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Flood risk perception and behavioural responses in conditions of repeated floods: evidence from Bagnacavallo (Ravenna, Italy)

Alexandra D'Angelo
University of Padua
Laura Marcon
laura.marcon@istc.cnr.it
National Research Council
Sara Gil-Gallen
National Research Council
Marcello Petitta
Roma Tre University
Giulia Andrighetto
National Research Council

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Abstract

Since 2023, the Italian region of Emilia-Romagna has been struck by a sequence of catastrophic floods, offering a rare scenario for observing how communities psychologically and socially adapt when environmental disaster becomes recurrent rather than exceptional. In May 2023 alone, two floods within two weeks caused 23 rivers to overflow and triggered more than 400 landslides across 123 municipalities, killing 17 people and leaving roughly 10,000 residents without a habitable home. Further flooding occurred in September 2024, with additional flash floods in October-November 2024 and March 2025. This repeated exposure raises a question central to the psychological and behavioural dynamics in the context of catastrophic events: does chronic risk erode or strengthen the social fabric needed for collective action? Focusing on how social norms shape cooperation in the face of collective environmental risk, we conducted three Focus Group Discussions and a survey (N=100) in Bagnacavallo (RA), one of the towns most severely and repeatedly affected. The research objectives are twofold: first, to investigate the evolution of flood risk perception among the residents of Bagnacavallo, with particular emphasis on the degree to which climate change is recognised as a driver of increasingly frequent and intense extreme events. Second, to examine how this evolving risk perception shapes behavioural engagement, both in the form of interpersonal cooperation and climate-oriented mitigation actions. Our findings show that repeated disasters act not merely as acute shocks but as long-term social stressors that reshape collective behaviours, reconfiguring risk perception, and generating a complex entanglement of cooperation, conflict, and institutional distrust. These dynamics illuminate the conditions under which communities move toward – or away from – sustained collective engagement under chronic environmental threat, contributing to broader debates on the normative and motivational foundations of community-level environmental response.

1. Introduction

In recent years, the Italian region of Emilia-Romagna has emerged as a critical site for observing the multi-hazardous nature of contemporary societies in a changing climate. The year 2023 was punctuated by a dual state of emergency – addressing first chronic drought and then catastrophic floods – illustrating rapid oscillations between hydrological extremes. In fact, following two years of severe water scarcity, in May 2023 the region was hit by two high-intensity pluvial events in rapid succession. This abrupt transition from drought to inundation triggered widespread soil erosion, riverine flooding, and systemic levee failures across the Romagna area, resulting in extensive damage to the lives of many. This abrupt oscillation between hydrological extremes was not incidental. The prolonged drought and the catastrophic rainfall share a common physical background: a warming Mediterranean atmosphere that both dries the land surface and, when a critical meteorological configuration occurs, brings storms with substantially more moisture (Barreto Rodriguez 2026). The two flooding events described above were considered rare and

exceptional on their own. However, in September 2024, another intense rainfall event once again caused severe damage to residential infrastructure, workplaces, agricultural lands, and viability in a portion of the territory that had already been heavily affected by the previous events. In the wake of this destruction, thousands of families were forced to leave their homes for short-, medium-, or long-term periods, and the territory underwent significant transformation.

The present study examines the extent to which recurrent disasters reshape not only the physical landscape but also the perceptions, attitudes and underlying social behaviours of the affected population. The research was conducted in Bagnacavallo, a small town in the province of Ravenna that suffered severe damage from all three flooding events occurring between 2023 and 2024. The research objectives are twofold: first, to investigate the evolution of flood risk perception among the residents, with particular emphasis on the degree to which climate change is recognised as a driver of increasingly frequent and intense extreme events. Second, to examine how risk perception shapes behavioural engagement, both in the form of interpersonal cooperation and climate-oriented mitigation action.

Three main gaps in the literature motivated the present study. First, empirical analyses of flooding contexts have rarely focused on multiple and recurrent events affecting the same, and small, community. This condition represents a particularly relevant setting for investigating risk perception, as it allows moving beyond an event-based approach and instead considers the cumulative effects of repeated exposure over a relatively short period of time – an increasingly common scenario in the context of climate change. Second, existing research has only limitedly addressed the role of climate change as a perceived driver of extreme events, leaving unexplored how individuals and communities interpret the link between catastrophic events, such as local flooding experiences, and broader climate dynamics. Third, the literature presents mixed and often contradictory evidence regarding cooperation and pro-social behaviour in the aftermath of natural disasters. In particular, it remains insufficiently understood how cooperative dynamics evolve over time when disasters are recurrent and when their material impacts are unevenly distributed within a community. When some residents suffer severe and repeated losses while others remain largely unaffected, the boundaries of solidarity are not fixed but are actively contested: whether cooperative behaviour extends across groups – drawing in those who did not directly experience damage – or remains bound within the community of those most affected is an open empirical question. Equally open is the temporal trajectory of such dynamics: whether an initial phase of solidarity gives way, over successive events, to fragmentation along lines of differential exposure, and whether in-group/out-group distinctions harden as the recovery process unfolds.

To address these gaps, we draw on original field data combining three Focus Group Discussions (FGDs) with residents differentially affected by the flood events in Bagnacavallo (N = 21) and a survey (N = 100) of the population in the affected areas. The focus groups constitute the core empirical material of the study. The survey served as a complementary tool, broadening the pool of respondents and deepening some aspects emerging from the qualitative data. The analysis was further informed by multiple observations conducted throughout both the emergency and post-emergency phases, including attendance at public meetings and events or community assemblies.

We find that the risk of future flooding is perceived as high, affecting both those who have and have not experienced direct damage; that awareness of the link between climate change and

increasingly recurrent flooding events is widespread; and that cooperative behaviour, while central during the emergency phase, tends to give way to tension and conflict thereafter. Cooperation is broadly recognised as being an important part of sustainable action while individual action alone is widely perceived as insufficient. The paper is structured as follows. Section 2 reviews the literature relevant to the study's aims: it first discusses approaches to flood risk perception and their relationship to climate change awareness and then examines the theoretical and empirical foundations of cooperative behaviour in the aftermath of natural disasters, with attention to in-group/out-group dynamics. Section 3 outlines the research context and the methodology adopted to address the research objectives. The results are presented and discussed in Section 4. The final section brings together concluding remarks, limitations, and directions for future research.

2. Literature review

2.1. Sociological approaches to risk perception

Once catastrophic events came to be understood as phenomena embedded in societal structures and cultural expressions, rather than merely technical issues, the study of how individuals and local communities perceive the risk related to such events has gained growing significance. This interest has been further amplified by the increasing frequency and intensity of extreme events associated with climate change, alongside the recognition that understanding public perceptions of climate-related risks is essential for the development of effective risk management strategies (Kellens et al. 2011). In fact, it is recognised that aligning institutional approaches with public perceptions can enhance trust in authorities, improve preparedness, and strengthen societal capacity to respond to flood events (Bradford et al. 2012).Within this broader field, flood risk perception has emerged as a particularly active area of research, constituting a dynamic and rapidly expanding domain of empirical investigation (Agrawal 2018).

Attempts to define risk perception and to identify the factors that influence it have been multiple and often contested (e.g. Lindell and Hwang 2008; Lechowska 2018; Rufat and Botzen 2022). Broadly speaking, risk perception can be understood as the subjective judgments and intuitive evaluations that individuals form regarding the probability and consequences of potential hazards (Slovic 2000). Over the past two decades, nine review studies on flood risk perception have been published, focusing on the drivers and dimensions of risk perception (Boholm 1998; Bradford et al. 2012; Bubeck et al. 2012; Wachinger et al. 2013; Birkholz et al. 2014; Lechowska 2018), on perceptions related to risk communication (Kellens et al. 2013), or on specific regional contexts, such as Central European countries (Raška 2015). The most recent systematic review examines the different approaches to flood risk perception research and their relevance for risk management (Lechowska 2022). Overall, these studies highlight that empirical findings on flood risk perception remain inconsistent and often yield contradictory results: "the way particular characteristics determine flood risk perception is not clear and many authors show diverse conclusions from similar research" (Lechowska 2018, p. 1341). This inconsistency underscores the multifaceted and context-dependent nature of risk perception. Nevertheless, to qualitatively investigate risk perception in a given context, it is essential to consider the range of factors identified as most influential in shaping risk perception.

Direct experience with flooding has consistently been shown to be strictly connected to risk perception and to increase both risk awareness and protective behaviours. Many empirical studies have demonstrated that people with a direct experience of floods display a higher level of risk perception (Kellens et al. 2011; Qasim et al. 2015), while in the areas rarely plagued by floods, risk perception is usually low (Bradford et al. 2012; Messner and Meyer 2006). However, in the case of direct experience with floods, the opposite effect may also emerge: extreme events are sometimes perceived as rare, once-in-a-lifetime occurrences, leading individuals to adopt a form of fatalism and to feel implicitly protected after having already experienced such an event (e.g. Thistlethwaite et al. 2018).

Disaster experience is often connected to awareness and risk knowledge, including both objective knowledge about flood hazards and subjective awareness. Lindell and Hwang (2008) empirically demonstrated that, within the same geographic context, people who experienced the disaster were much more aware of territorial risks than those unfamiliar with it. Therefore, awareness can arise together with the experience of flood (Bradford et al. 2012), also as a result of the rise of negative feelings: Griffin et al. (2008), for example, have proved that anger feelings triggered by the experience of a disaster are associated with the desire for information and risk knowledge. Access to information, previous exposure to risk communication, and the clarity of institutional messaging all contribute to shaping how individuals interpret and evaluate flood risk.

Closely related to this is the dimension of trust in institutions, which has been identified as a key factor influencing not only risk perception but also individuals' willingness to adopt protective behaviours (e.g. Terpstra 2011). Strictly connected to trust in institutions is the dimension of controllability – namely, the extent to which individuals believe that damage and losses can be prevented, managed or mitigated – which has been shown to influence both levels of concern and behavioural responses. Further consistent findings in empirical research emerge with regard to spatial and physical proximity to hazard-prone areas (Khan et al. 2026), as individuals living closer to rivers or in flood-exposed areas generally exhibit higher perceived risk (Coquet et al. 2019). Balžekienė et al. (2025) specifically focused on research based on the significance of proximity on subjective risk perception, showing how the majority of empirical investigations detect a positive correlation between risk perception and proximity to the source of hazard. However, the dimensions of trust in flood management, perceived controllability, and proximity – or the combination of these factors – can produce paradoxical effects on risk perception, among which the most widely discussed is the levee paradox (Dufty and Garrett 2022): building flood-control infrastructures creates a sense of safety and security and can encourage settlement, economic investment, and population growth in flood-prone areas. But, in the event of extreme events, the protection systems may rupture or be overtopped, and the damage can be significantly more severe. In this sense, the levee paradox highlights how risk perception is shaped not only by hazard exposure and proximity, but also by the presence of protective measures, which may foster a false sense of security and reduce individual and collective concern or mitigation efforts (Ludy and Kondolf, 2012).

Emotional dimensions likewise play a pivotal role in shaping risk perception. Feelings such as fear, anxiety, worry, and a sense of insecurity profoundly influence how hazards are perceived, mediating the relationship between objective hazard conditions and subjective interpretations (Loewenstein et al. 2001). This mediation can be shaped by both direct and indirect experience of disaster events, as well as by levels of trust in institutions and their perceived capacity to mitigate

disaster impacts. In this sense, emotions function both as cognitive shortcuts and as socially mediated signals, influencing not only how risk is understood but also individuals' willingness to engage in protective behaviours. However, the relationship between emotions and mitigation behaviours is not unidirectional: while feelings such as fear and concern may encourage protective actions (Weinstein et al. 2000), prolonged exposure to risk and the resulting emotional strain, such as fatigue or depression, may instead discourage such responses (Hanson et al. 1982). Some socio-demographic characteristics – such as age, gender, education, social status, income – have also been found to influence risk perception (e.g. Botzen et al. 2009; De Pascale et al. 2026), albeit with mixed and often inconsistent results across contexts. In this regard, some studies have pointed out that these individual characteristics do not play direct important roles but act as mediators or amplifiers of the main causal connections between risk perception and experience, trust, and attitudes toward taking protective or mitigation actions (Watchinger et al. 2013).

Finally, another important dimension for assessing risk perception within a given context is the adoption of risk mitigation practices, or hazard adjustments (Lindell and Hwang 2008), namely preventive measures undertaken individually or collectively to reduce potential damage. The extent to which individuals or communities engage in such practices can serve as an indirect indicator of perceived risk at both the individual and collective level. In the context of flooding, for example, these measures may include elevating furniture or household contents above expected flood levels, implementing structural modifications to prevent water from entering dwellings, or adapting new everyday practices, such as relocating vehicles during periods of heavy rainfall. Such practices not only reflect perceived levels of risk but also reveal how individuals translate risk awareness into concrete adaptive behaviours.

Despite these advances, risk perception research has largely focused on single or isolated flood events, leaving limited understanding of how these dimensions evolve under conditions of recurrent and closely spaced disasters. A further gap concerns the relationship between flood risk perception and concern about climate change. Although climate change itself cannot be directly experienced, its impacts can (Whitmarsh 2008), suggesting that repeated flood experiences may shape not only perceptions of flood risk but also, more broadly, individuals' understanding of, and concern about, climate change.

This connection points to a further dimension of the factors reviewed above: direct experience, physical proximity to hazard-prone areas, and hazard adjustments shape not only risk perception but also how people behave toward one another – whether inundated or spared, near the river or further away, protected or not – in a relationship that is bidirectional with the social ties, norms, and dynamics of trust and conflict structuring community life. In communities affected by recurrent, unevenly distributed flooding, this intertwining raises pressing questions of cooperation: who is seen as a co-sufferer deserving support, to what extent groups help one another, and whether repeated disasters deepen or fracture the social fabric. The following section reviews the literature on prosocial behaviour, cooperation, and group dynamics in disaster contexts.

2.2 Social cooperation and conflict in the aftermath of natural disasters

The relationship between disaster exposure and prosocial behaviour has gained theoretical and empirical attention (e.g. Méon and Verwimp 2022), yet the evidence remains mixed, and the temporal dynamics of cooperation and conflict across the post-disaster process are still unclear. To deal with this literature, we draw on three intertwined bodies of work: the theoretical and experimental literature on prosocial behaviour and cooperation; the empirical evidence, particularly flood-specific, on how direct exposure to collective disaster affects these behaviours over time and across differently affected groups; and the dynamics of in-group and out-group relations, specifically the extent to which social identity theory and in-group favouritism shape cooperation under conditions of collective risk. While there are well-established theoretical reasons to expect floods to activate cooperative responses, the empirical evidence is mixed and context-dependent, and the temporal evolution of cooperation and conflict across the phases of the post-disaster process remains insufficiently studied.

Cooperation in response to collective threats is best understood as a conditional social norm: individuals are willing to contribute to collective effort, for example by implementing mitigation or adaptation measures, when they believe others will do the same, but this willingness is contingent on the belief structures that sustain the norm (Fehr and Fischbacher 2004). From a social dilemma perspective, collective action benefits everyone, but individual incentives to free ride persist unless prosocial motivations or shared norms intervene (Ostrom 1990; Carattini et al. 2019). Experimental research has consistently shown that cooperation is sustained not only through external enforcement but through reciprocal expectations (Ostrom 2000; Fischbacher et al. 2001). Bicchieri (2006) formalizes this by distinguishing empirical expectations – beliefs about what others will actually do – from normative expectations – beliefs about what others think one ought to do. Both must be sufficiently strong for a cooperative norm to take hold; when it is eroded, so is the norm. This norm-based conditionality scales beyond the laboratory: Becchetti et al. (2025), studying collective responses to climate threats in a setting where individual action is costly but collectively necessary, find that perceptions of others' cooperative behaviour significantly predict individual willingness to act. Critically, however, the same conditional structure that makes cooperation possible also makes it fragile: if empirical or normative expectations shift – because others appear to be defecting, because the normative reference group fractures, or because perceived obligations weaken – cooperation can unravel as rapidly as it emerged.

Natural disasters can both activate and weaken prosocial behaviour and the social norms that sustain it, and the empirical evidence reflects both dynamics. In the acute phase, shared exposure to material loss generates high mutual visibility and perceived common fate, temporarily strengthening social norms of cooperation (i.e. empirical and normative expectations), producing the rapid escalation of solidarity documented across diverse disaster contexts (Dynes and Quarantelli 1976; Solnit 2010; Szekely et al. 2021; Vriens et al. 2024). The norm-activation model (Schwartz 1977) provides a complementary mechanism: prosocial behaviour is triggered when a need is visible, personal responsibility is salient, and a moral obligation is felt – conditions that disasters tend to meet at once (Bubeck et al. 2012). Experimental evidence on collective risk confirms that the salience of shared threat is a genuine driver of cooperation: Milinski et al. (2008) show that a higher perceived risk of collective failure substantially increases cooperative contributions, and Szekely et al. (2021), in a long-term experiment, demonstrate that collective risk not only activates prosocial

behaviour but actively reshapes the social norms governing it, with cooperative norms emerging as risk increases. In line with these predictions, the empirical literature on floods and extreme events documents significant prosocial effects in many contexts: Rao et al. (2011) found that greater devastation from the 2008 Wenchuan earthquake predicted stronger prosocial intent; Cassar et al. (2017) documented long-lasting increases in prosocial behaviour among tsunami-affected communities in Thailand; and Chongo and Clot (2024) found that flood-affected farmers in Zambia cooperated substantially more in managing communal resources than their unaffected counterparts. Yet the evidence is far from uniform. Hoenow et al. (2025), studying the 2021 German floods, found a complex and internally contradictory prosociality pattern – higher altruism alongside lower positive reciprocity and higher negative reciprocity – which suggests emotional strain rather than generalized solidarity. Veszteg et al. (2015) found no significant effect of the Tohoku earthquake on trust, despite the scale of the disaster. Cross-national analyses confirm this ambiguity: positive effects on in-group solidarity following disasters are temporary and do not reliably extend to out-groups (Carlin et al. 2014; Yamamura 2016). Particularly relevant for the present study, Pancotto et al. (2024), in a lab-in-the-field experiment across earthquake-affected municipalities in two neighbouring Italian regions, found not only that personal damage – rather than community embeddedness – was the primary driver of prosocial differences, but that the same disaster produced substantially different cooperative dynamics across regions. Disaster-induced prosociality, in short, is highly context-dependent: the same event can strengthen cooperation in some communities while leaving it unchanged or weakened in others.

Three mechanisms help explain why post-disaster cooperation and the norms sustaining it are structurally vulnerable to erosion as communities move from acute emergency into recovery and reconstruction. First, the cooperative dilemma itself changes shape across this process. Gächter et al. (2017) show that positive reciprocity – a key driver of cooperation – is substantially weaker in maintenance dilemmas than in provision dilemmas, even with identical material incentives; recovery is a maintenance task, restoring what existed rather than creating something new, and this framing diminishes the reciprocal motivations activated during the emergency. Second, structural heterogeneity in exposure creates exit options that undermine collective solutions. De Dreu et al. (2020) show that when some group members can solve a shared problem individually – through private repairs, insurance, or relocation – self-reliance crowds out group cooperation, leaving more dependent members exposed and widening inequality. In communities like Bagnacavallo, where material damage was radically uneven across hamlets and households, this mechanism may operate on a territorial scale: those able to recover independently are likely to withdraw from collective efforts, fragmenting the normative basis for shared recovery. Third, and most fundamentally, the social norms that generate cooperation in a collective threat are inherently fragile under sustained uncertainty. Vriens and Andrighetto (2025) identify a core paradox: norms are most actively sought when uncertainty is high, because they reduce behavioural ambiguity, yet that same uncertainty destabilizes them. Tracking norm dynamics under fluctuating pandemic risk, Vriens et al. (2024) show that cooperative norms coevolve with perceived risk but decline faster than they are re-established as the threat recedes – an asymmetry they attribute to a compliance-violation bias (Bicchieri et al. 2022; Gächter et al. 2025), whereby people respond more strongly to a few observed, unpunished violations than too many instances of compliance. Norm persistence in contexts cycling between acute and more moderate phases therefore depends on a system's ability to

keep expectation noise low even after macro-level shocks subside; decline occurs whenever the feedback loops between visibility and enforcement are disrupted.

When disasters are recurrent, as in Bagnacavallo, this dynamic compounds across events: repeated activation of prosocial obligations without adequate institutional resolution produces what can be described as norm fatigue, progressively weakening the obligatory force of mutual aid norms (Rao et al. 2011; Pancotto et al. 2024). These mechanisms together explain the temporal pattern consistently documented in the disaster literature: an acute phase marked by solidarity and mutual aid (Dynes and Quarantelli 1976; Coates 2022), followed by a recovery phase in which normative erosion, material competition, and institutional failures transform cooperative communities into conflictual ones (Lamond et al. 2015; Grunewald et al. 2010). The intention-behaviour gap documented by Osberghaus et al. (2025) reflects the end state of this process: even among those who express cooperative intentions after a flood, sustained collective action is substantially weaker among those without direct material damage, suggesting that heterogeneous exposure progressively fragments the shared normative expectations on which collective recovery depends.

A second, intersecting driver of cooperative and conflictual dynamics concerns the role of group boundaries when disaster exposure is unevenly distributed within a community. Social identity theory (Tajfel and Turner 2004) and the parochial altruism hypothesis predict that cooperation under shared threat strengthens in-group cohesion, while generating indifference or hostility toward out-groups: prosociality is bounded by perceived group membership, and the definition of who belongs to the relevant group shapes both the scope and the limits of solidarity (e.g., Choi and Bowles 2007). In the post-disaster context, where different residents and communities experience radically different levels of damage, the boundaries of the relevant in-group are not fixed but actively renegotiated – and the definition of who shares one's fate directly determines who falls within the normative scope of mutual aid. Recent large-scale evidence substantially complicates the parochial altruism prediction, however. Otten (2026), analyzing six datasets spanning 743,402 individuals in 121 societies, finds a robust positive relationship between in-group and out-group prosociality across all contexts and societies. When people are not structurally constrained to choose between in-group and out-group beneficiaries, those who are prosocial toward their in-group also tend to be prosocial toward out-groups: the dominant pattern is what Otten (2026) calls "imperfect universal prosociality" (p. 6) rather than bounded parochialism. This finding does not eliminate the in-group/out-group distinction – in-group prosociality is consistently higher in absolute terms – but it reframes the question. The critical variable is not whether community members are inherently parochial but whether structural conditions convert a generally prosocial orientation into a bounded one. Crucially, Otten (2026) finds that the co-occurrence of in-group and out-group prosociality weakens precisely in contexts characterized by high nepotism, particularism, and zero-sum resource competition – conditions that the post-disaster recovery process itself tends to produce.

The post-disaster context thus creates the structural conditions under which in-group favouritism is most likely to emerge and harden. Otten et al. (2020) show that heterogeneous groups can coordinate on cooperative norms despite divergent views on contribution levels, but only when situational conditions support it. Otten et al. (2022) show that shifts in group composition, of the kind produced by displacement, relocation, and the arrival of external relief workers, disrupt established cooperative norms and require slow renegotiation. From a social norms perspective,

solidarity fractures along group lines not because of individuals' inherent dispositions, but because of the circumstances that shape whether those dispositions lead to cooperation or not (Bicchieri2006): when different subgroups within a community disagree on who is a credible cooperative partner and what they owe one another, the social norms that sustain collective action break down. In communities like Bagnacavallo, where different hamlets experienced radically different levels of damage across multiple events, those who suffered severe losses may hold strong injunctive norms (i.e., rules of conduct people should follow) of reciprocal aid and expect these to be shared across the entire territory, while those largely spared may define their reference group more narrowly or perceive themselves as outside the community of co-sufferers. This norm of heterogeneity – where the same territorial identity coexists with radically different experiences of loss – erodes those social norms on which sustained collective action depends (Bicchieri 2016) and is amplified by the structural conditions of a prolonged and unequal recovery. It is this configuration of recurrent flooding, heterogeneous damage, contested group boundaries, and norm fragility under uncertainty that generates the cooperative and conflictual dynamics the present study is designed to detect.

3. Research context and methodology

3.1 Study area

Bagnacavallo is a small town located in the province of Ravenna, in the Emilia-Romagna region of northern Italy, within the area of Romagna (see Figure 1). This territory consists of a flat plain stretching between the Apennine Mountains and the Adriatic coast and is characterized by a dense network of rivers, extensive agricultural land, and a settlement pattern composed mainly of small and medium-sized towns. Bagnacavallo holds a population of approximately 16,500 residents, and its urban structure has developed over time around and between two major rivers: the Senio and the Lamone (see Figure 2), both of which played a central role in the flooding events of recent years.

Figure 1. Study area: on the left, the Emilia-Romagna region; on the right, the municipality of Bagnacavallo. Authors' creation with QGIS.

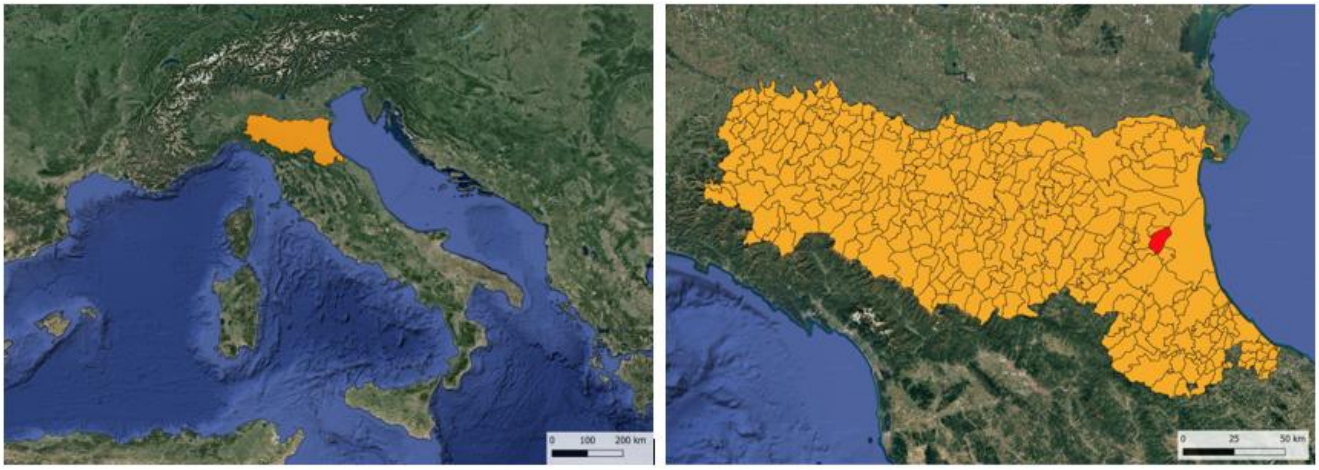
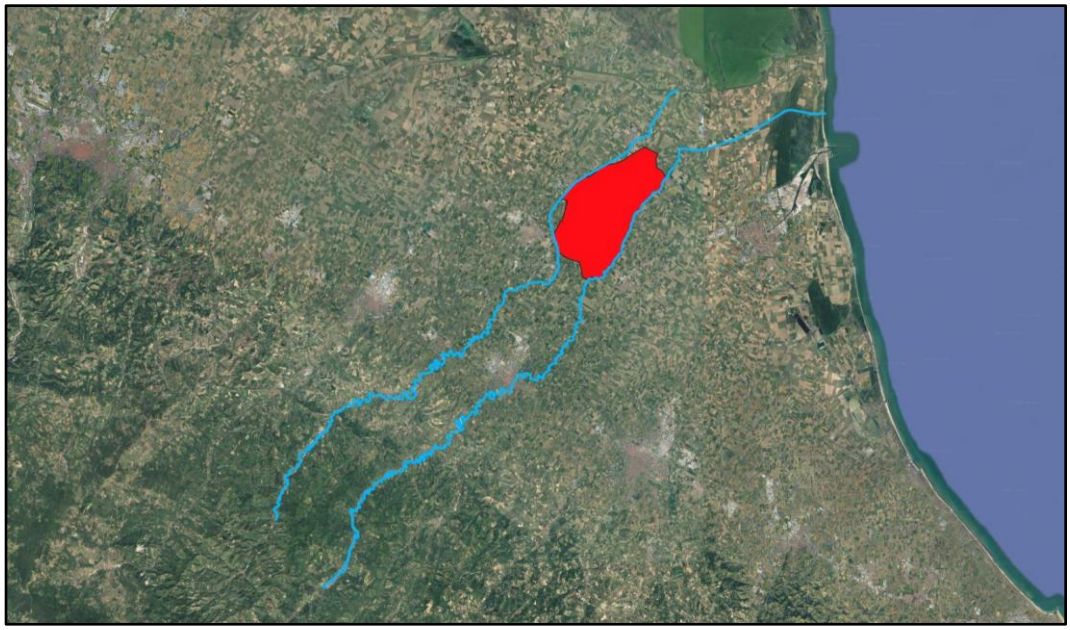


Figure 2. Study area: Bagnacavallo's municipality area,between the rivers Senio and Lamone. Authors' creation with QGIS.



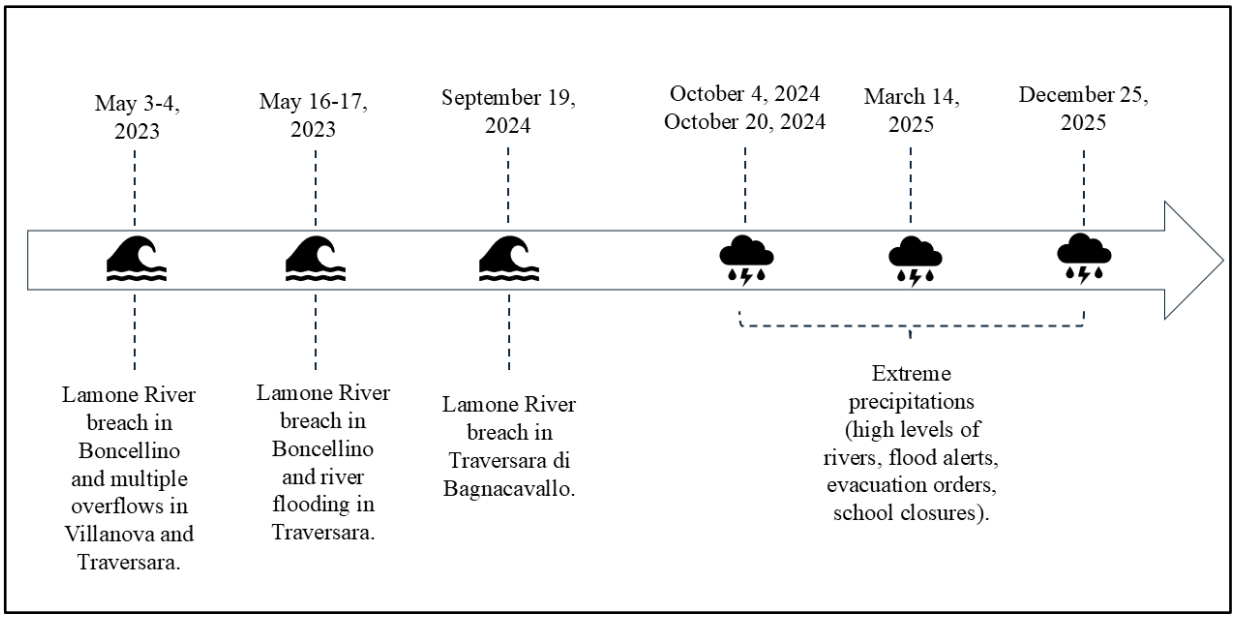
The first event, of moderate intensity, took place on May 2-3, while a second and more severe event occurred only a few days after, on May 16-17, further exacerbating the vulnerability of an already fragile territory.

The atmospheric forcing, however, explains only part of the severity of the impacts. Two years of drought had dried and compacted the soil, initially limiting their capacity to absorb water; the rainfall of early May then brought them to saturation, so that the mid-May precipitation fell on a hydrological system with virtually no residual storage capacity and was converted almost entirely into surface runoff (Dorrington et al. 2024; Barreto 2026). Extensive soil sealing associated with urbanisation further reduced natural drainage. It was this compounding of atmospheric, soil and land-use factors, rather than rainfall intensity alone, that turned an exceptional meteorological event into a hydrological catastrophe. The cumulative impact was devastating: 23 rivers overflowed and more than 400 landslides were activated, affecting a total of 123 municipalities in the entire region. Beyond the geophysical toll, the social consequences were profound, resulting in 17 fatalities and the displacement of nearly 50,000 individuals, many of whom were left without viable long-term housing solutions (Alessandrini et al. 2024). While the return period for such rainfalls was statistically estimated at 200 years – representing an annual probability of 0.5% (Barnes et al. 2023) – the recurrence of a similar high-intensity event in September 2024 challenged the traditional stationarity models. The third flooding event in a span of only fifteen months caused significant damage in Traversara, a locality of the municipality of Bagnacavallo, where a levee breach once again resulted in the destruction of multiple dwellings.

Like many municipalities in Romagna, the population of Bagnacavallo was differently impacted by the floods: while the hamlets of Boncellino, Traversara and Villanova, located near the Lamone river, were severely affected by the river's overflows, other portions of the municipality were never directly hit by the floodings. However, as this study demonstrated, the recurring extreme events occurring from May 2023 contributed to the spread of a profound sense of insecurity across the wider community, extending beyond those who experienced direct material losses. This sense of

insecurity was further exacerbated by further episodes of intense precipitation occurring in the months following the floods (see Figure 3), which did not result in actual flooding but led to rising river levels and triggered high-risk alerts, school closures and evacuation orders.

Figure 3. Flood events in Bagnacavallo: timeline. Author's creation.



3.2 Data collection and methodology

Exploratory meetings with members of the Bagnacavallo municipal council were conducted prior to the data collection phase to gain a deeper understanding of the local context and to inform the development of the initial research hypotheses. The data used to address the research aims were collected through three Focus Group Discussions (FGDs) (N=21) and a survey (N=100). The adoption of a qualitative focus group approach was employed in order to gain an in-depth understanding of the controversial, complex, and sometimes contradictory aspects of post-disaster social dynamics. Indeed, many of the factors influencing risk perception are inherently subjective, although embedded in social and cultural dynamics: this aspect requires researchers to adopt methodological approaches that can "translate these subjective dimensions into forms of data suitable for comparison across individuals" (Brennan et al. 2016, p. 2). In this regard, focus group discussions (FGDs) represent a particularly valuable tool. For instance, although the FGDs constitute the core empirical material of this study, the data collected through field observations and the survey were fundamental to corroborate, contextualize, and further explore the results that emerged from the focus groups.

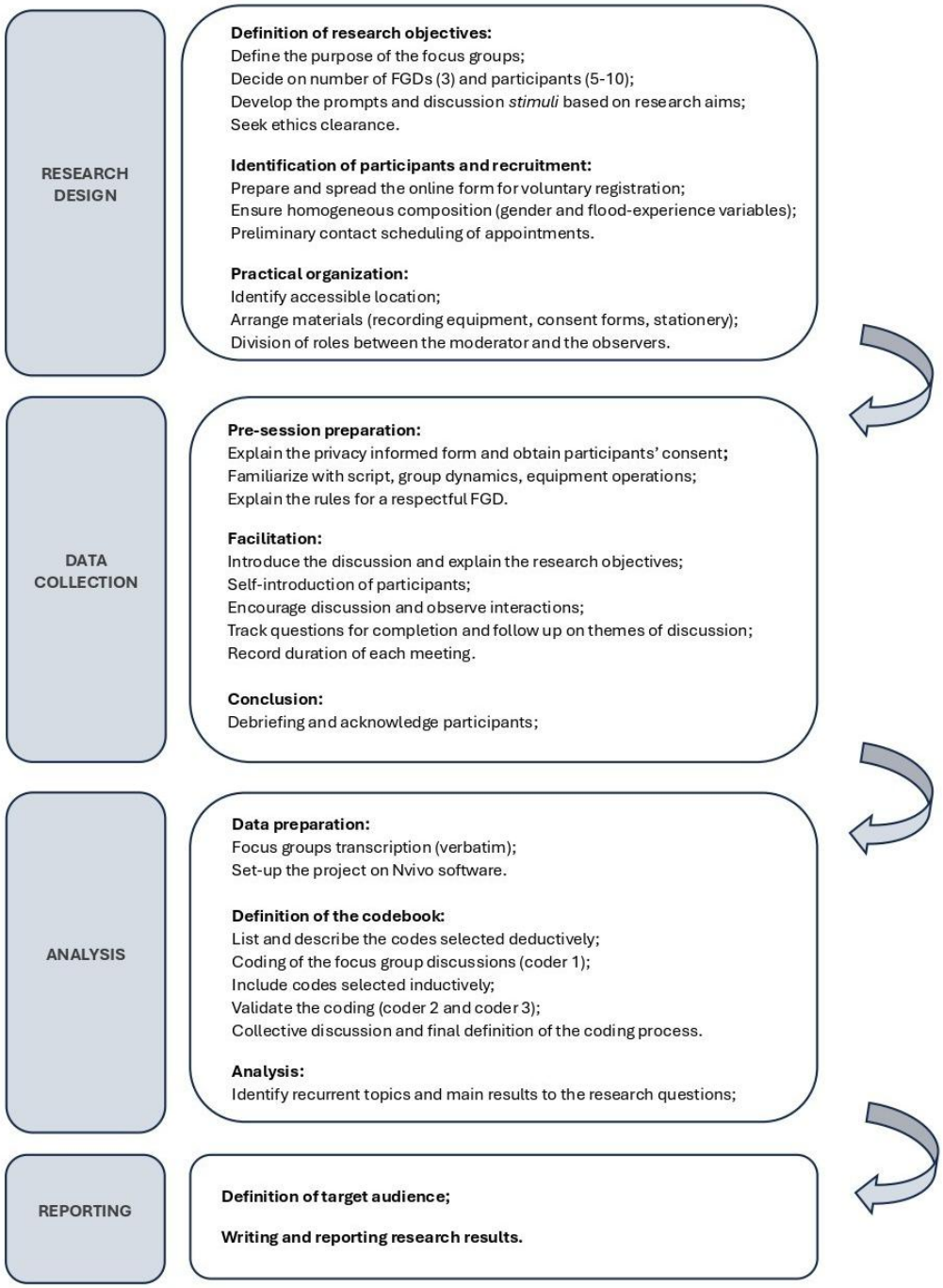
3.2.1 Focus groups

Participation in the FGDs was voluntary, for a total of 21 participants (see Section 1 of the Supplementary Materials for more details). The municipal administration assisted with participant recruitment by disseminating the invitation to participate in FGDs through an online registration

form, and by providing the public spaces where the FGDs were conducted. The groups were composed of a pool of 32 residents in Bagnacavallo who had previously registered via an online form. Participants were selected on the basis of their experience of the flood events, including residents who had been severely affected by the floods, individuals who had suffered moderate damage, and residents who had not been affected at all. This composition was intentionally designed with the purpose of capturing potential differences in the levels of risk perception and of cooperative attitudes between affected and unaffected residents within the same territory. In fact, the focus groups' method aimed to obtain data from a purposely selected group of individuals rather than from a statistically representative sample of a broader population (Nyumba et al. 2017).

The work of the FGDs followed a four-step technique composed of the following phases: research design, data collection, analysis and reporting (Morgan et al. 1998) (see Figure 4). The discussions took place between June and October 2025 and were conducted by a moderator, observed by two members of the research team, and facilitated by the use of prompts (Cardano 2011), previously designed and discussed that aligned with the research questions. Three main prompts were implemented, each reflecting specific research aims (see Section 2 of the Supplementary Materials for a description of the prompts). Discussions were recorded and transcribed verbatim and analyzed through coding using the qualitative data analysis software NVivo. The coding of the transcripts followed primarily a deductive approach, although additional inductive codes were incorporated into the codebook during the coding process. Each phase of the coding process is described in detail in Section 3 of the Supplementary Materials.

Figure 4. Focus group development in four steps.
Author's creation, adapted from Morgan et al. 1998.



3.2.2. Survey

The survey was conducted with the aim of expanding the number of participants involved in the study and of exploring the topics that emerged from the FGDs. The questionnaire consisted of three sections: a demographic one, which included a distinction between respondents who had been affected by the floods and those who had not; a section aimed at investigating risk perception; and a third one aimed at examining participants' attitudes toward the adoption of cooperative

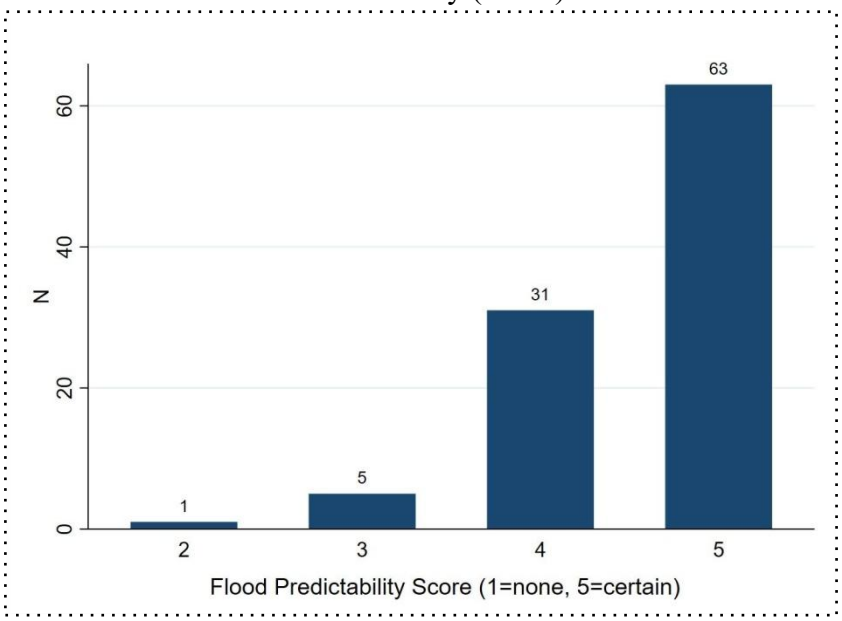
behaviours.The second section included questions regarding the (subjective) likelihood that another flooding emergency might happen in their territory, who is more at risk of being affected (i.e., risk vulnerability), and how severe the impact would be (i.e., risk severity). The third section aimed to map participants' beliefs about the extent to which individual habits and collective behaviour can help mitigate risks connected to climate change, and which habits they would be willing to change, such as reducing water consumption, using private cars less, cycling more, managing waste, recycling, and reducing meat consumption, as well as how willing they believe others in their community would be to do the same. In total, the survey collected 100 responses, with a relatively balanced distribution between male (43%) and female (57%) respondents, as well as between individuals affected by the floods (55%) and those not affected (45%). The survey therefore served a complementary and exploratory role, providing additional insights into the themes emerging from the qualitative data rather than aiming for statistical representativeness.

4. Results

4.1 Risk perception and its evolution over time

The analysis of the FGDs portrays a community deeply marked by the flood events that began in May 2023, characterised by strong emotional intensity and a radically transformed risk perception: in Bagnacavallo, risk is no longer conceived as a mere exception, but as a concrete and tangible reality, while the territory is perceived as structurally fragile. This finding was also confirmed by the data collected from the survey (Figure 5), where respondents were asked to rate, on a scale from 1 to 5, how likely they considered that future flood events would occur in their territory.

Figure 5. Distribution of perceived flood predictability.
Source: Survey (N=10).



In all three FGDs, several dimensions of risk perception widely discussed in the literature emerge clearly, which, in the context of Bagnacavallo, contribute to building a complex picture. Among these, the most prominent are: emotional dimensions, awareness of the phenomenon, knowledge of

the mechanisms generating floods, (dis)trust in institutions, and the mitigation and adaptation practices learned following the events. Proximity to rivers and, therefore, exposure to risk also emerged as a relevant dimension, connected both to knowledge of the phenomenon and to direct experience of the floods. In the following paragraphs, we describe each of these elements, highlighting both their prevailing and more contested aspects, while emphasising, where present, the differences between flood-affected and non-affected inhabitants.

The dominant emotional aspects are predominantly fear, uncertainty, anger, and a sense of helplessness, with varying intensity and nuances among participants. Fear represents the most widespread emotion and simultaneously concerns the memory of the past event and the concrete possibility of its recurrence: thus, it manifests both as a traumatic memory and as an anticipation of the future. The significant differences between them concern direct experience: individuals directly affected report deeper consequences and more radical transformations in daily life, resulting in a strongly embodied risk perception; participants who did not experience direct impacts maintain high levels of tension, but tend to express risk in more general terms, referring to the fragility of the territory and limited trust in institutional risk management. However, the high level of risk perception corresponds to non-affected inhabitants as well. In fact, the experience of disaster is not exhausted by the count of direct material damage. Floods profoundly transform the affected territories, imposing long periods of road closures, widespread construction works, and a redefinition of the spaces of everyday life. As a result, continuous exposure to such transformations produces a significant emotional impact even for those who did not experience the flooding of their own home, contributing to a widespread sense of vulnerability. This generalised tension is well expressed in the words of one participant: *"Every time there is a weather alert, we're all on edge. Those who lived through it firsthand certainly feel it more, but it's a general condition affecting our whole community"* (P4[1]). The sentiment of uncertainty has to do with both the predictability of future events and their possible consequences. Participants question which parts of the territory might be affected again and which protective measures would actually prove effective. This results in a condition of constant anticipation, fuelled by the numerous alerts issued after the floods: although these did not translate into new flooding, rising river levels and precautionary closures kept the perception of an imminent threat high. Finally, anger and frustration also represent the emotional aspects most frequently recalled by participants, and are closely connected to the perception of the ability of the institutions to govern risk. In fact, trust in institutions represents one of the most critical issues to emerge from the analysis. Participants report institutional communication being perceived as insufficient or contradictory, and limited transparency regarding ongoing interventions, particularly during the first event in May 2023. This sentiment emerges clearly in an exchange between two participants: *A: "If only we knew what the administration is doing! It's the lack of communication that creates anger, frustration"; B: "But is anything even being done? I mean, are they not communicating because they don't know how to, or because they're not doing anything?"* (P8 and P10). Added to this is the perception of slow interventions and fragmented responsibilities across different institutions, which fuels the idea that part of the impacts of the third flood (September 2024) could have been avoided through more adequate

[1] To ensure anonymisation, participants are reported using their corresponding participant code (see Table 1 of the Supplementary Materials).

management. The result is an overall erosion of trust in institutions, which inevitably contributes to heightening the residents' sense of insecurity and negatively affects the perception of future risk.

A further central element of risk perception concerns the role of memory within the territory. Intergenerational narratives, initially perceived as simple stories from the past, are retrospectively reinterpreted as possible keys to understanding the recent floods:

> *My father always described the river to me as a friend. He grew up on the river, and so did I. I always saw it as a friend, not an enemy. But then, in light of what happened, I did some research: the older generations said there were no problems, but regional technical documents had already been flagging critical structural issues since the early 2000s, exactly at the points where the river breached* (P11).

Thus, a fracture emerges between three levels of knowledge: family memory, which represented the river as safe; technical documentation, which had signalled critical issues for years; and direct experience, which contradicted both. This misalignment produces a sense of surprise and, in some cases, of betrayal, as reported in the words of P13: *"My anger is directed at whoever allowed this to happen, but I'm also a bit angry at the river, even though it's not its fault. Still, for a long time I haven't gone back to the river, even though I used to go there every day".* Risk perception is also reflected in the adoption of new adaptive and risk mitigation behaviours, now firmly embedded in everyday life: reorganising living spaces, installing removable barriers at entrances, and paying closer attention to mobility and vehicle placement during weather alerts. Basements and ground floors are no longer used to store valuables, or are arranged so that furniture and belongings can be quickly raised above the water levels reached during previous events. A particularly significant element is the newly established existence of *"household protocols for civil protection"* (P2): numerous participants describe a clear division of roles and responsibilities within the family unit, following informally shared procedures that have become consolidated through experience. Risk adaptation is thus expressed not only through material changes to domestic space, but also through relational and organisational practices aimed at responding quickly and in a coordinated manner to emergencies.

This transformation in the relationship with risk takes different forms among flood-affected and non-affected residents: the former adopt practical self-protection behaviours, while the latter have mainly developed forms of increased awareness that lead them to seek information, join civic committees, and engage in public debates. In both groups, a growing tendency to monitor water levels and warning systems has emerged, now part of everyday practices. Since the first flood in May 2023, a new knowledge of the territory and of the hydrogeological dynamics characterising flood events has emerged among focus group participants. This is knowledge built through direct or indirect experience of the disaster, translating into a greater awareness of one's own exposure to risk. Within this framework, proximity to waterways remains a relevant element in the subjective interpretation of territorial vulnerability: residents of the hamlets closest to the Lamone river tend to perceive themselves as more exposed. However, the variability of levee breach points across the three recent events has progressively challenged this spatial reading of risk, fuelling a sense of insecurity linked to the impossibility of predicting where and in what form future floods might occur. Risk perception thus appears to have shifted from a condition confined to certain areas of the territory to a vulnerability perceived as broader and potentially shared by the entire community.

During the design and conduct of the focus groups, we placed particular emphasis on participants' perception of the role of climate change in the occurrence of extreme events such as the recent floods. The analysis shows that this relationship is widely acknowledged by participants, although the presence of additional concurrent factors related to territorial management and risk prevention is also generally recognised. A particularly significant aspect concerns the shift from a predominantly abstract knowledge of climate change to an awareness built through direct experience of its effects. As noted by some participants, climate change was already a well-known phenomenon, but recent extreme events made its consequences more concrete and immediately perceptible: *"the flood was a consequence we saw right in front of us"* (P3). At the same time, the recognition of the role of climate change is intertwined with a dimension of responsibility and institutional inaction towards the phenomenon: climate change is not perceived solely as a largely uncontrollable global process, but also as a phenomenon whose impacts are exacerbated by the absence of adequate institutional interventions. Awareness of climate risk is thus associated with a sense of frustration, linked to the perception of a lack of institutional response on national and international levels, despite the existence of well-established knowledge. Overall, in the focus groups, climate change emerges as a central element in shaping flood risk perception. However, on a local level, it is not considered the main cause of recent floods, but rather a factor that interacts with structural vulnerabilities directly linked to human management of the territory.

4.2 Social dynamics of cooperation and conflicts in Bagnacavallo

The heightened risk perception described in Section 4.1 did not lead to univocal behaviour. Instead, it shaped how cooperation shifted in the different phases of the post-disaster process. Consistent with our focus on how cooperation and conflict within the community evolved over time, the discussions point to a community narrative structured around two contrasting sides. The first is a strong sense of solidarity in the immediate aftermath of the floods; the second is a form of self-interest, tension, and at times *"evilness"* (P9) that emerged once the emergency phase had passed. Participants from all three FGDs converge in describing the emergency phase by way of an unexpected paradox. Even as loss surrounded them, the scale and spontaneity of the response was experienced as deeply moving, – for instance, residents helping neighbours, volunteers arriving from across Italy, mutual aid organised informally – evoking the atmosphere of a celebration town. In this phase, solidarity also took the form of cooperation, as people worked alongside one another to respond to shared needs. This incongruity nonetheless fits with a broader pattern often observed after disasters: solidarity tends to emerge quickly and visibly, as social norms of mutual aid are activated almost immediately. The acute phase generated strong expectations that people would help one another, and residents experienced this not simply as cooperation but as a genuine sense of collective unity.

As the emergency phase receded, tension, competition, and increasingly individualised responses took hold. Part of this shift may be explained by the changing nature of the underlying cooperation problem: recovery is essentially a maintenance task, aimed at restoring what already existed, whereas the emergency response was a provision task, built around creating something new together. Since maintenance tasks tend to elicit weaker reciprocal motivations than provision tasks, this shift could help explain the decline in cooperation (Gächter et al. 2017). Critically, this

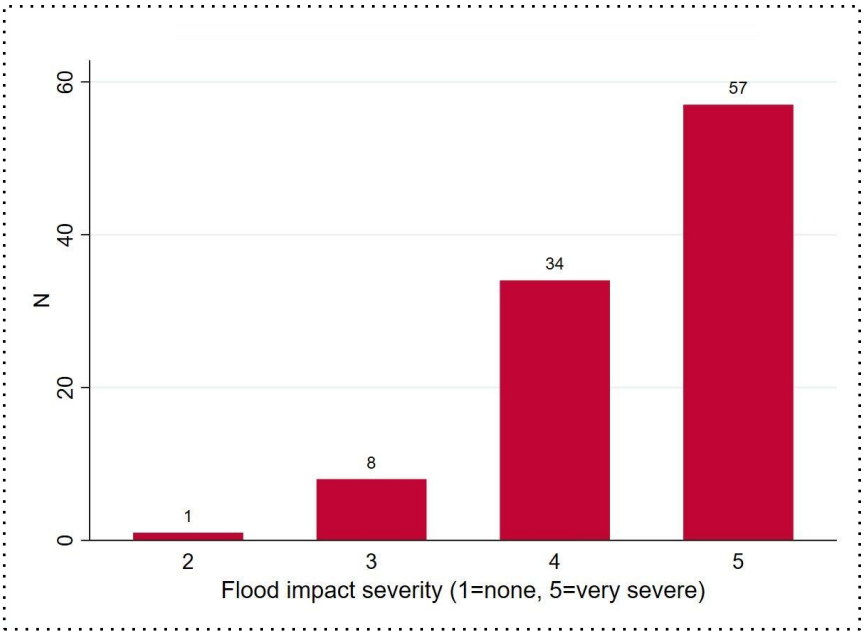
fragmentation did not occur solely along the divide between flooded and non-flooded residents, but also within the group of those directly affected. Residents who had suffered damage in a single flood event report being perceived differently from those who had been struck repeatedly in all three episodes, generating a form of comparative grievance over the legitimacy and severity of one's own suffering. As one participant summarised, "*it's become a competition over who has been hit harder by the floods*" (P7). This dynamic illustrates how, in the conditions of a recurrent but unevenly distributed disaster, the boundary of the relevant in-group is not defined solely by exposure versus non-exposure, but is further subdivided and contested along lines of cumulative exposure.

A parallel dynamic emerged among residents who had not suffered material damage at all. Rather than being exempted from the emotional weight of the disaster, several participants report a specific and recurring sense of guilt for having been spared, as reflected in the observation that "*it's clear that those who didn't experience the flooding firsthand even felt guilty for not having been affected by it*" (P20). This finding nuances the parochial altruism framework and the in-group/out-group literature discussed above: rather than exhibiting indifference or detachment from the in-group of the affected, unaffected residents appear to maintain an unresolved sense of obligation toward it, even though this identification does not appear sufficient to sustain cooperation over time.

These findings suggest that it is not disaster exposure as such, but the recurrence of disaster exposure and its uneven distribution amongst residents and over events that would reshape cooperative dynamics. The clearest and most consistent pattern recorded is temporal. Regardless of their internal fractures, participants describe the sense of community and solidarity that characterised the emergency phase as weaker in the post-emergency period. This decline coincides with a shift toward individualized forms of preparedness, as residents report relying on their own solutions to prepare for future events, rather than on collective or institutional responses.

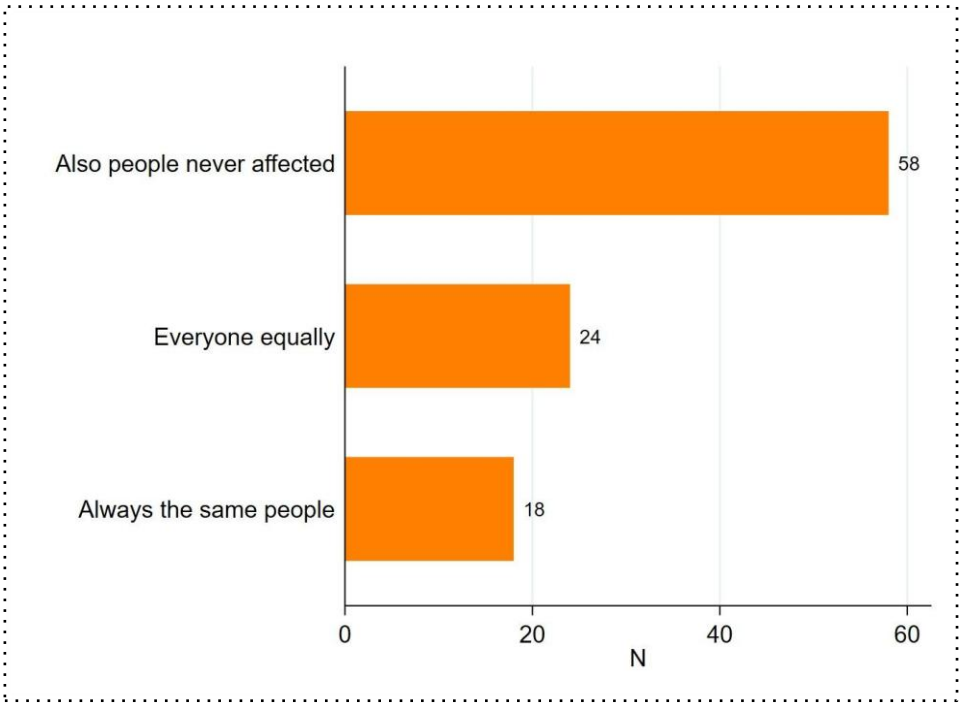
These qualitative findings are strengthened by the survey data. When asked how severe the impact of a future flood would be, respondents overwhelmingly cluster at the high end of the scale: 57 of 100 respondents rated expected severity as 'very severe' and a further 34 rated it 'severe' (Figure 6), with almost no respondents anticipating limited or no impact.

Figure 6. Distribution of perceived flood impact predictability.
Source: Survey (N=10).



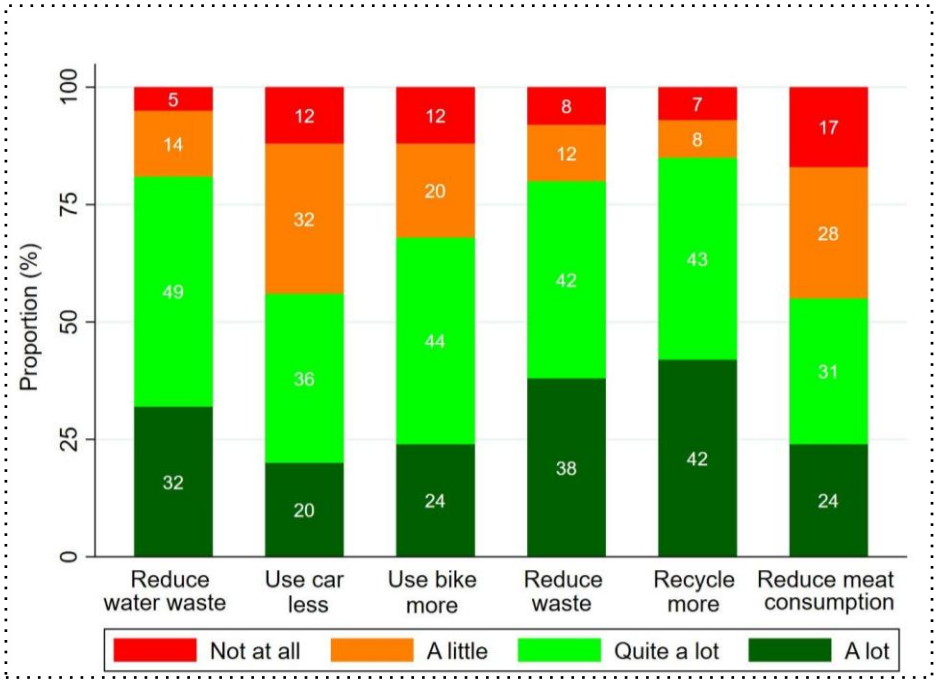
A similar pattern emerges in perceptions of risk vulnerability: when asked who is likely to be affected by a future event, the majority of respondents indicate that a future flood could also strike people who have never been affected before. By comparison, 24 respondents consider the risk to be shared equally by everyone, and only 18 believe the same residents would be hit again (Figure 7). Rather than distinguishing between directly and indirectly affected residents, or confining risk to areas already struck, the floods appear to have produced a levelling effect on risk perception across the community as a whole.

Figure 7. Perceived vulnerability to future floods.
Source: Survey (N=10).



Here, participants display a shared recognition of the value of individual pro-environmental action, such as reducing meat and waste consumption, improving waste separation and recycling, riding a bike, combined, however, with a widespread perception that such actions carry limited practical weight. The survey also allows this picture to be extended to the domain of climate-related mitigation behaviours, and here a more critical dynamic emerges. Respondents report, on average, a moderate individual willingness to adopt sustainable habits, such as cycling more, reducing meat consumption, and improving waste separation, in order to mitigate climate-related risks (Figure 8).

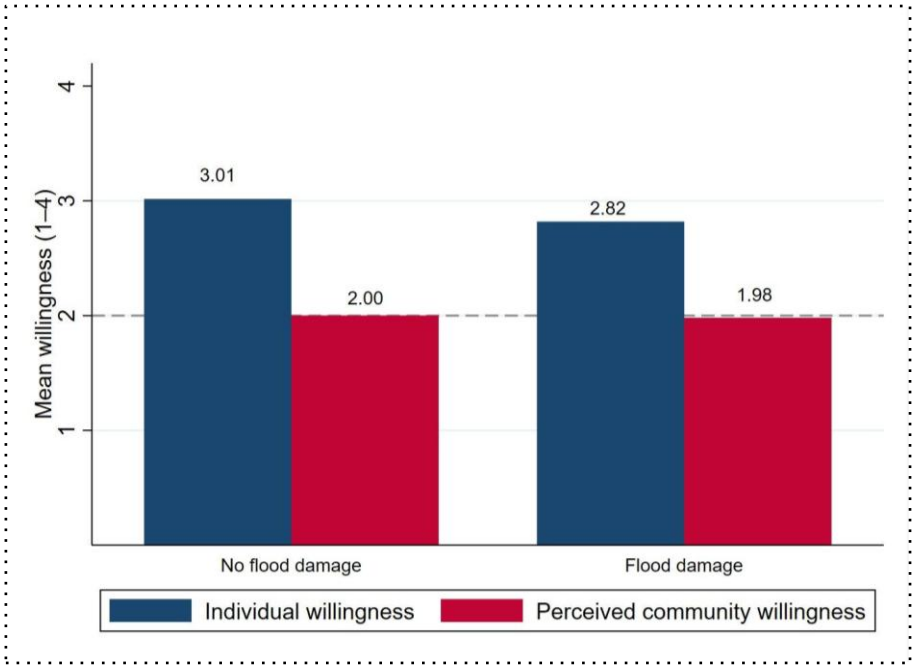
Figure 8. Distribution of individual willingness to change habits by behavioural domain. Source: Survey (N=10).



Overall, individual and small-scale efforts are seen as marginal relative to the drivers more commonly identified as impactful, including large-scale industry, urban development and soil sealing. This view was echoed with visible consensus among participants, as captured in statements such as "*an individual or a small community can do something within their local area, but this does not affect the economy on a large scale*" and "*in our own small way, we do what we can*" (P13). This pattern is consistent with the broader gap identified in the literature between environmental concern and the perceived efficacy of individual mitigation action. Unlike interpersonal solidarity, which proved strong but fragile, engagement with sustainability behaviours appears comparatively stable, though participants themselves see its impact as limited and almost useless.

Moreover, when asked how willing they believe others in their community are to make the same changes, the estimate drops substantially: among respondents without flood damage, individual willingness averages 3.01 against a perceived community willingness of only 2.00, while among those with flood damage the same gap appears, from 2.82 to 1.98 (Figure 9).

Figure 9. Individual and perceived community willingness to adopt climate mitigation behaviours. Source: Survey (N=10).



The consistency of this nearly one-point gap across both groups indicates that it is not driven by differences in flood exposure, but reflects a systematic underestimation of others' willingness to act. This pattern is consistent with what the literature terms pluralistic ignorance (Miller 2023): a situation in which individuals privately hold attitudes supportive of collective action, but mistakenly assume that others do not share the same commitment, and therefore underestimate the broader willingness to act. In line with the conditional-cooperation framework outlined in Section 2.2, this finding suggests that the obstacle to sustained mitigation behaviour in this case study may lie less in a genuine lack of individual motivation than in inaccurate beliefs about others' motivation. If left uncorrected, this misperception can become self-reinforcing, continuing to block the emergence of a shared norm of climate action.

This tension between individual intention and perceived collective inaction resurfaces, in a different form, in participants' own accounts of post-disaster behaviour. During one focus group, a participant invoked the "Broken Windows Theory" (P6) to describe how some residents used the state of the environment as a justification for avoiding basic norms, such as improper waste disposal in public spaces. However, other participants described the opposite response: heightened attention to environmental care and a renewed seriousness about waste management following the floods. This divergence reflects, once again, the coexistence of the two contrasting sides identified at the outset of this section: the disaster appears to produce a twofold effect on cooperation, strengthening or weakening everyday cooperative norms depending on the temporal phase of the post-disaster process. At the same time, cooperation oriented toward broader mitigation, although widely recognized and, in many cases, reported as practised, appears to remain confined within the community, without extending into forms of collective action beyond it.

5. Concluding remarks

This study investigates how repeated floods (2023-2024) reshaped flood-risk perception and the social dynamics of cooperation and conflict in Bagnacavallo (Italy), with particular attention to climate change awareness and willingness to engage in collective mitigation and adaptation behaviours. The table below summarises the study's main findings in relation to its two research objectives.

Table 1. Study's main findings in relation to its two research objectives.

Research Objectives	Key findings
1. How has flood risk perception evolved in response to repeated flood events, and is climate change recognised as a driver?	● Risk shifts from exception to expectation; ● Fear, anger, and eroded institutional trust dominate; ● Intergenerational memory of the river as 'safe' is shattered; ● New mitigation and adaptive habits become routine; ● Climate change is recognized as a factor that worsens already existing local territorial mismanagement.
2. How do cooperation and conflict shift across post-disaster phases?	● Strong solidarity in the emergency phase gives way to tension in recovery; ● Rivalries emerge along multiple lines: flooded vs. non-flooded, once-hit vs. repeatedly-hit; ● Sustainability cooperation is endorsed but stays local, not scaling outward; ● Climate action stalls on pluralistic ignorance: people underestimate others' willingness to act.

Using focus groups as core evidence, supported by a survey, we show that recurrent natural shocks transformed risk from an episodic anomaly into a persistent condition and spread preparedness practices across affected and non-affected households, albeit at differing costs and intensities. Emotional responses, especially fear, uncertainty, and anger, were central, acting both as catalysts for information seeking and, over time, as depressors of sustained action when fatigue set in. Perceived opacity, fragmented responsibilities, and slow or patchy interventions eroded institutional trust and interacted with beliefs about controllability, heightening a sense of insecurity. Climate change was recognized as a critical risk factor, in interaction with local management deficits. Participants noted a shift from an abstract conceptualization of risk to an experience-based understanding of the risk. Finally, cooperation surfaced in the acute phase but fragmented during recovery along lines of differential exposure (flooded vs. non-flooded), suggesting emerging norm fatigue (Rao et al. 2011; Pancotto et al. 2024).

Our findings connect and extend several strands of research. First, they are consistent with conditional cooperation accounts in which social norms are an important driver of collective action (i.e., empirical and normative expectations) (Ostrom 2000; Bicchieri 2006; 2016): when a collective threat is acute and salient, and mutual responsiveness is visible, cooperation emerges. When the emergency phase ends, expectations about how others will behave, and how one ought to behave, diverge, and social norms unravel. In Bagnacavallo, the emergency phase temporarily aligned

expectations and obligations, while the recovery phase reduced collective action. Second, heterogeneous exposure and available 'exit options' (private repairs, insurance, relocation) exacerbated within-community inequalities, thereby destabilizing the shared normative expectations crucial for collective solutions. While our qualitative evidence identifies mechanisms and provides indications about how heterogeneity shapes risk perception and mitigation/adaptation actions, it does not establish causal effects. In a future study, we will run a lab-in-the-field experiment in Bagnacavallo using collective-risk social dilemma games (Székely et al. 2021; Milinski et al. 2008; Tavoni et al. 2011; Barret and Dannenberg 2012) augmented with an individual self-protection option (De Dreu et al. 2020). We will exploit natural variation in flood exposure (flooded vs. non-flooded residents matched on socio-demographics and locality) to test how risk perception and tensions between flooded and non-flooded residents shape cooperation and the allocation of effort between collective protection and private self-protection. This cross-method design, from qualitative exploration to causal testing, will corroborate or refute the patterns identified and inform scalable, context-sensitive policy design.

This work offers four main contributions: we examine a rare setting, repeated, closely spaced floods in the same small community, that allows for the analysis of cumulative effects beyond single events; we link flood-risk perception to climate risk, distinguishing abstract knowledge from lived awareness; we integrate the roles of emotions, institutional trust, and everyday adaptive practices to trace how cooperation evolves over time amid unevenly distributed damage; and, methodologically, we adopt a mixed-methods design that uses qualitative evidence to guide subsequent causal tests in a lab-in-the-field experiment. Finally, we acknowledge that the study presented so far holds some limitations. First, the design does not allow for causal inference. Second, the number of participants in the Focus Group Discussions was relatively limited, as recruitment proved challenging despite our use of multiple communication channels to engage the population. This difficulty, however, may itself corroborate our findings on social engagement within a community heavily affected by repeated catastrophic events and, at the time of data collection, that was still experiencing significant internal tensions while simultaneously processing collective trauma.

The data and code supporting the findings of this study are provided as supplementary material accompanying this manuscript. The deposit comprises the raw anonymized survey export (N = 100), the cleaned analysis dataset in CSV and Stata formats, the two Stata scripts that clean the data and reproduce Figures 5-9, a full codebook documenting every variable and transformation, and a README with reproduction instructions. Direct personal identifiers were removed from all deposited files and replaced by an anonymous respondent identifier; the original identifiable data cannot be shared under the informed-consent terms and GDPR requirements applying to this study. Further enquiries may be directed to the corresponding author.

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