- Previous flood-experience (and therefore age) has an impact on reading flood signs and result in a more appropriate coping behaviour.
- Warnings by informal networks (friends, kin etc.) are more trustworthy than from formal networks (authorities), because the social network of *ego* is in a more or less regular communication process, whereas the two systems “authorities” and “citizens” only rarely face extraordinary situations like the 2002 flood. That is why their (sudden need for) communication might be deficient or, from the point of view of the affected people, non-trustworthy or non-reliable. Therefore, we assume that in the case of informal warnings people are more willing to react (e.g. to leave their homes).
- Non-local networks are more appropriate in the immediate hazardous situation because they have access to a variety of information channels. To put it slightly different: Exclusively local networks transfer more redundant information than non-local networks (which can be regarded as a flood-adopted version of the “strength-of-weak-ties” hypothesis developed by Granovetter 1973, 1983).
- “Strong ties”, irrespective of their geographical orientation or location, are the major source of various kinds of support in the post-flood situation.

This chapter focuses on behavioural questions (preparedness, coping with the immediate situation and coping in the longer term), whereas Chapter 6 will treat questions of risk construction (awareness, perception, pre- versus post-flood comparison). For the time being, these issues will therefore be neglected.

## **5.2 Anticipation**

This section wants to answer the question concerning how people anticipated the 2002 flood. Three issues will be differentiated: Firstly, which long-term mitigating activities (precautionary measures) were undertaken before the flood 2002 in order to minimize the impact of a possible hazardous event. Secondly, we will consider how people *ex post* perceive their own preparedness with regard to the flood. And finally, the eve of the disaster—announced by warnings, ad-hoc activities and evacuation—will be (as far as possible) reconstructed.

### **5.2.1 Precautionary measures**

Precautionary measures are regarded as an important means to reduce the vulnerability of flood-prone building structures (Kreibich *et al.* 2005). They contribute to the mitigation of damage mainly by proofing measures in the private sphere. From previous research it seems that precautionary measures are most effective in areas prone to frequent, small floods (ICPR 2002). However, also with regard to less frequent and more severe events, like the Rhine floods in 1993 and 1995, these measures apparently have an important impact on reducing monetary damages. Taking the example of the Rhine and given a similar water height as well as almost the same sensitivity of the buildings, the damage caused

by the 1995 flood was considerably lower than in 1993. The precautionary measures that residents implemented in the meantime seem to have reduced the monetary losses (Fink *et al.* 1996). Also with regard to rare floods, some measures, like flood-adapted use, flood-adapted interior fitting and utility installation in higher storeys, obviously influence the scale of monetary damage (Kreibich *et al.* 2005).

It is important to emphasize in this context that in Germany private precautionary measures were not rewarded or demanded before the 2002 flood, as for example in the US American context by the National Flood Insurance Program. By means of this program communities that want to participate are obliged to consider certain non-structural mitigation measures, like for example spatial zoning or adapted constructions (May 1985; Platt 1999). However, also in Germany—as a consequence of the unknown damage caused by the 2002 flood—there are significant changes going on: In May 2005, a new flood protection law (*Hochwasserschutzgesetz*) became effective in Germany, which for the first time provides coherent instructions for how to mitigate flood hazards. This law complements the Water Management Act (*Wasserhaushaltsgesetz*, *WHG*) (Köck 2005). From now on every citizen who is prone to flood hazards is obliged to implement mitigation measures in accordance with his possibilities and abilities (WHG §31a). Almost the same phrase is to be found in the formulation of the new Saxonian Water Law (*Wassergesetz*), which was passed in September 2004 (§99; in more detail: Kuhlcke and Steinführer 2006 and below Chapter 6.3).

In the survey, people were asked whether, and if so, which precautionary measures they adopted before the flood. Since these were two methodologically different questions (open and closed, respectively), this allows us to distinguish between the subjective definition of the respondents—what they define as precautionary measure—and compare their definitions with more agreed upon definitions within the academic discourse. In the following, we follow the **categorisation** proposed by the Deutsches Komitee Katastrophenvorsorge (DKKV; German Committee for Disaster Reduction) and others (DKKV 2003; Kreibich *et al.* 2005, 119). Three general groups will be distinguished: instruments related to **buildings and furniture**, to the **behaviour** of people at risk and to the **monetary consequences** of a damage event (insurances; Fig. 5.1).

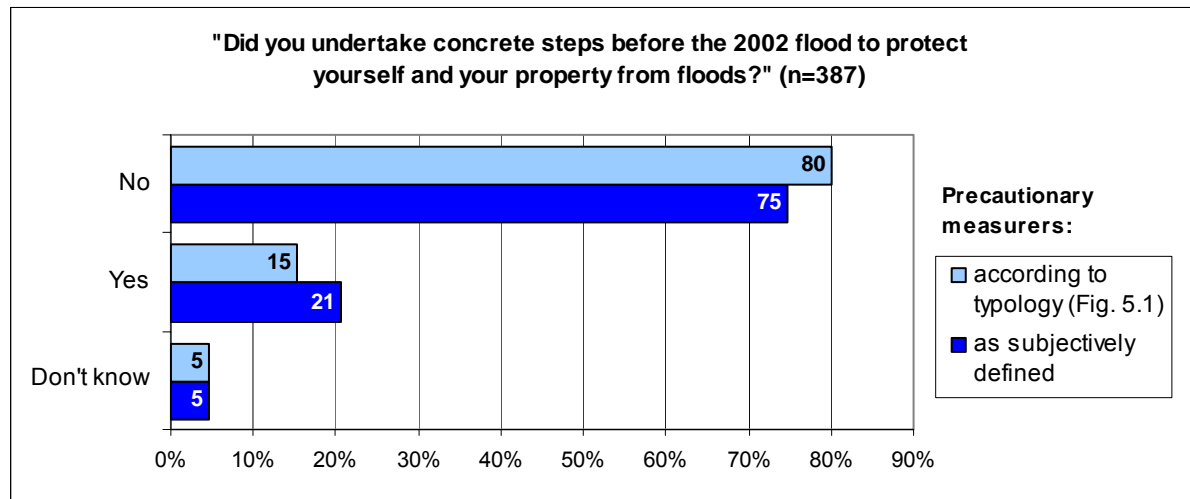
Fig. 5.1: Typology of precautionary measures

|   |
|---|
| <p><b>Types of measures with respect to buildings and furniture:</b></p> <ol style="list-style-type: none"> <li><b>1. Evasion:</b> Elevated configuration and/or shielding with water barriers</li> <li><b>2. Resisting:</b> Waterproof sealing and/or fortification of cellar and foundation</li> <li><b>3. Drawback:</b> Adapted use and/or interior fitting of the flood endangered storeys</li> <li><b>4. Securing:</b> Safeguarding of hazardous substances</li> </ol> <p><b>5. Behavioural measures:</b></p> <ul style="list-style-type: none"> <li>- May comprise little details for further preparation: e.g. having the necessary medicine, enough food or some important phone numbers at hand but also to know reliable sources for gathering information as well as having sandbags stored</li> </ul> <p><b>6. Flood insurance:</b></p> <ul style="list-style-type: none"> <li>- This is certainly a very context-sensitive variable since their conditions are diversely regulated: While in the Netherlands, for example, insurances for elementary damages do not exist at all, citizens of Switzerland, France and Spain are obliged to have insurance for elementary damages. Germany is one of the few countries where private insurances for elementary damages are offered. Here, every tenth household has a household content insurance (<i>Hausratversicherung</i>) and approximately 4% hold building insurance (<i>Wohngebäudeversicherung</i>) which includes elementary damages. However, the situation in the different federal states is quite different. In eastern Germany, insurance density is considerably higher than in the rest of Germany, since the Deutsche Versicherungs-AG, a subsidiary company of the Allianz insurance, took over the policies of the “Extended Household Insurance of the State Insurance of the German Democratic Republic” (<i>Erweiterte Haushaltsversicherung der Staatlichen Versicherung der DDR</i>), which automatically insured elementary damages.</li> </ul> |
|---|

Source: DKKV 2003

Approximately 21% of the respondents said that before the 2002 flood they took precautionary measures (75% did not; Fig. 5.2). However, when one compares the **subjective definitions** given by the respondents with the typology outlined in Fig. 5.1, several nominated measures have to be excluded, because they are short-term measures just in the face of the flood (e.g. clearing the house; see below Chapter 5.2.3). Hence, when taking the DKKV typology as point of departure, considerably fewer people applied precautionary measures (just 15%; Fig. 5.2).

Fig. 5.2: Precautionary measures (1)



Source: FLOODsite survey 2005

Among those respondents who applied precautionary measures, most either nominated insurances (43%) or they had sandbags at hand in order to hinder the water to penetrate the building (behavioural measures; 40%) (Table 5.1).

Table 5.1: Application of precautionary measures, categorised (n=40)

| Type             | Examples for type of measure  | Applied by |
|------------------|---|------------|
| <b>Evasion</b>   | Elevated configuration and/or shielding with water barriers         | 8%         |
| <b>Resisting</b> | Waterproof sealing and/or fortification of cellar and basis         | 8%         |
| <b>Drawback</b>  | Adapted use and/or interior fitting of the flood endangered storeys | 3%         |
| <b>Securing</b>  | Safeguarding of hazardous substances                                | –          |
| <b>Behaviour</b> | Food, medicine, sandbags, phone numbers at home                     | 40%        |
| <b>Insurance</b> | Specific flood-insurance  | 43%        |

Source: FLOODsite survey 2005

Interestingly, only 17 respondents mentioned **insurance** in the open question (“did you undertake concrete steps ...?”). But when asked directly whether they hold insurance against natural hazards, 201 persons (50%) answered the question positively.

The application of **precautionary measures** is above all one of **tenure**. The respondents who own their houses applied significantly more precautionary measures than renters (Table 5.2).

Table 5.2: Application of precautionary measures, by tenure (n=363)

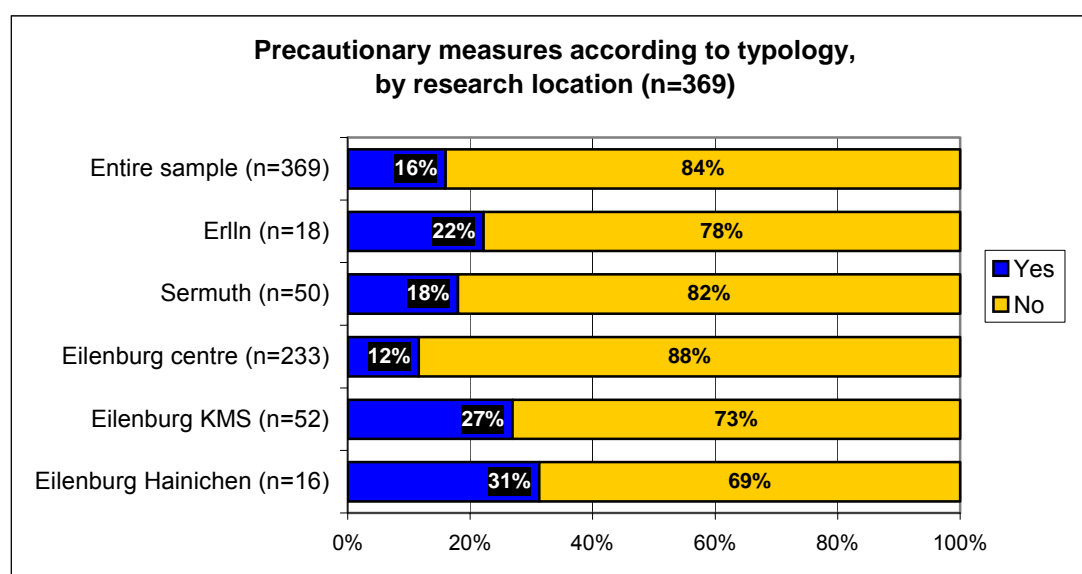
| Precautionary measures | Owner-occupier (n=198) | Renter (n=165) |
|------------------------|------------------------|----------------|
| Yes                    | 22%                    | 9%             |
| No                     | 78%                    | 91%            |

(p<0.05; Chi-square test)

Source: FLOODsite survey 2005

Consequently, there are also differences among the research locations: While in the (quasi-)rural areas of Eilenburg KMS and Hainichen the share of respondents taking such measures is highest, the lowest proportion is to be found in Eilenburg centre (Fig. 5.3). Further socio-economic or socio-demographic independent variables play no significant role.

Fig. 5.3: Precautionary measures (2)



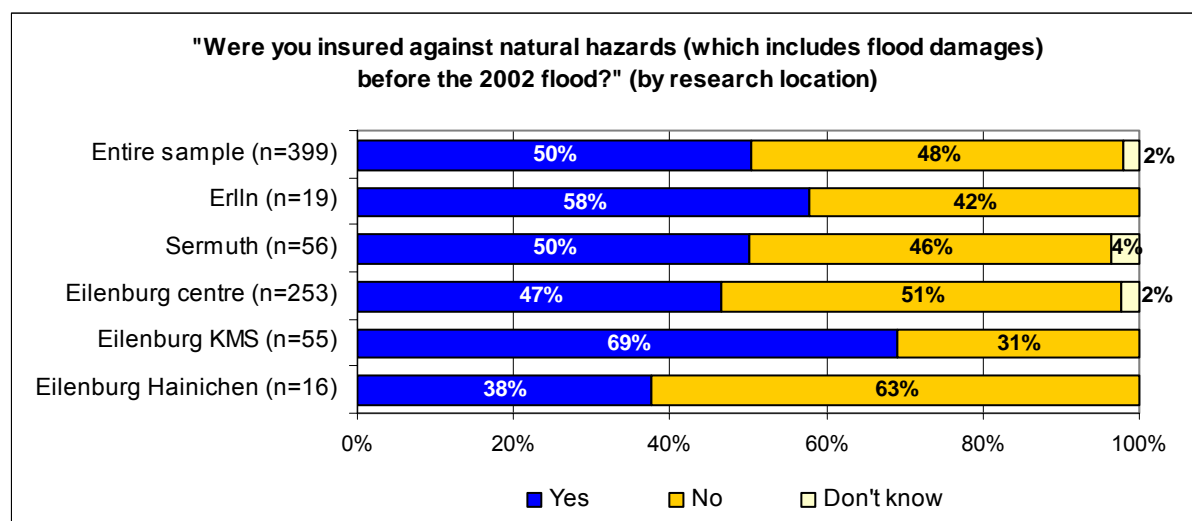
(p<0.05; Chi-square test)

Source: FLOODsite survey 2005

Asked straightforward, 50% of the respondents answered that they hold **insurance** against natural hazards.<sup>19</sup> Again, location matters: The respondents of Eilenburg KMS have the highest proportion of flood insurance. But, as to be seen in Fig. 5.4, the spread of insurance is generally high. Hence in this case, tenure does not account for the differences.

<sup>19</sup> This result is in line with a telephone survey that was conducted after the 2002 flood in the affected region of the Elbe basin. It found out that 50% of the surveyed households (N=1,248) were insured against flood damages before the 2002 flood (DKKV 2003, 62).

Fig. 5.4: Holding insurance before 2002 flood



Source: FLOODsite survey 2005

Instead, the answer to the question whether people are insured against natural hazard is basically one of **age and income**. First, there is a strong correlation between **age** and taking up flood-insurance. This is confirmed by the highly significant variance in the age of people with and without such an insurance (60.5 vs. 53.5 years;  $p < 0.001$ ; T-test). The jump between the group of 40–49 and 50–59 year-old respondents is noteworthy (Table 5.3). Particularly respondents older than 50 years are more likely to possess insurance policies against elementary damages. However, this figure should not be misinterpreted in the sense that elderly people have more pronounced requirements for security; they simply still hold their insurance policies dating back to the GDR. This also explains why there are no differences between owner-occupiers and renters when considering the entire sample.<sup>20</sup> Secondly, **income** plays a role. Although not strictly linear and therefore not significant ( $p < 0.09$ ; T-test), people with higher income are more inclined to hold flood-insurance than people with lower income (Table 5.3).

Table 5.3: Holding insurance before the 2002 flood, by age (n=386)

| Insurance | <30 y.<br>(n=18) | 30–39 y.<br>(n=41) | 40–49 y.<br>(n=70) | 50–59 y.<br>(n=68) | 60–69 y.<br>(n=96) | 70+ y.<br>(n=93) |
|-----------|------------------|--------------------|--------------------|--------------------|--------------------|------------------|
| Yes       | 28%              | 37%                | 37%                | 60%                | 54%                | 66%              |
| No        | 72%              | 63%                | 63%                | 40%                | 46%                | 34%              |

Table 5.4: Holding insurance before the 2002 flood, by weighted per-capita income (n=320)

| Insurance | 0–250 €<br>(n=12) | 251–500 €<br>(n=49) | 501–750<br>(n=119) | 751–1,000 €<br>(n=69) | 1,000–1,250 €<br>(n=57) | 1,250+ €<br>(n=14) |
|-----------|-------------------|---------------------|--------------------|-----------------------|-------------------------|--------------------|
| Yes       | 17%               | 37%                 | 56%                | 48%                   | 53%                     | 64%                |
| No        | 83%               | 63%                 | 44%                | 52%                   | 47%                     | 36%                |

Source: FLOODsite survey 2005

<sup>20</sup> However, when taking into account only people younger than 45 years, there is a significant difference with respect to holding specific flood-insurance according to tenure ( $p < 0.05$ ; Chi-square test).

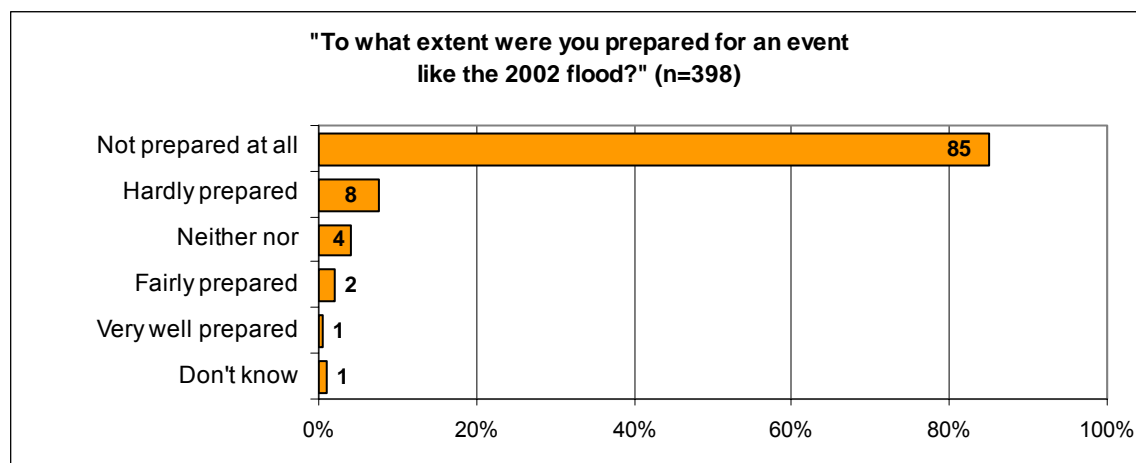


## 5.2.2 Preparedness

As already evident from the previous section, people **were by no means prepared** for the 2002 flood. This finding corresponds with their subjective perception: Retrospectively, 85% of the respondents chose the most extreme category of a 5-point scale of preparedness (“not prepared at all”). Only 3% indicated to have been at least a bit prepared (Fig. 5.5). There are no significant differences with respect to the single research locations or the type of flood (sudden onset in Erlln and Sermuth, where people received the warnings very late, versus the three Eilenburg districts which had more time; see below Chapter 5.2.3). Owner-occupiers *ex post* perceive their degree of preparedness as slightly higher than renters (not significant).

A separate analysis for the single age groups reveals only non-significant differences, with the youngest cohort being prepared relatively better. But also in this group 78% report to have not been prepared “at all”. This implies also that previous flood experience (which was not asked for directly but can be derived from a combination of age and place of occupancy) did not enhance the residents’ preparedness. However, one has to bear in mind that the last disastrous floods in the region took place in 1974 and 1954. People with very low income tend to have been even less prepared than those with high (but not with highest) income (not significant). Neither do further meaningful socio-economic and socio-demographic variables (gender, formal qualification) explain the differences—which in any case are far from strong. Hence the emerging picture of non-preparedness is one of great homogeneity among the respondents.

Fig. 5.5: Preparedness for the 2002 flood



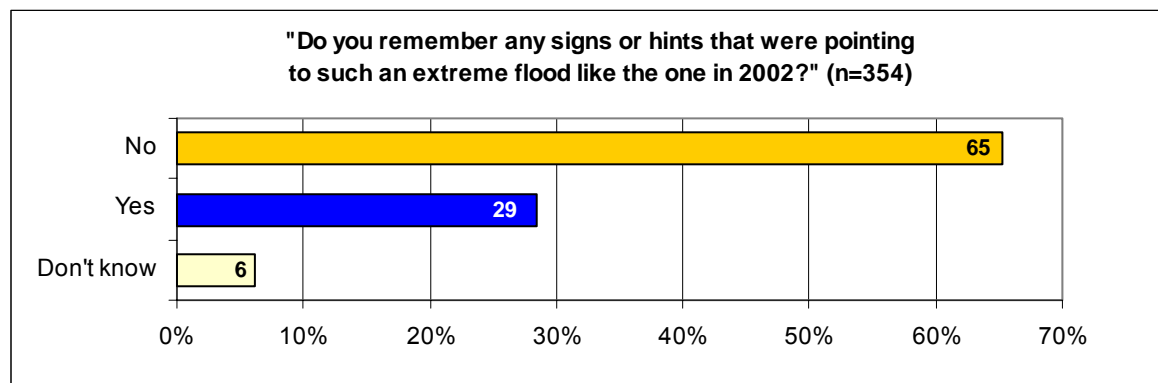
Source: FLOODsite survey 2005

Additionally, we asked whether the respondents *ex post* remember **any signs or hints** (*Anzeichen oder Hinweise*) that were pointing to such an extreme flood. The intention was to find out whether people had any knowledge on which they could rely to react before the official warning was disseminated and/or which made the official warning more trustworthy, because it was supported by their own empirical reasoning. In the literature the argument is often developed that “**local knowledge**” is an important resource to be better able to anticipate the impact of a hazard and to thus reduce individual and collective vulnerability<sup>21</sup> (Delica-Willison and Willison 2004; Wisner 2004). Local knowledge may be described as a knowledge that consists of practical capabilities that emerged from local conditions and the natural surrounding; they have been tested over a long period. Our general hypothesis therefore is that people, who were able to notice signs pointing to an extreme flood, were better able to take short-term measures that would reduce their damage potential.

<sup>21</sup> Greg Bankoff (2004) offers a critical review of the underlying assumptions of this perspective.

The majority answered negatively: Only one third remembered signs which were pointing to such a flood (Fig. 5.6). It is important to note that people not only mentioned “sings” that related to the physical environment, they also mentioned other signs pointing towards a possible flood. Interestingly, the **remembering of signs** shows significant differences among the different **age** groups. However, it is not the elderly people—hence potentially those with previous flood experience—but the younger respondents (below 39 years) who claimed to remember certain signs (Fig. 5.7).

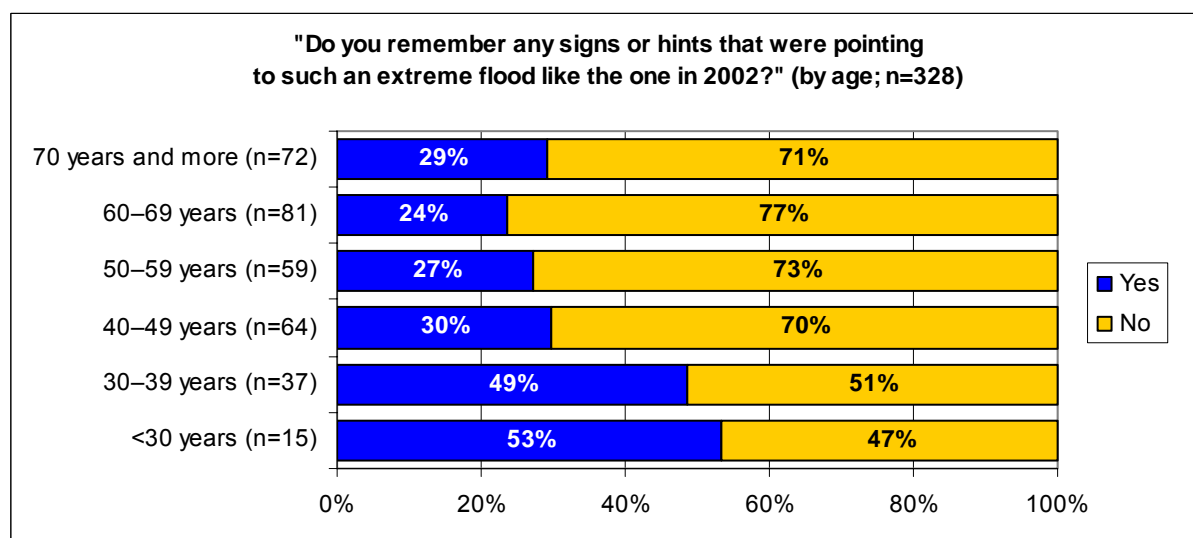
Fig. 5.6: Signs/hints for the 2002 flood (1)



Source: FLOODsite survey 2005

However, from the manner of posing the question we do not know whether these signs and hints were interpreted *ex ante* or whether the stated memory developed *ex post* in the long-term coping process (supported by films, newspapers, specific information etc.). But when taking into account the preparedness indicator (for which a similar tendency was shown), there is indeed a significant difference between those people who remember such signs and those who do not: The latter reported to have been worse prepared ( $p < 0.05$ ; T-test). Therefore the quoted indicator can indeed be interpreted as an indication about the **ex-ante existing ability of the younger age-groups to interpret flood signs more adequately**.

Fig. 5.7: Signs/hints for the 2002 flood (2)

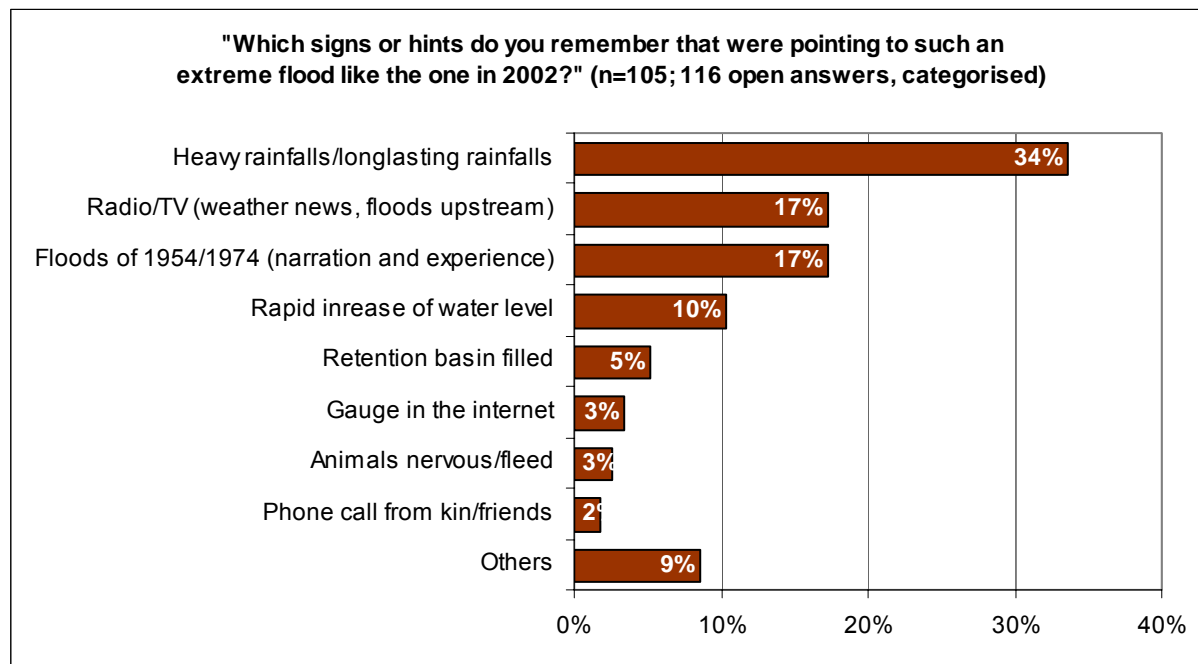


( $p < 0.05$ ; T-test)

Source: FLOODsite survey 2005

In our view, this result is remarkable since this group of respondents is the **least experienced** one with regard to flooding: The last major flood took place 31 years ago. If one considers the single answers more precisely, a variety of categories appear, including some relating to the concept of “local knowledge” (e.g. knowledge based on the 1954 and 1974 floods, strange behaviour of animals), while further categories rather relate to other forms of knowledge and information, respectively (Fig. 5.8).

Fig. 5.8: Signs/hints for the 2002 flood (3)



Source: FLOODsite survey 2005

With regard to the single categories, the anticipated age distribution is to be observed: Significantly more people older than 60 years remember the floods of 1954 and 1974, and significantly more elderly people understood nervous and/or fleeing animals as a sign for the flood (in both cases  $p < 0.01$ ; Chi-square test; but very small number of cases). However, other forms of knowledge which the respondents referred to were based on active information gathering. This activity was typical for younger respondents. The website, which hosts the gauge for the localities, was only consulted by respondents younger than 59 years. But it is the same groups of respondents ( $< 59$  years) who understood the heavy rainfalls in the days before the flood more often as a sign pointing to an extreme flood ( $p < 0.001$ ; Chi-square test).

In Chapter 5.2.3 we will discuss the consequences of the ex-post stated ability to read signs more thoroughly with regard to people's reactions upon the warning.

One of our key foci is on the significance of **social capital** (measured by social networks) in the different phases of the 2002 flood. From Fig. 5.8 it is evident that, with respect to reading (and adequately interpreting) flood signs, they played only a minor part. However, when digging deeper, one tendency can be highlighted: While the quality of the social networks (more/exclusively kin and more/exclusively friends, respectively) does not account for any variance, the **geographical heterogeneity** of the network does. Though not significant (but  $p = 0.06$ ; Chi-square test), people whose networks are exclusively founded on locals, report to a higher degree to have remembered signs than those with a spatially more dispersed network (Table 5.5).

Table 5.5: Remembering signs/hints, by geographical heterogeneity of social network (n=273)

|                            | Respondents whose social network is ... |                                   |
|----------------------------|---|-----------------------------------|
|                            | ... exclusively locally based           | ... scattered beyond the locality |
| Remember signs/hints       | 41%                                     | 29%                               |
| Don't remember signs/hints | 59%                                     | 71%                               |

Source: FLOODsite survey 2005

But none of the network parameters (including its geographical dispersion) affected the level of actual preparedness which, however, was very low anyway. How, then, to interpret Table 5.5? With respect to our knowledge about the role of social networks (channels of support, information, money etc.), then one can imagine that—more than 3 years after the event—“remembering flood signs” has already become part of the **local oral culture** where flood knowledge is produced and reproduced. Hence the mental reconstruction of the flood event is probably more a part of the locally based networks which also contribute to the long-term coping with the event than a real ability before the 2002 flood.

We therefore have to interpret the “sign”-indicator in an ambiguous manner: While for younger people there is evidence of a positive relationship between “reading signs” and preparedness, for people with a locally based network such an impact on their level of preparedness cannot be proven. In this case we assume that the signs were read and interpreted *ex post* and meanwhile belong to the **narrative culture** in the research locations. This assumption is further substantiated by the qualitative interviews which impressively refer to a local culture of **ex-post rationalisations, blame and ascriptions of responsibility**. A major role in these narrations is played by the authorities in charge of the retention basins (see also below Chapter 6).

### 5.2.3 Warning, ad-hoc activities and evacuation

The actual **warning** and the call for evacuation are the last links in a long decision chain that foregoes the utterance of the message up to that point. The chain entails four segments (register, forecast, warn and respond). This quite complex operation all too often does not work very well and frequently fails completely (Handmer 2000).

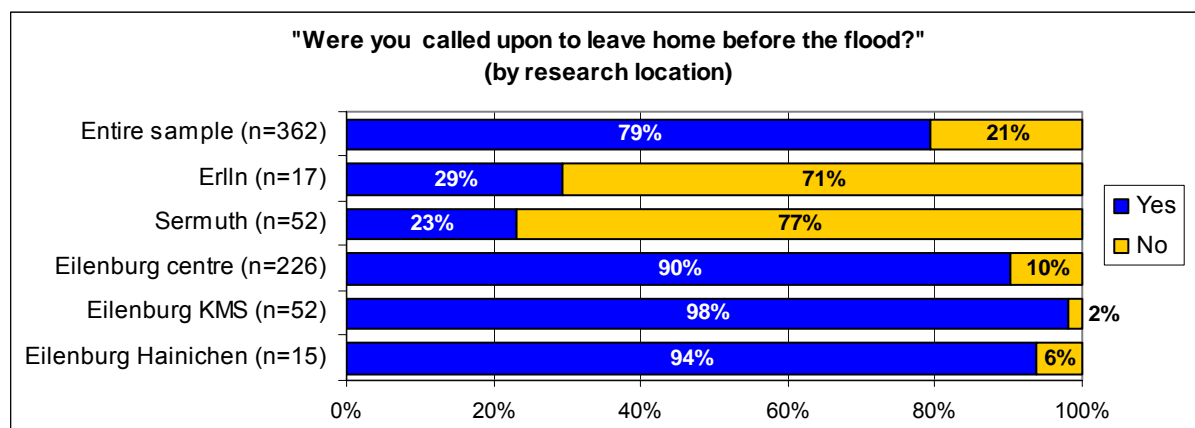
In the case of the 2002 flood, the warning was *ex post* criticised as deficient and inadequate (v. Kirchbach *et al.* 2002). However, there is no study yet published that tries to more thoroughly investigate the interaction between the formal warning system and the population at risk. In order to better understand the interaction between the official warning system and the population at risk, we define warning above all as a process that is based on (1) sense-making and (2) interactions between various actors:

- **Sense-making:** During a period that is defined by “situational uncertainty” the status of meaning is key. In a situation that is strange in a fundamental way—and surely the warning that a flood may inundate a certain territory, which is believed to be safe from flooding, is such a moment—it is not so much a strategic or a cost-benefit rationality that defines the decision-process; it is rather the process of sense-making, of understanding a situation as meaningful that becomes important (Weik 1993). Therefore the process of intersubjectively making sense of a situation defined by high uncertainty is central to the understanding of the decisions made shortly before the water inundates an area.
- **Social interaction:** During a warning in a situation as just described, two systems that seldom interact are suddenly dependent on each other. These are, on the one hand, formal governmental, regional or municipal organisations and, on the other, the general public. A warning that is uttered by such an official organisation and not understood by its addressee in the sense intended is meaningless. In order to analytically separate both systems, in Chapter 1.2 we distinguished between

formal and informal networks according to Matthiesen (2005). In the following, all those governmental and non-governmental organisations which are part of official disaster protection efforts are subsumed under the term “formal networks”. Informal networks, on the contrary, consist of family-members, friends, neighbours and colleagues (also referred to as social capital). As stated in the hypotheses above, we are also interested in probable differences between the two types of networks and their functioning.

In Chapter 1.3, the course of the 2002 disaster has been shortly described for the single research locations. Either dikes broke or were inundated everywhere on **August 13, 2002**. At the respective moment, most respondents (88%) were present in their town/village. This is of importance, since they were at least hypothetically able to secure furniture as well as other valuables from the impact of the flood as well as to help dependent persons in their households to leave buildings at risk. Fig. 5.9 displays the considerable differences between the single research locations: While in Eilenburg (including Hainichen) the majority **was called upon to leave home**, the situation in Erlln and Sermuth was completely different.

Fig. 5.9: Call for evacuation



( $p < 0.001$ ; Chi-square test)

Source: FLOODsite survey 2005

One explanation for the considerable variations between the research locations is to be found in the **different onsets of the flood**: In Erlln and Sermuth, where only a minority of the respondents reported to being warned, the flood came early in the morning (between 3 and 4 a.m.) and with considerable speed (“sudden onset”). The city of Eilenburg (neighbourhoods centre, KMS and Hainichen) was less rapidly inundated; the water approached the town even much later than expected and officially announced (“slow onset”). Here also the local warning system worked much better (Fig. 5.9 and Table 5.6).

This last aspect, however, might also be interpreted as first evidence for the assumption formulated at the end of Chapter 1.4 stating that **urban locations** with a higher density of potential emergency organisations (“formal networks”) might be better prepared for an event like the 2002 flood than rural areas where only few such organisations exist (for a similar interpretation: Cross 2001).

Table 5.6: Call for evacuation, by type of flood (n=362)

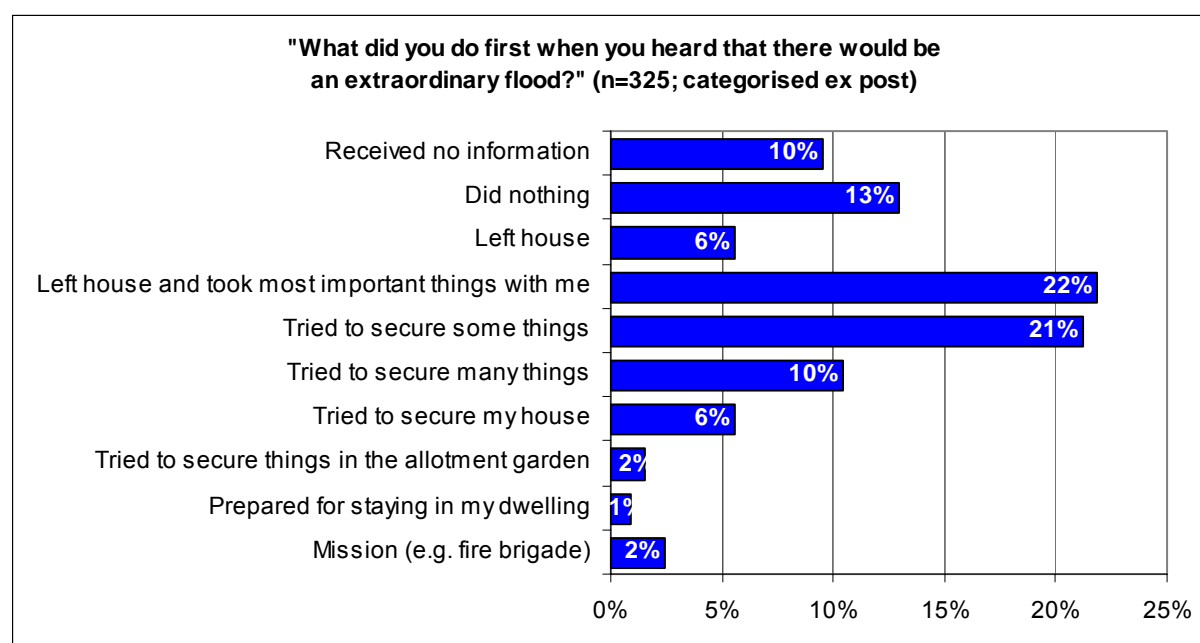
|                            | Called upon to leave home | Not called upon to leave home |
|----------------------------|---------------------------|-------------------------------|
| <b>Sudden onset</b> (n=69) | 25%                       | 75%                           |
| <b>Slow onset</b> (n=293)  | 92%                       | 8%                            |

(p<0.001; Chi-square test)

Source: FLOODsite survey 2005

With respect to **material vulnerability**, the moment after the information that the neighbourhood might be inundated (be it from media, informal or formal networks) is a crucial one: Besides having taken precautionary measures in the long run (as defined above), now the endangered population has at least the theoretical opportunity to reduce its vulnerability. Therefore we wanted to know (by an open question) how people reacted when they heard for the first time that a major flood might come. In order to analyse the answers, a typology of actions was developed *ex post*. This access to the qualitative data seemed meaningful to us, since a first intensive analysis revealed some distinct behaviour patterns that people pursued. We therefore distinguish different types of **ad-hoc activities** before the flood (but after whatever kind of information). The underlying assumption is that people who tried to secure as many things as possible (e.g. cleared their entire house before the flood or moved items off the ground) or citizens trying to secure their houses by means of sandbags and sealing material were firstly more aware of a flood and secondly reduced their damage potential. Fig. 5.10 provides a first overview of the different strategies people pursued.

Fig. 5.10: Ad-hoc activities intending to reduce material vulnerability (1)



Source: FLOODsite survey 2005

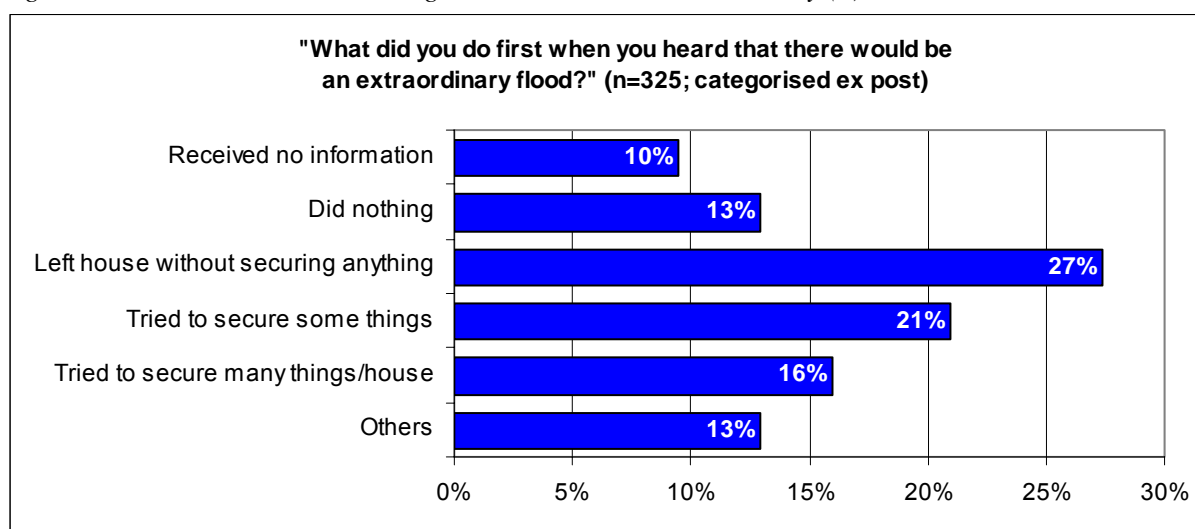
Most people simply took important things like documents or medicine, packed clothes for a few days and left their homes. After all, 21% of the respondents tried to secure some things like electronic devices, moveable furniture and so on, 10% undertook more efforts, e.g. cleared their basements or first

floors. 6% tried to secure their houses in order to hinder the water to penetrate the house and caulked windows and doors or towered sandbags in front of their doors. 13% simply did nothing, and 6% of the respondents quickly had to leave the house without taking anything with them. Beside these efforts, many respondents also reported to have helped others.

As also evident from Fig. 5.10 (and Fig. 5.11), 10% of the respondents received **no information at all**. The majority of them (52%) are residents of Sermuth, thus providing further evidence for the significant variance between the research locations with respect to warning and information policy. However, we also checked, whether the quality of the **social networks** might explain this fact (as stated in the hypotheses above). But neither composition (kin vs. friends) nor geographical heterogeneity (local vs. non-local networks) can explain the variance. People with exclusively local networks slightly more often belong to this group (10% vs. 7%), but the difference is not significant.

In a second step of analysis the categories were further condensed in order to find out how many people tried to **reduce their material vulnerability** by securing as many things in the house as possible as well as the house itself. At this stage it is not yet of interest whether they were successful or not but rather whether they had the capacity (or ability) to reduce their material vulnerability at all. We therefore distinguish one group of people that did nothing, one who left their houses without trying to secure anything, one group of people that tried to secure some things and one who tried to substantially reduce their material vulnerability. A further group includes respondents who received no information at all. All other strategies are subsumed in a residual category (Fig. 5.11).

Fig. 5.11: Ad-hoc activities intending to reduce material vulnerability (2)



Source: FLOODsite survey 2005

Fig. 5.11 shows that 50% of the respondents were not in the position to reduce their material vulnerability; either because they simply did not receive information, did nothing or had to or wanted to leave their dwelling quickly. Only 16% of the people tried to reduce their material vulnerability by securing their houses and furniture.

How people reacted was first of all dependent on **tenure**. Owner-occupiers significantly more often tried to reduce their material vulnerability. Hence the hypothesis formulated above (precautionary measures are to a higher degree taken by owner-occupiers) has to be broadened—also in the immediate situation this group of residents is more inclined to reduce its material vulnerability (Table 5.7). In particular the high proportion of renters that left their home without trying to secure furniture, electrical devices etc. (almost 50%) is remarkable.

*Table 5.7: “What did you do first when you heard that there would be an extraordinary flood?” (n=279), by tenure (activities categorised ex post)*

| Ad-hoc activities                 | Owner-occupier (n=158) | Renter (n=121) |
|-----------------------------------|------------------------|----------------|
| Received no information           | 16%                    | 5%             |
| Did nothing                       | 11%                    | 19%            |
| Left house                        | 18%                    | 49%            |
| Tried to secure some things       | 30%                    | 18%            |
| Tried to secure many things/house | 25%                    | 9%             |

( $p < 0.001$ ; Chi-square test; not considering category “others”)

Source: FLOODsite survey 2005

The clear difference between these two groups also explains the fact that people in urban areas (Eilenburg centre) tried less often to reduce their material vulnerability ( $p < 0.001$ ; Chi-square test). There approximately 45% of the respondents simply left their homes or took only some very important things along (documents, medicine, clothes), while in (quasi-)rural areas just 10% left their homes without trying to reduce the damage potential. Instead, much more effort was put into securing some or many valuables (all in all: 62%); in urban areas only 31% tried to do so. Also the proportion of people who did not receive any reliable information differs considerably. Again, it is significantly higher in Erlln and in Sermuth than in the Eilenburg neighbourhoods (see also Table 5.8).

There are further significant differences with respect to the **type of flood** (sudden vs. slow onset). However, the result is at first glance counter-intuitive: It is not in sudden-onset areas where people left their house more rapidly; it is in the area with a slow onset of the flood (Table 5.8). However, to understand this result, one has to keep in mind that the proportion of people who own their properties is significantly higher in the research locations of Erlln and Sermuth. Thus the important variable is not the flood, but tenure. Nevertheless, this result is also remarkable, since Erlln and Sermuth were both more rapidly approached by the flood and were told with considerably less frequency to leave their houses (Table 5.8). Additionally, this figure is a hint that the warning in Eilenburg was often not taken seriously, since people expected to be able to return to their dwellings within the next hours or days.

*Table 5.8: “What did you do first when you heard that there would be an extraordinary flood?” (n=283), by type of flood (activities categorised ex post)*

| Ad-hoc activity                   | Sudden onset (n=57) | Slow onset (n=226) |
|-----------------------------------|---------------------|--------------------|
| Received no information           | 33%                 | 5%                 |
| Did nothing                       | 7%                  | 17%                |
| Left house                        | 4%                  | 39%                |
| Tried to secure some things       | 30%                 | 23%                |
| Tried to secure many things/house | 26%                 | 16%                |

( $p < 0.001$ ; Chi-square test)

Source: FLOODsite survey 2005



If one further differentiates by the research locations, it turns out that in the centre of Eilenburg most people (predominantly renters) simply left their homes, while in all the other research locations more people tried to reduce their material vulnerability. This is further evidence for the significance of tenure with respect to adaptive flood-behaviour.

The **ability to read signs** also appears to a certain extent to influence the efforts to reduce the damage potential, although not significantly (Table 5.9). Respondents who understood the heavy and long-lasting **rainfall as a sign for the flood** as well as those who **gathered information via radio or TV** more often secured as many things as possible as compared with those who did not read any signs. Moreover, respondents who remembered the floods of 1954 and 1974 left their homes considerably more often than people who remembered no signs at all. This aspect can be explained in that the floods of 1954 and 1974 were understood as a “worst-case scenario” for the anticipated height of the 2002 flood. Therefore people simply left their homes which most often were not inundated in the preceding minor floods. However, the differences with regard to the various signs are not significant and the number of cases is usually very small.

*Table 5.9: “What did you do first when you heard that there would be an extraordinary flood?” (n=267), by remembering flood signs (activities categorised ex post)*

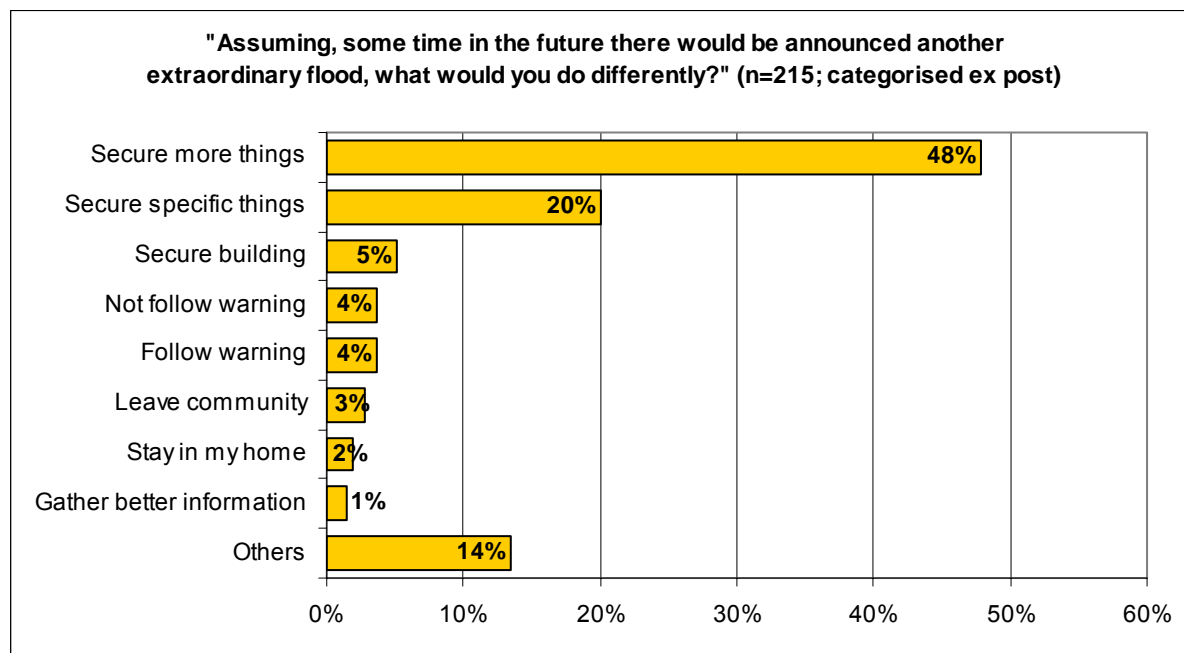
| Ad-hoc activity                   | Remember signs (n=79) | Don't remember signs (n=188) |
|-----------------------------------|-----------------------|------------------------------|
| Received no information           | 8%                    | 13%                          |
| Nothing                           | 11%                   | 16%                          |
| Left house                        | 29%                   | 31%                          |
| Tried to secure some things       | 25%                   | 25%                          |
| Tried to secure many things/house | 27%                   | 15%                          |

*Source: FLOODsite survey 2005*

Furthermore, people were asked **whether they would do something differently** if another extraordinary flood were announced. This question aims only partially at uncovering the assumptions about the actions before a next flood; it rather tries to address the question of **reflexivity** about the behaviour before the last flood. Therefore it is treated in the context of this chapter.

Almost two thirds of the respondents would indeed do something differently next time (63%), a quarter denied and approximately 13% could not answer the question (“don’t know”). However, when people were asked the open question what they would do differently, the majority answered they would try to secure more of their belongings (48%; Fig. 5.12). Similarly as above, the typology was created *ex post*. While under the category “secure more things” all those answers were subsumed that in a very general sense referred to clearing out the basement, the first floor or the entire dwelling, the second category “secure specific things” entails answers where certain properties, like for example important documents, personal items or valuable furniture, were mentioned. The category “secure the building” encompasses nominated measures by which the residents would try to hinder the water to penetrate the building, e.g. by means of sandbags. Interestingly, there are almost no differences in the answers with respect to tenure.

Fig. 5.12: Reflexivity of 2002 flood-behaviour



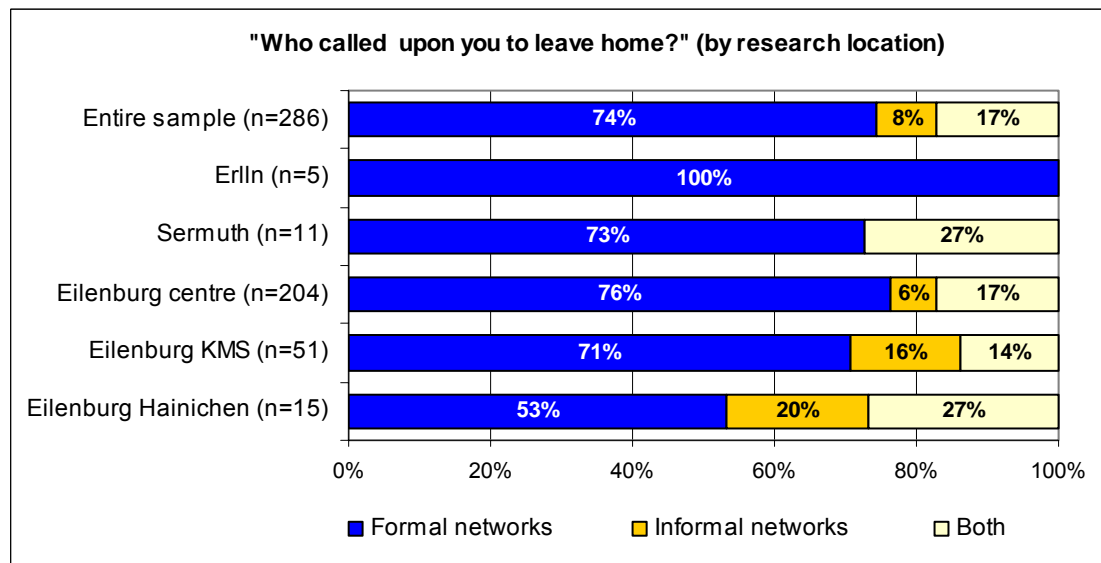
Source: FLOODsite survey 2005

In the following, we return to the **dramaturgy of August 13, 2002**. After having secured some valuables (or done nothing, just to mention the extreme reactions), for the later damage balance people's activities after having received the warning and/or call for evacuation—which in the case of the 2002 flood are not in all cases to be distinguished clearly—are assumed to be crucial.

The question whether the **call to leave home was in time** is seen quite contested: When considering only those who received a warning, one half of the respective respondents (n=286) stated that it was not in time (49%), the other half has the opposite opinion (51%). Most critical are the residents of Sermuth, where only about one third (36%; n=4) affirmed a calling in time.

We had the hypothesis that the **source of warning (formal or informal networks)** is a decisive factor for the individual reactions. More specifically, it was assumed that a warning uttered by friends and/or relatives (hence informal networks) is, firstly, more trustworthy than one that is uttered by an official organisation and, secondly, that people are in this case more willing to follow the call for evacuation. As for the entire sample (excluding those 106 respondents who were not at home or not called upon to leave home), most people (76%) received the call for evacuation by formal networks (e.g. fire brigades, THW, police, municipality) and 17% by informal networks. 6% relied on both sources. When comparing the **research locations** (Fig. 5.13), it becomes apparent that in Erlln all respondents (valid cases n=5!) received the warning through formal networks. However, there (as well as in Sermuth) only a minority at all received such a call (29% and 23%, respectively; see above Fig. 5.9). Also the city of Eilenburg (centre and KMS) was mostly covered by formal organisations. The only exception is represented by Hainichen: Here informal warnings as well as hybrid sources (made up of both formal and informal networks) were of greater importance. Hainichen was the last neighbourhood in the sample which was inundated in August 2002.

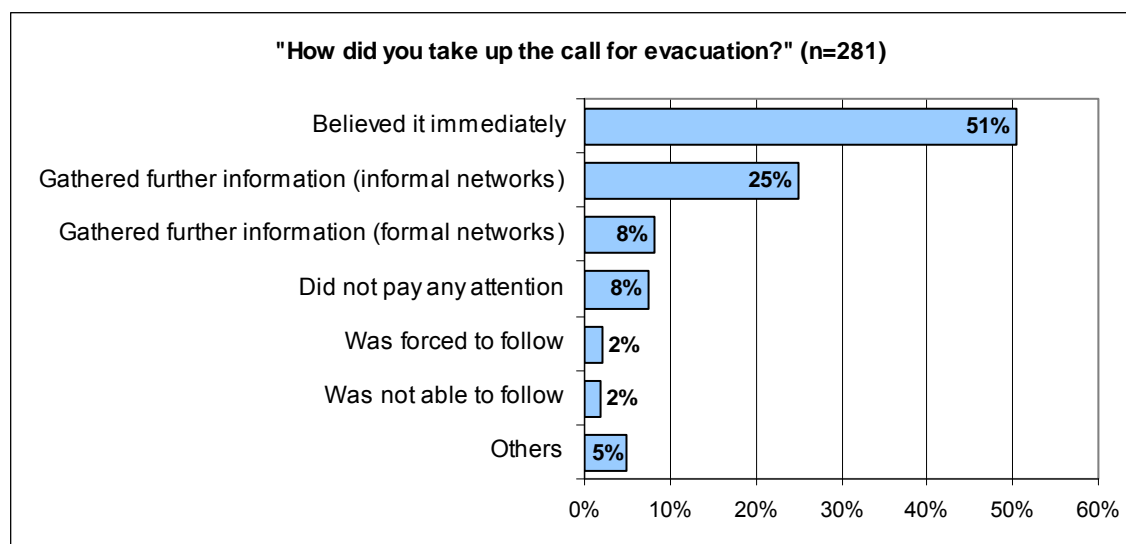
Fig. 5.13: Call for evacuation



Source: FLOODsite survey 2005

Fig. 5.14 indicates that only half of the sample believed the **call of evacuation** immediately and left their homes, 33% gathered further information by relying on informal (25%) or formal networks (8%). When taking a closer look at the first group (70 respondents) who at this very moment activated its **social capital** (informal networks), then one finding needs to be pointed out: Almost half of this group have available a social network which is exclusively locally based (47% vs. 28% among those who chose one of the other categories). **Hence, they relied on people with presumably a similar stock of information and tacit knowledge.**

Fig. 5.14: Acceptance of call for evacuation



Source: FLOODsite survey 2005

In order to test whether the **source of information** has any influence on the credibility of the warning (as hypothetically stated above), we combined the answers “gathered further information (informal networks)” and “gathered information (formal networks)” in a new category “gathered further infor-

mation". Furthermore, the categories "was forced to follow", "was not able to follow" and "did not pay attention" were summarized into the category: "did not follow (voluntarily)". Table 5.10 displays that the hypothesis of a higher credibility of informal networks is falsified, people on the contrary trusted formal networks much more than mixed ones or exclusively informal networks. In the latter cases, often further information was gathered. The differences are highly significant.

Table 5.10: "How did you take up the call for evacuation?" (n=264, by source of warning)

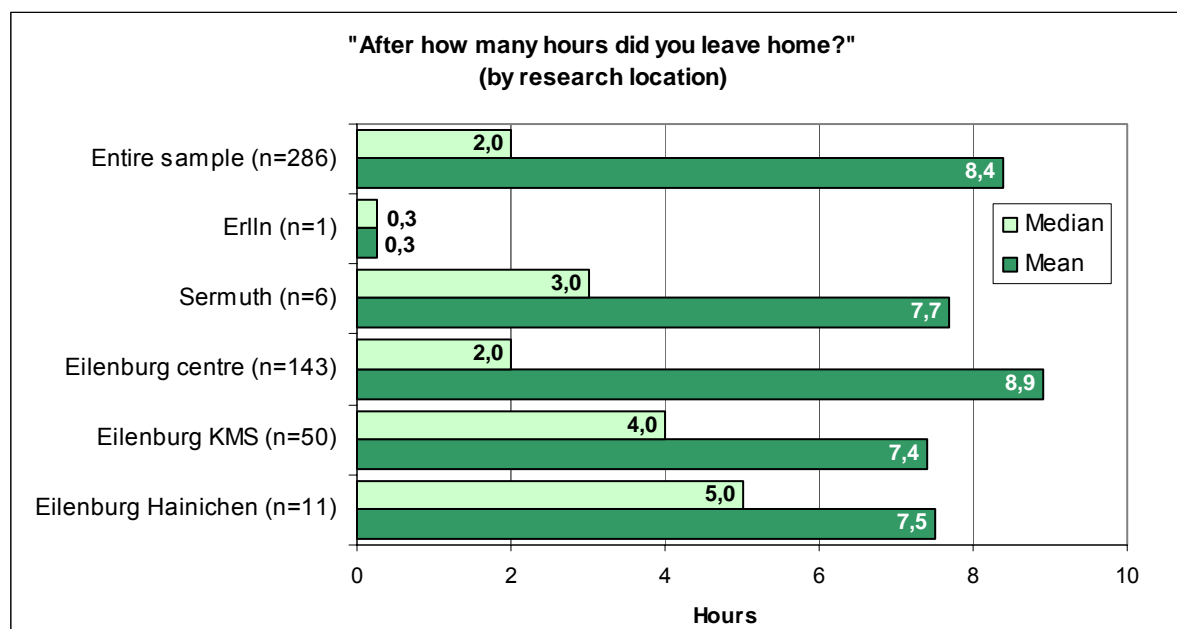
| Source  | Believed it | Gathered further information | Did no follow (voluntarily) |
|---|-------------|------------------------------|-----------------------------|
| <b>Formal networks</b> (n=196)                  | 59%         | 28%                          | 13%                         |
| <b>Informal networks</b> (n=20)                 | 20%         | 70%                          | 10%                         |
| <b>Both formal and informal networks</b> (n=48) | 44%         | 52%                          | 4%                          |

(p<0.001; Chi-square test)

Source: FLOODsite survey 2005

**The majority finally left their homes** (86% of those who were at home and received a call; n=245). Fig. 5.15 points to the great variance with respect to the time-span of actually following the call for evacuation. If one takes the median into account, then for half of the respondents most time for clearing the house and the like remained in Eilenburg Hainichen and KMS (4 and 5 hours, respectively).

Fig. 5.15: Time-span until leaving home



Source: FLOODsite survey 2005

Altogether 41 people (14%) stayed in their dwellings: absolutely most in Eilenburg centre (12%; n=30), relatively most in Hainichen (25%; n=4). The highest level of evacuation was to be found in Erlln and Eilenburg KMS (where from our sample only one person each stayed). Significantly more

men than women did not leave their home (19% vs. 9%;  $p < 0.05$ ; Chi-square test). Also the type of flood explains some of the differences: In the case of a sudden onset, fewer respondents left their homes. The fact that people had to take care of dependent persons in their household did not influence their actual evacuation behaviour. Neither does tenure account for any variance.

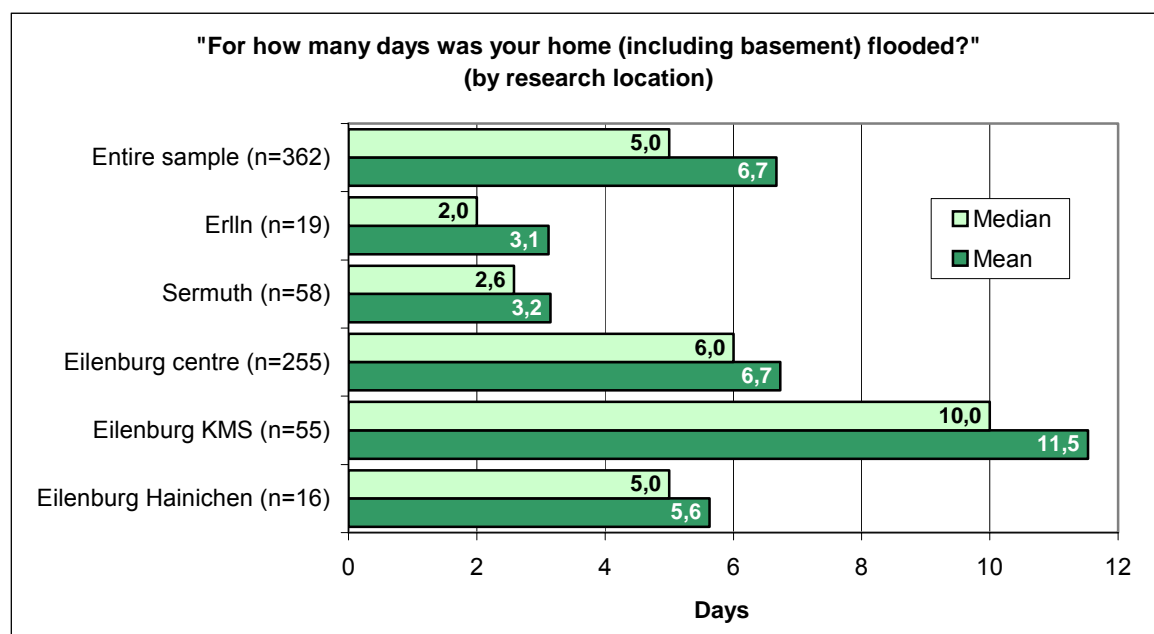
### 5.3 Resistance and coping

With the breaking of the dikes and the inundation of the research locations, the crisis changed from being latent into actual. The situation remained, however, characterised by great uncertainty. In the survey, “resistance” in this phase was measured only indirectly, via material vulnerability for which we have shown in the previous section, how people tried to reduce them in the long run (precautionary measures) and immediately before the flood (ad-hoc activities). Coping mostly covers the reception of support and help from others.

#### 5.3.1 Physical flood impacts

Almost all respondents (98%) were **directly affected** by the flood. Usually their basements, ground or first floors were inundated. But there are significant local differences with respect to the length of being inundated (Fig. 5.16). In Eilenburg KMS the water remained considerably longer than in all other locations, whereas in ErlIn and Sermuth after about three days the water was gone.

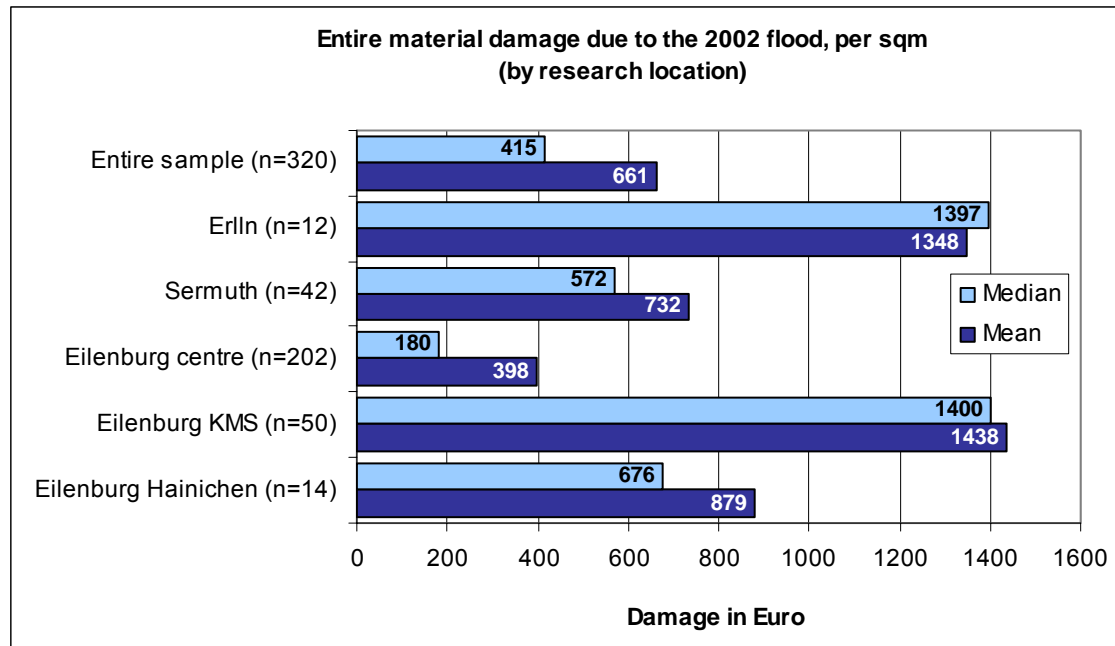
Fig. 5.16: Length of flooding with respect to respondent's dwelling



Source: FLOODsite survey 2005

Considering the high degree of affectedness, it is not surprising that most households (97%) **also experienced material damage**. Both the variance among the sub-samples but also between the research locations is considerable (Fig. 5.17). In ErlIn and Eilenburg KMS, residents were most affected in terms of monetary loss. However, the reliability of the damage data is very difficult to assess, since the answers vary highly in their preciseness. Some people simply stated that they lost “everything”, others gave exact numbers in Euro and Cent.

Fig. 5.17: Material damage



Source: FLOODsite survey 2005

Therefore, the data need to be interpreted rather cautiously.<sup>22</sup> According to a variety of analyses, the only variable which matters is again **tenure**: As to be expected, renters (i.e. the respondents living in Eilenburg centre) were significantly less affected than owner-occupiers (all other neighbourhoods), both with respect to buildings (which is not surprising) and to contents ( $p < 0.001$ ; T-test). There is also a tendency that with increasing degree of perceived preparedness the mean damage is lower (but not significant; ANOVA test). However, neither long-term precautionary nor ad-hoc activities nor receiving a warning led to a significant damage decrease, and in some cases it was even higher than for people who did not apply any measure. This is true for the entire sample and the location sub-samples as well as when controlling for tenure. We assume that one of the reasons for these partly counter-intuitive results is to be found in the severity and, at least in Erlln and Sermuth, the speed of onset of the 2002 flood. Furthermore, one has to bear in mind that only a minority took long-term precautionary measures (see above, Chapter 5.2.1).<sup>23</sup> Hence, the resulting picture is rather ambiguous and contradictory making it very difficult to explain damage variance and, therefore, material vulnerability.

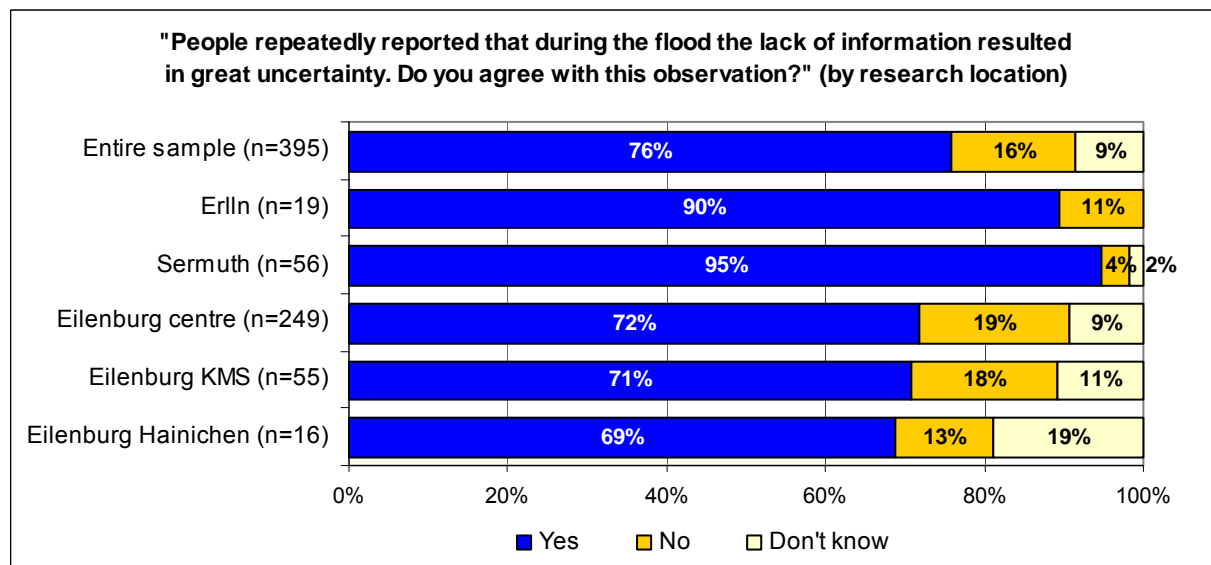
### 5.3.2 Information and uncertainty

Information is crucial for behaving and reacting not only before the onset of the flood but also for coping with the immediate situation. From the qualitative interviews with people in Eilenburg being mostly evacuated we knew that also during the flood uncertainty in various dimensions (expected length of flood, expected damages, general information flow, permits to return home etc.) was considerable. This assumption was also proven by the survey. However, Fig. 5.18 also shows that the inhabitants of Sermuth and Erlln felt considerably less informed than those in Eilenburg and therefore much more insecure during the flood. This result also echoes the general trend described in Chapter 5.2.3 that the situation in Eilenburg was managed more appropriately (warning, evacuation etc.).

<sup>22</sup> We are grateful to Volker Meyer and Michaela Sy for their support in analysing and interpreting the damage data.

<sup>23</sup> Also the partially small sub-sample sizes certainly count for the non-significant results of these analyses.

Fig. 5.18: Subjectively perceived uncertainty due to lack of information (1)

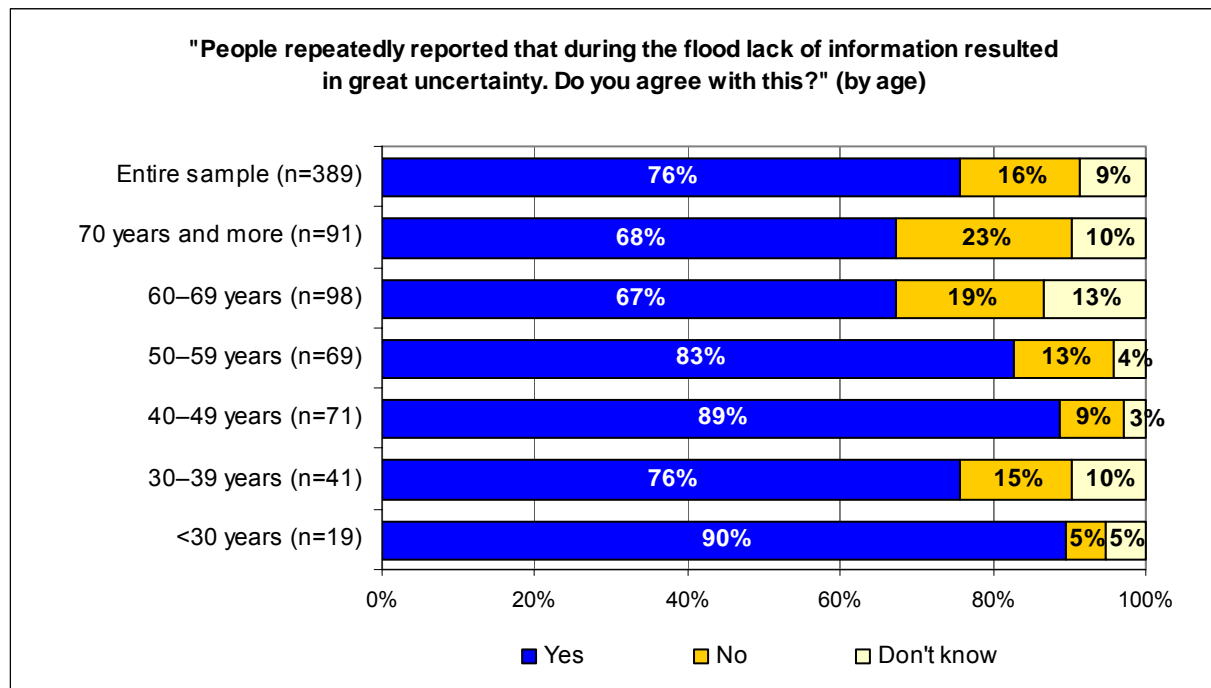


( $p < 0.05$ ; Chi-square test; only taking into account "yes" and "no")

Source: FLOODsite survey 2005

While social networks (neither their quality nor their geographical heterogeneity) do not explain any variance, **age** matters (Fig. 5.19). As a general trend, the younger the respondents were, the more they tend to agree with the statement that lack of information led to uncertainty. The age group 30-39 years is the only exception in this linear relationship.

Fig. 5.19: Subjectively perceived uncertainty due to lack of information (2)



( $p < 0.01$ ; T-test; only taking into account "yes" and "no")

Source: FLOODsite survey 2005

However, the interpretation of this finding is not straightforward since we know that younger people were better able to read and interpret pre-flood signs (see above, Fig. 5.7). One possible explanation is that the younger cohorts are more critical with respect to information policy and that they wanted to express their **dissatisfaction with the information flow during the flood** by this indicator.

From whom did people receive their information? Fig. 5.20 shows that particularly **family members as well as friends**—hence informal networks—were the most useful sources for gathering information during the flood. But also fire brigades and the THW played an important part. However, if one re-groups the answers with respect to the distinction “formal” versus “informal” networks, the picture becomes more diversified: The majority of the respondents (40%) received their most useful information by both formal and informal networks (Fig. 5.21). Again, there are differences between the **research locations**: While in Erlln most people got most useful information from formal organisations (including the municipality; 64%); in the four other localities the information channels were more mixed. Most critical with regard to the dissemination of information by the municipality are the inhabitants of Sermuth: Only 7% received useful news by this formal actor (in contrast with almost 40% in Erlln and Eilenburg KMS, respectively).

Fig. 5.20: Information during the 2002 flood (1)

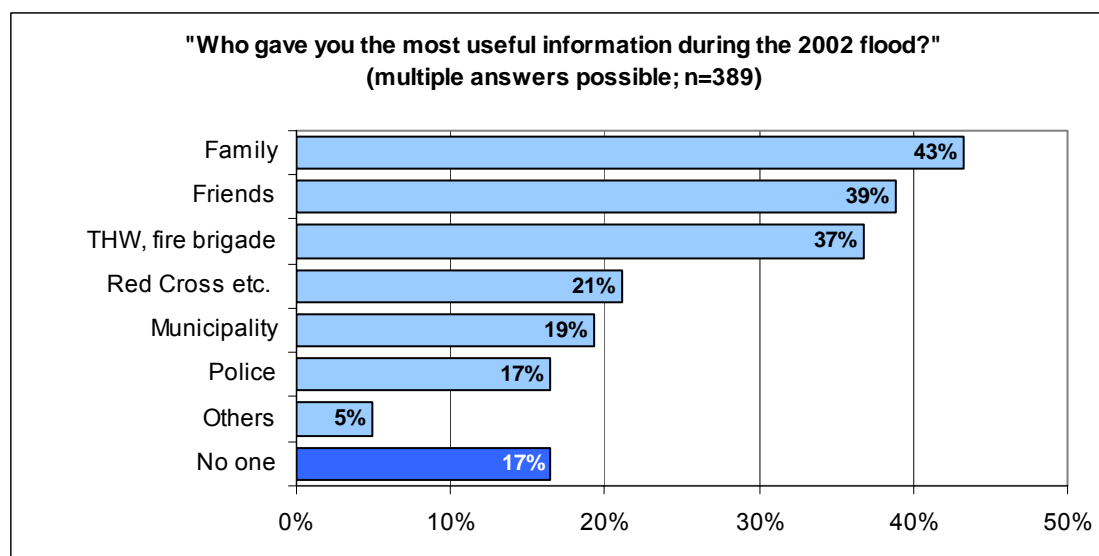
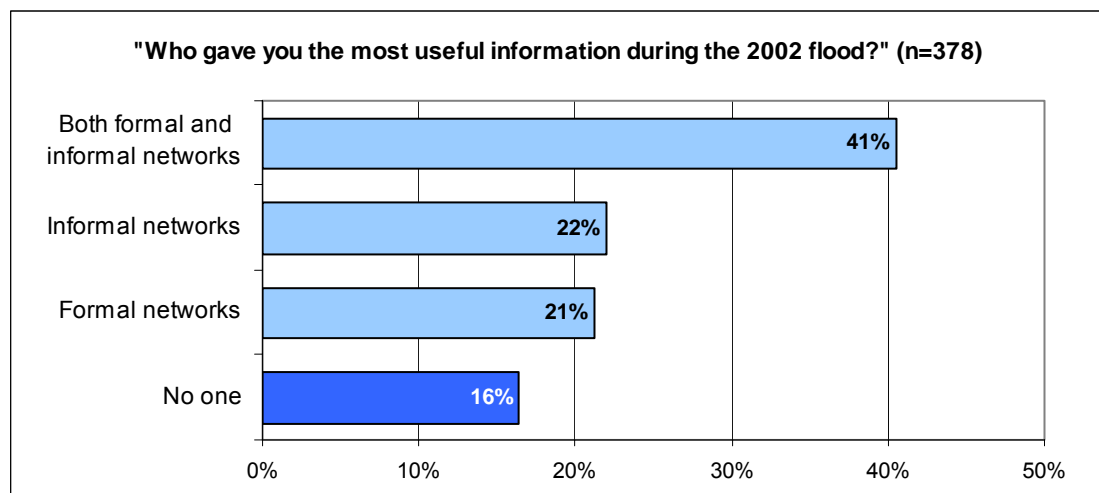


Fig. 5.21: Information during the 2002 flood (2)



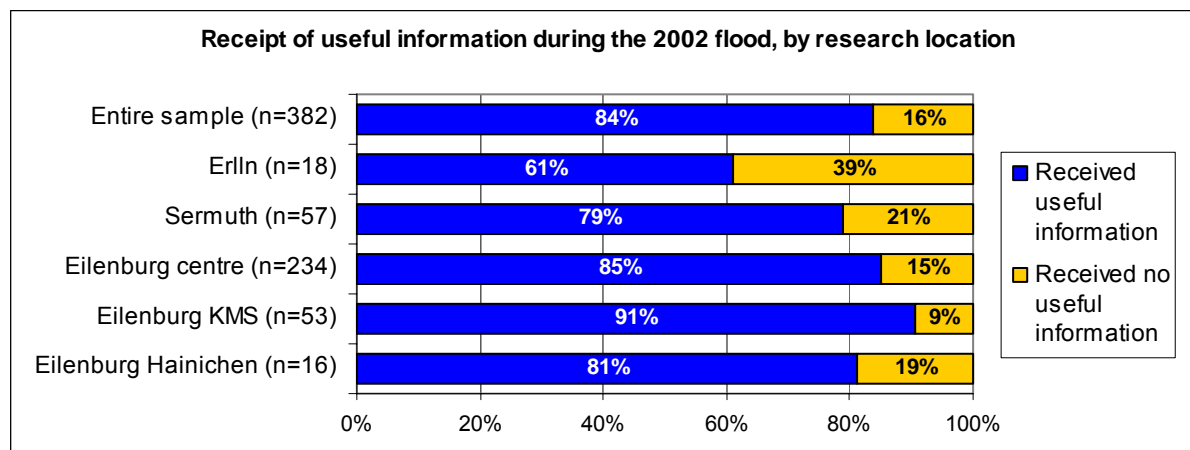
Source: FLOODsite survey 2005



When regarding all the different sources of information at once (by creating a simple additive index with 0=no information at all, 6=six different sources of information), one can point out that most people (40%) relied on two different sources. The only significant variance is due to **location**: While residents in Erlln and Sermuth relied on the, on average, lowest number of different information sources (1.5 and 1.6, respectively), residents of KMS could rely on 2.4 sources on average (entire sample: 1.9).

In the following, we will have a closer look at those respondents who reported that **no one** gave them **any useful information** during the 2002 flood (16%; n=62). First of all, the **locality** and probably the local specifics of coping with the situation there need to be taken into account (Fig. 5.22). People felt least informed in Erlln, again the Eilenburg neighbourhoods (except the more remote one of Hainichen) received useful information to a higher degree than the respondents elsewhere (variance significant;  $p < 0.05$ ; Chi-square test). To put it differently: The residents of Erlln and Sermuth, which were both prone to a sudden onset of the flood, received to a lower degree useful information than those of the research locations prone to a slow onset ( $p < 0.05$ ; Chi-square test).

Fig. 5.22: Information during the 2002 flood (3)



Source: FLOODsite survey 2005

**Social networks** matter in various respects with regard to the receipt (or non-receipt) of information:

- First of all, **network size** needs to be taken into account. People who did not receive any useful information have significantly smaller networks (despite the limitation to nominate just three persons; Chapter 4.2) than people who were informed by any source (network size: 2.2 vs. 2.6;  $p < 0.05$ ; T-test).
- When, secondly, regarding the quality of social networks, further substantiation of the hypothesis that people with exclusively local networks were endangered to **rely on people with presumably a similar stock of information and tacit knowledge** can be reported: While 40% among the respondents who answered that “no one” provided them with important information have exclusively local networks, only 28% among those who had any information source (irrespective of its formal degree) relied solely on local networks. These local networks are predominantly built upon kin. As for flood information, data analysis reveals that respondents with exclusively local networks also disposed of a significantly lower number of information resources than people also relying on *alteri* from outside ( $p > 0.01$ ; T-test).
- But, thirdly, also **people with alteri exclusively from beyond the district (Landkreis)**, hence with supra-regional networks were more likely to receive no useful information at all (not significant, but  $p = 0.062$ ; Chi-square test).

Table 5.11: Information during the 2002 flood, by age (n=372)

| Useful information | <30 y.<br>(n=17) | 30 – 39 y.<br>(n=41) | 40 – 49 y.<br>(n=69) | 50 – 59 y.<br>(n=65) | 60 – 69 y.<br>(n=95) | 70+ y.<br>(n=85) |
|--------------------|------------------|----------------------|----------------------|----------------------|----------------------|------------------|
| Received           | 94%              | 85%                  | 88%                  | 80%                  | 75%                  | 91%              |
| Not received       | 6%               | 15%                  | 12%                  | 20%                  | 25%                  | 9%               |

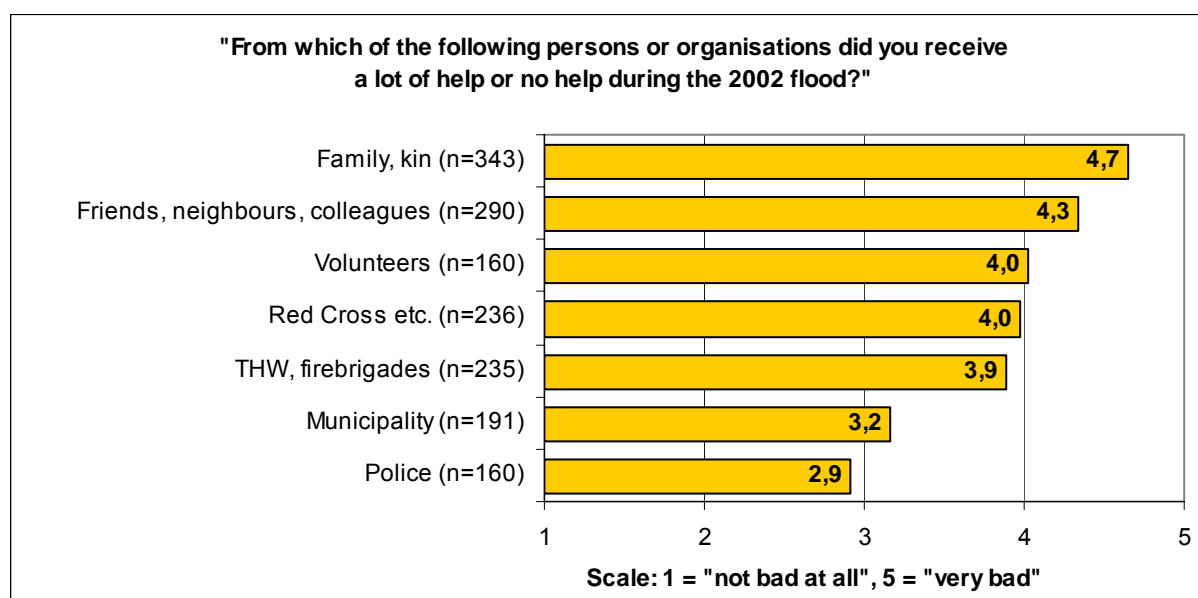
Source: FLOODsite survey 2005

Additionally, **age** is of, though minor, relevance (Table 5.11): Younger cohorts received useful information to a higher degree than elderly persons except the group which is older than 70 years ( $p < 0.05$ ; Chi-square test). However, as shown above (Fig. 5.19), the younger generations were also more critical about the information policy in general. Another group that received considerably less useful information are those respondents who have the lowest incomes ( $p < 0.05$ ; Chi-square test). However, the sub-sample size is too small ( $n=10$ ) to regard this as a reliable hint concerning situational vulnerability of those who are worse off.

### 5.3.3 Help and support

An important means for coping with the impact of such a severe event like the 2002 flood is the help and support people, households or entire community experience during this crisis. Again, similarly as in the previous section on information, **informal networks** (mainly family and friends) were the most important resource for coping with the flood (Fig. 5.23).

Fig. 5.23: Help received during the 2002 flood (1)



Source: FLOODsite survey 2005

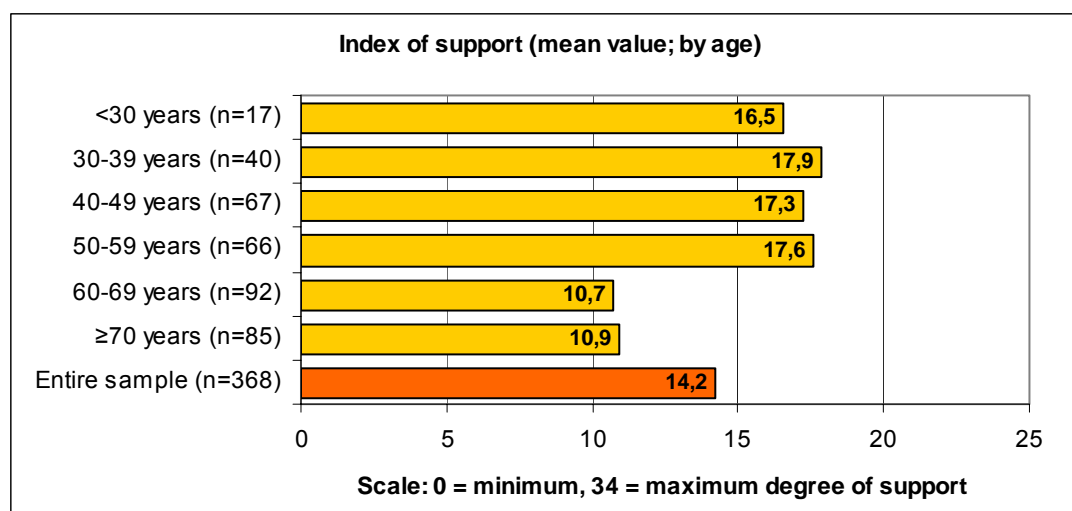
However, two limitations need to be pointed out. First of all, with respect to the open questions whether the respondents were supported by their network *alteri* during the flood and if yes, in which way, it turns out that most help was related to the reconstruction period (see below, Chapter 5.4.2). Hence, the subjective perception of what "during the flood" (Fig. 5.23) means is somewhat different

than originally intended (and once more points to the overlapping of the phases of a disaster, as discussed in Chapter 5.1). Secondly, the findings should not be misinterpreted in the sense of blaming certain groups of actors (such as the respective local authorities), since most of the actors nominated have different functions in the course of a disastrous event, and some are also more “visible” (and impressive) than others (e.g. fire brigades, THW and army with their technical equipment).

Of particular importance with regard to the ability to cope with and resist hazards is the question of how those that are not in the position to cope with the situation by their own are supported by other people. We therefore identified households that have to take care of **dependent persons** (all households with children under 18 years and ill or handicapped persons). Although with respect to certain actors (volunteers, fire brigades/THW and municipality) this group reports to have received significantly less help than people who do not need to take care of dependent persons, this is not the overall picture. All sources taken together (by an additive index of help, with 0=minimal support, 34=maximum support), there are no differences between these two groups. Rather, **age, professional situation, formal qualification and the existence of certain social relations** matter. As to be expected, also **location accounts** for some variance.

First of all, there is evidence that **the elderly** received significantly less support than younger residents (Fig. 5.24). However, it is not a linear relationship (as suggested by the significant correlation below Fig. 5.24) but rather a group-specific vulnerability: It is in particular the group of residents beyond the age of 60 who received less help from the different sources. But there is no straightforward explanation for this result: On the one hand, it might be due to fewer social contacts in general because of their exclusion from important societal spheres (such as the labour market). This assumption is further substantiated by the fact that retired persons received significantly less support than both people economically active and not employed ( $p<0.001$  and  $p<0.05$ ; T-test). But on the other hand, there is evidence that **social networks** played no major part in activating support. The correlation between the size of the social network and the amount of help is significant ( $p<0.01$ ), but weak (Pearson’s  $r = 0.16$ ). Quality or geographical range of these networks are important only in the sense that people with predominantly non-local *alteri* received more help than others, which at first glance is rather counter-intuitive. However, one might argue that they were also more dependent upon this support. Finally, people committed to a local association and/or the fire brigade were prone to a higher degree of support (significant in the case of fire brigade; T-Tst;  $p<0.01$ ). Hence, it was rather specific networks (and not necessarily the strong ties) which allowed for access to more help.

Fig. 5.24: Help received during the 2002 flood (2)



(Pearson’s  $r = -0.35$ ;  $p<0.001$ )

Source: FLOODsite survey 2005

As for **location**, Erlln, Eilenburg KMS and Hainichen (high level of support) are to be distinguished from Eilenburg centre and Sermuth (low level). This is not in line with other results but, instead, the picture becomes even more differentiated with respect to the flood performance of, and in, the single localities. Finally, people with a lower degree of **formal qualification** tend to have received less support than people with better qualification and, presumably, more abilities also to demand help and to contact the right actors at the right moment (not significant, but with a clear trend).

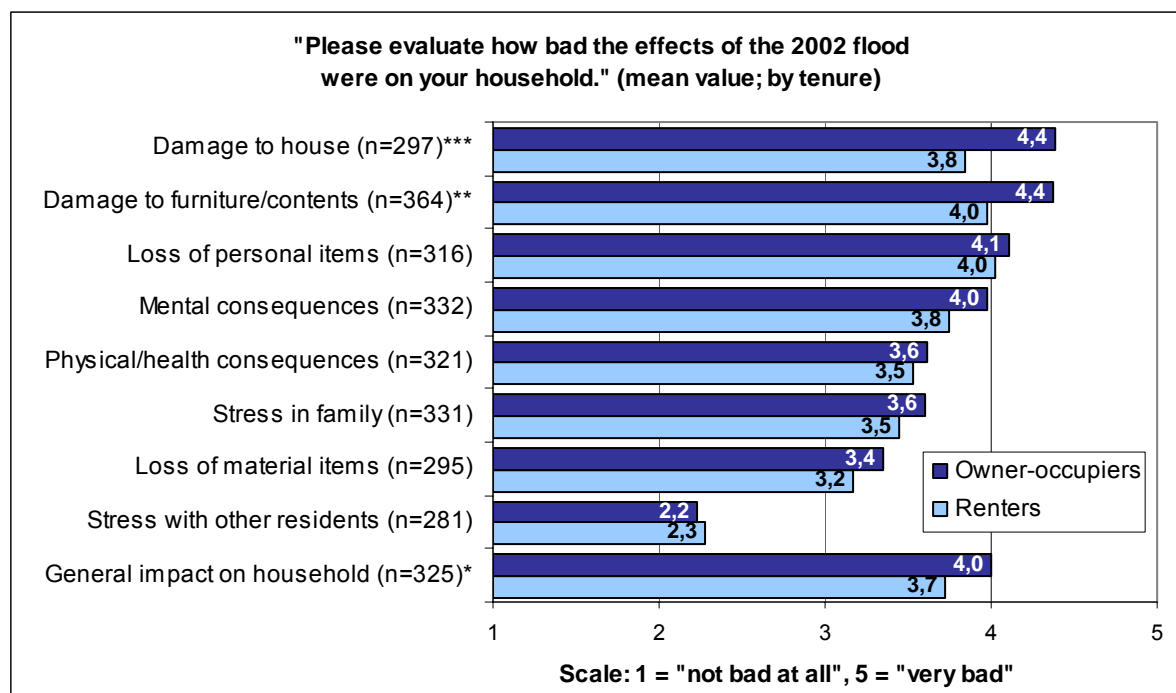
## 5.4 Recovery and reconstruction

This phase entails mental recovery and physical reconstruction efforts as well as the subjective and intersubjective abilities of the different households to cope with the long-term consequences of the flood. It is the phase of a return to whatever “normalcy”, which, beside others, also contains the contingency of a new hazard.

### 5.4.1 Perceived flood impact

While in Chapter 5.3.1 the physical consequences of the flood (mainly the monetary losses) were in the focus, we will now turn our attention to the **perceived impact of the 2002 flood**, which was asked for more than 3 years after, as already outlined above. Fig. 5.25 shows that the overall physical damage to the house itself and the damage to furniture are *ex post* evaluated as the worst effects. But also the personal consequences (both with respect to physical and mental health) are regarded as effects difficult to cope with in the long run. Material losses (which were mostly compensated; see below Chapter 5.4.2) are of minor importance. With regard to the **effects on the house and the furniture**, the variables **tenure** and **gender** significantly influence the perception of the effects: Owner-occupiers and men tend to evaluate the losses related to the building and its contents significantly worse than renters and women, respectively. Except the category “stress with other residents”, owner-occupiers in all dimensions perceive the consequences worse than renters (Fig. 5.25).

Fig. 5.25: Perceived impact of the 2002 flood (1)

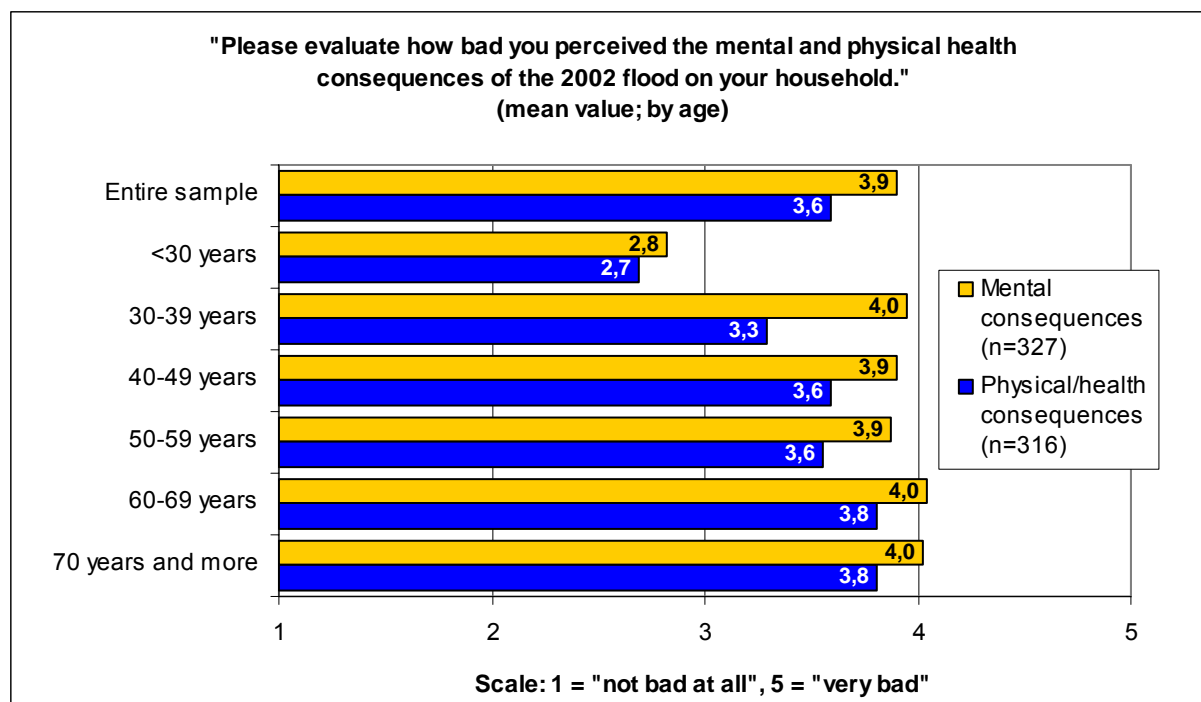


(\* p<0.05, \*\* p<0.01, \*\*\* p<0.001; T-test)

Source: FLOODsite survey 2005

When having a closer look at the **single research locations**, the respondents of Eilenburg KMS most often perceive the single effects of the 2002 flood as very severe. But beside the residents of Eilenburg centre, the respondents of KMS were evacuated for the longest period (also due to the length of inundation; see above Fig. 5.16).

Fig. 5.26: Perceived impact of the 2002 flood (2)



Source: FLOODsite survey 2005

The **overall impact on the household** is above all a question of **location, age and tenure**. Relatively seen, the respondents of Eilenburg KMS judge the general impact of the 2002 flood on their households mostly as "very bad" ( $p < 0.05$ ; Chi-square test). Again, the very young and the very old differ from each other with the younger people perceiving the consequences of the flood as less severe ( $p < 0.05$ ; Chi-square test). Finally, owner-occupiers evaluate the overall impact of the 2002 flood on their household significantly worse than renters.

The picture of the most important factors influencing the perceived impact does not change when taking into account all impacts at once (by creating an index). Again, tenure, gender, age and location matter more than other aspects do.

When singling out **physical and mental consequences** (Fig. 5.26) the only independent variable for which any significant influence can be verified is **age**. Particularly persons who are older than 60 years evaluate both the psychological and physical consequences significantly more often as "very bad" ( $p < 0.05$ ; Chi-square test). However, the correlation between these variables is rather weak (mental health: Pearson's  $r = 0.11$ ;  $p < 0.05$ ; physical health: Pearson's  $r = 0.18$ ;  $p < 0.01$ ). This finding is to be explained with the non-linear relationship. It is mostly the extreme groups (very old vs. very young) who vary in their perceptions (Fig. 5.26; significant only for psychological consequences;  $p < 0.05$ ; Scheffé test).

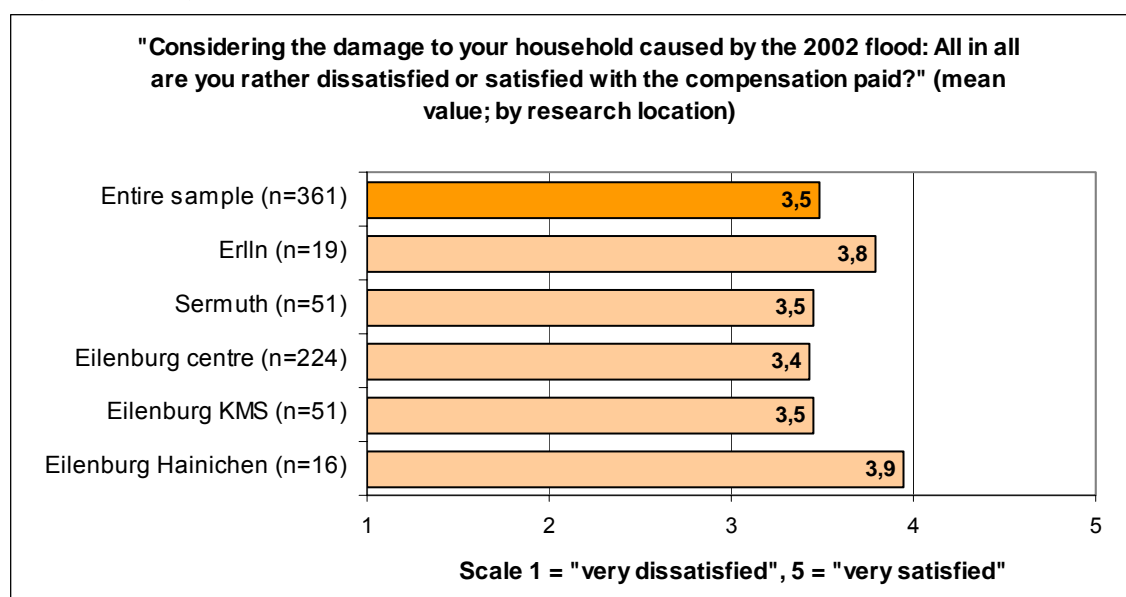
As for **social networks**, no influence on long-term coping with respect to the above mentioned consequences could be verified directly. However, they played a crucial role in the process of post-flood recovery and will be dealt with in more detail in the next section.

### 5.4.2 Compensation and support

In Chapter 5.2.1, the relatively high coverage with specific flood insurance in eastern Germany was already explained (see also Fig. 5.1). In the sample, 50% of the respondents hold such insurance. However, particularly after the 2002 flood the people affected could not only rely on their insurance. They were also financially supported by the private donations, the Bund (Federation) and the Länder (federal states) as well as the European Union. Particularly the substantial support by public authorities (78% of all subsidies) is without example in German flood history. After the Rhine Flood in 1993, in contrast, only 10% of the damages were compensated by public authorities (DKKV 2003). A few weeks after the flood, the Federal Government adopted the *Sonderfonds Wiederaufbauhilfe* (Reconstruction Fund) regulating reimbursement payments for the people affected. If one **sums up all** the donations and reimbursement **payments** for the people affected by the 2002 flood, **more than 100% of the damages were compensated**. The reasons for this unknown wave of solidarity sweeping through Germany in summer 2002 were threefold: Firstly, during the flood the campaign for the parliamentary elections (to be carried out in September 2002) was taking up speed and the flood offered a welcome opportunity to demonstrate the solidarity with the flooded people regardless of party affiliations; secondly, the flood affected in particular the eastern part of Germany, which is, as outlined above, undergoing substantial economic and social transformation; thirdly, the flood was defined as an “extraordinary event”, letting it appear irresponsible to leave the burden on those hit most by the flood (Kuhlicke and Drünkler 2005).

People in the flood areas were thus usually reimbursed by 100% (and sometimes even more). This is also mirrored by our survey data: We asked about the **satisfaction with the material compensation** from various sources. Almost half of the respondents are either satisfied or very satisfied. Just 18% were rather or completely dissatisfied. Variance is low, and none of the tested variables accounts for it. Even the different experiences the residents of the various research locations made before and during the 2002 flood were balanced in the post-disaster phase by the monetary subsidies (Fig. 5.27). Bearing this specific reimbursement situation and the above mentioned political framework in mind, it is not surprising that satisfaction is increasing with the height of material damage ( $p < 0.01$ ; ANOVA test). Moreover, when comparing owner-occupiers and renters in one of our research locations (Eilenburg centre) one has to point out that the first group is even significantly more content than the latter ( $p < 0.05$ ; T-test).

Fig. 5.27: Satisfaction with reimbursement



Source: FLOODsite survey 2005

Beside the material compensation from public authorities, private donations, interest-free loans etc., crucial means of support were delivered by the **social networks** of the respondents. With respect to the phases differentiated above, it is precisely the period of recovery and reconstruction when these networks became most meaningful. As illustrated by Table 5.12, the bulk of support covered reconstruction and clearance works. But also material help (money, catering and building materials) as well as the provision with accommodation and mental help played a significant part.

As for the level of the **individual network persons**, the findings presented in Table 5.12 indicate that the degree to which the single *alteri* supported the affected *ego* does not differ: About 70% of all network persons were active in helping to overcome flood effects. While about 10% of all *alteri* were affected themselves, they supported *ego* to more than one third (36 out of 103). However, this also means that the majority of *alteri* affected themselves did or could not provide any support in the recovery phase. Since they usually belonged to predominantly local networks, this result points to a certain **“weakness of local ties”**.

Table 5.12: Post-flood support by social networks (types of support categorised ex post)

|   | Person 1<br>(N=365) | Person 2<br>(N=338) | Person 3<br>(N=302) | All <i>alteri</i><br>(N=1,005) |
|---|---------------------|---------------------|---------------------|--------------------------------|
| <b>Number of <i>alteri</i> providing support</b>                                      | 263                 | 239                 | 205                 | 707                            |
| <b><i>Alteri</i> themselves affected by flood<br/>(among them: providing support)</b> | 39<br>(15)          | 34<br>(10)          | 30<br>(11)          | 103<br>(36)                    |
| <b>Proportion of <i>alteri</i> providing support</b>                                  | 72%                 | 71%                 | 68%                 | 70%                            |
| <b>Types of support</b> (multiple answers possible):                                  |                     |                     |                     |                                |
| Reconstruction/clearance work   | 110                 | 101                 | 80                  | 291                            |
| Provision of accommodation  | 52                  | 42                  | 28                  | 122                            |
| Mental support  | 35                  | 29                  | 35                  | 99                             |
| Financial and material support  | 33                  | 38                  | 25                  | 96                             |
| Other (catering, child care, organisational help etc.)                                | 60                  | 72                  | 62                  | 194                            |

Source: FLOODsite survey 2005

As explicated in Chapter 4.2, a social network is more than just the sum of its parts. In a next step of analysis, it is therefore necessary to leave the level of the individual *alteri* and to analyse the importance of the **social networks in their entirety** for recovery and reconstruction. From Chapter 4.2 we know that 39 respondents could not nominate any person they trust (9%). These will be excluded in the following. For whatever reasons, 18% of the remaining 365 respondents could not “capitalise” their social networks in the recovery phase (Table 5.13). Yet, the majority of people surveyed activated at least a part of their social network. 46% had even access to the maximum number of three people. However, while at first glance people with just one person of trust nominated seem to be specifically vulnerable (to receiving less support), in 74% they were able to activate their entire “network”. In the case of people with two and three strong ties, it is about the half of the sample (47% and 55%, respectively). This means that **people with a smaller network are not necessarily more vulnerable to receiving no support** in the post-flood phase.

As for location, people in the **rural and quasi-rural areas** were better able to activate their networks (85–100% in contrast with 78% in Eilenburg centre, the only “really” urban location).



Table 5.13: Activation of social networks after the 2002 flood (n=365)

|                          | Respondents | = Activation of entire network* |
|--------------------------|-------------|---------------------------------|
| No support at all        | 64 (18%)    | —                               |
| Support by one person    | 62 (17%)    | 74%                             |
| Support by two persons   | 75 (21%)    | 47%                             |
| Support by three persons | 165 (46%)   | 55%                             |

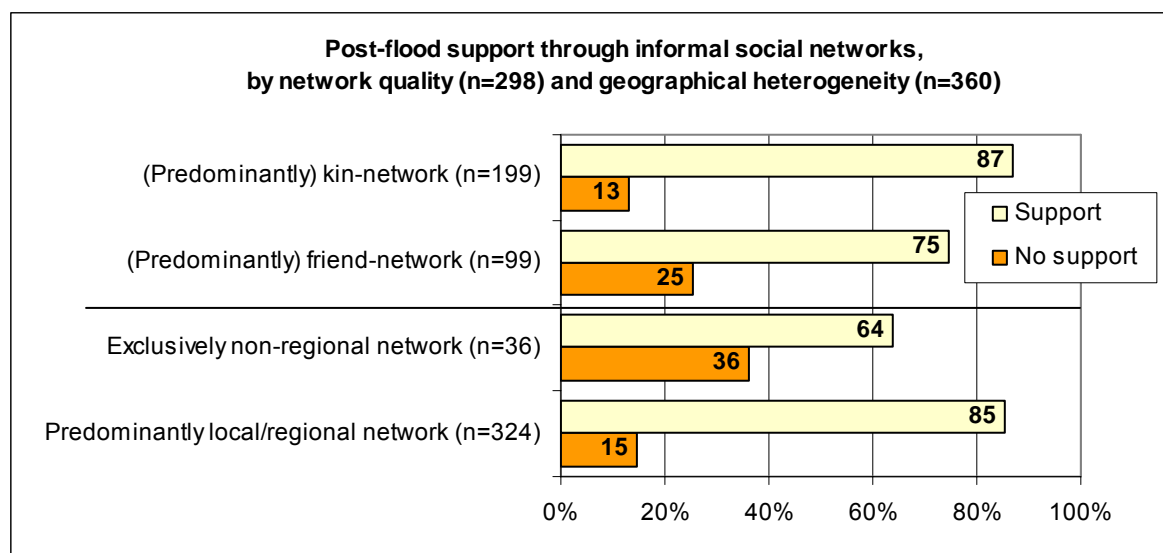
\* As explained in Chapter 4.2, in the case that just one person was nominated, it is strictly speaking not possible to regard the social relation as a network. This problem is neglected here.

Source: FLOODsite survey 2005

Rather, it was residents with an **exclusively non-regional network** (all *alteri* living beyond the regional district/*Landkreis*) who were endangered to receive **no support** in the recovery phase (Fig. 5.28). Moreover, kin-networks were significantly more ready to provide various forms of help than informal **networks based predominantly or exclusively on friends**. When comparing five different network types (only friends, predominantly friends, only kin, predominantly kin, mixed networks), the highest proportion of non-support is to be found with regard to exclusively friend-based networks. All other types—which are all “mixed” in terms of their quality, with the exception of exclusively kin-based networks—provided support in the aftermath of a major flood to a significantly higher degree ( $p < 0.05$ ; Chi-square test).

Finally, we found certain social groups who were more likely to receive no support by their social networks such as one-parent households, people with low income and those with low formal qualification, but not—as might be assumed—the elderly.

Fig. 5.28: Post-flood support



( $p < 0.01$  for both network quality and geographical heterogeneity; Chi-square test)

Source: FLOODsite survey 2005



When returning to our **network hypotheses** formulated above, we are faced with some **ambiguity**:

- First of all, we can state that in the recovery phase “strong ties” located remotely from the place of the disaster figure out to have been rather “weak” ties.
- Secondly, ties to other locals were comparatively more accessible, in particular in non-urban locations. Hence, our hypothesis that people were “trapped” in their local networks (since almost everybody experienced the same situation), and deprived of adequate help, cannot be verified with respect to the recovery phase. On the contrary, there are several hints that residents with local and emotional bonds (membership in voluntary organisations, strong attachment to the area) received post-flood support to a significantly higher degree than people without such bonds (“strength of local ties”). However, in the case their *alteri* were affected themselves they often had to manage flood consequences and did only partially provide support (“weakness of local ties”).
- Thirdly, mixed networks were more ready to provide support than homogeneous ones—except for exclusively kin-based networks which proved to be the most reliable networks in the aftermath of the flood event.

### 5.4.3 Precautionary measures after the flood

We also considered the implementation of **precautionary measures** after the 2002 flood as part of the recovery process. In contrast with the time before the flood, the proportion of respondents who applied such measures is considerably higher (39% vs. 15%; see above Fig. 5.2). However, there is no empirical evidence for a simple cause-response behaviour: The **majority of the residents did not change anything** in their home in order to be more adequately prepared for a possibly new flood. In Chapter 6 we will come back to this issue and discuss possible reasons of this (non-)behaviour.

In the case that precautionary measures were applied, the residents of the flooded areas directed most of their efforts towards an **adaptation** of the use of certain parts of the house (e.g. the basement) and the interior (measure type “drawback”; Table 5.14).

Table 5.14: Application of precautionary measures after the 2002 flood (n=155)

| Type             | Examples for type of measure  | Applied by |
|------------------|---|------------|
| <b>Evasion*</b>  | Elevated configuration and/or shielding with water barriers         | 10%        |
| <b>Resisting</b> | Waterproof sealing and/or fortification of cellar and basis         | 12%        |
| <b>Drawback</b>  | Adapted use and/or interior fitting of the flood endangered storeys | 30%        |
| <b>Securing</b>  | Safeguarding of hazardous substances                                | 8%         |
| <b>Behaviour</b> | Food, medicine, sandbags, phone numbers at home                     | 12%        |
| <b>Insurance</b> | Specific flood-insurance  | 26%        |

\* “Evasion” also includes moving to another place (as far as a respondent also mentioned this step as a precautionary measure). The reason is that the entire household is then out of the hazard’s way.

Source: FLOODsite survey 2005

As to be expected, the most important distinction can again be made with respect to **tenure**: While 43% of the owner-occupiers applied precautionary measures after the 2002 flood, only 27% of the renters did so (Table 5.15 and Fig. 5.29). However, also for the group of the owner-occupiers, there is no straightforward connection between “being affected” and “applying precautionary measures”.

*Table 5.15: Application of precautionary measures after the 2002 flood, by tenure (n=374)*

| Precautionary measures | Owner-occupier (n=205) | Renter (n=169) |
|------------------------|------------------------|----------------|
| <b>Yes</b>             | 43%                    | 27%            |
| <b>No</b>              | 57%                    | 73%            |

(p<0.01; Chi-square test)

Source: FLOODsite survey 2005

Furthermore, **age and gender** played a role. Most efforts were conducted by people between 30 and 50 years (Table 5.16). Interestingly, both very young and (very) old persons applied relatively fewer measures after the 2002 flood, probably both for the reason that they don't ascribe much sense to such measures (see also Chapter 6.3). There is also a significant difference between men and women. While 43% of the male respondents answered the question for precautionary measures positively, only 33% of the women did so (p<0.05; Chi-square test). This result might have to do with traditional divisions of labour in the households and is somewhat artificial since the answer given probably depended upon who filled in the questionnaire.

*Table 5.16: Application of precautionary measures after the 2002 flood, by age (n=372)*

| Precautionary measures | <30 y.<br>(n=19) | 30–39 y.<br>(n=42) | 40–49 y.<br>(n=71) | 50–59 y.<br>(n=68) | 60–69 y.<br>(n=91) | 70+ y.<br>(n=81) |
|------------------------|------------------|--------------------|--------------------|--------------------|--------------------|------------------|
| <b>Yes</b>             | 21%              | 45%                | 55%                | 37%                | 37%                | 28%              |
| <b>No</b>              | 79%              | 55%                | 45%                | 63%                | 62%                | 72%              |

(p<0.05; Chi-square test)

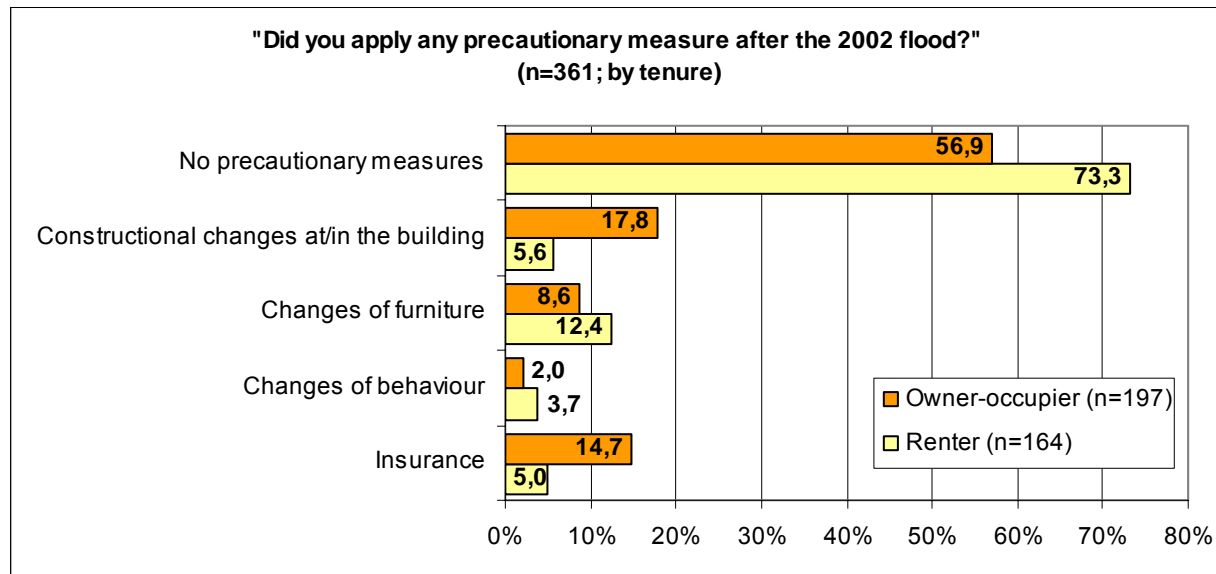
Source: FLOODsite survey 2005

In the following, we want to shed some more light on the **types of post-flood mitigation measures**. We differentiate between measures that are based on constructional changes (evasion, resisting and securing), changes of the furniture (drawback), moreover measures related to different behaviour patterns and measures based on investing money (new insurance or an increase in already existing insurance policies; see Table 5.1).

The most obvious difference relates once more to **tenure**: While owner-occupiers are in particular inclined to pursue constructional changes at or in their buildings and to take up new or improve their existing insurance policies, renters more often fitted the interior of their flats to a possible flood (Fig. 5.29). As a consequence of the tenure distribution, in **(quasi-)rural areas** the proportion of those respondents that applied constructional precautionary measures is considerably higher than in urban areas.

However, further aspects—such as compensation, satisfaction with compensation, height of damages and the like—don't help to further explain the variance in the application of precautionary measures after the 2002 flood.

Fig. 5.29: Precautionary measures after the 2002 flood



( $p < 0.001$ ; Chi-square test)

Source: FLOODsite survey 2005

Finally, we asked the respondents about the **long-term changes due to the 2002 flood** with regard to their locality and their personal relation to certain bodies of formal networks ("trust"; Figs. 5.30 and 5.31). Out of the given statements, the issue "awareness of flood hazards" received the highest mean value: Four out of five respondents were convinced that it improved (slightly or even significantly). However, this **does not point necessarily to a high level of awareness**, it rather relates simply to a change in perceptions. While we will discuss this question in more detail in Chapter 6.2, the most distinct result of this indicator is that **trust in formal networks**, especially those "close by" and physically present (and apparent) during the flood, increased significantly. This is of interest not least due to the specifics of the East German path of post-socialist transition, since during the 2002 (and already the 1997 Odra) flood certain "Western" organisations (like the Army, the THW etc.) for the first time were both visible and meaningful for the inhabitants of the East German floodplains. The actual and "first-hand" experience of their support probably makes them so prominent in comparison with other formal networks, like for example the **local authorities**. But as Fig. 5.31 illustrates, with respect to the latter there are remarkable differences between the research locations: The inhabitants of Erlln judge most positively, whereas residents of Sermuth are much more critical about their municipality and its management capabilities during the crisis.

As for the **social climate** in the respective locations ("solidarity among the residents"), the highest value is to be found, quite astonishingly in relation to other evidence discussed above, in Eilenburg centre (Fig. 5.31). One probable explanation might be that the flood is indeed seen as a crucial event having improved the (before more negatively evaluated) social climate while in the other areas the level had been higher anyway. However, we cannot test this hypothesis because our survey only produced cross-sectional and not longitudinal data allowing for a comparison in time. Moreover, the variance between the single research locations does not differ significantly.

Fig. 5.30: Changes after the 2002 flood (1)

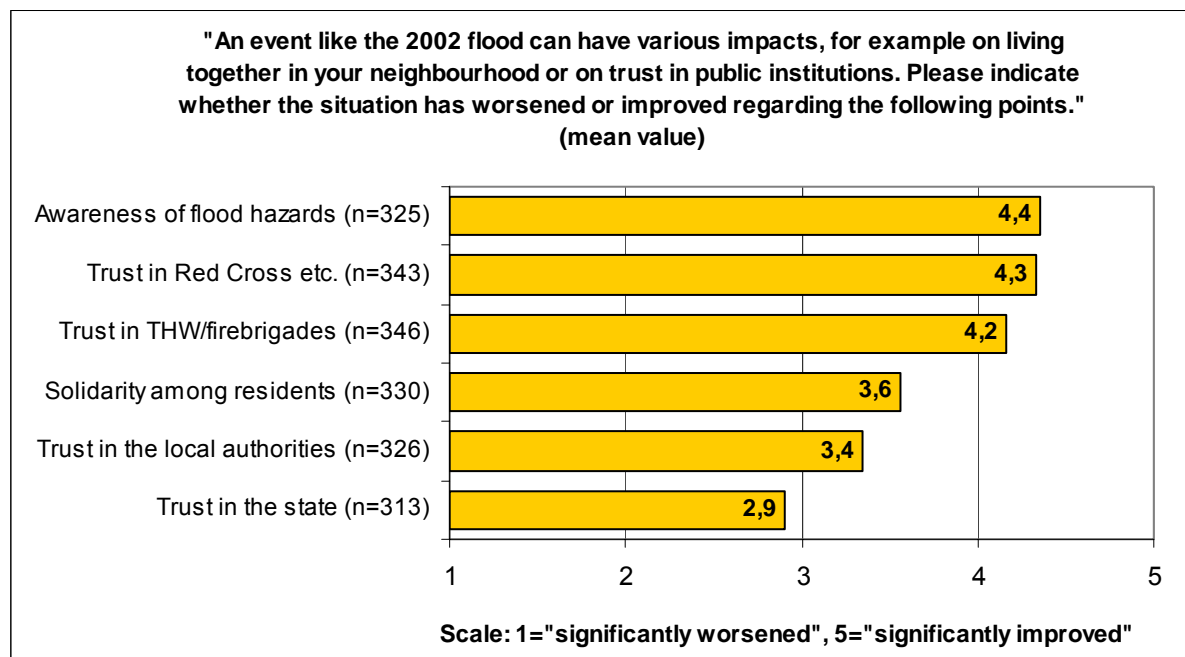
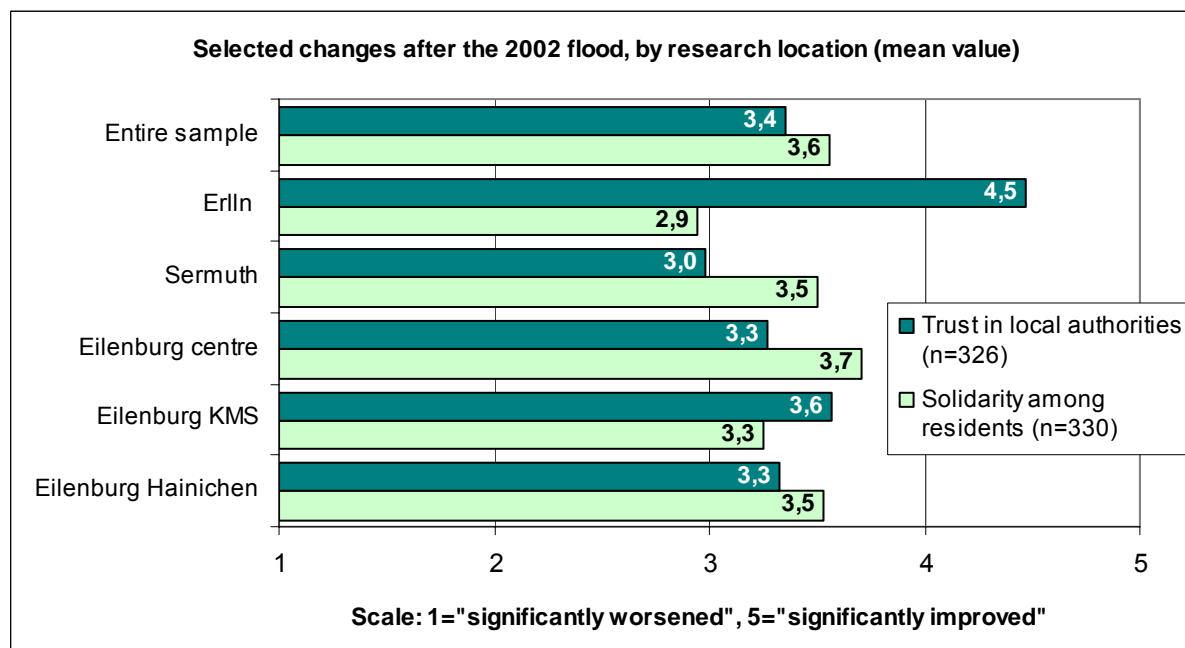


Fig. 5.31: Changes after the 2002 flood (2)



Source: FLOODsite survey 2005

## 5.5 Summary

Irregardless, for the most part, of all "classical" indicators (such as age or former flood experience, as stated in one of our hypotheses in the beginning of this section), the great majority of the residents of the Mulde floodplains was by no means prepared for the 2002 flood. This is confirmed both by their self-perception and the overwhelming impression from the data with regard to the low level of applying precautionary measures and the like. With the exception of insurance, there were only few indications of such activities in advance.

What is more, literally everybody was affected by the 2002 flood and experienced **material damages**. Although this result is partly due to the sample selection, it also mirrors the collective character of the event for most people living in the floodplains of the Mulde and Elbe Rivers. While there is almost no variance in the first instance (affected or not), the magnitude of damage differs highly. Not surprisingly, owner-occupiers suffered more than renters, in spite of having applied more pre-flood mitigation measures (thus verifying one of our hypotheses formulated above). However, we found no indicator explaining why neither precautionary measures nor ad-hoc activities significantly contributed to diminishing the monetary damage. We suggest that one reasonable explanation is to be found in the severity of the 2002 flood and its event characteristics: the stream had a very high velocity, in contrast with similar events in the past (Fig. 1.5) and, at least in the cases of Erlln and Sermuth, the water came suddenly without precise information or evacuation in the very early morning hours. Another idea—also representing a hypothesis for further in-depth research—is that the “normal” flood-experience, which constitutes the intersubjective “**horizon of collective experience**” of the residents, before the 2002 flood was defined, above all, by regularly and relatively-often-occurring minor floods (inundating allotments and basements). This circumstance has to be taken into account more thoroughly. The events of 1954 and 1974 represented this horizon before the 2002 flood but were **almost meaningless** with respect to damage reduction in 2002. But this hypothesis exceeds the possibilities of a standardised social-science approach. Nevertheless, this question will be more thoroughly approached in a non-standardised, qualitative research approached within a PhD thesis which is part of the final research phase of FLOODsite Task 11.

However, we did not restrict our **understanding of vulnerability** to material damages. Rather, we tried to draw a **comprehensive picture** of the event from its vague onset until the present. Particular emphasis was laid on the activation of and the reliance on **various social networks, both informal and formal ones**. We could show that during the anticipation phase informal networks were used for gathering further information (predominantly for people with exclusively local networks). By means of this, the endangered inhabitants tried to further substantiate the original information received. However, in this period of great situational uncertainty, formal networks proved to be more trustworthy than informal ones, thus falsifying our hypothesis with respect to the higher relevance of the latter. With the water being in the residents’ homes, the situation changed completely. Information about the possible future (the next hours, the next days), about institutionalised support, about whom to contact and so forth became crucial. While we could not verify the hypothesis that non-local networks were more appropriate in the immediate hazardous situation due to their presumably greater variety of information channels, we found some evidence for one extreme group: **those not receiving any information** during this phase. With respect to this kind of vulnerability, both the quantity and the geography of the **networks mattered**: People with no informal network at all as well as those with exclusively locally based ties were more endangered to having belonged to this group which was excluded from probably valuable information. What is more, receiving support in this phase of resistance and coping was also influenced by social networks. However, their role was rather ambiguous since both strong ties and specific networks (members of local associations, fire brigade) enabled the activation of more support.

“After” the flood (which, in the perception of most respondents, was still “during” the flood), support became even more crucial. This is the situation when the social networks and, in particular, the strong ties are most significant in a variety of dimensions, irregardless of network size and quality. Again, we had a closer look at respondents receiving no help by their networks in the reconstruction and recovery period and found that people with non-regionally based networks were more inclined to be without support. Moreover, kin-based and mixed networks turned out to be more reliable in this situation than close friends and homogeneous networks, respectively.

As for the “**strength**” or “**weakness**” of strong ties—on which our investigation was focused—we found evidence for both, just like for the **strength and weakness of local** in contrast with non-local ties. Even people with a very small number of friends and kin, respectively, usually received support both during and in the recovery and reconstruction phase, be it by weak informal ties or by formal networks. This is good news with respect to social vulnerability indicating that hypothetically “deficient” informal networks can be successfully complemented by other helping hands.

Finally, there was evidence that the people in the floodplains tried to use the **“window of opportunity”** offered to them in the reconstruction phase. They applied precautionary measures to a significantly higher degree than before, mainly when living in their own property, thus verifying one of the hypotheses formulated above. They also confirmed that their flood awareness increased, although we also want to stress that there is no simple cause-consequence relation between damages and traumatic flood experience, awareness and, in particular, preparedness.

The subjective and intersubjective framing of this “window of opportunity” is also dealt with in the next chapter when we have a closer look at risk constructions in the aftermath of the 2002 flood, though with clear references to precisely this event.

## 6. Risk constructions

### 6.1 Conceptual approach and main hypotheses

The term “**risk construction**” chosen in the title of this section highlights our understanding of risk. Risk is neither objectively given nor predetermined by social structures such as income, age, class etc., nor is it simply a matter of individual cognitive operations. Risk is socially constructed in the sense that norms and values as well as belief systems influence and possibly define it. Therefore, the *modi* of risk construction have to be taken into account. We draw upon the work of Berger and Luckmann (1967) and focus on the institutionalised ways for how risk is dealt with in a society. Institutions are evolving when different actors are confronted with a recurring problem (such as a flood), which is solved more or less routinely (in more detail to all these points: Chapter 1.2.3).

Understanding the construction of risk in the outlined manner allows us to take into account rather subjective definitions of risk but also to focus on the institutionalised “perception” of risk. This seems for us a fruitful design for approaching cross-cultural comparison (which will be the next step of analysis) in order to not remain on the level of superficial results and not to apply too rigid interpretations of social structures.

More precisely, this chapter has four aims: Firstly, it investigates how people perceive the risk of being flooded; secondly, how this perception changed through the 2002 flood event, and thirdly, how people perceive the usefulness of, as well as the responsibility for, different protection and precautionary measures. Finally, the question of responsibility with respect to the 2002 flood will be discussed.

One of the main topics of this section therefore is, how **risk perception influences the application of private precautionary measures**. The connections between individual risk perception and mitigation efforts are scrutinised rather seldom. If such studies are pursued, it is mostly hypothesized that there is a relation between risk perception and the application of precautionary actions. “The lack of action is correlated with a low level of perceived risk” (Sjöberg 1999, 129). However, Sjöberg was able to show that the motivation for applying precautionary measures is more complex. He divides risk into the dimensions of probability and consequence. Based on his own empirical investigations, he comes to the conclusion that risk reducing actions, such as precautionary measures, are largely driven by the severity of consequences and not the probability of the event (*ibid.*). We will therefore also differentiate between the **probability** of an event and its **consequences**. However, we did not ask people for a numerical probability (e.g. “How likely do you think is the recurrence of an event like the 2002 flood in the next 25 years?”) since it is not clear how to interpret the answers of such a question (they cannot be “right” or “wrong”). We rather wanted to know whether the respondents could imagine that a recurrence of such an event in the respective area is likely at all. The consequences were acquired by asking people to what extent their municipality, their home and their personal life, respectively, are threatened by a flood.

Based on what has worked previously, further aspects related to the perception of risk are scrutinized in this chapter, too. Grothman and Reusswig, for example, develop a socio-psychological model that is based on Protection Motivation Theory (PMT) to investigate the application of private precautionary measures. They included such different variables as “previous flood experience, risk of future floods, reliability of public flood protection, the efficacy and costs of self-protective behaviour, their perceived ability to perform these actions, and non-protective responses like wishful-thinking” (Grothmann and Reusswig 2006, 101). The empirical testing of their model indicates that the individual application of precautionary measures is again far more complex than Sjöberg’s approach suggests. Although this aspect cannot be dealt with in satisfying depth, we also include further dimensions—that is the **perceived usefulness** of, the **responsibility for** as well as the **degree of information about different measures** that contribute to the mitigation of flood impact.

- **Usefulness:** Generally it is agreed upon in the literature that private precautionary measures are an important means of reducing the vulnerability of communities and people (Chapter 5). In this sec-

tion, we will focus on how people perceive the usefulness and efficacy of different “traditional” protection measures, such as dikes, but also private precautionary measures.

- **Responsibility:** In most industrialised societies the handling of risks is institutionalized and professionalized. This also holds true for so-called natural hazards. Be it civil or technical flood protections, in both cases state-run organisations are responsible for protecting, warning, evacuating, and sheltering people, at least this is their official assignment. Along the Elbe, at least since the *Elbstrom- Ufer- und Dammordnung* from 1819, local communities are no longer solely held responsible for these concerns, but more and more the regional and national organisations are (Poliwoda 2007). The same holds true for the Mulde. Although technical measures were and are still intended to both protect people in floodplains and make or keep the rivers navigable, they inevitably led to an increased damage potential. In Germany it was no earlier than in 1995 when this relationship between intention (protection and control) and unintended side-effects (reduced awareness and increased damage potential) was officially acknowledged by the Federal Working Group Water (*Länderarbeitsgemeinschaft Wasser*; LAWA 1995). In this statement, the committee underlines the limits and failures of technical protection measures and demands for a change in flood control: Organisations should put stronger emphasis on non-structural measures. But also the citizens should assume more responsibility with respect to mitigation measures (such as insurance, constructing safer buildings and so on). This paradigm shift was on the national scale supported and accelerated by the heavy and costly flooding of the Rhine in 1993 and 1995, 1997 Odra and the 2002 Elbe floods. As a result, several amendments in the legal sphere both at the level of the *Bund* (Federation) and the federal states (e.g. Saxony) became effective (as outlined in Chapter 5.2.1). In these regulations, one major novelty has to be emphasised: From now on every citizen in these regions is obliged to implement mitigation measures in accordance with his possibilities and abilities (see below, Chapter 6.3). This approach is in line with the much cited “paradigm shift” from flood protection to flood risk management (Brown and Damery 2002; Tapsell *et al.* 2005; Messner and Meyer 2006; Schanze 2006; for a critical review: Kuhlicke and Steinführer 2006). However, empirical investigations show that people are rather reluctant to accept responsibility for individual mitigation efforts (Felgentreff 2000; Felgentreff 2003; Kreibich *et al.* 2005).

To better understand this empirical evidence, we regard this paradigm shift as an “**individualisation of risk**” (which, by the way, is in line with similar tendencies in many societal sectors), pointing towards a change in the general societal system of relevancy, since flood protection is no longer seen simply as a public but also as an individual duty. With this step, however, questions of responsibility as well as elucidation have to be more thoroughly taken into account. Against this background **the flow of information** is important. In our opinion it is not sufficient to simply adopt a new law without informing people, firstly, of the existence of such a law, and, secondly, about its intention as well as its implications. We expect therefore a gap of knowledge between scientific and planning discourses, on the one hand, and the real world, on the other.

For the empirical analysis, the following **hypotheses** were developed in advance:

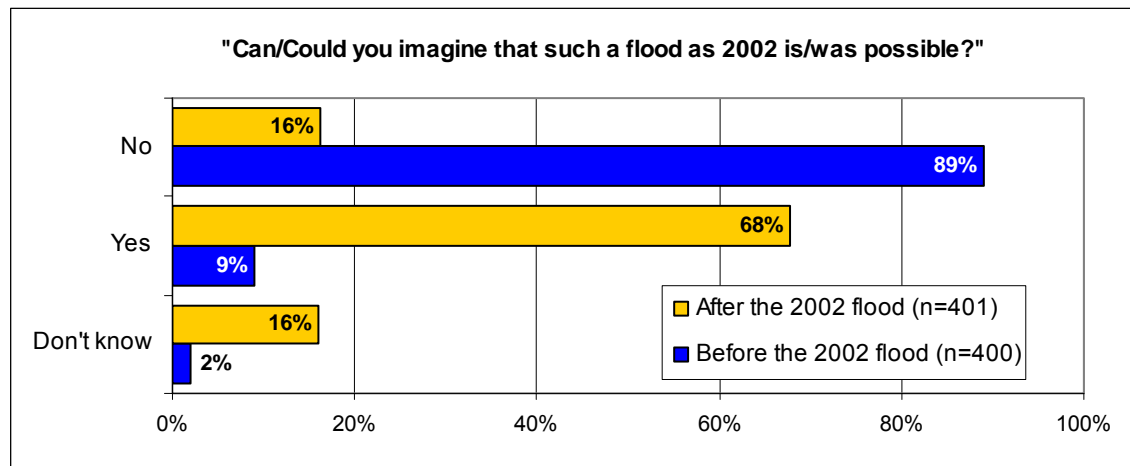
- **Risk perception and precautionary measures:**
  - If people perceive another flood like that of 2002 as likely, they are more inclined to apply precautionary measures.
  - The more people perceive their household as threatened by another flood, the more likely they are to apply precautionary measures.
- **Usefulness, responsibility and information:**
  - People who regard private precautionary measures as useful apply more precautionary measures.
  - People who feel better informed about precautionary measures apply more precautionary measures after the flood than people who feel less informed:



## 6.2 Risk perception before and after the 2002 flood

Almost 90% of the respondents could not imagine that a flood like the one in 2002 could threaten them. This proportion changed drastically after the flood. The majority of people, namely almost 70%, now can indeed imagine that such a “bad” or an even “worse” event could occur again in the respective area (Fig. 6.1). This result also helps to more adequately interpret the risen “flood awareness” (Fig. 5.30) since it becomes obvious that neither in the **collective “spaces of experience”** (*Erfahrungsraum*) **nor in the “horizons of expectations”** (*Erwartungshorizont*; for these concepts cf. Koselleck 1989) of the predominant majority of the respondents, such a severe flood did not exist and was not imaginable before it actually happened.

Fig. 6.1: Perception of flood risk before and after the 2002 flood



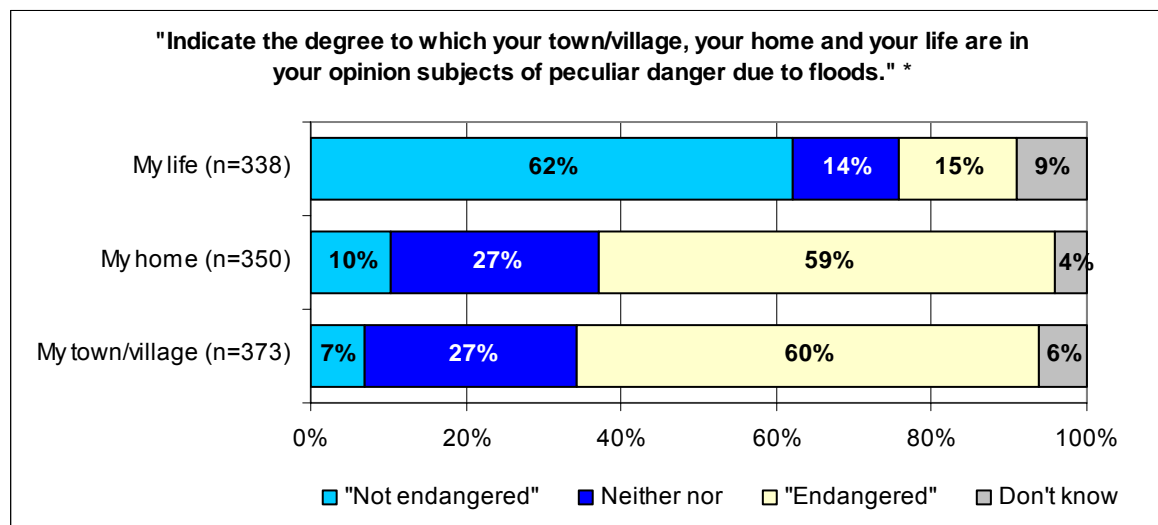
Source: FLOODsite survey 2005

While the imagination before the flood is not significantly influenced by any of the independent variables, the judgement about the recurrence of a similar or a even worse flood is above all a question of **age**: People who can imagine that such an event might happen again are on average 54 years old, while the opposite group is aged 64 ( $p < 0.001$ ; T-test). For elderly persons the probability of a reoccurrence is rated lower, possibly because the question is not understood as an abstract experiment. They rather seem to directly connect the question to the available lifespan they attribute to themselves (“during my lifetime”).

However, if one focuses on the consequences of the flood and considers the threat appraisal with respect to different **spatial scales** (municipality, residential home, personal life), it turns out that the home as well as the municipality are regarded as the most endangered units. On a scale from 1 (“not endangered at all”) to 5 (“very endangered”), the mean is 3.9 for both the entire community and the resident’s home. Also the frequency distribution of the single categories is quite similar in these two cases (Fig. 6.2). As for loss of life, this option is only exceptionally considered probable. Rather, the respondents draw a clear dividing line between their home and their personal life which is only to a very limited degree seen as being endangered (mean value: 2.2 on the 1–5 scale).

Although not knowing anything about respondents’ perceptions before the **2002 flood**, one can interpret the findings presented in Fig. 6.2 as **influenced by this disastrous event**: Almost everybody in the sample was directly affected by the 2002 flood (Chapter 5.3.1). Hence the respondents live in the most endangered parts of their respective localities thus making the differences between their own house and the village or urban district negligible. Furthermore, in the area of the Vereinigte Mulde nobody lost his life in the course of the 2002 flood.

Fig. 6.2: Perception of flood hazard



\* Original scale (1–5) merged to 3 categories

Source: FLOODsite survey 2005

The variance with respect to the perceived threat to the entire municipality cannot be explained by any of the tested variables. As for the **threat to the individual's life**, only the level of **formal qualification** is figured out as relevant: The higher the degree of formal qualification, the less people feel that their life is threatened by a next possible flood (not significant). With regard to the perception of the threat to the resident's house the different **locations** play an important role. People in Hainichen feel most, residents of the city centre of Eilenburg least threatened with respect to their homes. A possible explanation at first sight is the difference with regard to **tenure**: Owner-occupiers feel significantly more threatened with respect to their home than renters ( $p < 0.01$ ; T-test). Similarly, the variance between urban and (quasi-)rural areas is highly significant ( $p < 0.001$ ). Additionally, people feel less endangered in areas threatened by a slow onset flood ( $p < 0.05$ ), which may be explained by the circumstance that people prone to slower rising water levels feel more able to influence the impact of the flood by ad-hoc activities.

Our hypothesis that **risk perception influences the application of precautionary measures** could be verified to the extent that respondents who perceive the recurrence of an event like the 2002 flood as likely applied more precautionary measures after the 2002 flood than those who do not evaluate the recurrence as likely ( $p < 0.05$ , 2-sided;  $p < 0.01$ , 1-sided; Fisher's Exact test). However, the **perception of the threat** obviously does **not influence the application of precautionary measures**; on the contrary, people who perceive the building where they live as very threatened applied less precautionary measures after the flood than those that feel less threatened. This result is quite surprising, since in the literature usually a connection is made between mitigation activities and the perceived severity of an event and not the probability: "It is concluded that demand on risk reduction is driven by the severity of the consequences, not probability of harm, or risk" (Sjöberg 1999, 129). At this stage of the analysis, no satisfying answer can be offered in this matter. However, the clear correlation stated is questioned by our empirical evidence.

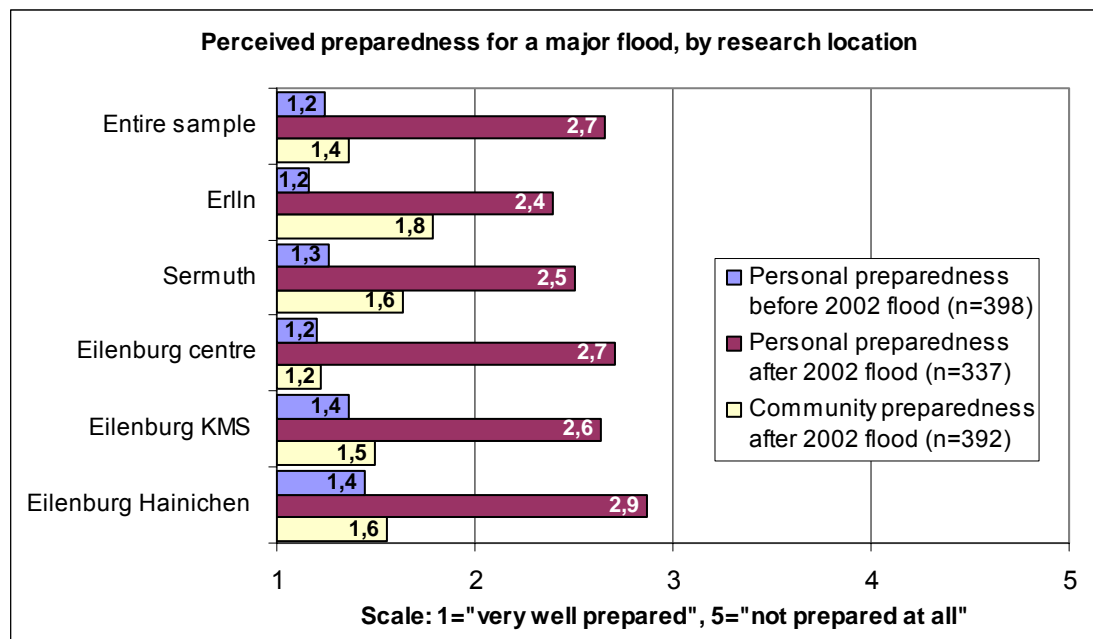
### 6.3 Private and public mitigation measures

One of the major empirical findings of Chapter 5.2.2 was that among the respondents almost nobody retrospectively regarded himself as prepared for a disastrous event like the 2002 flood. Although the proportion of people "being prepared" (in their own perception) has significantly improved (from 3% to 20%; mean value on a 5-point scale 1.2 versus 2.4), 40% of our respondents do not feel prepared for a possible new flood (Fig. 6.3). Moreover, as a general pattern it turns out that in all research locations

the respondents perceive the collective level of preparedness of the local community as much lower than their own one. It is striking that this perceived community preparedness does not differ from the ex-post stated level of pre-event preparedness, while a convincing explanation of this finding is rather difficult to find. Neither do we exactly know what the respondents understood as “community preparedness”. However, this critical observation by the residents at risk needs to be taken seriously.

This is important background information when discussing the application, perceived usefulness of and information about private and public mitigation measures in this section.

*Fig. 6.3: Personal and community preparedness for a major flood*



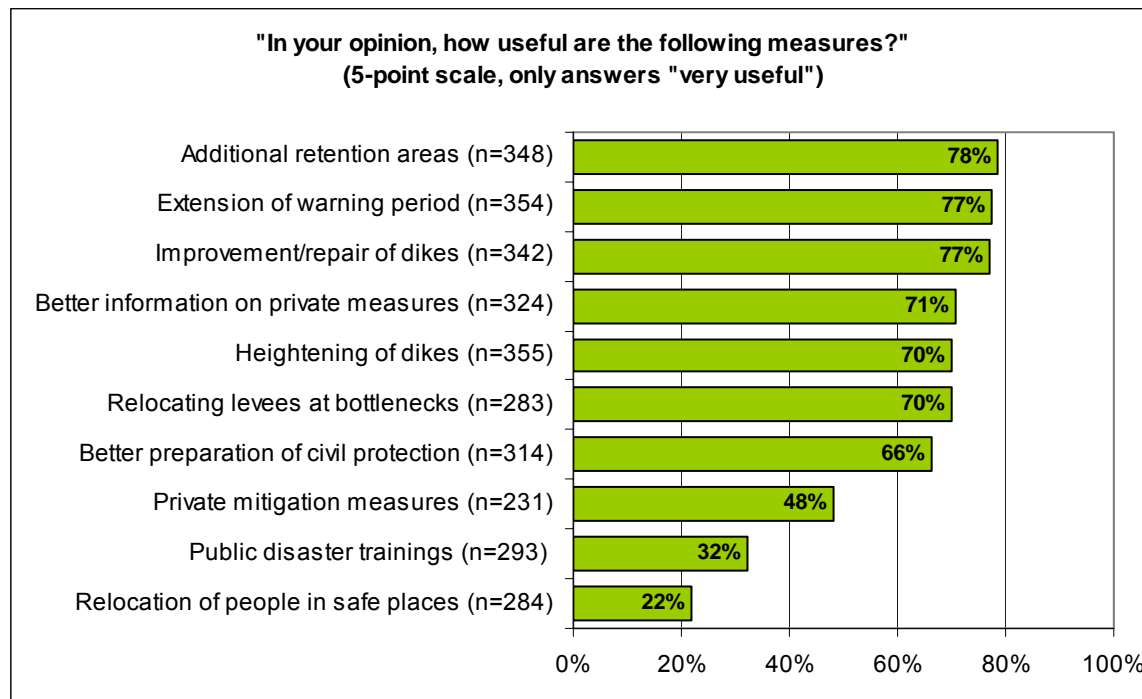
Source: FLOODsite survey 2005

In traditional approaches of flood protection, but even more so in flood risk management, it is agreed upon that mitigation of the impact of floods requires not only one measure (e.g. dikes) but rather the interplay of many different measures, some of which are planned, built and maintained by public authorities, while others are conducted and implemented by private households. In the following, we want to investigate how people perceive the usefulness of and responsibility for different protection and mitigation measures. To start with, in the questionnaire we introduced a list of different measures to people and asked them to indicate the degree to which they thought these measures were useful or not. From Fig. 6.4 it becomes apparent, that most proposed measures were rated as very useful, irrespective of their “structural” or “non-structural” character (for a detailed discussion of this distinction: Olfert and Schanze, 2007). However, it is also striking that **measures based on individual actions** (like private mitigation measures and public disaster drills)<sup>24</sup>, are rated as least useful. We interpret this as a first sign for our hypothesis that the people at risk not necessarily share the responsibility the new paradigm of flood risk management attributes to them.

<sup>24</sup> The low rank of “public disaster trainings” was one of the surprises of our survey. This is due to the fact that one of the public myths with respect to the 2002 flood is that before the German reunification people in eastern Germany were much more used to holding public disaster drills and, therefore, better prepared for a disastrous event. According to this story, this knowledge has vanished in the course of the 1990s, because such drills no longer took place. However, our findings indicate that the residents in the flood-affected areas are not convinced of the necessity and usefulness of such measure. Rather, it is regarded as not very useful (same distribution when considering mean values rather than the only extreme category “very useful”, as in Fig. 6.4).

The fact that **relocation** of people and entire communities received the last position (Fig. 6.4) is less surprising given the fact that in the area around Leipzig (where the research locations are situated) many villages were forcibly relocated in the past century due to mining activities. Therefore, the word “relocation” carries not only very negative connotations but is also part of real life for many of the inhabitants in this region.

*Fig. 6.4: Usefulness of different measures*



Source: FLOODsite survey 2005

Yet, the high ranks of an “extension of the warning period” and “additional retention areas” are to a certain extent surprising. Other studies (Felgentreff 2000 and 2003; Plapp 2004) indicate that structural measures for reducing the flood problem are usually rated as most useful. Felgentreff’s study about the Odra flood of 1997, for example, revealed that almost 60% of the respondents suggested that “dike construction and maintenance” is the best strategy for improving flood protection and mitigation. However, Felgentreff asked the question openly; thus the respondents had to answer it without referring to predefined categories (as in our case). But in a later stage of the questionnaire a list of different measures was introduced to the respondents. Again, a strong “approval of physical flood control by way of structural means can be observed” (Felgentreff 2003, 173).

Against the background of these findings, the two answers assessed highest in our survey are remarkable. However, the general approval to “extend the warning period” has to be read as a strong criticism of the public warning and evacuation procedure before the 2002 flood. But also the superior rank of “additional retention areas” is not in line with most other studies conducted in the German context and could be read as a signal that no longer solely technical protection measures are preferred. However, we are more inclined to another interpretation: that is that the people at risk in the Mulde floodplains **do not distinguish between the different types of measures** as “flood experts” (be it managers or scientists) usually do. This is substantiated by the fact that among the measures regarded as most useful (Fig. 6.4) also **all technical (“traditional”) flood protection measures** are included. Rather, the respondents draw a clear line between “public and private” measures, and therefore of personal and public responsibilities, as we will see in later parts of this section.

A closer look at socio-economic variables reveals that particularly **elderly people** evaluate all the different categories as “very useful” (except the three answers which are ranked the lowest). This is also supported by the finding that retired persons rated all answers (again except those ranked as least useful) significantly more often as “very useful” than people that are still economically active or not employed for several reasons.

For our scientific objective, differences between the perception of the usefulness of **traditional protection measures**, such as improving or heightening dikes, on the one hand and **private mitigation measures**, on the other, are of interest.

First of all, there is a high degree of unanimity with respect to the repair of dikes. Irrespective of their social background, people regard this measure as highly useful. Secondly, **formal education** matters with respect to dike heightening. People with a high formal education define this activity as less useful, while the opposite group is much more convinced of their relevance for flood protection (but only weak correlation: Spearman’s Rho -0.22;  $p < 0.001$ ).

As for private mitigation measures, the picture is different. They are regarded as “useful”, which, however, in comparison with most other measures means that they are not understood as “very useful”. People seem to have their doubts about the actual relevance of private measures. Most critical towards such measures are people with a high level of formal education, qualified workers and white-collar employees with a higher position (partly overlapping). Hence the emerging picture is ambiguous, there is no linear relation between socio-economic status and the meaning attributed to private mitigation measures, as might have been expected. Tenure does not matter, both renters and owner-occupiers regard private mitigation measures in their majority as “useful” but not “very useful”.

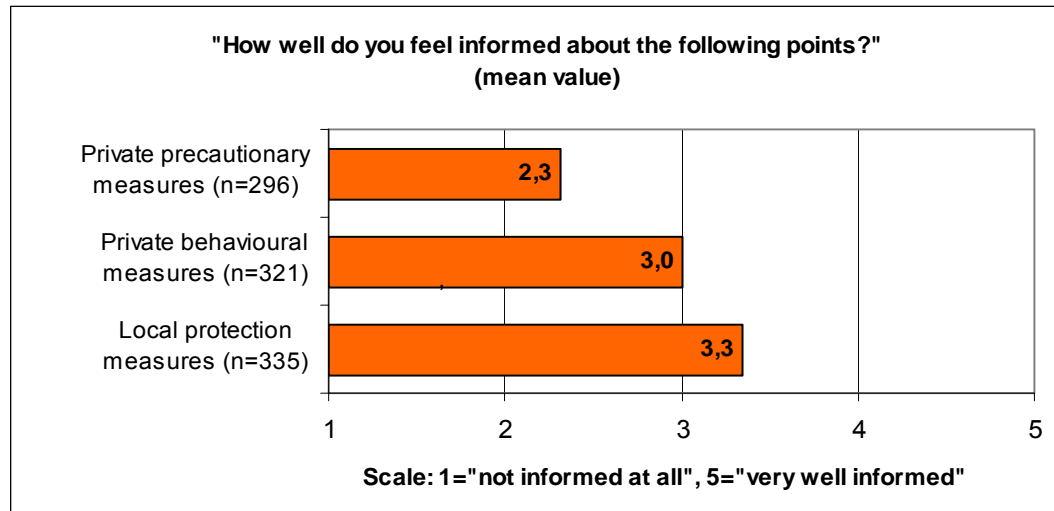
Another hint about people’s attitudes towards private mitigating measures offers the answer concerning gathering more **information about private mitigation measures**. In the ranking discussed above, this issue has been classified as relatively important (Fig. 6.4). Surprisingly, **renters** rank this activity significantly higher than people who live in their own home ( $p < 0.01$ ; T-test). **Formal education** has a negative influence on the respective position. This might be interpreted in two ways: On the one hand, people with a high formal education (and also a high position in the labour market) might consider improvement of the information about private mitigation measures as less useful, because they already have such information at their disposal. On the other hand, they might be critical in what they think about the general sense of such measures. The latter attitude can be justified by the prevalent experience in the 2002 flood, as precautionary measures did not lead to decreasing damages (Chapter 5.3.1). This argument is further supported by the finding outlined in the section above: people with a high formal education are also most critical with regard to private mitigation measures. Nevertheless, in the next section also empirical findings are outlined supporting the first hypothesis that people with a high formal education have more information at their disposal.

The question, how well people feel informed about technical protection measures as well as individual measures was intended to find information deficits among the local population. The results support previous findings, since when comparing the **information flow** with regard to public (traditional) protection measures and private activities, a clear distinction needs to be made (Fig. 6.5). Traditional measures at local level are relatively well known. This can be supported by our observation: The regional press regularly reports on progress in the reconstruction and/or new construction of dikes and protective walls in the single communities. Additionally, the day before the survey began, in Erlln a public hearing had taken place, where the engineers responsible and the dam organisation in charge (*Talsperrenverwaltung*) reported on new dike constructions around the village which are currently being built. This might also explain another—at first glance surprising—result from the survey: We asked the respondents whether they are aware of any flood protection measure in their location. In Erlln, the level of awareness is lowest (63% versus between 75% in Hainichen and 91% in Sermuth and Eilenburg KMS). But those people in Erlln who answered the question positively, usually referred to the “old” or “present” dike implying thereby that a new one is about to come in the near future.

Fig. 6.5 also reveals that while the level of information about behavioural measures (e.g. having important phone numbers at hand) is regarded as neither good nor bad, people are rather critical concern-

ing their knowledge of private precautionary measures (e.g. with respect to buildings and furniture; see typology above, Fig. 5.1).

Fig. 6.5: Information about public and private measures



Source: FLOODsite survey 2005

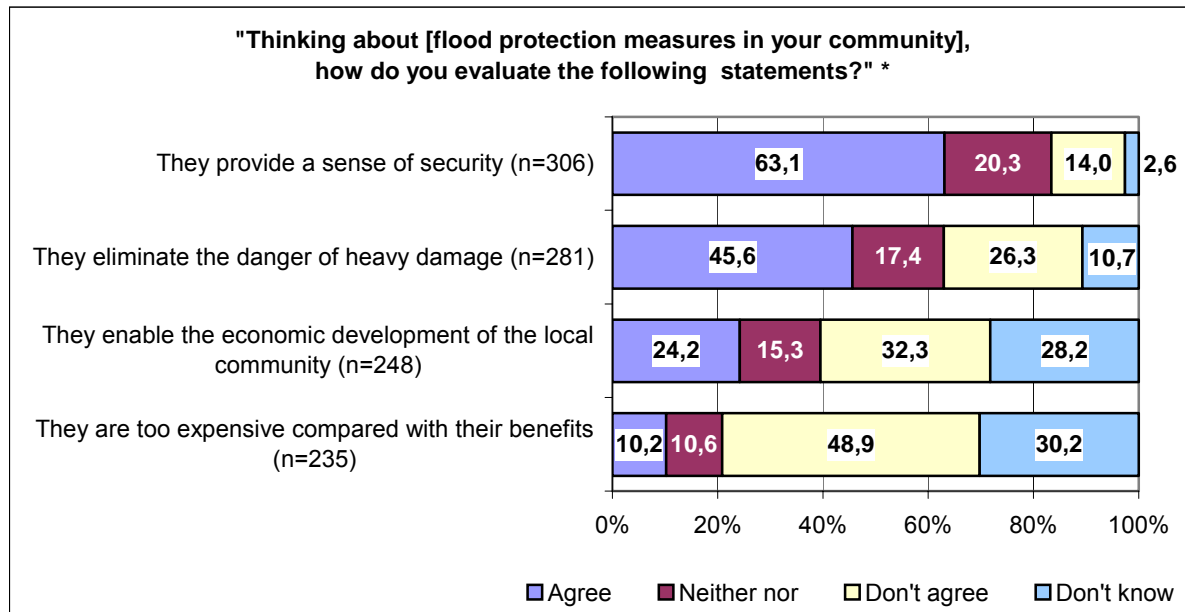
In this context it is important to point out that those people **feeling better prepared** for a possible next flood also **feel better informed** (though only weak correlation; Pearson's  $r$  0.14;  $p < 0.05$ ). However, cause and effect of this correlation are not clear. More important, the degree of information does **not account** for any variance in the **application of precautionary measures**. The same is true for the perception of the usefulness of different private and public measures: The answers revealed no significant difference.

Nevertheless, with regard to the degree of information about personal mitigation measures some remarkable tendencies have to be recorded: **Gender, tenure, age and formal education** matter. Men, owner-occupiers and people with medium and high education feel significantly better informed about private precautionary measures than women, renters and people with low qualification (at least  $p < 0.01$ ; T-test). This finding supports our hypothesis that people with a higher education feel better informed than those with a lower education. Additionally, both retired persons and people with low incomes feel less informed than people economically active and with high incomes ( $p < 0.5$ ; T-test; partly small sub-sample size).

These findings already give a first hint towards a possible critical future development connected to the new flood protection law (as outlined above), since particularly **the well educated and rather wealthy elites** are informed about the possibility of applying precautionary measures, while other groups are falling behind. Below we will focus more on this issue.

A similar picture emerges when considering **attitudes towards public protection measures**. First of all, there is a high degree of unanimity in favour of the sense of security and damage reduction these structural devices provide (Fig. 6.6). But, secondly, uncertainty is high specifically with regard to the actual efficiency of these measures: 30% don't feel able to judge whether the costs for their construction and maintenance are justified or not compared with the benefits. However, almost every second respondent refuses the statement that dikes and the like are too expensive. Finally, a closer look at certain social groups reveals that in particular **formal qualification** and **age** are crucial for interpreting these assessments: The better educated and the younger are much more sceptical with regard to the actual capabilities of public protection measures than people with lower degrees of formal education and, partly overlapping with the first group, the elderly.

Fig. 6.6: Attitudes towards public protection measures



\* Original scale (1–5) merged to 3 categories

Source: FLOODsite survey 2005

In the next section, we want to better understand the motivations which exceed risk perception, in the narrow sense, for applying precautionary measures. To find out what people think about the meaningfulness and usefulness of private precautionary measures as increasingly demanded for by Flood Risk Management approaches, we did not ask them directly but formulated a question about the **new Saxon Water Law** in the following phrasing: “The new Water Law of Saxony will include the phrase: ‘Everybody who is prone to flood hazards is obliged to implement mitigation measures in accordance with his possibilities and abilities’. Do you think that this law is reasonable?” The reason for doing so was threefold: Firstly, pre-survey interviews and the pilot phase of the questionnaire survey showed that many people living in floodplains were not aware of the existence of the law. Secondly, it seemed more promising to ask a question which is directly linked to the real lives of the people in the sense that the law addresses the respondents directly instead of asking an abstract thought experiment. Thirdly, most people do not know the very concept of private precautionary measures, as many interviews and the pre-test showed. This, by the way, is already a remarkable result in our opinion.

The **majority** of people (40%) regard **this law as not reasonable**, 27% think the opposite, and 32% could not answer the question (n=371). These figures are a further hint indicating that the often claimed necessity of private precautionary measures is not accepted without restrictions by the population at risk. There are no significant differences among the tested socio-economic variables, except that **owner-occupiers** are more inclined to evaluate the new law as not reasonable than renters ( $p < 0.01$ ; Chi-square test). Hence, those potentially more forced to implement and finance such measures are also most critical about the new law.

However, it seems important to point out that people who think this law is reasonable and thus—more or less—agree with the demand to mitigate damages by private precautionary measures, significantly more often **applied such measures** (Tab. 6.1).



*Table 6.1: "Do you think that [the new Saxon Water Law] is reasonable?" (by application of precautionary measures; n=238)*

|                                   | Applied precautionary measures | Applied no precautionary measures |
|-----------------------------------|--------------------------------|-----------------------------------|
| <b>New law useful (n=99)</b>      | 54%                            | 46%                               |
| <b>New law not useful (n=139)</b> | 35%                            | 65%                               |

(p<0.01; Chi-square test)

Source: FLOODsite survey 2005

A closer look at the **reasons** for the answers (open question) indicates a quite diverse picture about people's judgements concerning the usefulness of the newly introduced law (Table 6.2).

*Table 6.2: Comments on Saxon Water Law (n=372; multiple answers possible, categorised ex post)*

| <b>"Please explain why you think the new Saxon 'Water Law' is, or is not, reasonable."</b> |    |
|--|----|
| <b>(a) No, not reasonable (n=152; answers=168)</b>   |    |
| The single citizen is unable to do anything  | 27 |
| Don't know what to do  | 18 |
| Flood protection is a public duty  | 17 |
| Definition is imprecise (disadvantages for the citizen)                                    | 17 |
| Is a matter of course/ the duty of every citizen   | 13 |
| Too expensive for many citizens  | 9  |
| Natural events are not predictable/avoidable   | 7  |
| Problems/guilt are/is to be found elsewhere  | 6  |
| As a consequence people must move away/population will decline                             | 3  |
| Unreasonable demand  | 2  |
| ..., but new constructions should be prohibited  | 2  |
| Others   | 5  |
| No reason mentioned  | 42 |
| <b>(b) Yes, reasonable (n=103; answers=108)</b>  |    |
| Some things you can do by yourself (sand bags, furniture, securing property)               | 19 |
| It is the responsibility/in the interest of the citizen                                    | 16 |
| Insurances are important   | 7  |
| Everyone should contribute   | 6  |
| If you live in a floodplain, you should be aware of it                                     | 3  |
| During the reconstruction you should apply precautionary measures                          | 2  |
| In this area construction should be prohibited   | 2  |
| ..., but better warnings are necessary   | 7  |
| ..., but better information about precautionary measures are necessary                     | 2  |
| ..., but what does "in accordance with his abilities" mean?                                | 1  |



| <b>"Please explain why you think the new Saxon 'Water Law' is, or is not, reasonable."</b> |    |
|--|----|
| ..., but elderly and handicapped people should be excluded                                 | 1  |
| ..., but the endangered area should be displayed more precisely                            | 1  |
| ..., but how to control the law?   | 1  |
| Others   | 11 |
| No reason mentioned  | 29 |
| <b>(c) "Don't know" (n=121; answers=123)</b>   |    |
| Definition is imprecise (disadvantages for the citizen)                                    | 9  |
| The single citizen is unable to do anything  | 5  |
| Is a matter of course/ the duty of every citizen   | 3  |
| Problems/guilt is to be found elsewhere  | 3  |
| State displayed building land  | 2  |
| Natural events are not predictable/avoidable   | 1  |
| Warning in time more important   | 1  |
| Don't know what to do  | 1  |
| Information more important   | 1  |
| No reason mentioned  | 97 |
| <b>No answer (n=32)</b>  |    |

Source: FLOODsite survey 2005

In order to get a more nuanced picture, we further compiled the answers in the following three categories, regardless of whether the respondents agreed with the law or not. Also the reasons for answering "don't know" were considered:

- Answers pointing to an **excessive demand (overload) of the individual**, either because of missing information, knowledge or resources (such as "don't know what to do", "cannot do anything", "natural events are not predictable/avoidable", "too expensive", "people must move away", "problems/guilt are/is to be found elsewhere", and "unreasonable demand");
- Answers taking such an approach as a matter of course, hence regarding flood protection **not exclusively, but also as a private task** (mainly "is a matter of course/the duty of every citizen", "it is the responsibility/ in the interest of the citizen", "insurance is important", "everyone should contribute", "if you live in a floodplain, you should be aware of it", as well as "during the reconstruction you should apply precautionary measures"),
- Answers underlining that flood protection is understood not as duty of the individual but rather as a **public responsibility** (e.g. "flood protection is a public duty", "warning is more important", or "information is more important").

This typology follows the hypothesis of an "**individualisation of risk**" which was introduced at the beginning of this chapter. In this view flood protection is no longer a public duty, but in some parts increasingly to be regarded as a task for the individual. Therefore we developed a typology trying to categorise the answers with regard to this individualisation of risk.

Table 6.3 shows that the majority understands the new flood management requirements as something going beyond the individual's responsibility. The detailed answers point to the problems that some people are either not financially in the required position, that they do not know what to do or do not see any possibility to mitigate the impact of a flood. 11% of the respondents answering this question explicitly regard flood protection as a public duty, while 35% find it self-evident that people living in floodplains have to contribute to flood protection.

Table 6.3: Opinions about new Saxon Water Law (by answer categories; n=133)

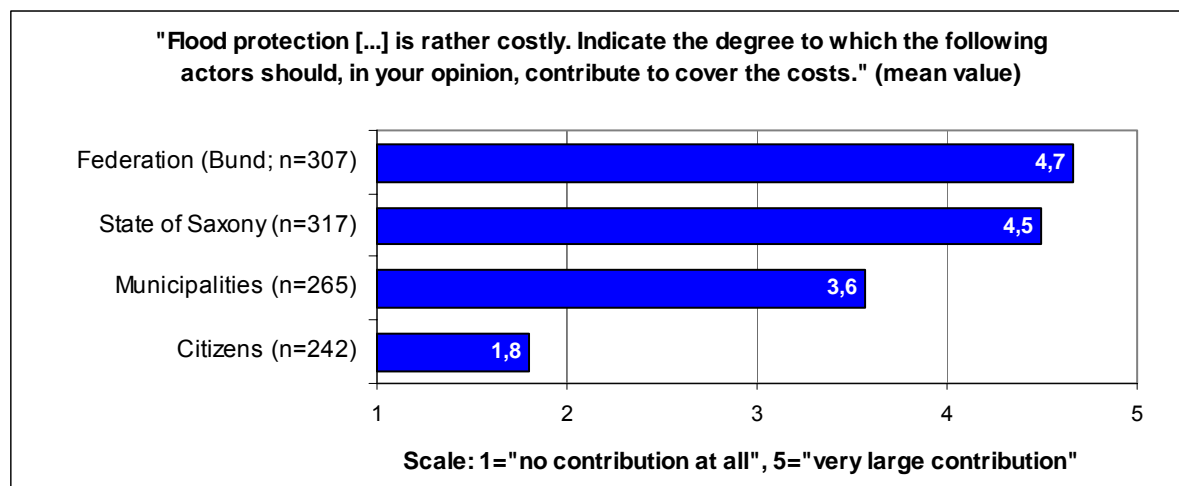
|  | New law reasonable<br>(n=34) | New law not reasonable<br>(n=87) | Don't know<br>(n=12) | All<br>(n=133) |
|--|------------------------------|----------------------------------|----------------------|----------------|
| <b>Flood protection: excessive demand (overload) of citizens</b> | –                            | 71%                              | 83%                  | 54%            |
| <b>Flood protection: also citizens' task</b>                     | 100%                         | 14%                              | 8%                   | 35%            |
| <b>Flood protection: public responsibility</b>                   | –                            | 15%                              | 8%                   | 11%            |

Source: FLOODsite survey 2005

These findings are supported by Fig. 6.7, which presents a rather expectable result: most respondents see the **financial burden of flood protection measures** to be carried by public authorities, in the first instance by state organisations. The further “away”, the higher the contribution should be. However, the respective numbers of valid cases (n) also indicate that there is **considerable uncertainty** about these issues in the population.

The answers did not reveal any significant differences with regard to the application of precautionary measures. Out of the tested socio-economic variables, only **tenure** needs to be mentioned: Owner-occupiers ascribe a significantly lower financial contribution to the citizens in flood-prone areas than renters ( $p < 0.01$ ; T-test).

Fig. 6.7: Cost distribution for flood protection in the residents' perception



Source: FLOODsite survey 2005

#### 6.4 Causes of the 2002 flood and individual classifications of risk

In this section, we want to discuss reflections of the affected residents about the flood causes, their own behaviour and the personal significance of floods in general.

The question about the causes of the flood is above all to be viewed in the light of processes of **ex-post rationalisations**. An event like the 2002 flood challenges existing stocks of knowledge and established causal explanations. Therefore people tend to develop certain strategies which allow them, on the one hand, to further live in and with their specific environment and, on the other, to return to their daily routines after a while.

As a first rapprochement to the topic, we asked whether the respondents think that any **mistakes were made** in the context of the 2002 flood. It is not surprising that the majority (64%) answered the question positively (n=381). However, even more remarkable is the relatively high proportion of respondents who did not know how to answer (34%) pointing towards the difficulty of establishing clear causalities that may have resulted in the 2002 disaster.

Asked openly to name the main mistakes, respondents predominantly referred to **disaster management** during the crisis (Table 6.4). Most criticism relates to information, warning and organisational issues, only few people take broader issues (dike maintenance beforehand, river regulation or soil sealing) into account. However, the high degree of satisfaction with post-disaster management (including compensation) is also mirrored by the answers, since almost no criticism is formulated in this regard.

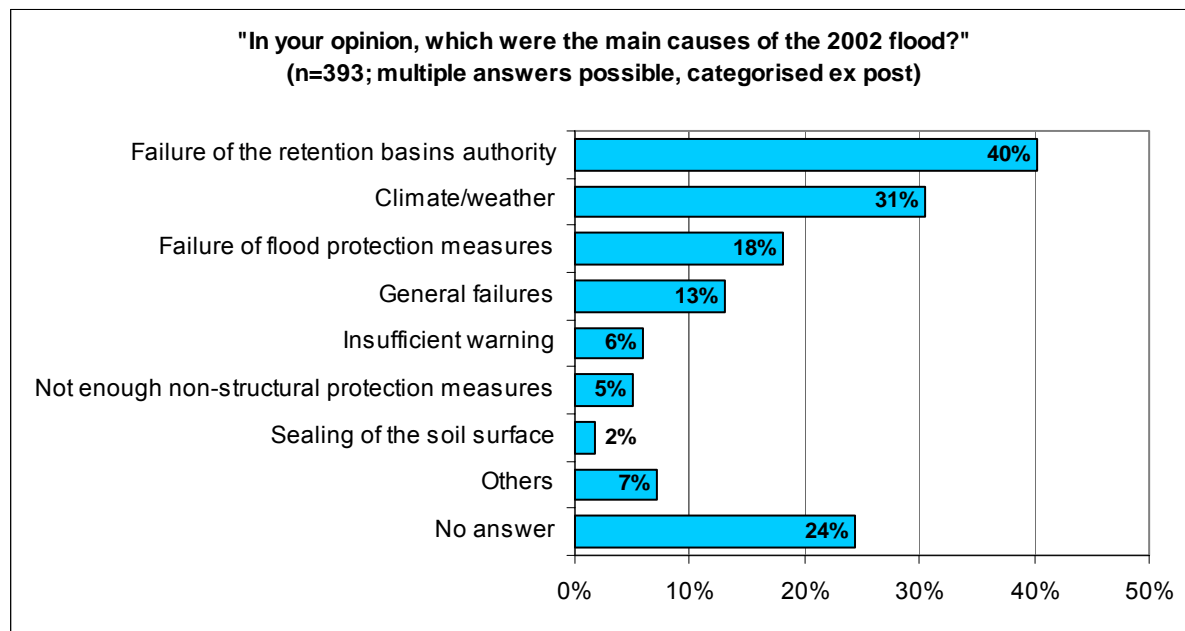
Table 6.4: “Do you think there were any mistakes made in connection with the 2002 flood? If yes: which ones?” (n=332; multiple answers possible, categorised ex pos)

| Answer categories  | number |
|--|--------|
| Insufficient, wrong or even no <b>information</b> before and during the flood  | 106    |
| No or late previous <b>warning</b>   | 74     |
| <b>Dam operation</b> failed: too much water was discharged and also too late; after privatisation insufficient functioning for objective of flood protection   | 36     |
| Inadequate <b>disaster management</b> (precipitated evacuation, regulation of entrance/ exit, lack of sandbags, no specific meeting place, neglect of streets and districts etc.)                        | 36     |
| Bad <b>organisation</b> /failure on the part of the state, local authorities and mayor; bad communication on the local level and with other communities  | 26     |
| <b>Technical/charitable organisations</b> (such as THW) could not handle the situation adequately mainly with regard to the coordination of aid assistants, supply, electricity, help for residents etc. | 26     |
| Underestimation/ <b>trivialization of the danger</b> and the flood impacts   | 22     |
| Ailing [“marode”] dikes; lacking <b>dike maintenance</b>   | 7      |
| Soil sealing; interference in the course of the river  | 3      |
| Unfair distribution of aid supplies and donations  | 3      |

Source: FLOODsite survey 2005

However, while compensation was almost no issue for blaming, a clear “scapegoat” is figured out already in Table 6.4: the regional **Landestalsperrenverwaltung (retention basin authority of Saxony)** which is also to be found in Fig. 6.8 revealing a more nuanced picture. In the survey we asked people an open question about what they consider to be the **main causes for the flood**. Above all, in our research locations the 2002 flood is understood to be a failure of the Saxon retention basin authority. In order to understand this answer, some background information is necessary. The duty of the retention basin authority encompasses many different aspects such as supply with drinking water, flood protection and low water heightening as well as maintenance and extension of waters of so-called first order (*Gewässer erster Ordnung*). The authority is responsible for administering 115 retention basins and large dams with a water storage space of about 523 million m<sup>3</sup>; 3,000 km of flowing waters of first order as well as of 650 km of dikes (LTV Sachsen 2006). The “failure” is mostly attributed to the retention basins, since the authorities are blamed for not having emptied the basins in time to absorb the heavy rainfalls. This is understood until the present day as one of the main “causes” for the 2002 flood both in the public debate and among the residents of our sample (Fig. 6.8).

Fig. 6.8: Causes for the 2002 flood



Source: FLOODsite survey 2005

Generally, most causes given point to failure, either of existing structural protection measures and/or general mistakes made which were not further specified in the answers. Also, the heavy rainfalls during the days before the flood are seen as a major cause. Only a minority mentions factors such as the non-existence of additional retention areas and/or the sealing of the soil surface.

By way of conclusion, one has to point out that the causes are above all **attributed to an authority** and in a more general sense to **technical failure** (dikes, retention basins etc.) as well as to **nature** (rain and climate change). Other, more reflexive (in the sense of self-confronting) forms of reasoning are clearly less present.

However, we also asked people directly about their personal reflexivity by posing the open question: "Assuming, some time in the future there would be announced another extraordinary flood, would you do anything differently next time?" While 62% of the respondents would indeed **do something differently**, 25% would not, and 13% could not give a precise answer (n=352). With regard to this question the context of the questionnaire is of importance, since it was directly placed after the question about ad-hoc activities (see above, Chapter 5.2.3 and Appendices II and III). Therefore people related their answers mostly to their actions shortly before the flood wave inundated the different localities. This might also be the reason for the variance among the research locations (Table 6.5).

Table 6.5: "Assuming, some time in the future there would be announced another extraordinary flood. Would you do anything differently next time?" (n=305)

|  | ErlIn<br>(n=14) | Sermuth<br>(n=44) | Eilenburg<br>centre<br>(n=196) | Eilenburg<br>KMS<br>(n=42) | Eilenburg<br>Hainichen<br>(n=11) |
|--|-----------------|-------------------|--------------------------------|----------------------------|----------------------------------|
| <b>Would do something differently</b>    | 57%             | 71%               | 72%                            | 71%                        | 91%                              |
| <b>Would not do anything differently</b> | 43%             | 29%               | 28%                            | 29%                        | 9%                               |

Source: FLOODsite survey 2005

In particular, respondents who did nothing after they had received the information that a flood may threaten them, would significantly more often do something differently (92%) than those who secured as many things as possible (60%; Table 6.6). Hence, past behaviour is regarded as (hypothetically) influencing future actions.

Table 6.6: “Assuming, some time in the future there would be announced another extraordinary flood. Would you do anything differently next time?” (by ad-hoc activities; n=225)

|  | “What did you do first when you heard that there will be an extraordinary flood?” |                    |                               |                               |
|--|---|--------------------|-------------------------------|-------------------------------|
|  | Nothing<br>(n=39)   | Left home<br>n=82) | Secured some<br>things (n=62) | Secured many<br>things (n=42) |
| <b>Would do something differently</b>    | 92%   | 62%                | 76%                           | 60%                           |
| <b>Would not do anything differently</b> | 8%  | 38%                | 24%                           | 40%                           |

( $p < 0.01$ ; Chi-square test)

Source: FLOODsite survey 2005

Another important variable is **formal education**: Those with high and very high formal education would significantly more often behave differently next time ( $p < 0.01$ ; Chi-square test). Similar evidence is to be found with respect to professional status: White-collar employees in medium and higher positions (hence a group partly overlapping with the one mentioned before) also answered this question more often positively (not significant).

Asked (by an open question) **what they actually would do differently** next time, most respondents referred to securing more things (58%), certain things (24%) and/or the entire building (6%). Only a minority would either follow the warning (5%) or rather not follow the warning (7%; n=215).

A similar, also openly formulated question referred to post-flood reflexivity and asked for **personal learning** (Table 6.7). Beside mentioning concrete actions reminding of the indicator discussed above (“what would you do differently...?”), further issues emerge: among them, most prominently, a certain sense of personal responsibility in all the overlapping phases of an extreme event (“not rely on public institutions”). Moreover, respondents also refer to the specific **community experience** during the crisis, specifically to the support and help received.

Table 6.7: “Did you learn anything from the 2002 flood?” (n=325; multiple answers possible, categorised ex post)

| Answer categories  | number |
|--|--------|
| Have <b>more trust in oneself and one’s own decisions</b> instead of relying on public institutions (state, administration/ public authorities, fire brigade etc.) | 45     |
| Take the danger/ warnings more seriously and <b>secure earlier and more</b> things in the future   | 44     |
| Increased <b>environmental and risk awareness</b> : always watch closely and never feel safe; nature is unpredictable  | 32     |
| Be <b>more prepared</b> (e.g. constructional changes, specific insurance, copious supply of food, adapted interior fitting and storage of valuables)               | 19     |
| High <b>helpfulness and strong cohesion</b> in the neighbourhood/locality/community during the flood   | 17     |

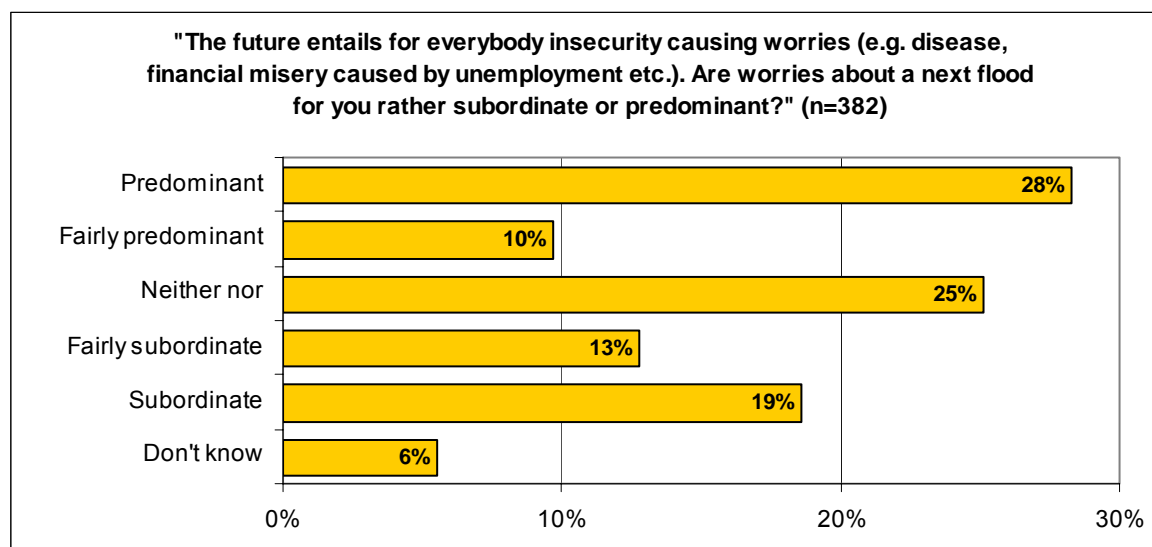
| Answer categories (continued)   | n  |
|---|----|
| <b>Real friendships</b> are made out ("A friend in need is a friend indeed.")   | 13 |
| <b>Early warning</b> and more <b>information on precautionary measures</b> are required; the current flood protection is insufficient | 13 |
| <b>Changed values:</b> personal items prevail; material items are replaceable   | 10 |
| <b>Do not leave home</b> in spite of call for evacuation  | 9  |
| <b>Stronger cohesion</b> in the future; <b>aid</b> one another  | 8  |
| <b>Remove</b> (higher floor or another town); build the house at another place  | 8  |
| Absolute <b>certainty impossible</b>  | 6  |
| <b>Fear</b> of another extraordinary flood  | 4  |
| <b>Leave</b> home and town <b>earlier</b>   | 3  |

Source: FLOODsite survey 2005

By a final question, we wanted to **relate flooding to other risks in life**. Therefore we asked whether worries about floods dominate people's minds or whether other problems are more important. According to Fig. 6.9, floods are a relatively important issue: only every third respondent regarded them as subordinate in comparison with other worries. However, this was the last in a long chain of questions only referring to floods. The answers would have been certainly more balanced if this question was asked at the beginning of the questionnaire.

When having a closer look at the respondents for whom floods are a worry of specific relevance, one can summarise the findings as follows: Particularly for **elderly people** (in contrast with the very young;  $p < 0.05$ ; T-test) and respondents with **low formal education** (not significant), worries about a flood are at the forefront, all the same as people who feel their dwellings as well as their lives threatened by a flood (Pearson's  $r$  0.32 for both correlations;  $p < 0.001$ ).

Fig. 6.9: Worries about floods and other risks



Source: FLOODsite survey 2005

## 6.5 Summary

The perception of the risk of being flooded changed considerably in the course of the 2002 flood. Approximately three and a half years after the flood, this **risk of being flooded is taken much more seriously** than before. This is not least mirrored by a higher (reported) feeling of personal preparedness—in contrast with the perceived collective preparedness of the local community which is regarded as very low. We could verify our hypothesis that if people regard another flood like the one in 2002 as likely they are more inclined to apply precautionary measures. Nevertheless, the perception of the threat seems to play only a minor role in this regard. As already discussed above (Chapter 5.4.3),

However, several other results reported in this Chapter point to some important conclusions: There is no linear relationship between “being affected”, “being aware” and “being prepared”. Although the level of applied precautionary measures increased in the aftermath of the 2002 flood (as documented in Chapter 5.4.3), this should not be interpreted as a simple cause-reaction chain. Rather, we could provide evidence that many respondents either doubt about the sensitivity, usefulness or meaning of private pre-flood measures or that they don’t feel responsible for taking actions in this direction. The appraisal of local and regional structural measures, their efficiency and benefits is very high. The residents at risk don’t refuse non-structural measures like land use changes, at least as long as they are not affected by such measures (like for example public flood drills and simulations) themselves which can be interpreted as a sign of the NIMBY phenomenon (“not in my backyard”). However, the distinction between structural and non-structural measures which is regularly made by flood “experts”, proved to be not meaningful for the respondents—but highly meaningful in their perceptions is the **dividing line between public and private responsibility**.

This has implications for the much discussed paradigm shift “from flood protection to **flood risk management**” (Brown and Damery 2002, 413; Tapsell *et al.* 2005, 2; Messner and Meyer 2006, 149; Schanze 2006) which means significantly greater responsibility for the individual. Generally, our empirical results point out that most respondents have a **critical stance** towards such an individualisation of risk. In the survey, we used the example of the new Water Law, which was passed in Saxony in 2004 and in a similar phrasing by the German Bundestag in 2005. The majority of answers understand these new legal regulations as an excessive demand (overload) for the citizens living in the floodplains. However, the hypothesis with regard to the perception of usefulness, information and responsibility and their respective role for the application of precautionary measures could not be verified. Whether people apply precautionary measures or not seems to be relatively independent of the degree of information, the perception of usefulness and responsibility. Only the question for the meaningfulness of the new Water Law revealed significant differences: Respondents who support the law more often applied precautionary measures.

Finally, it is necessary to emphasise that our results point to a significantly lower degree of information about private precautionary measures, in particular among elderly persons, people with a low formal education or a low income. These findings are important since they allow the development of a further critical perspective towards the recent discourse on flood risk management. While the approach of a holistic **flood risk management approach** is meanwhile relatively well established within the scientific community, the results of our survey reveal a **different picture with regard to the local population**: Here traditional associations of flood protection, both its structure (technical defence) and the bodies that are responsible (public authorities) dominate. Thus a gap of knowledge between the scientific community on the one hand and the local population on the other hand is apparent.





## 7. Lessons learnt

In this report, our efforts were directed towards two objectives: First of all, we applied an **event perspective** and tried to reconstruct the 2002 Mulde flood from a bottom-up perspective by means of a standardised questionnaire survey, which was partly supplemented by information from in-depth interviews with people affected and with expert interviews. The main results were presented in Chapter 5. Particularly, strategies of preparedness (anticipation), coping (adaptation) and recovery (resilience) of local communities were investigated in order to understand why flood risk management in the different phases worked well or failed. In this phase-sensitive approach also the link to the title of **FLOODsite** Task 11 (“Risk perception, community behaviour and resilience”) is to be found: “Risk perception” can be regarded as crucial in the anticipation phase (which, in a certain sense, overlaps with the recovery from a more or less recent hazardous event in the past). “Communities” were operationalised in a twofold sense: They are understood, firstly, as the population of rural and small-town locations and, secondly, as (locally based) social networks which we investigated by means of surveying one of its members (*ego*). Finally, “resilience” can be conceptualised as relating to post-flood recovery.

Secondly, we tackled the issue of (ex-post) **flood-reflexivity** (mainly in Chapter 6). Based upon the same survey, we asked about responsibility and blame not only with respect to the last major flood event. Rather, we were also interested in whether tendencies of an “individualisation of risk”, which are mirrored by the new European paradigm of “flood risk management” as well as recent legal directives at the national level, are accepted from the point of view of the residents of the floodplains. Therefore, we once more discussed the issue of private mitigation activities as well as of public measures, in particular their perception and evaluation.

In the following, we want to return to one of our main concepts: **social vulnerability**. Under this heading, we will reconsider the findings mainly of Chapter 5 and partially also of Chapter 6. In the final section, open questions for further and future research will be addressed.

### 7.1 Social vulnerability reconsidered

In the preceding chapters, a variety of independent variables was tested in order to come to a deeper understanding of flood anticipation, resistance, coping behaviour, recovery as well as risk constructions. Most of these factors had been derived from conceptual deliberations outlined in Chapters 3 and 4. Before summarising our results, we want to recapitulate which social groups, indicators and variables we paid specific attention to (without repeating the reasons for doing so).

In a **first step**, **certain socio-economic and socio-demographic groups** with a potentially higher vulnerability to flooding were identified. Mainly based on sociological and geographical hazard research, but also on more general ideas of the sociology of social inequality (which is basically the most general idea of vulnerability), we defined the following groups as worth investigating in more detail:

- Old and very old persons (65 and 75 years or more, respectively),
- Households with dependent persons,
- People with low formal qualification,
- Unemployed people,
- People with very low income.

A **second category** of potentially more vulnerable groups was derived from deliberations about the **role of social networks** in general and in the course of a disaster. In the latter field, however, there is not much research to date (except, for example, Beggs *et al.* 1996; Hurlbert *et al.* 2000; Scherer and Cho 2003; Kirschenbaum 2004). Specific focus was laid on:

- People without social network at all,
- People with exclusively locally based social network,

- People with a social network exclusively based on *alteri* from outside the region, and
- People with a low degree of local attachment.

The hypothesis behind the first and the second categorisation always is that these social groups exhibit a higher vulnerability than people without this specific feature. In some cases, also the opposite end of the social continuum (the very young, people with very high income/formal qualification etc.) was taken into account, since at least implicitly there is also the hypothesis that these groups are less vulnerable to flooding and its impacts. Hence we are convinced by the very idea of vulnerability as a relational concept, as argued by Green (2003 and 2004).

A **third group** of tested variables refers to **nominal social characteristics** which seemed to be meaningful already before starting data analysis but whose explanatory force with respect to vulnerability was not to be decided upon *ex ante*. In either case, there were both good reasons to argue in favour and against a higher relative vulnerability. Most important were:

- Tenure (owner-occupiers versus renters),
- Gender (men versus women),
- Location, and, related to this,
- Onset of flood (sudden versus slow).

Finally, a **fourth group of indicators** was partially integrated during data analysis. These are most **heterogeneous** and came up in certain moments of the investigation and for only specific dimensions of vulnerability to flooding, respectively, as hypothetically meaningful dimensions worth testing:

- People being not prepared for flooding at all,
- People not in fire brigade/THW,
- People with very high material damage due to the 2002 flood,
- People dissatisfied with reimbursement after the 2002 flood,
- People feeling their home/their life threatened by a flood.

The following Table 7.1 provides an overview of the “statistical” results of Chapter 5. Since we did not restrict our understanding of vulnerability to (potential) material damage, we applied a broad approach of **phase-specific dimensions of social vulnerability**, such as obtaining information and being warned (anticipation), experiencing material damage and receiving support (resistance and coping) or suffering from long-term consequences with respect to physical and mental health (recovery and reconstruction). Most of these dimensions either refer to behaviour influenced by certain expectations about a probable future flood (such as undertaking activities to mitigate flood impacts both before, during and after a hazardous event) or take into account the predominantly responsive nature of human behaviour in a flood situation which is influenced by the fact, for example, whether and which kind of information and support, respectively, one receives.

*Table 7.1: Social vulnerability to flooding during the several phases of the 2002 flood*

| 1. ANTICIPATION                        | Applying precautionary measures | Holding insurance | Feeling prepared | Remembering flood signs | Taking ad-hoc activities | Being warned |
|--|---------------------------------|-------------------|------------------|-------------------------|--------------------------|--------------|
| Owner-occupiers                        | +                               |                   |                  |                         | +                        |              |
| (Very) old people                      |                                 | +                 |                  |                         |                          |              |
| Very young people                      |                                 |                   | +                | +                       |                          |              |
| People with low income                 |                                 | -                 | -                |                         |                          |              |
| People with high income                |                                 |                   | (+)              |                         |                          |              |
| People with exclusively local networks |                                 |                   |                  | +                       |                          |              |
| Locations with sudden onset            |                                 |                   |                  |                         |                          | -            |

| 2. RESISTANCE AND COPING                      | Being affected | Experiencing lack of information | Receiving no information | Receiving support |
|---|----------------|----------------------------------|--------------------------|-------------------|
| Owner-occupiers                               | (+)            |                                  |                          |                   |
| (Very) old people                             |                | -                                |                          | -                 |
| Very young people                             |                | (+)                              |                          |                   |
| People with high formal education             |                |                                  |                          | (+)               |
| People without social network                 |                | +                                | +                        |                   |
| People with exclusively local networks        |                |                                  | +                        |                   |
| People with exclusively non-regional networks |                |                                  | +                        | (+)               |
| Locations with sudden onset                   |                | -                                | +                        |                   |

| 3. RECOVERY AND RECONSTRUCTION                | Suffering physical/health consequences | Suffering mental consequences | Suffering high general impact on household | Applying precautionary measures | Receiving support |
|---|--|-------------------------------|--|---------------------------------|-------------------|
| Owner-occupiers                               |  |                               | +  | +                               | +                 |
| (Very) old people                             | +                                      | +                             | +  | -                               |                   |
| Very young people                             | -                                      | -                             | -  | -                               |                   |
| Men   | +                                      |                               | +  | (+)                             |                   |
| People with exclusively non-regional networks |  |                               |  |                                 | -                 |

Source: FLOODsite survey 2005

The results in Table 7.1 can be summarised as follows:

- **Anticipation:** The empirical material revealed that the majority of the respondents felt by **no means prepared** for a flood like the 2002 flood. Moreover, none of the tested variables explained any significant differences. However, with regard to precautionary measures as well as insurance some differences were to be observed. Particularly **tenure** plays a role, since owner-occupiers applied precautionary measures significantly more often than renters. Besides, but probably due to East German specifics (flooding used to be covered by normal household contents insurance until 1990), **age** mattered, since it was to a higher degree elderly people who were holding insurance policies before the flood. **Income** also plays a part, since insurance was more often held by wealthier respondents. With regard to the period shortly before the flood, it is usually expected that ad-hoc activities are particularly important for reducing material vulnerability. However, the majority of people simply left their homes without taking any action. Similarly as above, **tenure** was of importance, since home-owners more often than renters tried to secure as many things as possible.
- **Resistance and coping:** In spite of all activities before the water actually inundated the residents' homes, the individual efforts to reduce material vulnerability did **not have any influence** on the **economic damage**. Neither long-term precautionary nor ad-hoc activities nor receiving a warning led to a significant damage decrease, and in some cases losses were even more substantial than for people who did not apply any measure. Hence, the picture is rather contradictory making it very difficult to explain damage variance and, therefore, material vulnerability. The only explaining factor is once more **tenure**: As to be expected, renters (in Eilenburg centre) were significantly less affected than owner-occupiers (in all other neighbourhoods), both with respect to buildings (which is not surprising) and to contents. However, this phase is not only about damage but also about people. In this sense, information is crucial for coping with the immediate situation. The analysis showed that family members and friends were the most important source for reliable and subjectively important information. Furthermore, help and support by other people is an important means for coping with the immediate crisis. The survey revealed that **informal networks** (family members and friends) were the most important resources people relied on. Additionally, there is empirical evidence that particularly the group of respondents **older than 60 years** as well as people with a **low formal qualification** seem to have received less support (for social networks see also below Chapter 7.2).
- **Recovery and reconstruction:** With regard to the consequences of the flood, the picture is again diverse. However, the perceived overall impact of the flood on the household is above all a matter of **age and tenure**: Elderly people as well as home-owners perceive the impact as most severe. Additionally the elder cohorts (more than 60 years old) evaluate the consequences for physical and mental health as particularly bad. However, with regard to the consequences, the specifics of the **reimbursement process** after the 2002 flood in Germany have to be mentioned, since they were profoundly influencing the recovery. Due to the extensive degree of monetary compensation, satisfaction with material compensation is very high. Variance is low, while none of the tested variables accounted for it. With regard to a next possible flood the question of **precautionary measures** becomes virulent again. Though the level of awareness and also of preparedness increased, still the majority of the residents **did not change anything** in their homes in order to be more adequately prepared for a possibly new flood. This has its causes certainly also in the high level of post-flood compensation. As to be expected, the most important distinction is due to **tenure**: More residents living in their own house than renters applied precautionary measures after the 2002 flood. Also with regard to the types of post-flood mitigation measures, tenure is a central variable: While owner-occupiers are more inclined to pursue constructional changes at their buildings and to take up or improve their existing insurance policies, renters more often (but at large: relatively seldom) fitted the interior of their flats to a possible flood.

Generally, the empirical analysis is evidence that a strict ex-ante assumption concerning social vulnerability which is solely based on socio-economic variables is not meaningful in the case of the 2002

flood. There is **no single variable** (e.g. age, income etc.) which would coherently and for all single phases explain the vulnerability of specific groups. **Neither** is there **one single social group** (the very old, the very poor, those without social network etc.) which proved to be particularly vulnerable in all dimensions. Moreover, in many cases the relations between behaviour and underlying social structures turned out to be not linear, rather the extreme groups (such as the very young versus the very old, people without social networks and so forth) were striking. On the contrary, the analysis revealed a quite diverse picture emphasising the importance of applying a **situational approach**, which not only relies on demographic and/or taxonomic variables, but rather takes into account the different aspects of vulnerability outlined in Chapter 1.2.1 as well as the peculiarities of a certain flood event. Moreover, also the **phase-oriented approach** provided valuable insights because at different points in time varying “performances” of different social groups and also of the actors in the single research locations were to be observed. The latter issue will be discussed in the subsequent section.

As one of the most explanatory factors in a wide range of analyses **tenure** was figured out. Tenure, more precisely: owner-occupation, carries with it notions of a specific responsibility for property which is also mirrored in our data. However, the picture is ambiguous, since home-owners on the one hand applied more precautionary measures, but experienced greater material damage on the other. However, again the specifics of the 2002 flood event need to be taken into account which only rarely allowed effective counter-measures in the very same situation.

At this point it seems necessary to point towards the **limitations of the concept of vulnerability**. It is, above all, a relational construct and this in a twofold sense: Firstly, it links a subject or a group of subjects with an object (e.g. river), and the relationship is defined by specific social characteristics (in contrast to natural ones). Secondly, the concept of vulnerability carries an implicit notion of desirability and therefore relates a specific existing state to a desired state (Green 2003 and 2004). Mostly, this relationship is not explicated, since different groups are simply compared (e.g. the rich versus the poor) and it is looked at which group is better able to “anticipate, cope with, resist, and recover from the impact of a natural hazard” (Blaikie *et al.* 1994, 9). If one group’s capacity is less obvious (than another group), than this group is regarded as vulnerable. This is surely the strength of the concept of vulnerability; it allows one to illustrate the different abilities of groups to cope with disasters. However, as for the 2002 Mulde flood, if clear differences between social groups are difficult to find, it is **difficult to identify any “vulnerable” group**. Nevertheless, it would be misleading to understand all the people as not vulnerable. The empirical results rather support Beck’s hypothesis that literally everybody is vulnerable to the consequences of “risk society” (1992; first in German in 1986) with respect to this specific event, since it was almost the entire population of the floodplains who can be classified as “vulnerable”. However, this “absolute” vulnerability, which is also inherent in the **FLOODsite** definition (“the potential to be harmed”) can hardly be grasped by a relational approach, which was pursued in our analysis.

## **7.2 Social capital and vulnerability**

In the course of this report, social capital was dealt with by means of two distinct approaches. First of all, we were interested in **social networks**, mainly their informal parts of “strong” ties. Secondly, we paid extensive attention to the different research locations (**local communities**) and their phase-specific flood performance.

**Informal social networks** are the **most important source of help** during the flood which, in the perception of the people affected, not only relates to the very moment when the water is inundating their homes, but also when it had already gone. Hence “during” the flood in this view also includes the phase of recovery and reconstruction. As for **warning and information** in the situation just before the onset of the flood, it is **both formal and informal networks** which people rely on in order to receive, refine and validate uncertain or unexpected information. In this respect, formal networks (in the form of “visible” organisations with a high reputation based on their specific expertise, such as fire brigades, THW and Red Cross) proved to be even more trustworthy in the immediate hazardous situation

than both weak and strong informal ties. With these organisations having left the affected areas, people once again successfully activated their strong informal ties (informal social networks) and received a variety of material, physical and mental support which often preceded the material compensations provided by public authorities.

Certain **qualities of social networks** indeed have an impact on vulnerability. It was, however, less the distinction between kin- and friend-based social networks which mattered but their **geographical heterogeneity**. As outlined in Chapter 1.2.2, there are both good reasons to argue against and in favour of local strong ties with respect to coping with a disaster. While in a situation like the 2002 flood, locally based networks might have been dysfunctional because literally everybody was affected, the counter-argument could be that still these network partners are available and their interrelationship is reinforced by having survived the same disaster. After having finished the quantitative part of our data analysis, we found evidence for both hypotheses. What is more, there is not one single tendency for all dimensions of social vulnerability with respect to social networks. We found both hints on the **restricted utility of exclusively local and of exclusively non-regionally based networks**. The former tend to provide no valuable (surplus) information in the anticipation phase since all members usually rely on the structurally same sources of information. Hence, exclusively local networks could not fulfil their main function when the general situation was very uncertain. The latter constellation of strong ties exclusively located outside the region leads to a relative deprivation of these residents mainly in the recovery phase. Rather, it was easier to capitalise local and regional help (except in the case they themselves were affected) than to rely on kin and friends living remotely. However, we also critically assess the limits of our methods and the restrictions of the network indicator and parameters applied. In general, for more sophisticated network analyses one has to include further social-science methods beyond a standardised questionnaire survey.

In many dimensions of social vulnerability, part of the variance found was due to **location** (which is only partially displayed by Table 7.1). However, a geographical place *per se* does not explain anything. Rather, one has to distinguish two different aspects: It was, firstly, specific **event characteristics** (sudden versus slow onset, at night versus during the day) which account for the varying performance in and of the single research locations during the 2002 flood (e.g. with respect to taking ad-hoc activities and which ones). While the differences in warning and evacuation at first glance also appear to relate to local flood specifics, we think that a second argument—related to the very nature of the different communities—is worth considering: the structural differences between **urban and rural locations**. Although urban areas are more prone to high damage due to disasters (hence, in a traditional understanding, they are “more” vulnerable than other types of settlements) they also possess a higher capability, in quantitative and qualitative terms, of coping with and overcoming the impact of a disastrous event. Although this idea was originally developed with respect to megacities (in contrast with small towns; Cross 2001), we found evidence that it holds true also for small towns in contrast with villages (Eilenburg versus Sermuth, Erlln and also Hainichen).

There was also some evidence that “sound” communities (in our survey in particular **Erlln** and **Eilenburg KMS**) can cope better with such an event in the long run (as well as the other way round) and that already existing community trends are reinforced by such an event. Though not in all respects, the overall picture as drawn by the respondents is relatively negative in **Hainichen**. In particular, there was much criticism about local flood performance. At the same time, Hainichen is the place where certain dimensions of local capital were rather weak (perceived solidarity among residents, commitment in local associations) but, in contrast, also the place where, according to the residents, local “community feeling/solidarity” improved mostly after the flood. Hence, this case is very contradictory in itself, which might have to do with its hybrid structure as an official district of the small town Eilenburg on the one hand, and its actual rural character on the other. Moreover, one has to bear in mind that the very small sample certainly also accounts for the ambivalent results. Also with regard to **Eilenburg centre**, we found some specific features, but most of them could be either attributed to the different kind of material attachment (predominantly renters) and the high social and, in particular, demographic homogeneity (most residents already retired) of this place.

### **7.3 Risk awareness, risk construction and vulnerability**

The relationship between risk awareness and vulnerability is seldom researched; in the discourse on vulnerability there is even a strong objection against questions of interpretation and perception. Nevertheless, we investigated also possible relationships between the vulnerability of people and their risk awareness. Risk awareness here is only confined to the perception of the threat as well as the recurrence of such an event. Other variables, which were outlined in our work on risk construction (Chapter 6), are not included at this stage of the analysis.

Before outlining some further empirical results, a methodological problem has to be addressed: As shown above, the 2002 flood considerably changed the perception of risk among the population. Therefore, it would be misleading to assume that it might be possible to find correlations between prior flood risk perception and the vulnerability of respondents with regard to the 2002 flood; it is rather more meaningful to look for connections between the respondents' **experience of the 2002 flood** and their risk perception.

A first hypothesis was that the perceived impact of the 2002 flood on the household correlates with the perception of the threat of a next possible flood with regard to the house. Therewith the causality runs from vulnerability to risk perception (impact perceived as "very bad" correlates with the perception of the house as "very threatened" by a next possible flood). However, the correlation is only modestly pronounced. Only with regard to the psychological consequences does a certain connection exist. Respondents who evaluate the psychological consequences of the flood as harmful also perceive their houses threatened by a next possible flood. Further variables relating to the experience of the 2002 flood (before, during and after) did not reveal any significant differences or correlations.

Further results from our analysis on "risk construction" are worth recapitulating. The Integrated Project **FLOODsite** is particularly dedicated to the idea of **flood risk management**. This new paradigm of coming to terms with floods at different scales carries with it a **shift in responsibilities**, since residents of floodplains are expected to take active part in these efforts. The respective legislation in Germany which we asked for was understood by the majority of the respondents as an excessive demand (overload) for the citizens living in the flood plains. While the general level of information on private mitigation measures is regarded as not very high, it is in particular the elderly as well as people with a low formal education and with low income who feel badly informed. These findings are important, since they allow the development of a critical perspective on the current discourse on **flood risk management**. While this holistic approach is, meanwhile, relatively well established within the scientific community, the results of our survey reveal a **different picture with regard to the local population**: Here **traditional assumptions** about flood protection, both its structure (technical defence) and the responsible bodies (public authorities) dominate. Thus a **gap of knowledge** between the scientific community on the one hand and the local population on the other is apparent. Probably even more important, also a **gap in the attribution of meaning to certain measures** exists since the residents at risk have their own clear comprehension about public responsibilities for flood protection—somehow mirroring their counterparts who demand for increasing private mitigation efforts.

### **7.4 Open questions for further and future analysis**

This report represents a major milestone in our efforts to come to a deeper understanding of the course, the medium- and long-term impact as well as ex-post reconstruction of a disaster like the 2002 Mulde flood from the point of view of the affected people. Beside many valuable insights, it also became clear that with a standardised approach (questionnaire survey) not all questions were to be answered and many new research problems arose, among them:

- **Geographical variance:** Despite many structural similarities of the single research locations, we found many flood-related differences. As already discussed, some variance was to be attributed to rural-urban differences as well as to specific tenure patterns and event peculiarities. Yet, the picture with respect to certain dimensions of vulnerability still is ambivalent and we do not yet under-

stand it very well. Further factors (social cohesion before and after such an event, role of municipal authorities during the 2002 flood, implementation of post-flood mitigation measures etc.) need to be paid more attention to and integrated in holistic flood risk management (research).

- **Material vulnerability:** With the only exception of tenure, we found no real explanation for the high variance with respect to the material damages caused by the 2002 flood; neither did activities taken by the residents lead to a decrease in the damage. Does this mean that taking precautionary measures (in the sense of evasion, drawback, resistance and securing; see typology in Chapter 5.1) as well as ad-hoc activities is redundant? Several in-depth analyses, which were only partly documented in this report, led us to the assumption that the reasons for non- or even counter-intuitive correlations are to be found in the peculiarities of the 2002 flood, most importantly its severity and the high speed of onset. However, as social scientists we don't regard this explanation as sufficient.
- **Collective "spaces of experience" and "horizons of expectations" – ignorance and vulnerability:** As part of FLOODsite Task 11, a PhD thesis (to be completed in 2007) will more thoroughly investigate the interrelation of knowledge and ignorance and its influence on vulnerability. The specific research question is which stocks of knowledge people accessed in a highly uncertain situation (shortly before the flood). The hypothesis for further in-depth research is that the "normal" flood experience, which constitutes the intersubjective "horizon of collective experience" of the residents, is defined, above all, by regularly and relatively-often-occurring minor floods. The events of 1954 and 1974 represented—before the 2002 flood—the most extreme flood imaginable within this horizon. However, the 2002 flood by far exceeded the previous floods and thus the collective horizon of experience. Nevertheless, most people adjusted their actions according to the 1954 and 1974 floods. With regard to such an event they had sound knowledge; yet this stable form of knowledge made it difficult to take into account its very limitation (e.g. a "bigger" flood). The 2002 flood, however, exposed the limits of comprehension and can therefore be understood as an event which revealed people's ignorance; that is their borders of knowledge.
- **Situational versus taxonomic approach:** While there is much unanimity in the research community dealing with vulnerability about the most endangered social groups, we found only little evidence for this in our case study. How to explain the low importance of standard indicators of vulnerability/disaster research? Our results suggest that the reasons are threefold: First of all, again the severity of the 2002 event affecting literally everybody in certain areas of the Mulde catchment needs to be taken into account. Secondly, extremely disadvantaged social groups (e.g. ethnic minorities) do not exist in the areas investigated. Rather the social milieu is very homogeneous. Thirdly, the increasing individualisation and differentiation of life courses in general questions the explanatory power of traditionally "strong" factors of socio-economic status (such as formal qualification, income or professional status). Though they are still important, they do not account for every situation in life and are supplemented by further aspects of life style, life cycle and social capital, the explanation of which often exceeds the opportunities of standardised social-science instruments. Fourthly, standard "linear" thinking sometimes obviously obstructs the view for specific vulnerabilities both in the different phases and with respect to certain groups.

Finally, it shall be underlined, that by now research remained at the level of a single case study in one national context with its specific institutional and cultural setting. The **next step** of our analysis will therefore focus on **cross-national comparisons** with the cases investigated in Italy and England and Wales. This process, however, must not to be misunderstood as a comparison of "numbers", it will be rather about understanding how disasters impact on communities in different settings and how social groups can and do cope with it.



## **7.5 Executive summary – main theses**

- **Thesis 1: The 2002 flood by far exceeded the space of experiences and the horizon of expectation of most people.**

The hydrological characteristic of the 2002 Mulde flood was singular with regard to its velocity and height, at least for the 20<sup>th</sup> and 21<sup>st</sup> centuries. Previous floods that inundated parts of the surveyed areas, like those of 1932, 1954 and 1974, were by far less rapid and less high and therefore also less destructive. Accordingly, the inhabitants of the flood plains could not rely on previous experiences to anticipate the extent of the 2002 flood; on the contrary, previous floods were seen as “worst-case scenario”—an event exceeding these floods was not considered as possible. It is therefore not surprising that the majority of the respondents uttered that they felt not prepared for a crisis like this. Moreover, the low variance with respect to a broad range of vulnerability indicators is also explained by the all-encompassing character and severity of the 2002 flood.

- **Thesis 2: Vulnerability in the context of European welfare states also needs to be understood as non-linear, situational, and temporarily restricted – hence: individualised.**

Vulnerability is often understood as a static characteristic of a person or a social group. However, the empirical findings in this report reveal that none of the “classical” variables for “measuring” vulnerability was able to satisfyingly explain the vulnerability of a person/group with regard to its ability to anticipate, cope with and recover from the impact of a natural hazard. The explanation of this finding is challenging. However, some preliminary answers seem possible. Most importantly, the concept of vulnerability was developed in geographical contexts, which are defined by a highly unequal distribution of resources in a general sense. Therefore “vulnerability” as an analytical concept emerged to uncover social inequality with regard to the ability to cope with stress, crisis and so on. In the case of the 2002 flood, such distinctive unequal distribution of resources seemed to be not present. This is, first of all, surely explainable by an event-specific feature: the high rates of compensation affected people received in consequence of the 2002 flood. Secondly, the societal framework of traditional European welfare states with their efforts for at least balancing social inequalities needs to be taken into account. However, also a more general explanation may be stressed; that is the process of individualisation. While in modern societies social inequality existed and was perceived along the lines of the division of labour and the distribution of wealth, they become increasingly “blurred” in the sense that social inequality no longer runs along large identifiable groups, but becomes increasingly fragmented across space and time (Beck 1992). As a consequence both the conscious belonging of individuals to a distinguishable group, such as class, eroded and to a certain degree also classes themselves. They are, according to the hypothesis of Beck, increasingly replaced by individual forms of self-management. Accordingly “classical” variables to approach social inequality in modern societies are only to a limited degree congruent with current societal dynamics.

- **Thesis 3: Both research and practice need to stay critical concerning the “myth” of private mitigation measures and the individualisation of risk.**

Particularly in the German debate on flood risk management it is often argued that private mitigation measures would reduce the financial damages caused by hydrological events. However, our empirical investigation shows that this linear understanding is far from satisfying or in extreme floods even misleading. However, a simple demand that people should apply more private mitigation measures is also short-sighted because of other reasons: Firstly, this view is not shared by a large part of the surveyed population. It is still “the public” and rather technical flood protection measures which are regarded as most appropriate agencies for reducing damages. Similarly, the increasing “individualisation of risk” is seen critically by the residents: They understand the attempt to avoid or reduce damages as a public duty which is certainly a major challenge for flood risk management in the future.



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## Appendix I: Overview of main independent variables

| Variable   | Dimension                           | Operationalisation  | Type                                      |
|--|-------------------------------------|---|---|
| <b>Research location</b>                             | geographic                          | - 5 categories (locations)  | - nominal                                 |
| <b>Settlement type</b>                               | geographic                          | - urban vs. [quasi-]rural   | - nominal                                 |
| <b>Type of flood (speed of onset)</b>                | hydrological, geographic            | - sudden vs. slow onset   | - nominal                                 |
| <b>Previous flood experience</b>                     | biographic                          | - 1974/1954 floods already experienced or not [via length of residence]   | - nominal                                 |
| <b>Age</b>   | socio-demographic                   | - years<br>- 6 categories (<30, 30-39 ... 60-69, 70+ years)   | - scale<br>- ordinal                      |
| <b>Gender</b>  | socio-demographic                   | - male vs. female   | - nominal                                 |
| <b>Households with dependent persons</b>             | socio-demographic                   | - children and/or permanently ill persons in the household yes vs. no   | - nominal                                 |
| <b>Formal qualification</b>                          | socio-economic                      | - schooling (4 categories)<br>- professional qualification (6 categories)<br>- indices of formal qualification (school leaving certificate + professional qualification): Index I, II and III (3, 5 and 8 groups, respectively) | - ordinal<br>- ordinal<br>- ordinal (all) |
| <b>Labour marked status</b>                          | socio-economic, socio-demographic   | - employed/in qualification vs. not employed for several reasons vs. retired  | - nominal                                 |
| <b>Income</b>  | socio-economic                      | - monthly household income (6 categories)<br>- weighted per-per capita  | - ordinal<br>- scale                      |
| <b>Tenure</b>  | socio-economic                      | - owner-occupier vs. renter   | - nominal                                 |
| <b>Length of residence</b>                           | socio-demographic                   | - years<br>- 6 categories (<10, 10-19 ... 40-49, 50+ years)   | - scale<br>- ordinal                      |
| <b>Biographical relationship</b>                     | socio-demographic                   | - hometown/-village vs. place of later residence  | - nominal                                 |
| <b>Quality of social networks</b>                    | social capital                      | - mixed vs. one-dimensional<br>- exclusively/predominantly kin vs. exclusively/ predominantly friends   | - nominal                                 |
| <b>Geographical heterogeneity of social networks</b> | social capital                      | - predominantly local vs. predominantly supra-local<br>- networks exclusively locally based vs. also consisting of people from outside the locality   | - nominal                                 |
| <b>Formal vs. informal networks</b>                  | social relations                    | - formal networks = professionals/authorities<br>- informal networks = social networks as defined above (social capital)  | - nominal                                 |
| <b>In fire brigade/ THW</b>                          | specific disaster-related knowledge | - respondent and/or family member vs. nobody  | - nominal                                 |



## Appendix II: Questionnaire (English translation)

**First of all; we would like to ask you a few questions about your place of living.**

**1. How long have you been living in [name of location]?**

Since birth ☐ <sub>1</sub> => Please proceed with question 3  
Since .... years

**2. Where did you live before?**

In another municipality within the same county ☐ <sub>1</sub>  
=> (please, specify the municipality .....)  
In another county but within the same state of Saxony ☐ <sub>2</sub>  
=> (please, specify the county.....)  
Outside of Saxony ☐ <sub>3</sub>  
=> (please, specify the state or the county .....)

**3. Indicate the degree to which you feel attached to the place you are living and the area.**  
Please indicate your answer on a scale from “Not at all” to “Very strong”. In all the other cases cross the boxes in-between.

Not at all ☐ <sub>1</sub> ☐ <sub>2</sub> ☐ <sub>3</sub> ☐ <sub>4</sub> ☐ <sub>5</sub> Very strong

**4. Which one of the following statements best describes the relations among people in [name of location]?**

Everybody minds his own business ☐ <sub>1</sub> ☐ <sub>2</sub> ☐ <sub>3</sub> ☐ <sub>4</sub> ☐ <sub>5</sub> People help and support each other

**5. Do you participate in any association or club in [name of location]?**

Yes ☐ <sub>1</sub> Which ones? .....  
No ☐ <sub>2</sub>

**6. Are you or anyone in your family a member of voluntary fire brigades (FFW) or of the Technische Hilfswerk (THW; semi-voluntary disaster organisation)?**

Yes, I am a member of FFW ☐ <sub>1</sub>  
Yes, I am a member of THW ☐ <sub>1</sub>  
Yes, somebody from my family is a member of FFW ☐ <sub>1</sub>  
Yes, somebody from my family is a member of the THW ☐ <sub>1</sub>  
No, neither me nor a family member ☐ <sub>2</sub>

**7. Would you recommend a good friend to move to [name of location]?**

Yes ☐ <sub>1</sub>                      No ☐ <sub>2</sub>                      Don't know ☐ <sub>0</sub>

Now, we would like to continue with another topic: Sometimes there are situations in life when you don't want to make decisions on your own or there might be an important question to be answered where you need advice from somebody. We would like to know who the people are with whom you discuss your concerns.

**8. Please name three persons who are important to you with respect to the above mentioned points. Please, take only people into consideration who are not living in your household. Please indicate the first character of the person's name.**

Person 1: .....                      Person 2: .....                      Person 3: .....

**9. How are you related to these persons?**

|                       | Person 1                              | Person 2                              | Person 3                              |
|-----------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Friend                | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>1</sub> |
| Relative              | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>2</sub> |
| Colleague             | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>3</sub> |
| Other, specify: ..... | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>4</sub> |

**10. And where do these persons live?**

|                               | Person 1                              | Person 2                              | Person 3                              |
|-------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Here in the same house        | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>1</sub> |
| Here in the same street       | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>2</sub> |
| In the neighbourhood          | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>3</sub> |
| In Eilenburg                  | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>4</sub> |
| In the district Delitzsch     | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>5</sub> |
| Not in the district Delitzsch | <input type="checkbox"/> <sub>6</sub> | <input type="checkbox"/> <sub>6</sub> | <input type="checkbox"/> <sub>6</sub> |

**11. Did you experience during or after the 2002 flood support in any form by the above-mentioned persons? If yes, could you shortly describe in which form?**

Person 1: .....  
.....

Person 2: .....  
.....

Person 3: .....  
.....

**The next questions are about floods. In particular we want to find out more about the flood 2002. Most questions are about your experiences and your own opinion / trying to know your own opinion.**

- 12. Indicate the degree to which [name of location], your house, and your life are in your opinion subjects of particular danger due to floods.**

|            | Not at all<br>at danger               |                                       |                                       |                                       | Very<br>much at<br>danger             | Don't<br>know                         |
|------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| [location] | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| My home    | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| My life    | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |

- 13. Now some questions about the 2002 flood. Were you in [name of location ], when the dikes collapsed on August, 13?**

Yes ☐<sub>1</sub>  
No ☐<sub>2</sub>    => Please proceed with question 22

- 14. Now we would like to ask you to remember the time shortly before the 2002 flood. What did you first do when you heard that there would be an extraordinary flood?**

.....  
.....  
.....

- 15. Assuming, some time in the future there would be announced another extraordinary flood: Would you do anything differently next time?**

Yes ☐<sub>1</sub>    **What?** .....  
.....  
No ☐<sub>2</sub>  
Don't know ☐<sub>0</sub>

- 16. Do you remember any signs that were pointing to such an extreme flood like the one in 2002?**

Yes ☐<sub>1</sub>    **Which ones?** .....  
.....  
No ☐<sub>2</sub>  
Don't know ☐<sub>0</sub>

**17. Were you called upon to leave home before the flood?**

Yes ☐<sub>1</sub>  
No ☐<sub>2</sub> => Please proceed with question 22

**18. Who called upon you to do this? (multicode)**

Local government ☐<sub>1</sub>  
Fire Brigade, THW, Police ☐<sub>1</sub>  
Voluntary aid organisations ☐<sub>1</sub>  
Family / neighbours / friends ☐<sub>1</sub>  
Others, specify ..... ☐<sub>1</sub>

**19. How did you take up this call? (single code only)**

I believed it immediately. ☐<sub>1</sub>  
I tried to contact friends, relatives or neighbours  
in order to gather further information. ☐<sub>2</sub>  
I tried to contact local/public authorities or the police  
in order to gather further information. ☐<sub>3</sub>  
I didn't pay any attention to it. ☐<sub>4</sub>  
I wanted to follow the call but I couldn't. (Please specify  
the reasons: ..... ) ☐<sub>5</sub>  
I didn't want to follow the call but I was forced. (Please  
specify the reasons: ..... ) ☐<sub>6</sub>  
Other, specify..... ☐<sub>7</sub>

**20. In your opinion, was the call in sufficient time?**

Yes ☐<sub>1</sub> No ☐<sub>2</sub> Don't know ☐<sub>0</sub>

**21. Did you leave your home?**

Yes ☐<sub>1</sub> After how many hours: ..... and days: ....., respectively?  
No ☐<sub>2</sub>

**22. Was your dwelling (basement included, if exists) flooded? If yes, please indicate for how long.**

Yes ☐<sub>1</sub> **For how long?** ..... Days; ..... Hours  
No ☐<sub>2</sub> => Please proceed with question 24

**23. Up to which level did the water reach in your house / dwelling?**

Basement: approx. .... cm => no basement exists ☐<sub>0</sub>  
Ground floor: approx. .... cm =>  
First floor: approx. .... cm =>



**24. Did your household experience any kind of material damage caused by the 2002 flood?**

Yes ☐<sub>1</sub> **How?** .....

.....

.....

No ☐<sub>2</sub> => Please proceed with question 28

**25. Was the damage to your home and the contents of home measured by an official assessor after the flood?**

Yes ☐<sub>1</sub> No ☐<sub>2</sub> Don't know ☐<sub>0</sub>

**26. How high was the financial damage caused by the flood?**

Damage to buildings: approx. .... €

Damage to contents of home: approx. .... €

Other: approx. .... €

Total damage: approx. .... €

**27. Considering the damage to you and your household caused by the 2002 flood: All in all, are you rather dissatisfied or satisfied with the compensation paid?**

Very dissatisfied ☐<sub>1</sub> ☐<sub>2</sub> ☐<sub>3</sub> ☐<sub>4</sub> ☐<sub>5</sub> Very satisfied  
Don't know ☐<sub>0</sub>

**28. Please evaluate how bad/awful [*schlimm*] you perceived the effects of the 2002 flood on your household.**

|  | Very bad                              |                                       |                                       |                                       |                                       | Not bad at all | Don't know                            |
|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------|---------------------------------------|
| Physical consequences (for you or a family member) | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Damage to the house itself                         | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Damage to furniture                                | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Having to leave home                               | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Psychological consequences                         | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Stress/Tension within the family                   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Stress/Tension with other members of the community | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Loss of material items (like jewellery)            | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Loss of personal items (like photos, remembrances) | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| General impact on the household                    | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |
| Others, specify:.....                              | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |                | <input type="checkbox"/> <sub>0</sub> |

**29. In your opinion, what were the main causes of the 2002 flood?**

.....  
.....  
.....

**30. When looking back, to what degree were you prepared for such an event?**

Not prepared at all      ☐<sub>1</sub>      ☐<sub>2</sub>      ☐<sub>3</sub>      ☐<sub>4</sub>      ☐<sub>5</sub>      Very well prepared  
Don't know      ☐<sub>0</sub>

**31. People repeatedly reported that during the flood the lack of information resulted in great uncertainty. Do you agree with this observation?**

Yes      ☐<sub>1</sub>      No      ☐<sub>2</sub>      Don't know      ☐<sub>0</sub>

**32. During the 2002 flood, who gave you the most useful indications about what to do? (multicode)**

Family/relatives      ☐<sub>1</sub>  
Friends, neighbours, co-workers      ☐<sub>1</sub>  
Aid organisations like THW or fire brigade      ☐<sub>1</sub>  
Charitable organisation (like Red Cross, Caritas)      ☐<sub>1</sub>  
Local authorities      ☐<sub>1</sub>  
Police, Army      ☐<sub>1</sub>  
Others, specify.....      ☐<sub>1</sub>  
Nobody      ☐<sub>2</sub>  
Can't remember      ☐<sub>0</sub>

**33. Indicate the degree to which you received help from the following persons or organisations during the 2002 flood.**

|   | No help                               |                                       |                                       |                                       | A lot of help                         | Don't know                            |
|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Family/relatives                                  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Friends, Neighbours or co-workers                 | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Aid organisations like THW or fire brigade        | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Charitable organisation (like Red Cross, Caritas) | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Local authorities                                 | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Police, Army                                      | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Volunteers  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Others, specify:<br>.....                         | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| I didn't need any help                            | <input type="checkbox"/> <sub>8</sub> |                                       |                                       |                                       |                                       |                                       |

**34. After how many days / weeks / months were you able to move back home?**

After ... days

After ... weeks

After ... months

**35. Before the 2002 flood, could you imagine that something like this could ever happen?**

Yes

☐<sub>1</sub>

No

☐<sub>2</sub>

=> Please proceed with question 37

Don't know

☐<sub>3</sub>

=> Please proceed with question 37

**36. If yes, why could you imagine this?**

.....  
.....  
.....

**37. Can you imagine that a similar damaging event or even one worse than the flood 2002 could occur again in this area?**

Yes, I can

☐<sub>1</sub>

No, I can't

☐<sub>2</sub>

Don't know

☐<sub>0</sub>

**38. Indicate the degree to which you are currently prepared for a similar flood like the one from 2002.**

Not at all prepared

☐<sub>1</sub>

☐<sub>2</sub>

☐<sub>3</sub>

☐<sub>4</sub>

☐<sub>5</sub>

Very well prepared

Don't know

☐<sub>0</sub>

**39. Indicate the degree to which the people in your neighbourhood are prepared in your opinion.**

Not at all prepared

☐<sub>1</sub>

☐<sub>2</sub>

☐<sub>3</sub>

☐<sub>4</sub>

☐<sub>5</sub>

Very well prepared

Don't know

☐<sub>0</sub>

**The next questions are related to flood protection measures in your community, and mitigation measures you possibly applied in your household.**

**40. Are you aware of any flood protection measure in your community?**

Yes

☐<sub>1</sub>

Which one(s)? .....

No

☐<sub>2</sub>

=> Please proceed with question 42

**41. Thinking about these protection measures, how do you evaluate the following statements?**

|   | I don't agree            |                          |                          | I agree                  |                          |                          | Don't know               |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| They eliminate the danger of heavy damage             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Compared with their benefits, they are too expensive  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| They give a sense of security                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| They enable the economic development of our community | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**42. Now about you: Had you undertaken any prevention measure before the 2002 flood in order to protect yourself and your property against floods?**

- Yes ☐ ☐
- No ☐ ☐ => Please proceed with question 44
- Don't know ☐ ☐ => Please proceed with question 44

**43. Please specify the kind of prevention measures.**

.....

.....

**44. Did you undertake any prevention measure after the 2002 flood?**

- Yes ☐ ☐
- No ☐ ☐ => Please proceed with question 46

**45. Please specify the kind of prevention measure.**

.....

.....

**46. Were you insured against natural hazard (which includes flood damages) before the 2002 flood?**

- Yes ☐ ☐ No ☐ ☐ Don't know ☐ ☐

**47. Are you presently insured against natural hazard (which includes flood damages)?**

- Yes ☐ ☐
- No ☐ ☐ => Please proceed with question 49
- Don't know ☐ ☐ => Please proceed with question 49

**48. How much do you pay for natural hazard insurance per year?**

Household contents insurance: approx. .... €/year  
Building insurance: approx. .... €/year

**The next questions are related to flood protection in general. In this context, we are not solely interested in technical measures (such as dikes), but also the contribution the citizens can make concerning the avoidance of flood damages.**

**49. Flood protection measures like dikes or the establishment of additional retention areas are very costly. Indicate the degree to which the following actors should contribute to the covering of the costs in your opinion.**

|  | No<br>contribution<br>at all |                            |                            | Very<br>high<br>contribution |                            | Don't<br>know              |
|--|------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|
| The citizens living in flood prone areas | <input type="checkbox"/> 1   | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4   | <input type="checkbox"/> 5 | <input type="checkbox"/> 0 |
| The municipalities                       | <input type="checkbox"/> 1   | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4   | <input type="checkbox"/> 5 | <input type="checkbox"/> 0 |
| The State of Saxony                      | <input type="checkbox"/> 1   | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4   | <input type="checkbox"/> 5 | <input type="checkbox"/> 0 |
| The Bund [Germany]                       | <input type="checkbox"/> 1   | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4   | <input type="checkbox"/> 5 | <input type="checkbox"/> 0 |

**50. The new „Water Law“ of Saxony will include the phrase: „Everybody who is prone to flood hazards, is obliged to implement mitigation measures in accordance with his possibilities and abilities in order to avoid flood danger and minimise damage“. Do you think this law is reasonable?**

Yes ☐1                      No ☐2                      Don't know ☐0

**Could you shortly explain your answer?**

.....

.....

.....

**51. Since the 2002 flood there is much deliberation about measures for how to avoid flood damages to this extent. Indicate the degree to which you think the following measures are reasonable [*sinnvoll*].**

|   | Not<br>reasonable                     |                                       |                                       | Very<br>useful                        |                                       | Don't<br>know                         |
|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Heighten dikes  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Improve dikes   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Relocation of people to safe places   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Additional retention areas  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Relocating dikes on bottlenecks   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Improved information with regard<br>to personal mitigation and<br>preparedness measures | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Better preparation of civil protection  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Disaster training with the people   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Extension of warning period   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Own mitigation measures<br>(e.g. [ <i>Rückstauklappen</i> ])                            | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Others, specify: .....  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| .....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |

**52. Indicate the degree to which you feel informed about the following points.**

|   | Not informed<br>at all                |                                       |                                       | Very well<br>informed                 |                                       |
|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Causes of the 2002 flood  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| Personal mitigation measures<br>(e.g. [ <i>Rückstauklappen</i> ]) | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| Personal preparation measures<br>(e.g. important phone numbers)   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| Flood protection in your community                                | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| Others, specify: .....  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |
| .....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> |

**Now we have some more general questions for you regarding the long-term consequences of the 2002 flood.**

- 53. An event like the 2002 flood can have various impacts e.g. on living together in your neighbourhood or on the faith/trust in public institutions. Please indicate whether the situation has become worse or has improved regarding the following points.**

|   | Has worsened                |                             |                             | Has improved                |                             | I don't know                |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|   | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Solidarity between the residents                              | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Jealousy and distrust between the residents                   | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Awareness of flood danger                                     | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Trust in aid organisations like THW or voluntary fire brigade | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Trust in charitable organisations like Red Cross etc.         | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Trust in the local authorities                                | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Trust in the state  | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |
| Others, specify: .....  | <input type="checkbox"/> _1 | <input type="checkbox"/> _2 | <input type="checkbox"/> _3 | <input type="checkbox"/> _4 | <input type="checkbox"/> _5 | <input type="checkbox"/> _0 |

- 54. Do you think there were any mistakes made in connection with the 2002 flood?**

Yes ☐\_1 Which ones? .....  
.....  
No ☐\_2  
Don't know ☐\_0

- 55. Did you learn anything from the 2002 flood?**

.....  
.....  
.....

- 56. The future entails for everybody many worries causing insecurity [*Unsicherheiten*] such as disease, financial misery caused by unemployment and many more. Are worries about a next flood for you rather subordinate or are they definitely predominant?**

Subordinate ☐\_1 ☐\_2 ☐\_3 ☐\_4 ☐\_5 Predominant  
Don't know ☐\_0





**64. With whom do you live in your household? (single code only)**

- |  |                          |   |
|--|--------------------------|---|
| I live alone.  | <input type="checkbox"/> | 1 |
| I am a single parent.  | <input type="checkbox"/> | 2 |
| I live in cohabitation (with partner), but without children. | <input type="checkbox"/> | 3 |
| I live in cohabitation (with partner), with children.        | <input type="checkbox"/> | 4 |
| I share a flat with others [ <i>Wohngemeinschaft</i> ].      | <input type="checkbox"/> | 5 |
| I live with my parents/at my parents' home.                  | <input type="checkbox"/> | 6 |
| I live with at my children's home.                           | <input type="checkbox"/> | 7 |
| I live in another way, namely: .....                         | <input type="checkbox"/> | 8 |

**65. How many children live in your household?**

..... children below 18 years                      ..... adult children

**66. Are there any disabled or permanently ill people living in your household?**

- Yes    ☐                      **How many?**    ..... persons
- No     ☐

**67. What is your highest educational qualification?**

*(given: three categories according to German standard socio-demographics)*

- |                         |                          |   |
|-------------------------|--------------------------|---|
| No school qualification | <input type="checkbox"/> | 6 |
| Still at school         | <input type="checkbox"/> | 8 |

**68. What is your highest professional qualification?**

*(given: five categories according to German standard socio-demographics)*

- |                                  |                          |   |
|----------------------------------|--------------------------|---|
| No professional qualification    | <input type="checkbox"/> | 6 |
| Still on training/still studying | <input type="checkbox"/> | 8 |

**69. What is your household's monthly disposable income? Please bear in mind all your forms of income including net salaries of all household members, family allowance, pensions, unemployment benefits etc.**

- |                   |                          |   |                 |                          |   |
|-------------------|--------------------------|---|-----------------|--------------------------|---|
| below 500 €       | <input type="checkbox"/> | 1 | 500 – 999 €     | <input type="checkbox"/> | 2 |
| 1.000 – 1.499 €   | <input type="checkbox"/> | 3 | 1.500 – 1.999 € | <input type="checkbox"/> | 4 |
| 2.000 – 2.599 €   | <input type="checkbox"/> | 5 | 2.600 – 3.999 € | <input type="checkbox"/> | 6 |
| 4.000 € and above | <input type="checkbox"/> | 7 |                 |                          |   |

**70. What is your current employment status?**

- |   |  |
|---|--|
| Full-time employee (35 h/week or more)                | <input type="checkbox"/> <sub>1</sub>  |
| Part-time employee                                    | <input type="checkbox"/> <sub>2</sub>  |
| Unemployed/seeking employment                         | <input type="checkbox"/> <sub>3</sub>  |
| Retraining/gaining further qualifications             | <input type="checkbox"/> <sub>4</sub>  |
| National service (Army/alternative service)           | <input type="checkbox"/> <sub>5</sub>  |
| In training (apprentice, trainee, university student) | <input type="checkbox"/> <sub>6</sub>  |
| Housewife/househusband                                | <input type="checkbox"/> <sub>7</sub>  |
| Parental leave  | <input type="checkbox"/> <sub>8</sub>  |
| Pensioner   | <input type="checkbox"/> <sub>9</sub>  |
| Not employed due to other reasons                     | <input type="checkbox"/> <sub>10</sub> |

**71. What is your current, or what was your previous, employment position?**

*(given: six categories according to German standard socio-demographics)*

**Finally two short questions:**

**Are you interested in being informed about the results of this survey, e.g. by information in the municipal/community gazette or daily newspaper?**

Yes    ☐<sub>1</sub>                      No    ☐<sub>2</sub>

**Please use the space below to indicate which issues were in your opinion missed out in this questionnaire.**

.....

.....

.....

.....

***Thank you very much!!!***

***You have helped us a lot indeed with your answers.***

## Appendix III: Questionnaire (original German version)

(attached on the following pages)



# **Einwohnerbefragung zum Muldehochwasser 2002 in Eilenburg**

Finanziert von der Europäischen Union im Rahmen  
des internationalen Forschungsprojekts FLOODsite

UFZ-Umweltforschungszentrum Leipzig-Halle  
Department Stadt- und Umweltsoziologie  
Permoserstraße 15  
04318 Leipzig

---

Dieser Fragebogen wird am ..... gegen ..... Uhr wieder abgeholt.

## Sehr geehrte Einwohnerinnen und Einwohner von Eilenburg,

vielleicht sind Sie schon durch die Ankündigung im letzten Amtsblatt oder durch einen Aushang auf unsere Befragung aufmerksam geworden. Wir, eine Gruppe von Sozialwissenschaftlern des Umweltforschungszentrums (UFZ) Leipzig-Halle, führen eine Befragung zum Muldehochwasser 2002 durch. Außer in Eilenburg befragen wir die Bewohner von Erlln und Sermuth. Dabei interessiert uns Ihre ganz persönliche Sicht auf das Hochwasser. Deshalb möchten wir Ihnen einige Fragen zum Ablauf des Ereignisses, zu Ihrer eigenen Betroffenheit sowie Ihrer Bewertung von Schutzmaßnahmen und zukünftigen Hochwassergefahren stellen.

Die Studie wird durch die Europäische Union finanziert. Ähnliche Befragungen laufen auch in Norditalien und im Großraum London. Die Resultate werden Eingang finden in neue Konzepte zum Hochwassermanagement. Sie, als unmittelbar vom Hochwasser Betroffene, können durch Ihre persönlichen Erfahrungen und das entsprechende Wissen ein für die Forschung bedeutsames Bild von der Hochwasserkatastrophe zeichnen.

Die Beantwortung der Fragen dauert etwa 30 Minuten und sollte durch die **erwachsene Person** Ihres Haushaltes erfolgen, die – von heute an gesehen – **als nächstes Geburtstags hat**. Der Grund für diese Bitte ist, dass wir eine Zufallsauswahl aus der Bevölkerung anstreben.

Das Ausfüllen des Fragebogens ist ganz einfach – richtige oder falsche Antworten gibt es nicht. Am besten, Sie antworten spontan und in der vorgegebenen Reihenfolge, indem Sie die für Sie zutreffenden Kästchen ankreuzen oder mit eigenen Worten Ihre Meinung aufschreiben. Bitte beantworten Sie möglichst alle für Sie zutreffenden Fragen – und zwar in der vorgegebenen Reihenfolge. Sollte hinter der für Sie zutreffenden Antwort ein Pfeil, z.B. „=> Bitte weiter mit Frage 3“, stehen, können Sie eine oder mehrere Fragen überspringen.

Das UFZ arbeitet nach den gesetzlichen Bestimmungen für den Datenschutz. Die Ergebnisse der Befragung werden ausschließlich in anonymisierter Form und für Gruppen zusammengefasst dargestellt. Das bedeutet: Niemand kann aus den Ergebnissen erkennen, von welcher Person die Aussagen stammen. Wir garantieren Ihnen, dass Ihre Angaben vertraulich behandelt und ausschließlich für Forschungszwecke verwendet werden.

Wenn Sie Fragen haben, können Sie uns folgendermaßen erreichen:

Dr. Frank Messner, Projektleiter UFZ, Leipzig, Tel.: 0341/235-2204

Christian Kuhlicke, Projektbearbeiter UFZ, Leipzig, Tel.: 0341/235-3263

Vielen Dank für Ihre Unterstützung!



Dr. Frank Messner



Christian Kuhlicke

**Zu Beginn möchten wir Ihnen einige Fragen zu Ihrem Wohnort stellen.**

**1. Seit wann wohnen Sie in Eilenburg?**

Seit meiner Geburt ☐<sub>1</sub> => Bitte weiter mit Frage 3

Seit ..... Jahren

---

**2. Wo haben Sie zuvor gewohnt?**

In einer anderen Gemeinde, aber im gleichen Landkreis ☐<sub>1</sub>

=> bitte geben Sie den Namen der Gemeinde an .....

Außerhalb des Landkreises, aber in Sachsen ☐<sub>2</sub>

=> bitte geben Sie den Landkreis in Sachsen an .....

Außerhalb von Sachsen ☐<sub>3</sub>

=> bitte geben Sie das Bundesland oder den Landkreis an .....

---

**3. In welchem Maße fühlen Sie sich dem Ort und der Gegend hier verbunden?** Das Kästchen ganz links bedeutet, dass Sie sich „gar nicht“ verbunden fühlen, das Kästchen ganz rechts, dass Sie sich „sehr stark“ verbunden fühlen. In allen anderen Fällen kreuzen Sie bitte ein Kästchen dazwischen an.

Gar nicht ☐<sub>1</sub> ☐<sub>2</sub> ☐<sub>3</sub> ☐<sub>4</sub> ☐<sub>5</sub> Sehr stark

---

**4. Wie lässt sich Ihrer Meinung nach die Beziehung der Menschen in Eilenburg am ehesten beschreiben?**

Jeder kümmert

sich um sich selber ☐<sub>1</sub> ☐<sub>2</sub> ☐<sub>3</sub> ☐<sub>4</sub> ☐<sub>5</sub>

Man hilft und

unterstützt sich gegenseitig

---

**5. Nehmen Sie an Aktivitäten von Vereinen oder anderen Organisationen in Eilenburg teil?**

Ja ☐<sub>1</sub> **Um welche Vereine/Organisationen handelt es sich? .....**

.....

Nein ☐<sub>2</sub>

---

**6. Sind Sie oder ein Familienangehöriger Mitglied der Freiwilligen Feuerwehr (FFW) oder des Technischen Hilfswerks (THW)?** Mehrfachantworten sind möglich.

Ja, ich bin Mitglied der FFW. ☐<sub>1</sub>

Ja, ich bin Mitglied des THW. ☐<sub>1</sub>

Ja, ein Familienangehöriger ist Mitglied der FFW. ☐<sub>1</sub>

Ja, ein Familienangehöriger ist Mitglied des THW. ☐<sub>1</sub>

Nein, weder ich noch ein Familienangehöriger ist Mitglied. ☐<sub>2</sub>

7. Würden Sie einem guten Freund raten, nach Eilenburg zu ziehen?

Ja ☐<sub>1</sub>

Nein ☐<sub>2</sub>

Weiß nicht ☐<sub>0</sub>

Nun zu einem anderen Thema. Es gibt immer mal Dinge im Leben, die man nicht allein entscheiden möchte oder wichtige Fragen, zu denen man sich einen Rat einholen will. Uns interessiert, wer für Sie die Personen sind, mit denen Sie diese Themen besprechen.

8. Bitte nennen Sie zunächst drei Personen, die für Sie in dieser Beziehung wichtig sind. Denken Sie dabei bitte nur an Menschen, die nicht in Ihrem eigenen Haushalt leben. Geben Sie jeweils den Anfangsbuchstaben des Namens an.

Person 1: .....

Person 2: .....

Person 3: .....

---

9. Was sind diese einzelnen Personen für Sie?

|                         | Person 1 | Person 2 | Person 3 |
|-------------------------|----------|----------|----------|
| Freund/Freundin         | 1        | 1        | 1        |
| Verwandter/Verwandte    | 2        | 2        | 2        |
| Kollege/Kollegin        | 3        | 3        | 3        |
| etwas anderes, nämlich: |          |          |          |
| .....                   | 4        | 4        | 4        |

---

10. Und wo wohnen diese Personen?

|                              | Person 1 | Person 2 | Person 3 |
|------------------------------|----------|----------|----------|
| Hier im Haus                 | 1        | 1        | 1        |
| Hier in der Straße           | 2        | 2        | 2        |
| Hier in der Nachbarschaft    | 3        | 3        | 3        |
| Hier in Eilenburg            | 4        | 4        | 4        |
| Im Landkreis Delitzsch       | 5        | 5        | 5        |
| Nicht im Landkreis Delitzsch | 6        | 6        | 6        |

---

11. Haben Sie während oder nach dem Hochwasser in irgendeiner Form Unterstützung durch diese Personen erfahren? Wenn ja, in welcher Form?

Person 1: .....  
.....

Person 2: .....  
.....

Person 3: .....  
.....

**Jetzt kommen wir zu unserem eigentlichen Thema: Im Folgenden möchten wir von Ihnen zunächst einiges allgemein zur Hochwassergefährdung erfahren. Anschließend stehen die Ereignisse 2002 und Ihre Erfahrungen im Mittelpunkt.**

- 12. Was glauben Sie, wie stark sind die Stadt Eilenburg, Ihr Wohnhaus und Ihr Leben durch ein Hochwasser gefährdet?**

|               | Überhaupt<br>nicht<br>gefährdet |                            |                            |                            | Sehr<br>stark<br>gefährdet | Weiß<br>nicht              |
|---------------|---------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Eilenburg     | <input type="checkbox"/> 1      | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 0 |
| Mein Wohnhaus | <input type="checkbox"/> 1      | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 0 |
| Mein Leben    | <input type="checkbox"/> 1      | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 0 |

- 13. Nun zum Hochwasser 2002: Befanden Sie sich in Eilenburg, als am 13. August 2002 die Deiche brachen?**

Ja ☐1

Nein ☐2 => Bitte weiter mit Frage 22

- 14. Bitte denken Sie jetzt an die Zeit kurz vor dem Hochwasser 2002 zurück. Was haben Sie als erstes getan, als Sie erfuhren, dass ein außergewöhnliches Hochwasser kommen könnte?**

.....  
 .....  
 .....

- 15. Angenommen, es wird nochmals solch ein extremes Hochwasser angekündigt: Würden Sie dann etwas anders machen?**

Ja ☐1 **Was?** .....

.....

Nein ☐2

Weiß nicht ☐0

- 16. Können Sie sich an irgendwelche Anzeichen oder Hinweise erinnern, die auf solch ein extremes Hochwasser wie das von 2002 hinwiesen?**

Ja ☐1 **Welche?** .....

.....

Nein ☐2

Weiß nicht ☐0



**17. Wurden Sie vor dem Hochwasser aufgefordert, Ihre Wohnung zu verlassen?**

Ja ☐<sub>1</sub>

Nein ☐<sub>2</sub> => Bitte weiter mit Frage 22

---

**18. Durch wen wurden Sie dazu aufgefordert? Mehrfachantworten sind möglich.**

Gemeindeverwaltung ☐<sub>1</sub>      Feuerwehr, THW, Polizei ☐<sub>1</sub>

Hilfsorganisationen ☐<sub>1</sub>      Freunde/Nachbarn/Bekannte ☐<sub>1</sub>

Andere, nämlich: ..... ☐<sub>1</sub>

---

**19. Wie haben Sie diese Aufforderung aufgenommen? (nur eine Antwort möglich)**

Ich habe ihr sofort geglaubt. ☐<sub>1</sub>

Ich habe versucht mich erst einmal bei Freunden, Bekannten oder Nachbarn zu erkundigen. ☐<sub>2</sub>

Ich habe versucht mich erst einmal bei den Behörden bzw. der Polizei zu erkundigen. ☐<sub>3</sub>

Ich habe ihr keine weitere Beachtung geschenkt. ☐<sub>4</sub>

Ich wollte ihr folgen, konnte aber nicht. Bitte nennen Sie die Gründe:..... ☐<sub>5</sub>

Ich wollte ihr nicht folgen, wurde aber gezwungen. Bitte nennen Sie die Gründe: ..... ☐<sub>6</sub>

Anderes, nämlich: ..... ☐<sub>7</sub>

---

**20. Kam diese Aufforderung ihrer Meinung nach rechtzeitig?**

Ja ☐<sub>1</sub>      Nein ☐<sub>2</sub>      Weiß nicht ☐<sub>0</sub>

---

**21. Haben Sie Ihre Wohnung dann verlassen?**

Ja ☐<sub>1</sub>      Nach wie vielen Stunden ..... bzw. ....Tagen

Nein ☐<sub>2</sub>

---

**22. War Ihr Wohnbereich (und gegebenenfalls Ihr Keller) überflutet? Wenn ja, wie lange?**

Ja ☐<sub>1</sub>      **Wie lange?** .....Tage; .....Stunden

Nein ☐<sub>2</sub>      => Bitte weiter mit Frage 24

---

**23. Wie hoch stand das Wasser in Ihrem Haus bzw. in Ihrer Wohnung?**

im Keller:      ca. .... cm      kein Keller vorhanden ☐<sub>0</sub>

im Erdgeschoss:      ca. .... cm

im 1. Stock:      ca. .... cm

**24. Hat Ihr Haushalt (Gebäude, Hausrat usw.) durch das Hochwasser 2002 in irgendeiner Form materiellen Schaden erlitten?**

Ja ☐<sub>1</sub> **Wie?** .....  
.....  
.....  
.....

Nein ☐<sub>2</sub> => Bitte weiter mit Frage 28

---

**25. Wurde der Schaden an Ihrem Haus und an Ihrem Hausrat nach dem Hochwasser von einem Gutachter erfasst?**

Ja ☐<sub>1</sub>                      Nein ☐<sub>2</sub>                      Weiß nicht ☐<sub>0</sub>

---

**26. Wie hoch war der Schaden, der Ihnen durch das Hochwasser entstanden ist?**

Schäden an Gebäuden:        ca. .... €

Schäden am Hausrat: ca. .... €

Sonstige:                      ca. .... €

Schäden gesamt:              ca. .... €

---

**27. Angesichts der Schäden, die Sie und Ihr Haushalt durch das Hochwasser 2002 erfahren hatten: Sind Sie mit den dafür erhaltenen Entschädigungsleistungen insgesamt eher unzufrieden oder eher zufrieden?**

Sehr  
unzufrieden    ☐<sub>1</sub>    ☐<sub>2</sub>    ☐<sub>3</sub>    ☐<sub>4</sub>    ☐<sub>5</sub>    Sehr  
zufrieden

Weiß nicht    ☐<sub>0</sub>

**28. Bitte beurteilen Sie, als wie schlimm Sie die nachfolgenden Auswirkungen des Hochwassers 2002 auf Ihren Haushalt empfunden haben.**

|  | Als sehr<br>schlimm        |                            |                            |                            |                            | Als gar<br>nicht<br>schlimm | Wei<br>nicht              |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|
| Krperliche und gesundheitliche Auswirkungen<br>(bei Ihnen oder bei Mitgliedern Ihrer Familie) | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Schden am Haus/an Nebengebuden   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Schden am Hausrat   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Dass ich mein Haus verlassen musste  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Seelische Auswirkungen   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Stress und Spannungen innerhalb der Familie  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Stress und Spannungen mit anderen<br>Einwohnern  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Verlust von materiellen Wertgegenstnden<br>(Schmuck etc.)                                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Verlust von ideellen Wertgegenstnden (Fotos,<br>Andenken usw.)                                | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Auswirkungen auf Ihren Haushalt insgesamt  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |
| Sonstiges, nmlich: .....  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                             | <input type="checkbox"/> 0 |

---

**29. Was waren Ihrer Meinung nach die Hauptursachen fr das Hochwasser 2002?**

.....  
 .....  
 .....

---

**30. Wenn Sie zurckschauen, in welchem Mae waren Sie auf solch ein Ereignis vorbereitet?**

Gar nicht vorbereitet ☐1    ☐2    ☐3    ☐4    ☐5    Sehr gut vorbereitet  
 Wei nicht ☐0

---

**31. Uns wurde immer wieder berichtet, dass mangelnde Information whrend des Hochwassers zu groer Verunsicherung gefhrt hat. Stimmen Sie dem zu?**

Ja ☐1                      Nein ☐2                      Wei nicht ☐0

**32. Wer gab Ihnen während des Hochwassers die nützlichsten Informationen, was zu tun ist? Mehrfachantworten sind möglich.**

- |  |                                       |
|--|---------------------------------------|
| Familie/Verwandte  | <input type="checkbox"/> <sub>1</sub> |
| Freunde, Nachbarn, Arbeitskollegen   | <input type="checkbox"/> <sub>1</sub> |
| Hilfsorganisationen wie Technisches Hilfswerk (THW) oder Freiwillige Feuerwehr | <input type="checkbox"/> <sub>1</sub> |
| Karitative Organisationen wie Deutsches Rotes Kreuz, Caritas usw.              | <input type="checkbox"/> <sub>1</sub> |
| Gemeindeverwaltung   | <input type="checkbox"/> <sub>1</sub> |
| Polizei, Bundeswehr  | <input type="checkbox"/> <sub>1</sub> |
| Andere, nämlich: .....   | <input type="checkbox"/> <sub>1</sub> |
| Niemand  | <input type="checkbox"/> <sub>2</sub> |
| Kann mich nicht erinnern   | <input type="checkbox"/> <sub>0</sub> |

**33. Welche der folgenden Personen bzw. Organisationen haben Ihnen während des Hochwassers in welchem Maße Hilfe geleistet?**

- |  | Keine Hilfe                           |                                       |                                       |                                       | Sehr viel Hilfe                       | Weiß nicht                            |
|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Familie/Verwandte  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Freunde, Nachbarn, Arbeitskollegen   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Hilfsorganisationen wie Technisches Hilfswerk (THW) oder Freiwillige Feuerwehr | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Karitative Organisationen wie Deutsches Rotes Kreuz, Caritas usw.              | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Gemeindeverwaltung   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Polizei, Bundeswehr  | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Freiwillige Helfer   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Andere, nämlich: .....   | <input type="checkbox"/> <sub>1</sub> | <input type="checkbox"/> <sub>2</sub> | <input type="checkbox"/> <sub>3</sub> | <input type="checkbox"/> <sub>4</sub> | <input type="checkbox"/> <sub>5</sub> | <input type="checkbox"/> <sub>0</sub> |
| Ich habe keine Hilfe benötigt  | <input type="checkbox"/> <sub>8</sub> |                                       |                                       |                                       |                                       |                                       |

**34. Nach wie vielen Tagen, Wochen oder Monaten konnten Sie wieder in Ihr Haus einziehen?**

Nach ..... Tagen                      Nach ..... Wochen                      Nach ..... Monaten

**35. Hätten Sie sich vor dem Hochwasser 2002 vorstellen können, dass solch ein Ereignis eintreten kann?**

- |            |                                       |                                     |
|------------|---------------------------------------|-------------------------------------|
| Ja         | <input type="checkbox"/> <sub>1</sub> |                                     |
| Nein       | <input type="checkbox"/> <sub>2</sub> | => <u>Bitte weiter mit Frage 37</u> |
| Weiß nicht | <input type="checkbox"/> <sub>0</sub> | => <u>Bitte weiter mit Frage 37</u> |

36. Wenn ja, warum haben Sie sich das vorstellen können?

.....  
.....  
.....

---

37. Können Sie sich vorstellen, dass ein ähnlich schlimmes oder sogar schlimmeres Ereignis wie das Hochwasser 2002 noch einmal in dieser Gegend auftreten kann?

Ja, kann ich mir vorstellen ☐<sub>1</sub>

Nein, kann ich mir nicht vorstellen ☐<sub>2</sub>

Weiß nicht ☐<sub>0</sub>

---

38. In welchem Maße sind Sie heute auf ein ähnliches Hochwasser wie 2002 vorbereitet?

Gar nicht vorbereitet ☐<sub>1</sub> ☐<sub>2</sub> ☐<sub>3</sub> ☐<sub>4</sub> ☐<sub>5</sub> Sehr gut vorbereitet

Weiß nicht ☐<sub>0</sub>

---

39. In welchem Maße sind Ihrer Meinung nach die Bewohner in Ihrer Nachbarschaft auf ein ähnliches Hochwasser wie 2002 vorbereitet?

Gar nicht vorbereitet ☐<sub>1</sub> ☐<sub>2</sub> ☐<sub>3</sub> ☐<sub>4</sub> ☐<sub>5</sub> Sehr gut vorbereitet

Weiß nicht ☐<sub>0</sub>

Die nächsten Fragen beziehen sich auf Anlagen zum Hochwasserschutz in Ihrer Gemeinde sowie auf Vorsorgemaßnahmen, die Sie möglicherweise persönlich in Ihrem Haushalt getroffen haben.

40. Kennen Sie eine Hochwasserschutzvorrichtung in Ihrer Gemeinde?

Ja ☐<sub>1</sub> Welche? .....

.....

.....

Nein ☐<sub>2</sub> => Bitte weiter mit Frage 42

**41. Wie beurteilen Sie die folgenden Aussagen zu diesen Vorrichtungen.**

|  | Stimme<br>nicht zu       |                          |                          |                          |                          | Stimme<br>zu             | Weiß<br>nicht            |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Diese Vorrichtungen beseitigen die Möglichkeit, dass schwere Hochwasserschäden eintreten | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Diese Vorrichtungen sind verglichen mit ihrem Nutzen zu teuer.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Diese Vorrichtungen vermitteln ein Sicherheitsgefühl.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Diese Vorrichtungen ermöglichen die wirtschaftliche Entwicklung unserer Gemeinde.        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**42. Nun kommen wir zu Ihnen: Haben Sie vor dem Hochwasser 2002 vorbeugende Maßnahmen getroffen, um sich und Ihr Eigentum zu schützen?**

- Ja ☐
- Nein ☐ => Bitte weiter mit Frage 44
- Weiß nicht ☐ => Bitte weiter mit Frage 44

**43. Um welche Maßnahmen handelte es sich genau?**

.....

.....

**44. Haben Sie nach dem Hochwasser 2002 vorbeugende Maßnahmen getroffen?**

- Ja ☐      Nein ☐      => Bitte weiter mit Frage 46

**45. Um welche Maßnahmen handelte es sich genau?**

.....

.....

**46. Waren Sie vor dem Hochwasser 2002 gegen Elementarschäden und damit gegen Hochwasserschäden versichert?**

- Ja ☐      Nein ☐      Weiß nicht ☐

**47. Sind Sie derzeit gegen Elementarschäden und damit gegen Hochwasserschäden versichert?**

- Ja ☐
- Nein ☐ => Bitte weiter mit Frage 49
- Weiß nicht ☐ => Bitte weiter mit Frage 49

**48. Wie viel bezahlen Sie im Jahr für die Elementarversicherung?**

bei Hausratversicherung: ca. ....€/Jahr

bei Gebäudeversicherung: ca. ....€/Jahr

Die nächsten Fragen beziehen sich allgemein auf den Hochwasserschutz. Hierbei interessieren uns nicht allein technische Vorrichtungen (wie z. B. Deiche), sondern auch der Beitrag, den die Bürger selbst zur Vermeidung von Hochwasserschäden leisten können.

**49. Hochwasserschutz wie Deiche oder die Schaffung von zusätzlichen Überschwemmungsgebieten ist sehr kostspielig. Wie viel sollten Ihrer Meinung nach die folgenden Akteure zur Deckung der Kosten beitragen?**

|  | Gar<br>keinen<br>Beitrag   |                            |                            |                            |                            | Sehr<br>großen<br>Beitrag | Weiß<br>nicht              |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|
| Die Bürger, die im Hochwassergefahren-<br>gebiet leben | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                           | <input type="checkbox"/> 0 |
| Die Gemeinden  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                           | <input type="checkbox"/> 0 |
| Der Freistaat Sachsen                                  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                           | <input type="checkbox"/> 0 |
| Der Bund   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                           | <input type="checkbox"/> 0 |

**50. Im neuen sächsischen Wassergesetz soll stehen: „Jeder, der durch Hochwasser betroffen sein kann, ist im Rahmen des ihm Möglichen und Zumutbaren verpflichtet, [...] geeignete Vorsorgemaßnahmen zum Schutz vor Hochwassergefahren und zur Schadensminimierung zu treffen“. Denken Sie, dass dieses Gesetz sinnvoll ist?**

Ja ☐1                      Nein ☐2                      Weiß nicht ☐0

**Können Sie Ihre Antwort bitte kurz erläutern?**

.....

.....

.....

51. Seit dem Hochwasser 2002 wird viel über Maßnahmen nachgedacht, wie man zukünftig Überschwemmungsschäden in diesem Ausmaß verhindern könnte. Wir möchten Ihnen nun eine Liste mit Maßnahmen vorlegen und von Ihnen wissen, in welchem Maße diese Punkte aus Ihrer Sicht sinnvoll wären.

|  | Nicht sinnvoll             |                            |                            |                            |                            | Sehr sinnvoll | Weiß nicht                 |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------|----------------------------|
| Erhöhung von Deichen   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Ausbesserung von Deichen                                       | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Umsiedlungen in hochwassersichere Gebiete                      | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Schaffung von zusätzlichen Überschwemmungsflächen              | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Zurückverlegung von Deichen an Engstellen                      | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Verbesserte Information zur privaten Vorsorge und Vorbereitung | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Bessere Vorbereitung des Katastrophenschutzes                  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Katastrophenschutzübungen mit der Bevölkerung                  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Verlängerung der Vorwarnzeiten                                 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Eigene Vorkehrungen (z.B. Rückstauklappen)                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |
| Sonstiges, nämlich: .....                                      |                            |                            |                            |                            |                            |               |                            |
| .....  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |               | <input type="checkbox"/> 0 |

52. In welchem Maße fühlen Sie sich über die nachfolgenden Punkte informiert?

|   | Gar nicht informiert       |                            |                            |                            | Sehr gut informiert        |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Ursachen des Hochwassers 2002                                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| Persönliche Vorsorgemaßnahmen (z.B. Einbau von Rückstauklappen)   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| Persönliche Vorbereitungsmaßnahmen (z.B. wichtige Telefonnummern) | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| Hochwasserschutz in Ihrer Gemeinde                                | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| Anderes, nämlich: .....   |                            |                            |                            |                            |                            |
| .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |



Es folgen nun noch einige allgemeine Fragen zu den längerfristigen Folgen des Hochwassers von 2002.

53. Ein Ereignis wie das Hochwasser 2002 kann verschiedene Folgen haben. So kann sich z.B. das Zusammenleben innerhalb der Gemeinde, aber auch das Vertrauen in öffentlichen Einrichtungen verändern. Bitte geben Sie für die nachfolgenden Punkte an, ob sich die Situation verschlechtert oder verbessert hat.

|   | Hat sich verschlechtert    |                            |                            |                            |                            | Hat sich verbessert | Weiß nicht                 |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------|----------------------------|
| Solidarität unter den Bewohnern                                       | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| Neid und Missgunst unter den Bewohnern                                | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| Bewusstsein für eine Hochwassergefahr                                 | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| Vertrauen in Hilfsorganisationen wie THW oder Freiwillige Feuerwehr   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| Vertrauen in karitative Organisationen wie Deutsches Rotes Kreuz usw. | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| Vertrauen in die Gemeindeverwaltung                                   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| Vertrauen in den Staat  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| Anderes, nämlich: .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |                     | <input type="checkbox"/> 0 |
| .....   |                            |                            |                            |                            |                            |                     |                            |

54. Wurden im Zusammenhang mit dem Hochwasser 2002 Fehler gemacht?

Ja ☐1 Welche?.....  
 .....  
 .....  
 Nein ☐2  
 Weiß nicht ☐0

55. Haben Sie aus dem Hochwasser 2002 etwas gelernt?

.....  
 .....  
 .....

56. Die Zukunft bietet für jeden Menschen Ungewissheiten, die einem Sorgen bereiten können – Krankheit, Unfälle, finanzielle Nöte infolge von Arbeitslosigkeit und vieles mehr. Ist die Sorge wegen des nächsten Hochwassers für Sie eher nachrangig oder steht sie eindeutig im Vordergrund?

Nachrangig ☐1 ☐2 ☐3 ☐4 ☐5 Steht im Vordergrund  
 Weiß nicht ☐0

Abschließend haben wir noch einige Fragen zu Ihrer Person und Ihrem Haushalt. Diese Angaben sind wichtig für uns und dienen ausschließlich dazu, die Bewohner in statistische Gruppen einzuteilen. Daher bitten wir Sie auch diese Frage noch sorgfältig auszufüllen.

57. Wie alt sind Sie? ..... (Jahre)

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58. Sind Sie ... ?      ein Mann      ☐<sub>1</sub>      eine Frau      ☐<sub>2</sub>

---

59. Das Haus/die Wohnung, in dem ich lebe, ist:

- Mein/Unser Eigentum/Teileigentum      ☐<sub>1</sub>  
Gemietet      ☐<sub>2</sub>  
Anderes, nämlich: ..... ☐<sub>3</sub>
- 

60. Besitzen Sie weiteres Eigentum hier in der Gegend?

- Ja, Häuser bzw. Wohnungen      ☐<sub>1</sub>  
Ja, Landwirtschaftsfläche bzw. Gärten      ☐<sub>1</sub>  
Ja, anderes, nämlich: ..... ☐<sub>1</sub>  
Nein      ☐<sub>2</sub>
- 

61. In was für einem Haustyp wohnen Sie?

- Freistehendes Einfamilienhaus      ☐<sub>1</sub>  
Doppelhaushälfte      ☐<sub>2</sub>  
Reihenhaus      ☐<sub>3</sub>  
Mehrfamilienhaus/Wohnblock      ☐<sub>4</sub>  
Anderer Typ, nämlich: ..... ☐<sub>5</sub>
- 

62. Wie groß ist die Grundfläche Ihres Hauses/Ihrer Wohnung?

..... Quadratmeter

---

63. Wie viele Personen, Sie eingeschlossen, leben in Ihrem Haushalt?

..... Personen

**64. Mit wem leben Sie in Ihrem Haushalt?** Bitte geben Sie nur eine Antwort.

- Ich lebe allein. ☐<sub>1</sub>  
Ich bin allein erziehend. ☐<sub>2</sub>  
Ich lebe mit Partner/in, aber ohne Kinder. ☐<sub>3</sub>  
Ich lebe mit Partner/in und Kind/ern. ☐<sub>4</sub>  
Ich lebe in einer Wohngemeinschaft. ☐<sub>5</sub>  
Ich lebe bei/mit meinen Eltern. ☐<sub>6</sub>  
Ich lebe bei meinen Kindern. ☐<sub>7</sub>  
Ich lebe anders, nämlich: ..... ☐<sub>8</sub>  
..... ☐<sub>8</sub>

---

**65. Wie viele Kinder leben in ihrem Haushalt?**

..... Kinder unter 18 Jahre      ..... erwachsene Kinder

---

**66. Leben in Ihrem Haushalt auch behinderte oder dauerhaft kranke Personen?**

- Ja ☐<sub>1</sub>      **Wie viele?** ..... Personen  
Nein ☐<sub>2</sub>

---

**67. Was ist Ihr höchster schulischer Ausbildungsabschluss?**

- Hauptschul- /Volksschulabschluss, POS 8./9. Klasse ☐<sub>1</sub>  
mittlere Reife/Realschulabschluss, POS 10. Klasse ☐<sub>2</sub>  
Hochschul-/Fachhochschulreife ☐<sub>3</sub>  
Ohne Abschluss/vor 8. Klasse abgegangen ☐<sub>4</sub>  
Noch in der Schule ☐<sub>8</sub>

---

**68. Was ist Ihr höchster beruflicher Ausbildungsabschluss?**

- Anlernzeit, Volontariat, Teilfacharbeiter ☐<sub>1</sub>  
Abgeschlossene Lehre, Facharbeiter ☐<sub>2</sub>  
Fachschul-/Meister-/Technikerabschluss ☐<sub>3</sub>  
Fachhochschulabschluss ☐<sub>4</sub>  
Hochschul-, Universitätsabschluss ☐<sub>5</sub>  
Ohne Abschluss ☐<sub>6</sub>  
Noch in der Ausbildung ☐<sub>8</sub>

---

**69. Wie viel Geld hat Ihr Haushalt monatlich zur Verfügung? Denken Sie dabei an das Netto-Einkommen aller Haushaltsmitglieder, Kindergeld, Renten, Arbeitslosengeld usw.**

- |                  |                                       |                 |                                       |
|------------------|---------------------------------------|-----------------|---------------------------------------|
| bis 499 €        | <input type="checkbox"/> <sub>1</sub> | 500 – 999 €     | <input type="checkbox"/> <sub>2</sub> |
| 1.000 – 1.499 €  | <input type="checkbox"/> <sub>3</sub> | 1.500 – 1.999 € | <input type="checkbox"/> <sub>4</sub> |
| 2.000 – 2.599 €  | <input type="checkbox"/> <sub>5</sub> | 2.600 – 3.999 € | <input type="checkbox"/> <sub>6</sub> |
| 4.000 € und mehr | <input type="checkbox"/> <sub>7</sub> |                 |                                       |

**70. Was ist Ihr derzeitiger Erwerbsstatus?**

- |  |                             |
|--|-----------------------------|
| Vollzeiterwerbstätig (mind. 35 h)        | <input type="checkbox"/> 1  |
| Teilzeit- oder stundenweise erwerbstätig | <input type="checkbox"/> 2  |
| Arbeitslos/auf Arbeitssuche              | <input type="checkbox"/> 3  |
| In ABM oder Umschulung                   | <input type="checkbox"/> 4  |
| Wehr-/Zivildienstleistender              | <input type="checkbox"/> 5  |
| In Ausbildung (Azubi, Student/in)        | <input type="checkbox"/> 6  |
| Hausfrau/Hausmann                        | <input type="checkbox"/> 7  |
| Im Mutterschutz/in der Elternzeit        | <input type="checkbox"/> 8  |
| Rentner/Rentnerin                        | <input type="checkbox"/> 9  |
| Aus anderen Gründen nicht erwerbstätig   | <input type="checkbox"/> 10 |

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**71. Was ist Ihre derzeitige bzw. was war Ihre letzte berufliche Stellung?**

- |   |                            |
|---|----------------------------|
| Un-/angelernter Arbeiter                        | <input type="checkbox"/> 1 |
| Vorarbeiter/Polier/Facharbeiter                 | <input type="checkbox"/> 2 |
| Einfacher Angestellter/Beamter einfacher Dienst | <input type="checkbox"/> 3 |
| Mittlerer Angestellter/Beamter gehobener Dienst | <input type="checkbox"/> 4 |
| Leitender Angestellter/Beamter höherer Dienst   | <input type="checkbox"/> 5 |
| Selbstständiger                                 | <input type="checkbox"/> 6 |

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**Abschließend noch zwei kurze Fragen:**

**Haben Sie Interesse an den Ergebnissen dieser Befragung, z. B. durch Information im Amtsblatt oder in der Tagespresse?**

ja            1                      nein            2

**Möchten Sie uns noch etwas mitteilen, was Ihrer Meinung nach im Fragebogen zu kurz gekommen ist?**

.....

.....

.....

.....

***HABEN SIE VIELEN DANK!!!***

***Sie haben uns mit Ihren Antworten wirklich sehr geholfen.***