multi-Risk sciEnce for resilienT commUnities undeR a changiNgclimate

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DV 5.3: Critical overview of models of trust in DRR and CCA: Community and policy maker awareness

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Abstract

This deliverable aims to providing a structured critical review of the state of the art of the research as regards trust dynamics in the field of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA). This knowledge can be used for: (1) emphasizing the significance of trust within the realms of natural disasters and climate change, (2) proposing strategies to enhance the development of trust among citizens, (3) understanding the connection between trust and decision-making in DRR and climate change, and (4) advancing community resilience by bolstering trust. Besides the literature review, this deliverable also provides guidelines and potential steps to follow to implement and evaluate trust in DRR and CCA. The deliverable is divided into four parts: the first part provides an overview of the concept of trust and its relevance in the process of advancing CCA and DRR; the second part summarizes the main findings derived from the review of scientific literature conducted to elucidate the role of trust in the different phases of DRR and CCA; the third part introduces a conceptual framework describing the dimensions of trust in DRR and CCA, and the relations among them, which are crucial for successful implementation of trust in both domains; the last part consists of guidelines intended for practitioners who need to implement trust for addressing the negative impacts of climate change and mitigate disaster risk. Overall, this deliverable fosters a deeper understanding of trust dynamics and their potential role in enhancing decision-making and favouring the development of effective strategies to tackle disaster- and climate-related risks.

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Summary

This document pertains to the extended partnership RETURN (multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate) and it is the output of task 5.3 ("*Identification of risk-taking functions and interdisciplinary models of trust and awareness, at the community and at the policy maker levels*") of WP5 - "*Psychological, sociological and behavioral aspects in decision making*" within Spoke 7 – TS3 – "Communities' resilience to risks: social, economic, legal and cultural dimensions".

Deliverable 5.3 titled "*Critical overview of models of trust in DRR and CCA: Community and policy maker awareness*", aims at providing a structured critical review of the state of the art of the research as regards trust in the field of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA). This knowledge can be used for: (1) emphasizing the significance of trust within the realms of natural disasters and climate change, (2) proposing strategies to enhance the development of trust among citizens, (3) understanding the connection between trust and decision-making in DRR and climate change, and (4) advancing community resilience by bolstering trust. Besides the literature review, this deliverable also provides guidelines and steps to follow to implement and evaluate trust dynamics.

This deliverable is divided into four parts:

PART I – EXISTING KNOWLEDGE provides an overview of the concept of trust and its relevance in the process of advancing CCA and DRR.

PART II – CRITICAL REVIEW summarizes the main findings derived from a comprehensive review of scientific literature conducted to elucidate the role of trust in the different phases of DRR and CCA.

PART III – CONCEPTUAL FRAMEWORK introduces a conceptual framework describing the dimensions of trust in DRR and CCA, and the relations among them, which are crucial for successful implementation of trust in both domains.

PART IV – GUIDELINES FOR POLICY MAKERS consists of guidelines intended for practitioners who need to implement trust to address the negative impacts of climate change and mitigate disaster risk. This part outlines the step-by-step process suggested for involving communities effectively, for integrating the dimension of community trust in actual community resilience practices, and for assessing the effectiveness of the trust dynamics in the realm of DRR and CCA.

The first part has a twofold purpose. First, it seeks to provide a structured and synthetic overview of trust dynamics in the fields of DRR and CCA. Second, it aims to identify the role of trust

dynamics in disaster risk management and climate change, and how they can impact community resilience.

In the second part, the pertinent literature is examined to show how trust might play a pivotal role in stimulating community involvement, facilitating collaboration among agencies and communities, and guaranteeing the long-term viability and sustainability of CCA and DRR initiatives. Trust represents a dynamic and complex factor that can serve to establish good practices within communities and institutions, fostering their involvement and participation in DRR- and CCA-related activities, thus acting as a prerequisite for the development of a resilient community.

In the third part, the conceptual framework illustrated in Figure 12 is discussed. It represents the key dimensions and sub-dimensions of the role of trust in DRR and CCA, together with the relationships among them, which are crucial for the implementation of trust in the realm of DRR and CCA.

The guidelines, based on the framework, are described in the fourth part of this deliverable. They provide practical instructions for effectively promoting trust in DRR and CCA efforts, offering step-by-step procedures to involve the community, integrate the dimension of trust, and evaluating the dissemination of trust.

Overall, this deliverable fosters a deeper understanding of trust dynamics and their role in enhancing the development of effective strategies to tackle disaster- and climate-related risks. By integrating both a theoretical foundation and actionable steps, the document adds value to the broader RETURN project and to the field of DRR and CCA. This document aligns with the objectives outlined in Task 5.1, which focus on investigating the factors influencing individuals' perception of risk and assessing the disparity between objective risk and perceived risk, examining the available evidence concerning variables that impact people's decision-making processes during disasters and climate-related risks. Furthermore, it has the potential to serve as a foundational resource for designing effective nudging interventions that may promote appropriate individuals' behaviors in the context of potential uncertainties involved in DRR- and CCA-related practices, as outlined in the specific goals of Task 5.3.

To conclude, this deliverable aims at providing a structured and concise review of the state of the art of the research as regards trust dynamics in the field of DRR and CCA, promoting a novel conceptualization of trust in the realm of natural disasters and climate change, and providing guidelines to instil and propagate a "culture of trust" within communities.

Introduction

The extended partnership RETURN (multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate) strives to improve the understanding of environmental, natural, and anthropogenic risks, and their interplay with the effects of climate change. Furthermore, the partnership aims to enhance methodologies for assessing risks in the context of prevention, adaptation, and mitigation strategies. It also endeavors to advocate for a more effective and sustainable utilization of data, products, and services pertaining to risk management. Lastly, the RETURN project aims to forge a robust link between research and the creation of end products. This involves developing a comprehensive framework that offers valuable insights into the intricate dynamics of various natural hazards and advanced predictive models for evaluating multi-risk over short- and long-term time scales.

Transversal Spoke 7 (TS7) "Communities' Resilience to Risks: social, economic, legal and cultural dimensions" within the RETURN project aims to improve risk perception across all levels, by integrating uncertainty conditions into cognitive and decision-making processes. It supports preparedness and resilience through information, education, training, and participatory approaches, while also defining technological, methodological, and political measures for risk mitigation, preserving cultural and natural heritage. This Spoke investigates legal considerations and the chains of decision-making responsibility, ultimately playing a role in shaping a robust socioeconomic and behavioral model for multi-level risk governance. This model actively engages crucial stakeholders in disaster risk preparedness and adaptation.

The Spoke 7 is structured into seven Working Packages (WP). WP1 is responsible for the spoke management, dissemination, and exploitation. WP2 concentrates on creating innovative tools to assess the efficiency of risk mitigation strategies, integrating stakeholder viewpoints, and evaluating associated costs and benefits. WP3 establishes novel technological, methodological, and political measures for mitigating risks to safeguard cultural heritage. This includes cultural landscapes and intangible values, which constitute a pivotal element for the resilience and cohesion of communities. WP4 strives to create inventive policies and participatory governance measures for the planning, co-design, and co-decision-making processes in DRR and CCA. WP5 focuses on designing innovative nudging interventions, grounded in the analysis of the disparity between risk perception and objective risk, as well as in the analysis of the role of trust dynamics in DRR and CCA. This aims to enhance the decision-making of various stakeholders throughout the phases of emergency management. WP6 defines new models and strategies for risk education and (top-down and bottom-

up) communication, tailored for different target groups and a variety of risks, educational settings, and communication channels. Meanwhile, WP7 addresses the legal and ethical aspects in its scope.

The primary aim of Work Package 5 (WP5), entitled "Psychological, Sociological, and Behavioral Aspects in Decision Making," is thus to develop innovative and effective nudging interventions for DRR and CCA. These interventions are informed by an analysis of the effect of trust on community behaviors and on the disparity between perceived risk and objective risk, with the overarching goal of enhancing decision-making among various stakeholders throughout the phases of emergency management. The WP is led by UNIBA, in partnership with Eurac Research, POLIMI, UNIROMA1, UNIKORE. Within WP5, Task 5.3. is dedicated to offering a review of trust dynamics within the realms of DRR and CCA and to examine their effects on individual and community behaviors, so to increase policy-maker and community awareness and promote effective decision-making.

Scope and structure of the document

Deliverable 5.3 aims at providing a review of the state of the art of the research as regards trust in the field of DRR and CCA, to foster decision making processes in these fields. Thus, besides providing a structured, concise yet comprehensive, review of the peer-reviewed literature, Deliverable 5.3 will provide guidelines on how to implement trust at community level, assisting institutions to promote trust for effective and inclusive decision and policy making.

This deliverable consists of 4 chapters, each containing subchapters. Chapter 1 describes the concept of trust and its declinations in the context of natural disasters and climate change, and emphasizes the significance of trust dynamics in DRR and CCA. Chapter 2 outlines the methodological steps used for the literature analysis on the role of trust in the different phases of DRR and CCA. It also presents the main findings from the literature review. Chapter 3 introduces the conceptual framework underpinning trust dynamics, including their relevant dimensions, sub-dimensions, and relationships. Chapter 4 offers guidelines on implementing trust at community level in DRR and CCA. The last part of the document lists the references.

PART I – EXISTING KNOWLEDGE

1.1. The concept of trust

Trust can be broadly defined as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau et al., 1998). The notion of trust plays a pivotal role in understanding the complexities of social interactions within and between individuals and groups. Trust involves the voluntary acknowledgment of vulnerability by the party extending trust when interacting with a trusted entity, be it an individual, group, or institution. This occurs in the absence of immediate guarantees or assurances regarding the intentions and actions of the trusted party (Cheng et al., 2017; Nikolova et al., 2015).

Therefore, trust constitutes a fundamental objective in the realm of risk communication and management. In the realm of communication science, trust pertains to a broad conviction or anticipation that a communicated message is not only truthful but also dependable. Furthermore, trust encompasses the perception of the communicator's competence and integrity, which are conveyed through the provision of precise, impartial, and thorough information (Siegrist, 2021). Similarly, these attributes align with the definition of trust within the domain of psychological science, where trust is described as a "reliance on or confidence in the dependability of someone or something" (American Psychological Association, 2023).

Two prominent trust models can be employed to elucidate the dynamics of the relationship between trustors and trusted entities. Gillespie's model (2012) posits that trust comprises two distinct yet interconnected components: reliance and disclosure. Reliance refers to the propensity of the trustor to depend on a trustee and is demonstrated through the acceptance of the trustee's influence, manifested by placing trust in the trustee's abilities and judgment. Conversely, disclosure is characterized by the trustor's readiness to share pertinent information with the trustee, evidenced by open communication and the exchange of ideas. In contrast, McAllister's model (1995) underscores the cognitive and affective dimensions of trust. According to this model, trust is formed based on the cognitive assessments made by trustors regarding the skills and competence of the trustee, as well as the emotional connections forged among individuals within a specific community.

Consequently, trust extends beyond individual boundaries and is closely linked to the concept of community. Community trust refers to the positive expectations held by members of a community regarding the current and future opportunities perceived within their local community, specifically within the context of their residence and social interactions (Walker et al., 2017). In more detail, community trust is a comprehensive metric for gauging the positive expectations pertaining to

opportunities that foster individual and collective planning within a designated local area. It encompasses the competence and efficacy ascribed to the territorial aspect of community, trust in perceived individual and collective capabilities, and confidence in the territorial community as a chosen context for personal gratification (Nasar, 2003). It is strictly linked to the "sense of community". McMillan and Chavis (1986) articulate the notion of a sense of community as a feeling of belongingness, an understanding that members hold significance for one another and for the collective as a whole, and a shared belief that members' needs will be met through their committed involvement. Therefore, trust is also assumed to play an important role in promoting community engagement (Salehi et al. 2014). Consequently, community trust is recognized as a construct that exerts an influence on the degrees of social engagement and, ultimately, on the overall well-being of a community (Salehi et al., 2014).

In recent years, there has also been a growing interest in the examination of trust concerning government and institutional entities. Institutional trust pertains to individuals' assessments of whether the performance of institutions, such as the government, aligns with their expectations (Hudson, 2006). Moreover, institutional trust is associated with the political legitimacy of governments and the extent to which citizens believe that legislative actions will be equitable and align with moral principles (Walker et al., 2017). Additional research (e.g., Das & Teng, 2001; Malhotra & Lumineau, 2011) also link institutional trust to the competencies, skills, and performance attributed to residents and local as well as public administrations. Generally, the notion of institutional trust is commonly linked to the belief that institutions will successfully implement policies that are beneficial to citizens' well-being and is recognized as a key indicator of widespread political support (Walker et al., 2017).

Institutional trust assumes heightened significance when risks and their potential adverse consequences primarily emanate from sources beyond individual control. Its relevance is particularly pronounced when the institution is entrusted with forecasting and mitigating damages primarily beyond citizens' control, as exemplified in instances of natural hazards, where individuals typically wield limited influence over recovery processes and lack foresight into the nature of impending damage. Cultivating robust sentiments of concern, community, and engagement constitutes crucial mechanisms through which trust can effectively mitigate risks and their attendant costs. Consequently, this may lead to more effective emergency responses (Castro-Correa et al., 2020; Sadri et al., 2018).

Relational and instrumental aspects are both inherent in institutional trust, which is thus closely tied to the outcomes of interactions between citizens and institutions. Factors such as the

perceived capabilities and personal knowledge of emergency personnel can influence institutional trust (Mayer et al., 1995). Consequently, enhancing public awareness as a means of supporting emergency plans can contribute to fortifying institutional trust in disaster management (Humann et al., 2022). Moreover, the perception of the competence of emergency workers—manifested in their confidence to formulate strategies, engage with the community, and bolster community resilience—plays a pivotal role in the establishment of institutional trust (Humann et al., 2022).

Conversely, if procedures for damage forecasting, mitigation, and recovery are inadequately executed, trust may be compromised. For example, there is evidence that ineffectual implementation of these processes carries the potential for the erosion of trust among disaster victims (Freudenburg, 1997). A decline in institutional trust signifies a lack of confidence that, in the event of adverse occurrences, institutions can be relied upon to furnish essential resources or undertake actions aimed at ensuring safety and justice. Notably, this perception may endure over time and contribute to the persistence of psychological distress within the community (Ehlers & Clark, 2000).

Within this context, the formulation of communication strategies necessitates a foundation grounded in both community trust and trust in political institutions (Marincioni, 2020). Over the past decades, academic interest in disaster management literature has markedly increased to explore the concept of trust, directly tied to community resilience during natural disasters (Bonfanti et al., 2024). While community resilience encompasses various dimensions, including social, institutional, economic, infrastructure, and environmental factors (Mendonça et al., 2019), a pivotal element is trust. This is intricately connected to the essential social skills communities require to prepare for, mitigate, endure, and recover from disasters (Stoyan et al., 2014).

Drawing upon a series of studies conducted over the years, barriers were also identified hindering active engagement with climate change, including a distrust of information sources. Furthermore, at local, national, and international levels, there has been a notable lack of trust in the responsibility assumed by governments and local policymakers, as well as scepticism about the significance of their actions (Becker, 2018; Lorenzoni & Pidgeon, 2006). Enhancing trust necessitates a careful consideration of the dynamics, communication, and reciprocal relationships involving both trusting parties and trustees.

1.2.Trust and disaster risk reduction

In recent years, researchers have shown a growing interest in examining the role of trust in DRR. Scholars and practitioners from different disciplines, including psychology, social sciences,

economics, and the law, have recognized trust as a crucial factor influencing the level of community response in the face of natural calamities and DRR.

The processes of DRR comprise coping, adaptation, and mitigation measures (Alves et al., 2020). Specifically, coping capacity is the ability of people, organizations, and systems to manage adverse risk or disaster conditions utilizing available skills and resources (UNISDR, 2015); adaptation is the process of adjusting to existing or predicted climate and its impacts in order to mitigate harm or capitalize on good opportunities (IPCC, 2014); and mitigation is the process of diminishing or minimizing the negative consequences of a hazardous event (UNISDR, 2015).

A comprehensive approach to DRR consists of four stages (Bullock et al., 2013), namely prevention, preparedness, response, and recovery (PPRR), to ensure a balance between the reduction of risk and the enhancement of community resilience, while guaranteeing effective response and recovery capabilities. These four phases are neither linear nor independent of one another, they overlap and support each other. For example, recovery actions are likely to start during the response phase, while mitigation techniques may be explored during the recovery phase (Bullock et al., 2013, Bonfanti et al., 2024). As a result, disaster management needs the effective collaboration of local, district, and state groups, government agencies, and non-governmental organizations (NGOs).

Events leading to socio-natural disasters are pivotal for the impacted population as they exert influence on the community's constructed environment, daily routines, familial relationships, and the community itself. These events initiate a process of compelled change that gives rise to novel modes of habitation. Similarly, the procedures associated with emergency response, recovery, and reconstruction have a distinctive impact on the affected individuals, shaping their considerations for future disaster risk reduction and potentially engendering new circumstances of disaster risk (Olivos, 2010).

In this context, scrutinizing the social capital of a community after a disaster - among which trust is included - allows for an examination of its association with the social fabric, cohesion, and the sense of rootedness and belonging that a group experiences in a region significantly altered by the event. This analysis aids in identifying difficulties in social relationships and facilitating the development of adaptive capabilities to navigate the altered conditions. Building disaster-response capacity at the community level is crucial for limiting damage and accelerating recovery. In terms of a community's capability for disaster response, the more well-trained and prepared community members are socially and culturally, the more successfully they will respond in the immediate aftermath of a disaster (Mathbor, 2007).

Communities with a strong sense of trust, solidarity, and active participation react to emergencies more effectively. In these communities, residents are more inclined to help neighbors in need by sharing food and other essentials, offering refuge or financial support, assisting others in preparing for a disaster through early warning information, and giving emotional support (Islam, 2014). During a natural hazard, a high level of trust in government or in institutions facilitates rapid recovery after a disaster (Sadri et al., 2018), and the trust between community members can improve reciprocity, facilitate planning for resource access, or establish rescue teams (Castro-Correa et al., 2020).

A number of studies have investigated the association between disaster response capability and community social capital, with a particular emphasis on trust in the context of community resilience. Also, numerous studies have illustrated that communities characterized by higher levels of trust exhibit a more effective and rapid recovery from different natural disasters (Bambals, 2015; Bian et al., 2022; Pollock et al., 2019; Joerin et al., 2018). Fostering trust among community members proves to be an effective means of mitigating disaster damage and enhancing community resilience during the post-disaster phase. This is attributed to an increased likelihood that members will collaborate in sharing shelter and resources, providing immediate assistance, and contributing to the initial recovery efforts (Gero et al., 2020; Joerin et al., 2018). Additionally, examinations within the realm of disaster studies have underscored the significance of informal social connections, highlighting that neighbors often serve as the primary responders in crises by expressing concern for others' well-being and offering immediate life-saving aid.

In the wake of a disaster, both physical capital and human capital may be reduced as a result of the destruction of houses and infrastructure or deaths of people, but trust in community or in institutions can be revitalized and improved by the community working together to deal with issues and support response actions (Masud-All-Kamal & Monirul Hassan, 2018). In other words, trust might be the least damaged domain of community functioning during a disaster, unlike physical or human capital, and it serves as the main core for a community's response during a crisis (Dynes, 2002). As a result, interest in trust, its function, and importance in crisis management keeps growing in a variety of disciplines.

Previous studies have confirmed the role of trust in the different stages of disaster situations (i.e., prevention, Bambals, 2015; preparedness, Bian et al., 2022; response, Pollock et al., 2019; recovery, Joerin et al., 2018) and analyzed how it affects a community's reactions to a disaster. In the following chapters, details are provided on the role of trust in DRR.

1.3.Trust and climate change adaptation

Climate change and its related disasters such as storms, floods, sea level rise, cyclones, and dry spells are expected to increase in their frequency, intensity, and impact (Glasser, 2020; IPCC, 2022). Half of the world's population is already living in areas vulnerable to climate disasters (IPCC, 2022) and the effects of climate change can be cascading and could lead to detrimental impacts in terms of health, malnutrition, migrations, and social conflicts.

The necessity of integrating measures to adapt to climate change and mitigate climate-related disasters is increasingly acknowledged within policy frameworks. The pivotal role of cities and local actors in promoting climate adaptation and resilience to disasters is considered crucial in these responsive initiatives (Rosenzweig et al., 2018). The United Nations Intergovernmental Panel on Climate Change defines adaptation to climate change as "the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities" (IPCC, 2022). The United Nations Development Program (UNDP) presents adaptation as "a process by which strategies to moderate, cope with and take advantage of the consequences of climate events are enhanced, developed and implemented" (UNDP, 2004, p. 36), whereas Berrang-Ford et al (2019) speaks of adaptation "efforts" (i.e., "what a government is actually doing in response to the vulnerabilities it faces and its adaptation goals, and also the ways in which governments discuss, mobilize and organize for adaptation", p. 441).

The *European Mission on Adaptation to Climate Change* described the climate change adaptation cycle, which consists of six steps (EU Mission on Adaptation to Climate Change Portal, 2023): (1) preparing the ground for adaptation, (2) assessing climate change risks and vulnerabilities, (3) identifying adaptation options, (4) assessing and selecting adaptation options, (5) implementing adaptation, and (6) monitoring and evaluating adaptation.

The first step (preparing the ground for adaptation) introduces the key elements required to start the adaptation process by creating a favorable political situation for adaptation and identifying evidence and data on current and potential future climate impacts, adaptation actions, good practices examples. The second step (identifying adaptation options) details how to assess how climate change will affect people, sectors or systems, and depends on three different factors: climate-related hazards, vulnerability, and exposure; while climate-related hazards are directly determined by climate change, vulnerability and exposure depend on psychological and socio-economic factors. The third step (identifying adaptation options) has the goal to identify a set of adaptation options to tackle the climate challenges identified in the previous step. The fourth step (assessing and selecting adaptation options) requires a close collaboration with expert stakeholders for assessing and prioritizing the potential

adaptation options. In the fifth step, adaptation policies must be implemented in a specific place through an adaptation strategy and action plan by regional or local authorities. The last step (monitoring and evaluating adaptation) assists in assessing the effectiveness of adaptation measures and identifying any unforeseen side effects that may have occurred.

Furthermore, this process of adaptation encompasses a diverse array of actions, categorized as structural, institutional, ecological, or behavioral. Structural adaptations entail the physical alteration of infrastructure and the built environment, such as the construction of flood barriers. Institutional adaptations involve creating policies, regulations, and governance mechanisms to facilitate adaptive responses, such as establishing a climate change adaptation department within a government agency. Ecological adaptations are centered on restoring and conserving natural ecosystems to bolster their resilience to climate impacts, such as creating wetlands for natural flood protection, enhanced biodiversity, and carbon sequestration. Lastly, behavioral adaptations encompass modifications in individual and collective behaviors, practices, and decision-making processes (for instance, the adoption of water conservation practices by households). The IPCC's suggested definition of adaptation emphasizes that adaptation policies should target both current and anticipated climate conditions ("in response to actual and expected impacts," as suggested by Moser and Ekstrom, 2010, p.1); and should also concentrate on the potential positive impacts of climate change on society.

Given that the world is increasingly faced with risks of climate change that are at the boundaries of human experience, there is an urgent need to learn from past and present adaptation strategies that take into account both the processes by which adaptation takes place and the limitations of the various agents of change—states, markets, and civil society— in these processes. In this context, trust has become one of the foremost topics in research about climate change. Research on trust, on its role in social group and identity formation, provides important lessons for the climate change research and individuals' adaptive capacity (Akinwale & Adepoju, 2019; Fairbrother et al., 2021; Le et al., 2022).

Trust can serve as a heuristic in climate change decision-making by helping individuals to act in complex environments (Earle, 2010; Siegrist, 2021). Climate change decision-making defines decisions with respect to the underlying mitigation-driven or adaptation-driven motives or goals held by the decision-maker. It encompasses the explicit decisions undertaken by an actor or group of actors (e.g., individuals, households, communities, organizations, or societies) that hold implications within the context of systems influencing, or being influenced by climate change. For example, an individual's transportation mode choice (e.g., personal vehicle versus public transit versus bicycle) is

a climate-relevant decision (because of the implications such a decision has for that individual's transportation-related greenhouse gas emissions), even if that individual is not explicitly thinking about climate change when making the decision.

In this situation, trust in governments and political institutions has also been found to positively correlate with the uptake of public and private pro-environmental behaviors (Cologna & Siegrist, 2020). Terpstra (2011) examined the causal relation between trust and flood preparedness behavior. He found that trust lessens the amount of dread evoked by flood risk, which in turn facilitates flood preparedness intentions. Ross et al. (2014) tested a model of trust on risk perception and the taking of recycled water. The study discovered that high trust in the water authority is associated with low risk perception and high acceptance of potable reuse projects. By contrast, low trust in water authority is related to poor acceptance and high risk perception. According to Siegrist et al. (2005), individuals who lack information about a hazard will evaluate the risk based on their trust in responsible risk managers. Higher evaluations and confidence of climate change authorities are associated with lower perceived risk, and conversely. Thus, trust played a vital role in affecting risk perception that had mediated effects on preparedness intention.

Some types of adaptation are undertaken by individuals in response to threats to the climate, often triggered by individual extreme events. Others are undertaken by governments on behalf of society, sometimes in anticipation of change but, again, often in response to specific events. Therefore, adaptation processes involve the interdependence of agents (including trust) through their relationships with each other, with the institutions in which they reside, and with the resource base on which they depend. The nature of these relationships has been central to human ecology and geography, micro-economics, and the anthropological and political sciences. Each discipline has theorized trust dynamics in climate change adaptation, but the different emphasis of each discipline has led to a compartmentalized view of the importance of trust. For these reasons, the next section of this deliverable will also endeavor to provide further insights into the role of trust in climate change adaptation processes.

PART II – CRITICAL REVIEW

2 Aims of the review

Resilience in the aftermath of a disaster is defined as the ability of a system, community, or society to resist, absorb, accommodate, adapt to, transform, and recover from the effects of a hazard in a timely and efficient manner, including the preservation and restoration of its essential basic structures and functions. It has been seen that resilience is closely related to the levels of trust (Hémond et al., 2012). Also, the relationship between trust and environmentally responsible behavior has been extensively explored in the academic literature. Trust plays a crucial role in alleviating the cognitive challenges associated with evaluating risks and making corresponding behavioral judgments referring to DRR and CCA, also improving the quality and rapidity of decision-making (Cologna & Siegrist, 2020). Therefore, is utmost importance to critically examine the role of trust in DRR and CCA, comprehend the connection between trust and decision-making on climate change, and advance community resilience by bolstering trust.

The goal of this literature review is to address the role of trust dynamics in DRR and CCA. The literature review is guided by the following research questions:

1. How does the dimension of trust affect responses to DRR?
2. How does the dimension of trust affect responses to CCA?
3. How can the positive dimensions of trust be implemented to bolster community resilience and influencing stakeholders' decision-making in the realms of CCA and DRR?

By addressing these research questions, this literature review seeks to provide a comprehensive understanding of trust dynamics in the realms of CCA and DRR. The main goal is informing future research, policymaking, and practice in these fields, to understand how to implement trust in the face of disaster risks and climate change impacts.

2.1.Method

The review was conducted according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement (Moher et al., 2015). The review encompassed four distinct phases (Figure 1): (i) keywords search; (ii) screening of the abstracts of the papers identified by keywords search; (iii) selection of relevant papers; (iv) comprehensive analysis of selected papers.

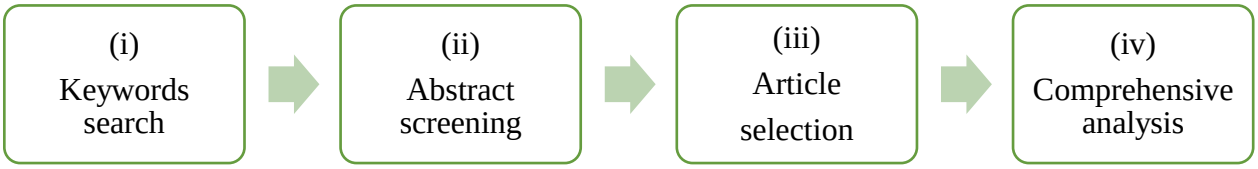

Figure 1: Stages of literature review

2.1.1. Phase one: Keywords search

A comprehensive approach was adopted to identify pertinent literature regarding the subject of investigation. Initially, we performed searches in academic databases (PubMed/Medline, ISI Web of Science, and SCOPUS), using a combination of relevant search keywords (e.g., trust, disaster risk reduction, climate change adaptation, resilience, community, decision-making). Subsequently, we scrutinized the retrieved literature to select articles of relevance, and further, we explored their reference lists to identify additional pertinent articles that have not been initially captured in the search, but held significance for inclusion in the present review. All the selected articles were subjected to close scrutiny and were subsequently summarized to construct the foundation for this review. The scientific literature search using the developed keyword strings yielded a total of 2727 papers, all of them containing the desired keywords in their abstracts.

2.1.2. Phase two: Abstract screening

To identify the papers directly relevant to the research questions, the first screening consisted in reading the abstracts of the articles that resulted from the search and selecting only the relevant ones. Search results from each database were examined, and duplicates were identified and deleted.

2.1.3. Phase three: Article selection

The articles whose abstracts were selected based on their relevance to the objectives of the research, underwent comprehensive reading and rigorous examination. In this phase, we considered only papers that satisfied one or more of the following requirements: (1) original articles, (2) written in English, (3) retrieved in scientific journals and (4) restricted to social sciences and psychological sciences.

Furthermore, all articles that considered trust dynamics in DRR and CCA were considered eligible for inclusion in the literature review with the following criteria: (1) they employed cohort, case-control, cross-sectional study, and/or experimental design. Publications were excluded if (1) they

were not original articles (e.g., proceeding, review, opinion paper, or dissertation), and (2) they did not specifically focus on the role of trust in natural disaster management and/or climate change adaptation (i.e., studies examining only opinions concerning DRR or CCA were excluded). A total of 65 articles met the inclusion criteria and were included in the quantitative analyses (Figure 2).

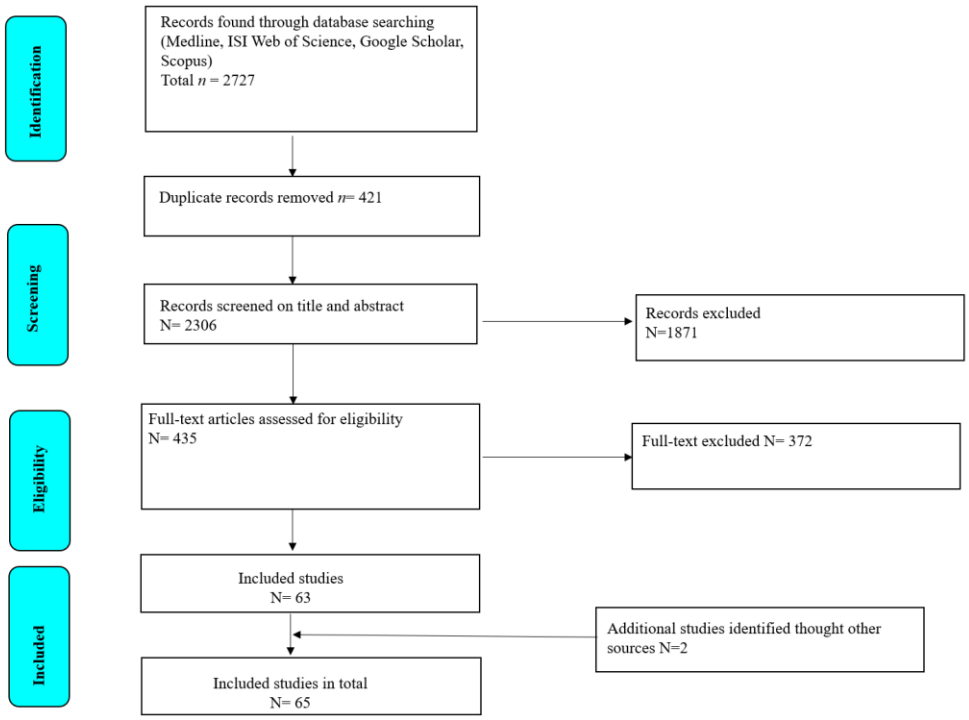

Fig. 1 PRISMA flowchart of study selection

Figure 2: PRISMA flowchart of study selection

2.1.4. Phase four: Comprehensive analysis

After selecting the relevant articles and integrating them with articles identified through manual search, the fourth phase involved a detailed analysis of these papers. To facilitate this analysis, an Excel table was prepared in advance, encompassing five dimensions and 14 categories. The Excel table served as a framework to systematize and categorize the findings extracted from the reviewed papers, aiding in the synthesis and organization of the literature review.

Overall, the criteria for this literature review involved an iterative process of screening, selection and reading to ensure the inclusion of papers that focused on the selected keywords. The following two sections include, respectively:

- an outline of the dimensions composing the Excel table, along with a brief reflection on the process undertaken to create the table, as well as a comprehensive description of each dimension incorporated in the table;

- a concise overview of how key theoretical concepts were operationalized to establish a shared understanding for this deliverable.

2.1.5. Dimensions and categories of analysis

An Excel sheet served as a framework to systematize the literature and comprises five dimensions, further subdivided into a total of 14 categories. This comprehensive structure facilitated the analysis of the papers incorporated in this review, enabling a deeper comprehension of trust dynamics in the fields of DDR and CCA.

The five dimensions are the following:

1. **General information**: gathers basic details about the papers selected for analysis.
2. **Context of the area under study**: captures information regarding the background and data regarding the characteristics of the targeted communities being studied in each paper.
3. **Trust dynamics information**: gathers information concerning trust dynamics included in the study
4. **DRR/CCA focus**: captures information concerning the DRR or CCA aspects included in the study.
5. **Methodology of the studies**: gathers information concerning the methodology of the conducted studies.

This structured Excel sheet served as a valuable tool for organizing and analyzing the information obtained from the examined papers, ensuring a comprehensive approach to the literature review process. Through the utilization of this Excel sheet, a deductive content analysis methodology was implemented. This approach offers several strengths as it helps in conducting a systematic analysis, which allows for an efficient organization of the extracted information.

2.1.6. Descriptions of dimensions and categories of analysis

This paragraph provides a detailed description of the structure of the Excel sheet, encompassing the explanations of the 14 categories that constitutes the columns of the Excel sheet. These categories collectively form the five dimensions previously outlined.

Dimension 1: General information.

- **Reference**: the citation of the paper.
- **Full abstract:** the abstract included in each paper.

- **Main Keywords**: the list of keywords, as reported in each paper.

Dimension 2: Context of the area under study

- **Geographical scale:** the country where the study was conducted.
- **Type of community**: three types of communities are considered: community of practice, community of interest, and community of place. Community of place indicates a group of individuals who share a common physical or online space as the primary basis of their connection and interaction (Christenson & Jerry W, 1989). Community of interest indicates a group of actors who establish a collective identity based on their shared concerns, purposes, and goals (Briard & Carter, 2013; Henri & Pudelko, 2003). Community of practice consists of a heterogeneous group of actors (e.g., individuals, associations, governmental and non-governmental agencies and organizations) which share a common interest or concern - the domain-, and collaborate to manage and address it (Wenger, 1998).

Dimension 3: Trust dynamics information

- **Type of trust**: this dimension addresses the different types of trust that were considered in the studies (e.g., institutional, community, social).

Dimension 4: DRR/CCA focus

- **Focus on DRR management or CCA cycle**
- **Phase of the DRR management/CCA cycle**: the phase of the disaster risk and/or climate change management cycle in which the community is involved while developing a risk reduction or adaptation strategy. Information is organized following the classic phases of the DRR cycle (prevention, preparedness, response, recovery) and the CCA cycle (preparing the ground for adaptation, assessing climate change risks and vulnerabilities, identifying adaptation options, assessing and selecting adaptation options, implementing adaptation, and monitoring and evaluating adaptation).

Dimension 5: Methodology of the studies

- **Type of study**: the methodological description of the study (i.e., qualitative, quantitative or mixed methods design)
- **Main topic(s) addressed**: the main topics addressed within each paper (e.g., resilience, agency, adaptation, risk management, awareness, decision-making).
- **Type of tools used**: the tools employed to engage with individuals and actors within the community, (e.g., focus groups, questionnaires, surveys).

- **Level of application of the tool**: indicates whether the tools were devised by the authors and tested using standardized questionnaire (i.e., tested), or, in addition to quality evaluation (i.e., evaluated).
- **Method for evaluating information**: the list of assessment methods employed to evaluate trust dynamics. The methods used varied among the articles and included both qualitative and quantitative research methods, such as surveys, interviews, data analysis, and participatory evaluations. Moreover, the chosen evaluation methods varied depending on the entity conducting the assessment, and included different methodological procedures for evaluating the collected information, such as statistical analysis, qualitative analysis or mixed methods analysis.
- **Results in terms of community resilience or stakeholders' decision-making**: the results obtained in relation to the intended objective of the trust dynamics examined in the paper (e.g., the role of trust in promoting pro-environment behaviors). The focus of the results varied across papers, ranging from outcomes related to community resilience to stakeholders' decisions.

2.2.Main findings from the reviewed literature

This section presents the resulting reasoned review of models of trust in the context of DDR and CCA, by considering the scientific peer-reviewed literature. By summarizing the key findings, this section is divided into 2 subsections. The first subsection includes the results and draws upon dimensions and corresponding categories described in previous paragraph, and the second subsection includes a discussion of the literature concerning trust dynamics in the realm of DRR and CCA in terms of community resilience and stakeholders' decision-making.

In total, 435 papers were selected by abstract reading; 65 papers describing trust dynamics were pertinent to the study aim and fully analysed. Figure 3 provides an overview of the type of selected studies on trust dynamics. Most of the studies (43) were quantitative research (e.g., cross-sectional analytic, longitudinal, or experimental studies), followed by mixed methods studies or adopted alternative research designs (e.g., they were based on a participatory approach) (13), and qualitative research (9).

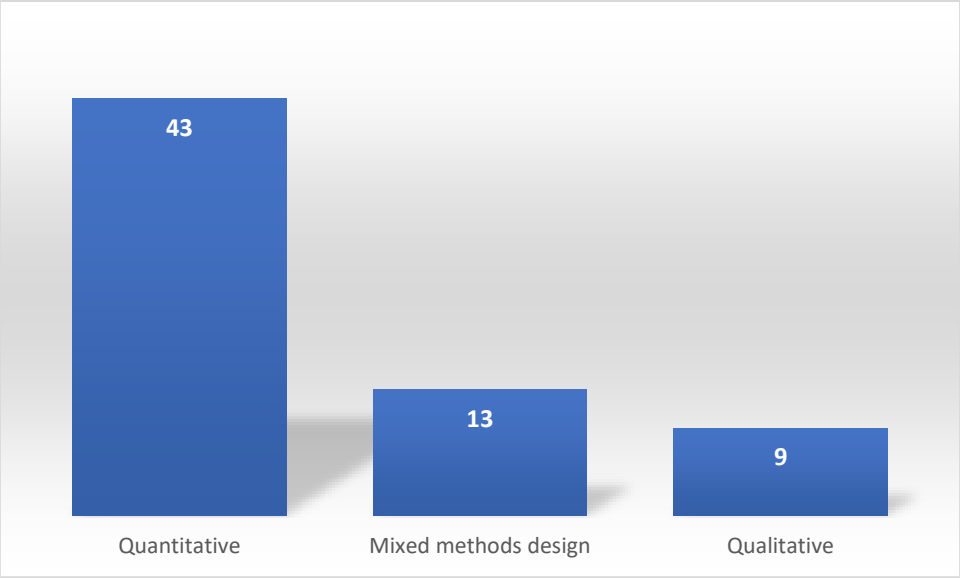

Figure 3: Type of studies on trust dynamics.

Figure 4 presents the distribution of papers based on their primary focus, either on CCA or DRR. The analysis reveals that 62% (40) of the papers primarily address the topic of DRR. On the other hand, 38% (25) of papers mainly focus on CCA.

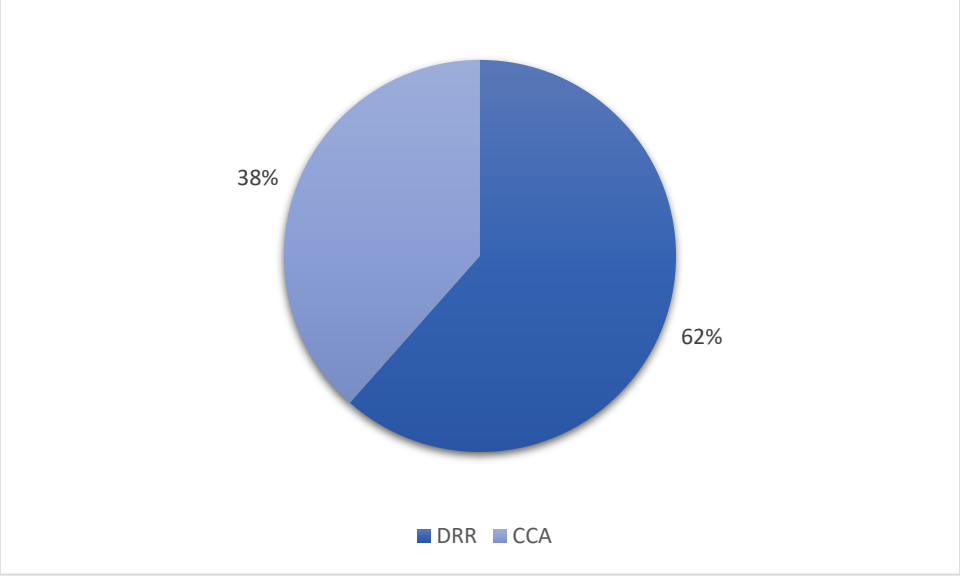

Figure 4: Prevalence of papers focusing on CCA or DRR.

Figure 5 provide information about the geographical scale of the areas studied in the analysed articles. Figure 5 reveals that the trust dynamics discussed in the papers cover a range of countries across North America, Oceania, south Asia, Europe, South America, and Africa, in a gradually decreasing way. However, there is a lack of studies exploring the trust dynamics in south Africa and in North Asia.

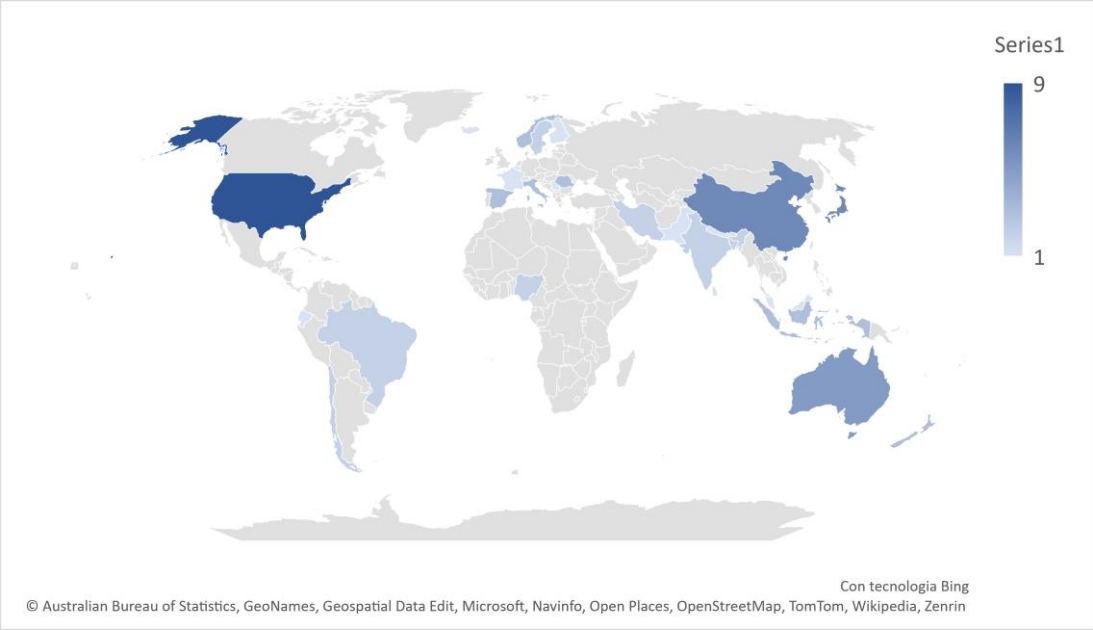

Figure 5: Number of trust dynamics studies by geographical scale.

Regarding the type of community involved, out of the 65 articles analysed, 44 of them display approaches aimed at disaster risk reduction and/or climate change adaptation that involve members of a community of place, followed by communities of interest (13) and by communities of practice (6). Finally, 2 of the 65 studies on trust dynamics were classified as "mixed community" because they involved two or three types of communities (Figure 6).

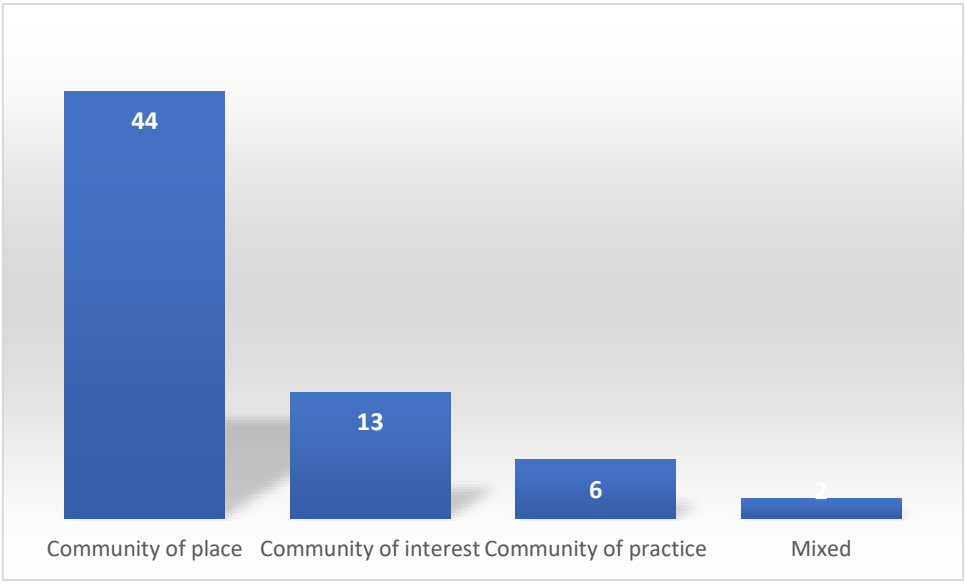

Figure 6: Number of trust dynamics studies by type of community involved.

Regarding the type of trust involved, out of the 65 papers analysed, 40 of them involve community trust (Figure 7), which is characterized by strong trust, solidarity, and active participation,

between community members. On the other hand, 18 papers focused on institutional trust (Figure 7), which hinges upon the belief in the capability of institutions to effectively manage a diverse array of risks and social challenges (Hudson, 2006). Finally, 7 paper focused on both interpersonal trust and institutional trust – which was defined as "social trust".

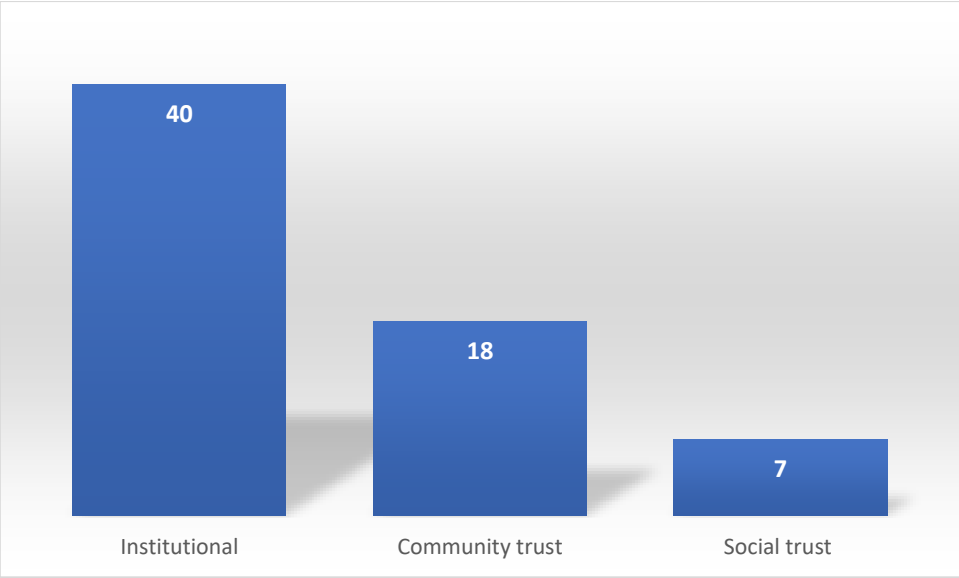

Figure 7: Number of trust dynamics studies by type of trust involved.

Out of the 65 papers analysed, 44 papers test an approach that has been theoretically developed by the authors of the study and then tested in specific cross-sectional designs (Figure 8). In these studies, the aim was to understand the psychological antecedents, behavioral patterns or health aspects related to trust dynamics. On the other hand, 21 papers describe research in which behavioral and psychological aspects related to trust dynamics involving the community in relation to DRR or CCA topic were evaluated (Figure 8). Most of these studies had a qualitative approach, aimed at identifying important variables related to trust dynamics in relation to different phases of DDR and CCA. Among the selected papers, 2 present a developed approaches aimed at improving the community trust (Figure 8).

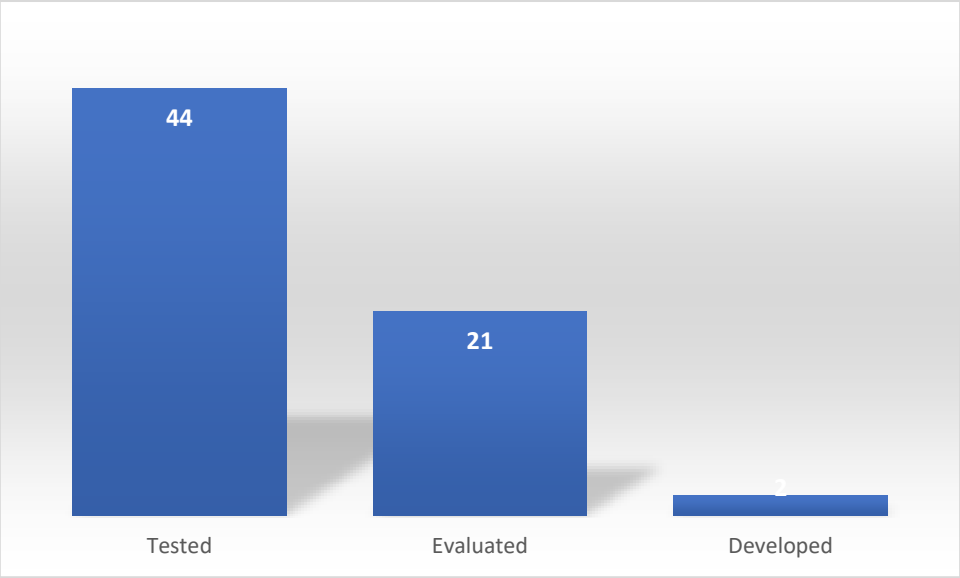

Figure 8: Number of trust dynamics studies by level of application.

The literature analysis has revealed a diverse range of tools employed within the studies on trust dynamics for DDR and CCA worldwide. The tools exhibit variations in several aspects. Firstly, they differ in terms of type of studies in which they are applied (interviews or focus groups for qualitative studies, questionnaire for cross-sectional studies, and mixed methods for participatory interventions). Additionally, they vary in terms of the objectives they aim to achieve, such as disaster perception, community engagement, adaptive capacity, vulnerability and resilience assessment, climate change perception, social capital, and various level of community trust.

As shown in Figure 9, 21 studies used survey method, followed by questionnaires (18), interviews (8), and focus groups (2). On the other hand, 16 studies used mixed methods, which include focus group discussions, open-ended interviews, surveys, questionnaires, and observation.

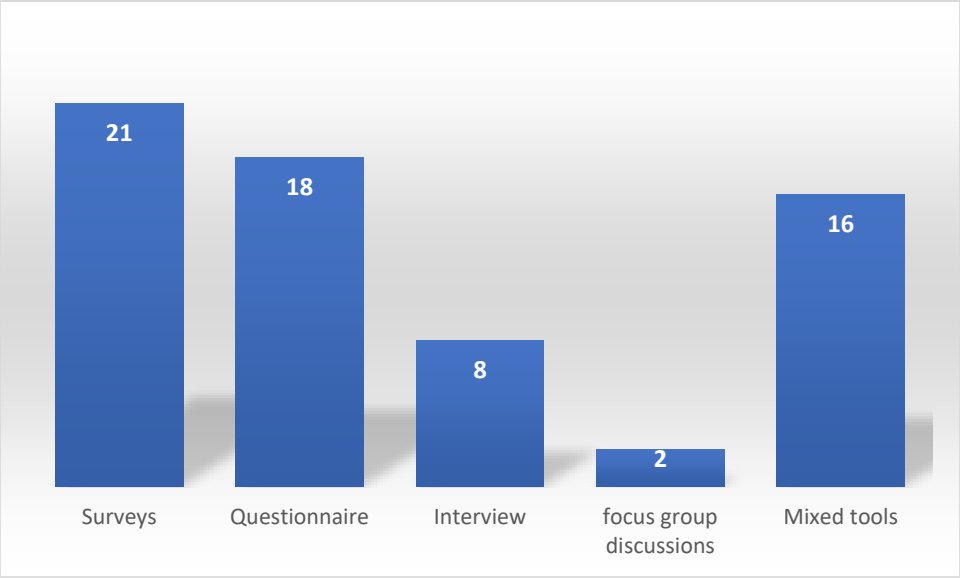

Figure 9: Number of papers by tools.

Figures 10 and 11 provides an overview of the categorization of the papers into predefined phases of disaster risk reduction (DRR) and climate change adaptation (CCA). Regarding the phases of the DRR (Figures 10), the analysis reveals that most papers (14) focused on the preparedness phase, referring to the period in which people prepare for a disaster, including the extent to which they feel that they are in danger of experiencing a disaster (risk perception), and their past experiences of disasters; 10 papers focused on recovery phase, referring to the period in which people restore normalcy in the community life and mitigate the aftermath and long-term effects of disasters following their subsiding; 9 papers focused on the response phase, a phase in which emerge the adaptive capacities or resources to adaptation after a disturbance or adversity; finally, 7 papers focused on prevention phase, referring to the period in which efforts are directed at safeguarding individuals from potential natural disasters, thus affording long-term protection.

Regarding the cycle of the CCA (Figures 11), the analysis reveals that all papers focused only on the last two stages of the whole cycle (*implementing adaptation,* and *monitoring and evaluating adaptation*). Specifically, most papers (19) focused on the stage of *implementing adaptation*, which requires the activation of whatever resources are provided to deliver the adaptive action to climate change. In this stage adaptation policies must be implemented throughout a place through an adaptation strategy and action plan by regional or local authorities. Six papers focused on the stage of *monitoring and evaluating adaptation*, which considers that the knowledge of the climate system, and the hazards to face, will evolve over time and that adaptive measures may need to change to keep up with new information. This stage assists in assessing the effectiveness of adaptation measures and identifying any unforeseen side effects that may have occurred. Limiting trust studies exclusively to

these two phases of the cycle is comprehensible as the initial phases of the CCA cycle prioritize the formulation of strategies for climate change management only by regional or local authorities. Therefore, it would be particularly difficult to incorporate trust dynamics assessment in studies conducted within these stages.

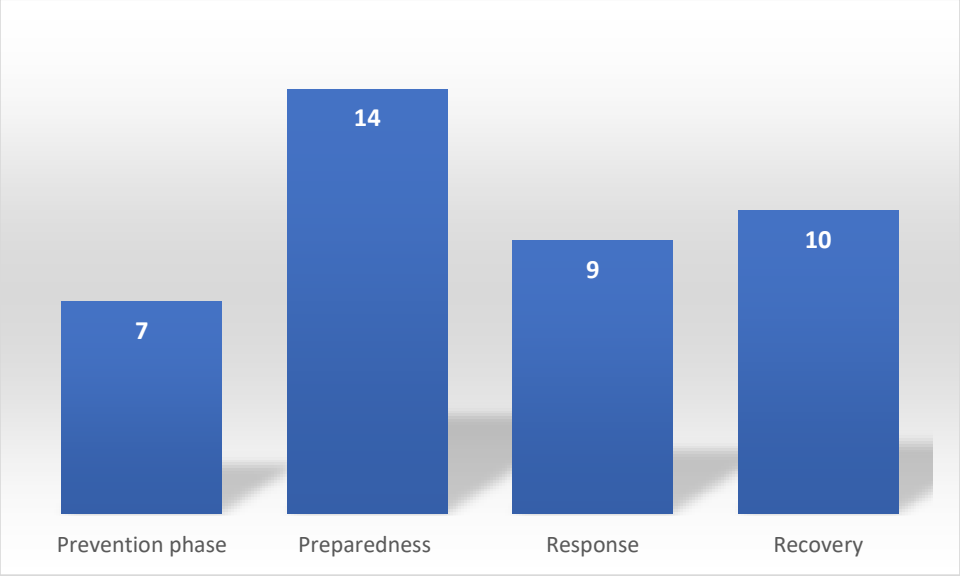

Figure 10: Number of trust dynamics studies by DRR cycle phases.

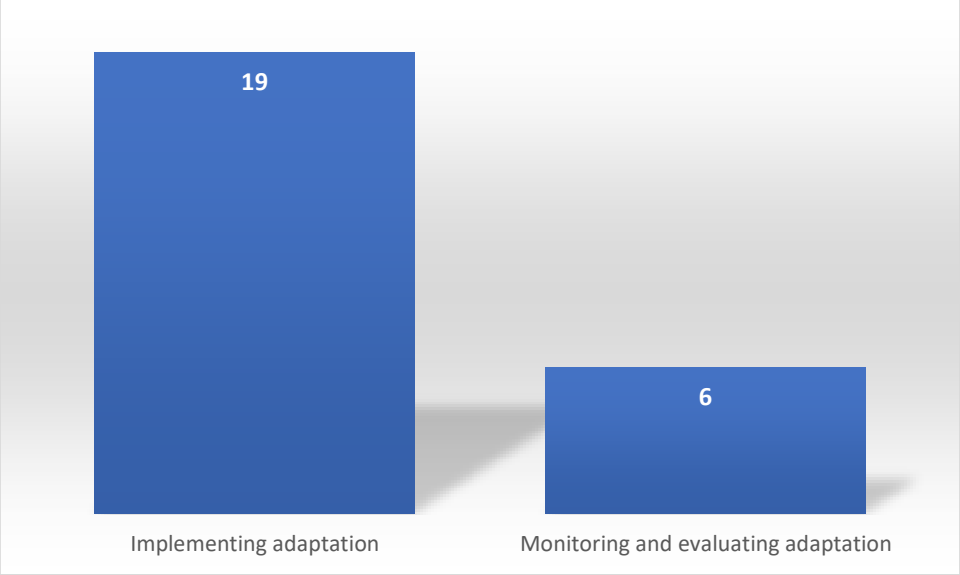

Figure 11: Number of trust dynamics studies by CCA cycle.

2.3.Summary of main findings on trust dynamics

This literature review has examined articles focusing on trust within the context of DRR and CCA to address prevalent research gaps. These gaps include the need to: (1) comprehend the role of trust across the various phases of DRR, namely *prevention, preparedness, response*, and *recovery*; (2) comprehend the role of trust across the various phases of CCA cycle, which are *preparing the ground for adaptation, assessing climate change risks and vulnerabilities, identifying adaptation options, assessing and selecting adaptation options, implementing adaptation,* and *monitoring and evaluating adaptation*; (3) elucidate the interconnection between trust dynamics and community resilience, and between trust and stakeholders' decision-making during natural disasters, to promote more effective strategies to foster community resilience and adaptation to climate change (Bonfanti et al., 2024).

Although differences in the definition and measurement of trust create challenges in drawing uniform conclusions from the body of research, the studies consistently identify a critical role of trust in all aspects of DRR and in the phases most related to implementation and monitoring of actions of CCA (such as *implementing adaptation,* and *monitoring and evaluating adaptation*). The findings from this critical review indicate that community and institutional trust serve as vital resources that aid communities in the management of natural disasters, climate change and contribute to the enhancement of the whole community resilience.

By summarizing the key findings, this discussion is divided into three subsections, reflecting the goals of the review.

2.3.1. The role of trust across the different phases of DRR

The first subsection includes the results on the role of trust across the various phases of DRR (summarized in the Table 1).

Concerning the prevention phase, it is evident that a high level of trust in information provided by public authorities during this stage is critical, as it allows residents to prepare for disasters (Alves et al., 2020). Conversely, a lack of trust in authorities responsible for disseminating early warnings and emergency information represents a significant hindrance to community resilience (Jayasiri et al., 2020). Therefore, during this phase, it becomes imperative to cultivate cross-sector collaborations and partnerships, with a primary focus on community engagement and promoting competent leaderships capable to expanding community trust in the early hazard management process (Pratama & Nurmandi, 2020). Thus, authorities should concentrate on nurturing proactive leadership styles and fostering relationships with residents to promote both community and institutional trust, rendering their emergency management campaigns credible.

In studies concerning the preparedness phase, the close connection between trust and DRR becomes even more evident. More precisely, when institutions are perceived as more reliable, and when community members have increased access to information and resources for preparedness, this empowers community members to better prepare during this phase. This, in turn, fosters a reinforcing cycle leading to an enhanced level of trust in these institutions. Accordingly, community empowerment is closely linked with resilience and encourages the community to engage in preventive measures, including disaster planning and evacuation (Adams et al., 2018; Humann et al., 2022).

As a result, the level of trust in institutions significantly impacts the degree to which the public actively participates in disaster prevention and preparedness measures. The efforts of governmental and institutional entities in effectively communicating the risks and preparing citizens to cope with them play a vital role in promoting disaster-resilient behaviors in the community, regardless of whether individuals had prior experience with natural disasters. Without such efforts, individuals may exhibit negligence and fail to adequately prepare to disaster (Bian et al., 2022).

In the response phase, the importance of social capital—of which trust is a pivotal component—and social infrastructures are emphasized. Social infrastructures, which provide spaces for community members to convene during disasters, constitute the underpinning of civic engagement and community trust (Aldrich, 2023). As such, it is recommended that institutions and other stakeholders strengthen social infrastructures to foster trust among local community groups and reduce individual risks during disasters (Faisal et al., 2021). Furthermore, during the response phase, the effectiveness of emergency communication is contingent upon the level of trust citizens have in the communicator. Individuals who exhibit higher levels of trust in the government's ability to furnish necessary assistance when required tend to experience lower levels of concern and are better prepared in times of emergency (Dvir et al., 2022).

Regarding the recovery phase, it is evident that heightened collaboration among citizens, stakeholders, and institutions, engenders trust in the aftermath of a disaster (Roshan Bhakta Bhandari et al., 2010). Therefore, the greater the degree of cooperation during the recovery phase, the more trust is fostered among individuals and towards the institution. It becomes imperative for institutions to facilitate collaborative initiatives involving community members, faith-based organizations, academic institutions, hospitals, police, public health services, neighbourhood associations, and government agencies (Pollock et al., 2019). In addition, the significance of adequate information and communication is underscored during this phase. Studies suggest that when authorities deliver emergency information that aligns with the citizens' needs, it enhances trust in authorities, reducing the likelihood of seeking information from alternative and unreliable sources (Zander et al., 2022).

Conversely, inadequate communication by authorities is linked to enduring negative consequences following a disaster. Developing strong negative emotions due to poor communication after a disaster may permanently erode trust in authorities. This decline in trust can impair people capacity to recover and reduce their future resilience to risks (Thoresen et al., 2018).

Reaching a more comprehensive framework for elucidating the mechanisms of trust in different phases of DRR necessitates a comprehensive understanding of research findings. In fact, when the results of the study are comprehensively examined, a recurring theme emerges: throughout the entire disaster management cycle, individuals can cultivate trust in their community (e.g., relatives, neighbours, coworkers) and institutions (e.g., agencies, authorities, government). Building trust can significantly enhance the capacity for disaster risk management and resilience within communities throughout the entire disaster management cycle.

Table 1: Description of main findings of selected studies on trust in DRR

Authors	Type of study	Country	DRR phase	Type of trust	Themes identified on trust in DRR
Adams et al., 2017	Quantitative	United States	Preparedness phase	Institutional	Trust in the public health department is associated with higher levels of engagement in disaster preparedness activities.
Adams et al., 2018	Quantitative	United States	Preparedness phase	Community	Community trust is associated with collaborative planning and capacity building conducted by community and faith-based organizations.
Aldrich, 2023	Quantitative	Japan	Response phase	Community	Social infrastructure forms the basis upon which civic engagement and trust are built.
Alves et al., 2021	Quantitative	Brazil	Prevention phase	Institutional	Trust in public authorities is correlated with communities' capacity to cope with challenges.
Antronico et al., 2020	Quantitative	Italy	Recovery phase	Institutional	Trust in local policymakers' ability to respond to an extreme event is intertwined with trust in the national and international political classes.
Appleby-Arnold et al., 2021	Mixed method design	Romania, Malta	Response phase	Institutional	Distrust in authorities can stem from personal experiences and unmet expectations during a response phase.
Bhandari et al., 2010	Quantitative	Japan	Recovery phase	Institutuional Community	The extent to which people collaborate during the recovery phase is associated with the level of trust among individuals and their trust in the institution.
Bian et al., 2022	Quantitative	China, Taiwan	Preparedness phase	Institutional	Trust in government is linked to greater involvement in disaster preparedness.
Bodas et al., 2022	Quantitative	Italy, Romania, Spain, France, Sweden, Norway, Israel, Japan.	Preparedness phase	Institutional	Trust in government and local authorities serves as a predictor of individual preparedness.
Carone et al., 2019	Quantitative	Italy	Response phase	Institutional	Trust can be established through effective emergency communication during a disaster.
Ching et al., 2020	Qualitative	United States	Recovery phase	Institutuional Community	Trust within the community and institutions is cultivated by enhancing relationships among neighbors, non-governmental organizations (NGOs), and government agencies.
Choo & Yoon, 2022	Quantitative	Korea	Response phase	Institutuional Community	Communities in which there is strong community or institutional trust show a solid capacity to respond to disasters.
Dvir et al., 2022	Quantitative	United States	Response phase	Institutional	Those who place greater trust in the government tend to be less anxious during times of emergency.
Faisal et al., 2021	Quantitative	Pakistan	Response phase	Community	Residents with access to institutional services tend to develop a higher level of trust.
Gero et al., 2020	Quantitative	Japan	Recovery phase	Community	Building trust among community residents is linked to sustained social interactions over an extended period.

Goidel et al., 2019	Quantitative	United States	Preparedness phase	Community	Community trust is closely intertwined with community preparedness and disaster awareness.
He et al., 2021	Mixed method design	New Zealand	Recovery phase	Community	Householders' recovery experiences influence patterns of trust within local communities.
Humann et al., 2022	Qualitative	England	Preparedness phase	Community	An increase in awareness about the risks could potentially erode community trust.
Joerin et al., 2018	Quantitative	India	Recovery phase	Institutional	The ability of institution to lead, trust and communicate is considered fundamental during the recovery process.
Kitagawa, 2018	Mixed methods design	Japan	Preparedness phase	Institutional	Trust is fostered through programs that are developed based on collaborative partnerships involving a diverse range of disaster management stakeholders and the community.
Lo et al., 2016	Qualitative	China	Response phase	Institutional	Higher levels of trust are associated with the persuasive abilities of higher-level authorities.
Ma et al., 2022	Quantitative	China	Preparedness phase	Community	Community trust is positively correlated with engagement in community participation behaviors.
Marin et al., 2020	Qualitative	England	Preparedness phase	Institutional	Engaging with the local community, leveraging people's knowledge, and utilizing their data-gathering capacity can help foster trust within the stakeholder community involved in DRR efforts.
Matthews et al., 2020	Quantitative	Australia	Recovery phase	Community	Community trust, a sense of belonging, and optimism were significantly correlated with lower levels of distress.
Moreno et al., 2019	Qualitative	Chile	Response phase	Institutional	Trust hinges on institutional members' responsiveness to an event and their perceived competence in managing the task.
Muller et al., 2014	Mixed methods design	United States	Preparedness phase	Community	Low levels of trust and limited relationships with communities beyond their own may hinder the establishment of resilient disaster networks.
Odiase et al.,2020	Mixed methods design	New Zealand	Prevention phase	Institutional	Trust in official and expert information is influenced by prior experiences with disasters.
Parkinson et al., 2022	Qualitative	Australia	Recovery phase	Community	Offering appropriate emotional support during the recovery process is valuable for building community trust.
Paton et al., 2010	Quantitative	New Zealand, Japan	Preparedness phase	Institutional	The absence of institutional trust is connected to the authorities' failure to provide the necessary information and resources during the preparedness phase.
Pendergrast et al., 2021	Qualitative	United States	Preparedness phase	Institutional	Building trust within the elderly community can be achieved by providing disaster-related information on disaster preparedness.
Pollock et al., 2019	Qualitative	United States	Prevention phase	Community	Both community trust and institutional trust are integral to fostering inter-sector collaborations and partnerships in disaster prevention.
Pratama & Nurmandi, 2020	Mixed methods design	Indonesia	Prevention phase	Community	Leadership style in the hazard governance process has the potential to foster community trust.
Rana et al., 2020	Quantitative	Bangladesh	Prevention phase	Community	Community trust is linked to the implementation of preventive measures prior to a disaster.

Slack et al., 2020	Quantitative	United States	Response phase	Institutional	The lack of trust in major institutional actors can create a gap between expert and community assessments of risk.
Stone et al., 2014	Community-based approach	Ecuador	Preparedness phase	Institutional	Trust in disaster risk management authorities enhances community disaster awareness through effective communication channels.
Thoresen et al., 2018	Quantitative	Norwegia	Recovery phase	Institutional	The levels of institutional trust are notably lower among victims compared to the general population, with chronic negative consequences.
Thouret et al., 2022	Qualitative	Indonesia	Preparedness phase	Institutional	Trust in government agencies is grounded in personal experiences during previous evacuations.
Torres et al., 2018	Qualitative	United States	Prevention phase	Institutional	Institutional trust facilitates the effective functioning of government entities in disaster prevention phase.
Zander et al., 2022	Quantitative	Australia	Recovery phase	Institutional	Trust in authorities is connected to the emergency information provided by those authorities.
Zhong et al., 2021	Quantitative	China	Prevention phase	Institutional	Trust in hazard warnings and their sources is associated with individuals' comprehension and utilization of risk information.

2.3.2. The role of trust across the CCA cycle

The second subsection includes the results on the role of trust across the CCA cycle (summarized in the Table 2).

Regarding the cycle of the CCA, the analysis reveals that all papers focused on only two stages of the whole cycle (*implementing adaptation,* and *monitoring and evaluating adaptation*). This phenomenon is comprehensible as the initial phases of the cycle (which are *preparing the ground for adaptation, assessing climate change risks and vulnerabilities, identifying adaptation options,* and *assessing and selecting adaptation options*) prioritize only the formulation of strategies for climate change management by regional or local authorities. Within these stages, considering the influence of public trust on the process would be only inferential.

Specifically, in papers focused on the stage of *implementing adaptation*, it emerges that trust influence different adaptive actions. Specifically, it influences the willingness to adopt renewable energy technologies (Akinwale & Adepoju, 2019), the willingness to pay for cyclone risk reduction (Akter, 2020), the willingness to engage in both low- and high-impact mitigation behaviors (Cologna et al., 2022), and the willingness to pay for fossil fuel taxes (Fairbrother et al., 2021). The dynamics of trust also contribute to an elevated perception of risk, exerting a significant influence on how the public responds to, addresses, and supports initiatives for climate change mitigation and adaptation (Choon et al., 2019). Additionally, trust was found to be the most important factor influencing public acceptance (i.e., attitudinal engagement) of climate adaptation behaviors (Le et al., 2022).

In papers focused on the stage of *monitoring and evaluating adaptation*, it emerges that trust is effective in driving climate adaptation behaviors (Azadi et al., 2019). Specifically, higher levels of trust are linked to adaptive practices for climate change and to government-aided relocation strategies (Ekoh et al., 2023).

Although there are different implications of trust at the two final stages of the CCA cycle, reading these results necessitates a comprehensive understanding of research findings. In fact, when the results of the study are comprehensively examined, a recurring theme emerges: throughout the entire CCA cycle, individuals may still have the opportunity to cultivate their trust, and building trust can significantly enhance the capacity for CCA. For this reason, institutions should recognize that fostering trust is imperative at the whole phases of the cycle to ensure the uninterrupted flow of this crucial dynamic, beneficial CCA.

Table 2: Description of main findings of selected studies on trust in CCA

Authors	Type of study	Country	CCA phase	Type of trust	Themes identified on trust in CCA
Akinwale & Adepoju, 2019	Quantitative	Nigeria	Implementing adaptation	Institutional	Trust influences the willingness to adopt renewable energy technologies by micro and small enterprises.
Akter, 2020	Quantitative	Bangladesh	Implementing adaptation	Community	Willingness to pay for cyclone risk reduction varied significantly across the levels of trust measured at the individual level. High level of trust are linked to high willingness to pay.
Azadi et al., 2019	Quantitative	Iran	Monitoring and evaluating adaptation	Institutional	Trust is effective in driving farmers' climate adaptation behaviors.
Bakaki & Bernauer, 2016	Quantitative	Brazil	Monitoring and evaluating adaptation	Institutional	Low levels of trust in public institutions have a strong negative impact on the public's willingness to pay for forest conservation, individually and/or via government spending.
Berry et al., 2011	Quantitative	Australia	Monitoring and evaluating adaptation	Institutuional Community	Higher levels of trust are linked to adaptive practices for climate change adaptation.
Budhathoki et al., 2020	Quantitative	Nepal	Monitoring and evaluating adaptation	Institutional	Trust influences flood risk perception. Risk perception, in turn, mediated the relationship between trust and farmers' intended flood adaptation strategies.
Choon et al., 2019	Quantitative	Malaysia	Implementing adaptation	Institutuional Community	Higher social trust will lead to higher risk perception, which can significantly affect how public response, address, and support climate change mitigation and adaptation initiatives.
Cologna et al., 2022	Quantitative	Swiss	Implementing adaptation	Institutional	Higher levels of trust in climate scientists predicted the willingness to engage in both low- and high-impact mitigation behaviours.
De Vocht et al., 2015	Quantitative	Norway, Spain, Serbia, Belgium	Implementing adaptation	Institutional	Trust in the government influences climate change-related behavioral intentions.
Devine-Wright & Batel, 2017	Quantitative	England	Monitoring and evaluating adaptation	Institutuional Community	Those with strong trust at local, national, and global levels were most willing to reduce energy demand.
Ekoh et al., 2023	Mixed	Nigeria	Monitoring and evaluating adaptation	Institutional	High levels of trust are linked to government-aided relocation strategies.
Fairbrother et al., 2021	Quantitative	Sweden, Spain, South Korea, China	Implementing adaptation	Institutional	People with more political trust were significantly less skeptical of the benefits of tax policies related to climate change.
Fairbrother et al., 2019	Quantitative	23 European countries	Implementing adaptation	Institutional	People who live in countries with high political trust tend to be much more supportive of fossil fuel taxes.

Haas et al., 2021	Mixed	India	Implementing adaptation	Community	Community resilience – assessed using the five core dimensions of trust, place attachment, collective efficacy, social networks and social support – significantly and positively influences adaptation actions.
Imbulana Arachchi & Managi, 2022	Mixed (indirect and quantitative)	30 developing and developed countries	Monitoring and evaluating adaptation	Institutuional Community	Higher community attachment and social trust are associated with higher concern about the global warming issue.
Jin, 2023	Quantitative	Korea	Implementing adaptation	Community	Trust moderated the causal relationship between societal risk perception and climate change- related behavioral intentions.
Kettle & Dow, 2016	Quantitative	United States	Implementing adaptation	Institutional	Trust plays a pivotal role in shaping individuals' endorsement of climate change adaptation measures.
Le et al., 2022	Mixed	Australia	Implementing adaptation	Institutional	Trust was found to be the most important factor influencing public acceptance (i.e., attitudinal engagement) of coral restoration.
Nikolakis & Guðjónsson, 2021	mixed methods research design	Iceland	Implementing adaptation	Institutional	Trust emerged as a crucial element fostering collaboration in endeavors related to climate action.
Park, 2021	Quantitative	Korea	Implementing adaptation	Institutional	Trust emerged as a critical variable for the public's desire to adopt renewable energy technologies.
Rahmani & Bonyadi Naeini, 2023	Quantitative	Iran	Implementing adaptation	Institutional	Trust had a positive effect on solar energy technologies usage intention in agriculture industry.
Saptutyningsih et al., 2020	Quantitative	Indonesia	Implementing adaptation	Community	The willing to contribute financially to the adaptation process is positively correlated with high level of trust.
ter Mors & van Leeuwen, 2023	Experimental	Netherlands,United Kingdom	Implementing adaptation	Institutional	Trust is linked to acceptance of the low-carbon technology project.
Vainio & Paloniemi, 2013	Quantitative	Finland	Implementing adaptation	Institutional	The belief in climate change mediates the effect of post-material values, trust and knowledge on climate-friendly action.
Wang et al., 2021	Quantitative	China	Implementing adaptation	Institutuional Community	The improvements of formal social networks, interpersonal trust, institutional trust, and social norms have significant impacts on the choice of climate change adaptation strategies for farmers.

2.3.3. Trust, community resilience, and stakeholders' decision-making

There is a consensus among scholars that populations that are more prepared for emergencies are also more capable of better reacting during the materialization of varied adversities (Hemond & Rober, 2012). A multitude of aspects influences the resilience on the individual, family, community, and society levels, which may mitigate the response to natural hazards (Stone et al., 2014). Overall, literature suggests that trust (either in local or national entities) is one of the most important elements of community resilience. It is a fundamental requirement for individuals to understand risks and process uncertainties (Sutton et al., 2021; Longstaff & Yang, 2008). With respect to the importance of community trust, recent literature continues to emphasize how it is vital for effective disaster management and preparedness (Bodas et al., 2022; Faisal et al., 2021; Matthews et al., 2020).

In this regard, a recent meta-analysis (Theodorou et al., 2024) found that trust in authorities is a significant antecedents of risk perception. For this reason, focusing on trust during risk management policies is crucial. Through effective utilization of communication channels (e.g., mass media or social media), disaster experts can facilitate the dissemination of emergency information and the development of trust. In turn, trust contributes to enhancing community awareness, fostering a deeper understanding of hazard processes, therefore playing a fundamental role in increasing community preparedness (Zander et al., 2022). Trust in authorities, in addition to resulting a predicting variable of risk perception, should be interpreted as a fundamental factor throughout the disaster management cycle. In this cycle, individuals can cultivate trust in their community (e.g., relatives, neighbours, coworkers) and institutions (e.g., agencies, authorities, government). Building trust can significantly enhance the capacity for disaster risk prevention, management, and resilience in communities.

It is noteworthy that trust is also a key component for decision-making in DRR and CCA. As it happens with community participation, trust indeed represents both an objective and a means for the development of community decision-making.

It is possible to define decision-making in the realm of DRR and CCA in broad, inclusive terms under the label "climate-relevant decisions". It defines decisions with respect to the underlying mitigation-driven or adaptation-driven motives or goals held by the decision-maker. It encompasses any explicit decisions undertaken by an actor or group of actors (e.g., individuals, households, communities, organizations, or societies) that hold implications within the context of systems influencing, or being influenced by, disaster risk and climate change. For example, an individual's transportation mode choice (e.g., personal vehicle versus public transit versus bicycle) is a climate-relevant decision (because of the implications such a decision has for that individual's transportation-related greenhouse gas emissions), even if that individual is not explicitly thinking about climate

change when making the mode choice decision. Likewise, when a business opts to construct its upcoming factory at a considerable distance from existing flood-prone areas, notwithstanding the elevated initial construction expenses (such as property costs), this constitutes a decision pertinent to climate adaptation. Such a choice carries significant implications for the future repercussions of climate change.

In sum, the literature review revealed that trust, encompassing both institutional and community trusts, plays a crucial role in decision-making within the realms of DRR and CCA. The analysis reveals that trust dynamics influence adaptive actions. Specifically, trust positively influences the willingness to adopt renewable energy technologies (Akinwale & Adepoju, 2019), to pay for cyclone risk reduction (Akter, 2020), to engage in both low- and high-impact mitigation behaviors (Cologna et al., 2022), and to pay for fossil fuel taxes (Fairbrother et al., 2021). Trust also led to higher risk perception, which has a significant effect on how the community supports climate change mitigation and adaptation initiatives (Choon et al., 2019). Specifically, trust was found to be the most important factor influencing public acceptance (i.e., attitudinal engagement) of climate adaptation behaviors (Le et al., 2022). Accordingly, Moreno and colleagues (2019) argued that for communities to exhibit resilience in the face of critical events, a strong foundation of trust is needed.

As observed before, trust and the perception of trustworthiness in the context of DRR and CCA are dependent upon the responsiveness of institutions and community members, based on their capacity to communicate openly and handle the situation. Within this context, Kitagawa (2018) examined the significance of promoting decision-making and participation through collaborative projects in community learning for disaster preparedness, emphasizing the need for the population's commitment and cooperation to prevent and mitigate anticipated large-scale disasters. Considering that human decision-making represents a key factor in determining how individuals and society respond to environmental risks (Brown & Westaway, 2011), these collaborations establish empowering and trustworthy relationships between community members and authorities: through collaborative efforts, both parties can familiarize themselves, exchange ideas and information, and jointly develop preparedness plans. At the community level, developing these types of participatory approach before disaster occurrences is crucial for building trust, raising awareness, and enhancing the general public's knowledge base.

Hence, in order to foster a positive and virtuous "culture of trust" (Bonfanti et al., 2024) in DRR and CCA, it is imperative to take into account all three domains of the trust dynamics: effective communication that aligns with the context and participants, active engagement of community members as catalysts for change, and the establishment of adequate feedback mechanisms to

collectively assess the impact of participatory processes. Given the findings of the literature review, it is imperative for stakeholders in DRR and CCA to cultivate and disseminate this culture of trust within communities. Establishing such a culture presents challenges due to the complex nature of trust and the requisite criteria for its implementation. Nevertheless, as with many complex subjects, transparent and open communication emerges as the most potent tool that every community can wield. Honest communication regarding the necessity and implementation of DRR and CCA can alleviate citizens' fears and mitigate inappropriate responses when it comes time to implement emergency management strategies and climate change adaptive behaviors. The cultivation of a culture of trust is indispensable for fostering community resilience and nurturing a cohesive bond wherein all community members collaborate towards ensuring the safety and well-being of everyone.

2.3.4. Limitations and future directions

The review presented in this deliverable has some limitations. Firstly, it evaluates trust in DRR and CCA phases independently due to data constraints, such as the lack of longitudinal studies, potentially obscuring the complex interconnections between these phases. Secondly, it confines itself to the scientific literature, possibly overlooking insights present in grey literature. Despite summarizing studies utilizing different methods to assess trust and its correlates in DRR and CCA, including ad-hoc and validated instruments, the possibility to compare study findings is limited because of the heterogeneity of contexts and methods. In this context, it is rather clear that the lack of longitudinal evidence demonstrating causal relationships between trust dynamics and individuals' behaviors and decisions in DRR and CCA should not be interpreted as evidence of non-existence. Its limitation notwithstanding, the review clearly underscores the importance of both institutional and community trust for effective DRR and CCA initiatives. However, additional research is crucial to elucidate the causal connections between trust and the effectiveness of DRR and CCA initiatives, necessitating innovative research methodologies such as longitudinal and experimental designs. These methods can explore specific characteristics influencing trust in the context of DRR and CCA.

PART III – CONCEPTUAL FRAMEWORK

3 General approach

This section introduces a conceptual framework on trust, elucidating its dimensions and relationships in the context of DRR and CCA. This framework comes before formulating practical and actionable steps for implementing trust in the realm of natural disasters and climate change (Chapter 4).

The development of the conceptual framework followed a multi-step process that drew from the literature review. Initially, we examined the papers included in the literature review, focusing on the prevalent concepts that were recurrently utilized to underpin the research about trust in DRR and CCA. We identified the key relationship that frequently emerged between trust and other relevant variables. Subsequently, we integrated these findings with further existing knowledge on the subject, including knowledge already generated within the RETURN project. Specifically, this document aligns with the objectives outlined in Task 4.1, which focus on investigating common set of methods and guidelines for community-based activities, approaches, codesign and policies, and it also aligns with the objectives outlined in Task 5.1, which focus on investigating the factors influencing individuals' perception of risk, so to constitute a fertile ground for the development of nudges to promote effective decisions and appropriate behaviors in DRR and CCA policy and practice, as implied in the global WP5 scopes.

The conceptual framework was, in part, built upon fundamental concepts such as community awareness, decision-making and agency, which are rooted in mainstream social science theories and that we then tailored and adapted to clarify, through the framework, the concept of trust in the context of DRR and CCA. The conceptual framework is embedded in the fundamental principle of promoting trust in the community. At its core is the need to adapt community to climate changes and reduce disaster risks. The realization of this need propels the community into action, framed by community agency and decision-making, a response intricately woven with the local context in which the community exists and its internal dynamics (i.e., enabling/constraining factors). The consequences arising from this procedural course engender a cascading impact across the community, influencing its capacity to adeptly adjust and proficiently mitigate risks.

3.1. An integrated perspective on trust and resilience

The findings presented in the review facilitated an understanding of how the levels of trust are intrinsically linked to a community's resilience and adaptive behaviors in the face of climate change

and natural disasters. Specifically, studies have indicated that trust serves as a direct predictor of resilience (Bodas et al., 2022, Carone et al., 2019). Similar to trust, resilience to disasters extends across all phases of a disaster (pre-event, during a disaster, and post-event phases) and is not confined solely to the disaster response and recovery stages (Nelson et al., 2007). Resilience is thus contingent on the community's capacity to recover post-disaster and is also connected to the extent of resources and capabilities the community possesses, both before and after a disaster. An integral dimension of resilience involves fortifying relationships among citizens, NGOs, and government agencies, which are indispensable for establishing a robust foundation of trust and cohesion within the community and its collaborative partners when faced with disaster risks. Consequently, resilience and trust appear to be mutually influential and interdependent during disasters.

The literature has also demonstrated that both institutional and community trust are crucial in DRR and CCA. For this reason, the framework considers the implementation of both types of trust in the development of a general trust model that encompasses them. In fact, an integration between community trust and institutional trust is needed to improve decision-making related to DRR and CCA. Community trust is established through the emotional connections between individuals, often occurring within homogeneous groups (among people of the same nationality, beliefs, and dialects) but also with heterogeneous groups (among individuals from different nationalities, beliefs, and dialects); it exhibits characteristics of both close and distant relationships, resulting in variations in trust (Yan et al., 2016). On the other side, institutional trust is frequently cultivated through 'non-interpersonal' relationships, underscoring confidence in legal, political, and other institutional frameworks. This trust serves as a crucial psychological foundation to enable individuals to successfully engage in social activities. It is primarily evident in the trust individuals place in the discourse of government agencies, media news, and village cadres (Sztompka, 1999; Ekici and Peterson, 2009).

"General trust", as observed in Figure 12, emerges from the interaction and combination between both types of trust, and serves as a relational adhesive, capable of either supporting or constraining formal and informal social interactions, knowledge sharing, and the innovation process. General trust leads individuals to navigate their risk perception and vulnerability during interactions with others and with the institutions, modifying their perspective, approach to problems, and responses. Accordingly, the literature has highlighted that adopting effective DDR and CCA strategies require a trust that encompasses both community and institutional aspects (Berry et al., 2011; Choon et al., 2019; Devine-Wright & Batel, 2017; Macgillivray, 2018).

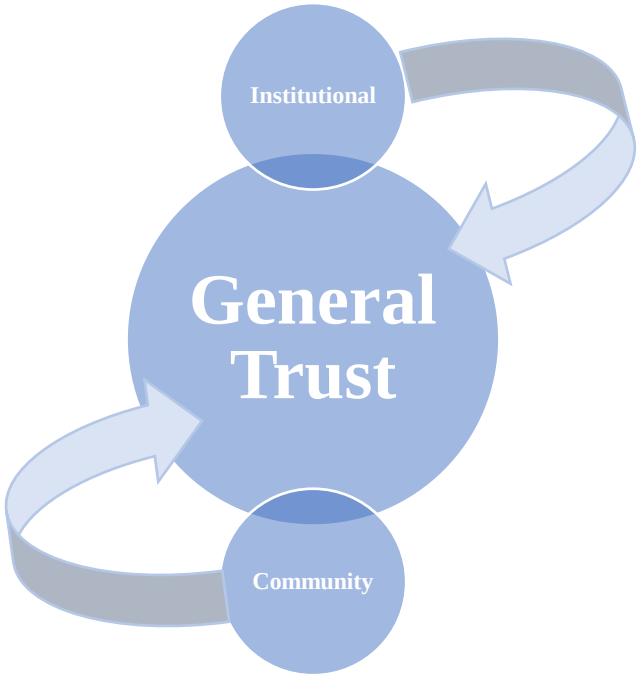

Figure 12: Model of general trust.

Establishing general trust can significantly increase the capacity for managing disaster risks and enhancing resilience within communities. By relying on trust, individuals, communities, and institutions have the capacity to absorb and recover from disasters, concurrently fostering positive adaptation and transformation in their behaviors amid enduring changes and uncertainties. Consequently, there is a crucial need to promote collaborations and partnerships across various sectors, prioritizing community engagement and endorsing leadership models capable of expanding trust in the disaster management process and CCA cycle. This, in turn, initiates a reinforcing dynamics leading to an elevated level of general trust. Moreover, the importance of appropriate information and communication is emphasized throughout the entire cycle. For example, research indicates that when authorities provide emergency information aligned with citizens' needs, this bolsters trust in authorities, thereby reducing the future likelihood of seeking information from alternative and unreliable sources. Conversely, inadequate communication by authorities is linked to potential long-term adverse outcomes in disaster management (Percy et al., 2011).

Through proficient use of communication channels, experts in disaster management and climate change can facilitate the dissemination of emergency information (e.g., by generating reliable and clear information and disseminating it through mass media or social media) and thus the cultivation of trust (Zander et al., 2022). Consequently, trust contributes to augmenting community awareness and fostering a more profound comprehension of hazard processes, playing a pivotal role in bolstering community resilience. In the realm of disaster management and climate change,

government should strive to enhance individuals' trust in their community (e.g., relatives, neighbours, coworkers) and institutions (e.g., agencies, authorities, government). The establishment of trust holds the potential to significantly fortify the resilience in communities.

3.2. Trust impact on community´s decision-making

As previously anticipated, trust is defined as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (Rousseau et al., 1998, p. 395). Thus, the integrative vision of trust represents both an objective and a means for the development of community agency and decision-making. This because there is empirical evidence supporting the view that:

1. The level of trust a person possesses is indicative of their willingness to engage in collaborative efforts and adhere to directives from authorities (De Cremer & Tyler, 2007; Pagliaro et al., 2021). Importantly, it has been observed that in situations where interpersonal coordination is necessary to optimize collective results, trust in others plays a pivotal role in determining one's willingness to cooperate (Balliet & Van Lange, 2013).
2. Trust in government can account for the variances among individuals in their compliance with governmental policies and recommendations (Chanley, Rudolph, & Rahn, 2000; Kim, 2005; Riccucci, Van Ryzin, & Li, 2016; Scholz & Lubell, 1998; Scholz & Pinney, 1995). Therefore, for the effective execution of community agency, it is essential to recognize that trust in government plays a pivotal role in bolstering individuals' adherence and cooperation with governmental policies and recommendations (Kim, 2005; Makkai & Braithwaite, 1994). Indeed, research has shown that individuals' readiness for various emergencies, such as earthquakes, hurricanes, and other health-related crises, correlates with their trust in federal, state, or local government (Arlikatti, Lindell, & Prater, 2007; Basolo et al., 2009; Murphy, Cody, Frank, Glik, & Ang, 2009; Greer et al., 2018). Heightened trust in the government aligns with increased cooperation among individuals regarding government decisions (Chanley et al., 2000; Levi & Stoker, 2000; Scholz & Lubell, 1998; Scholz & Pinney, 1995). Furthermore, individuals are more likely to adopt emergency preparedness measures when they perceive a heightened level of trust in the government (Ablah et al., 2009; Longstaff & Yang, 2008; Murphy et al., 2009; Greer et al., 2018; Paton, 2010).

3. There is a need to promote education regarding trust at interpersonal, community, and institutional levels, ensuring that DRR and CCA initiatives are responsive and equitable to the diverse needs of the stakeholders involved. For instance, during the disaster response phase of DRR, individuals tend to place greater trust in assistance from their fellow human beings (community trust), such as relatives and neighbours, rather than relying on the expectation of receiving aid from state-led services or international relief efforts (institutional trust). Consequently, community members may assume a more significant role in devising personal security strategies during a disaster than any other security framework. However, relying excessively on local support over an extended period may carry potential adverse consequences, including a decrease in overall trust in the state and its public services. This situation could lead to overconfidence to the extent of rejecting or refusing to utilize the resources provided by the state (Bambals, 2015).

As discussed in WP.4.1, in order to enhance the conceptualization of the role of trust in community agency and decision-making, it must be stressed here that trust functions as both a precondition and an outcome of agency and decision-making in the realm of DRR and CCA. The dynamics of trust are shaped by institutions, social capital, human capital, and community resources, while concurrently, trust has the potential to recursively instigate changes within these domains. Such recursive nature of trust dynamics has been frequently reported in the relevant literature on DRR and CCA. For example, Carone and colleagues (2019), while evidencing that trust in institutions can play a critical role in improving the perceived resilience of a community, also stressed that an effective communication relies on the citizens' trust in the communicator.

Figure 13 illustrates a graphical representation of the recursive character of trust dynamics within community agency and decision-making.

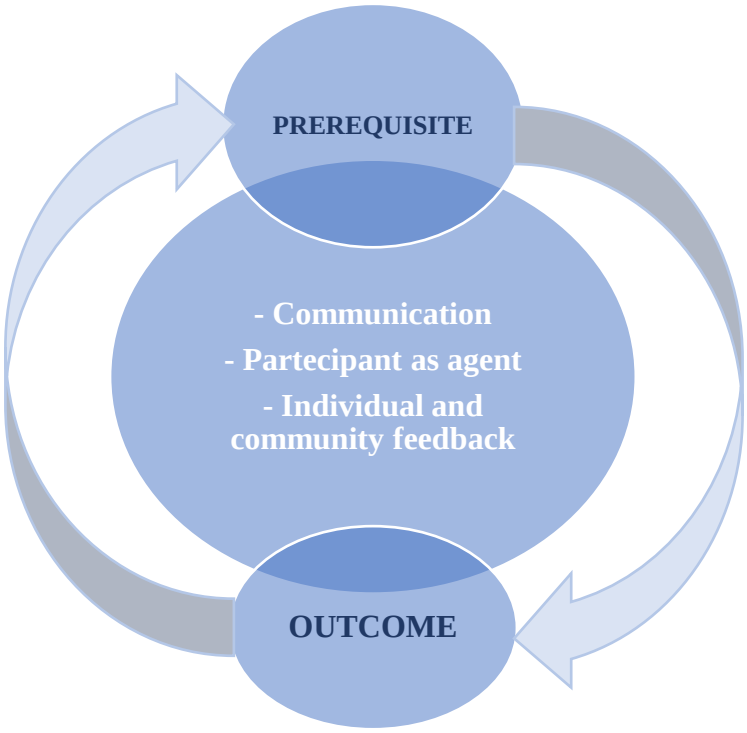

Figure 13: Trust dynamics in community agency.

As illustrated in Figure 13, trust dynamics within a community agency and decision-making are influenced by three key indicators that can be used to assess the overall quality of trust throughout the different phases of the DRR and CCA. These indicators encompass (1) the effectiveness and quality of communication among trust actors, (2) the personal and community perception of active agency and the ability to positively influence outcomes in DRR and CCA, and (3) the existence of feedback mechanisms at both individual and community levels. These latter mechanisms aim to offer support and information regarding the impact of DRR and CCA behavior, ensuring the potential to adjust subsequent actions based on the received feedback.

Aligned with this perspective, Moreno and colleagues (2019) argued that for communities to exhibit resilience in the face of critical events, a solid foundation of trust is indispensable. It is noteworthy that previous encounters with communication effectiveness, active involvement in community activities, and institutional response following natural disasters significantly impact individuals' trust in governments and local communities. These encounters also model people's expectations regarding future disaster management and climate change strategies (De Vocht et al., 2015; He et al., 2021). This occurs due to the interconnection among the three realms of communication, active involvement, and feedback. For example, when institutions engage in inadequate communication marked by ambiguity, lack of clarity, or idiosyncrasies, it can potentially

diminish community engagement in DRR and CCA initiatives. Consequently, individuals and groups might adopt decision-making approaches that discourage assuming responsibility, leading to disengagement from active involvement in positive community practices. Likewise, the lack of feedback regarding actions taken within the community can contribute to a diminished perception of community effectiveness among citizens and foster mistrust towards authorities and local law enforcement agencies. Also, as previously observed, trust and perceived trustworthiness within the realms of DRR and CCA hinge on the responsiveness of institutions and community members. This responsiveness is rooted in their ability to communicate transparently and effectively manage the situation. Within this context, Kitagawa (2018) investigated the importance of fostering agency and participation through collaborative projects in community learning for disaster preparedness, emphasizing the necessity for the population's dedication and cooperation to prevent and mitigate anticipated large-scale disasters.

Considering that human agency represents a key factor in determining how individuals and society respond to environmental risks (Brown & Westaway, 2011), these collaborations establish empowering and trustworthy relationships between community members and authorities: through collaborative efforts, both parties can familiarize themselves, exchange ideas and information, and jointly develop preparedness plans. At the community level, it is essential to cultivate participatory approaches before disasters occur. This is critical for establishing trust, increasing awareness, and enhancing the general public's knowledge base.

Therefore, to cultivate a positive and virtuous culture of trust in DRR and CCA, it is essential to consider all the three dimensions of trust dynamics: effective communication tailored to the context and participants, the active involvement of community members as agents of change, and the establishment of suitable feedback mechanisms to collectively evaluate the impact of participatory processes.

PART IV – GUIDELINES FOR POLICY MAKERS

4 Rationale and objectives of the guidelines for policy makers

This fourth part is to be intended as a practical guide for public administration, authorities and local law enforcement who intend to promote trust in management strategies of CCA and DRR. In this context, these guidelines advocate the development of general trust in all stages of the DRR/CCA cycle and are designed to ensure the most meaningful and appropriate level of trust diffusion. Practitioners are then free to customize the guidelines to suit their specific needs, meaning they can choose to promote general trust only in the phases of the policy process where it is deemed necessary. However, to enhance opportunities for more meaningful public participation, we suggest considering the steps of these guidelines in their entirety before initiating the CCA or DRR plans.

The guidelines are structured into multiple steps corresponding to the phases of the cycles, each comprising activities and sub-activities to promote trust. The description of each step includes various elements: a portrayal of the activities, operational instructions to facilitate the implementation of the proposed activity, information on the entity/organization responsible for the activity, the expected output, useful tools or instruments crucial for activity implementation (e.g., focus group, brochures, website, newsletters, and reports), and methods to evaluate trust dynamics.

4.1. Guidelines for strengthening community trust

Community and institutional trust establish links to essential resources that aid communities in managing natural disasters and climate change. Scholars associate community trust with outcomes such as heightened volunteerism, improved well-being of residents, and economic prosperity. It fosters connections among neighbours and friends, whom individuals rely on when they need assistance.

Professionals operating in these domains can take specific actions to contribute to the establishment of trust at various phases of disaster risk management (*prevention, preparedness, response*, and *recovery*) and climate change adaptation (*preparing the ground for adaptation, assessing climate change risks and vulnerabilities, identifying adaptation options, assessing and selecting adaptation options, implementing adaptation,* and *monitoring and evaluating adaptation*). This ensures an equilibrium between risk reduction and the fortification of community resilience, all while ensuring effective response and recovery capabilities.

The following part is divided into two subsections, reflecting the two cycles: DRR cycle and CCA cycle.

4.1.1. DRR phases and instructions

Here the focus is on DRR cycle. The specific actions to contribute to the establishment of trust at various phases of disaster risk management (*prevention, preparedness, response,* and *recovery*) will be described.

Step 1: Prevention phase

In the prevention phase, it might be crucial to disseminate updated information and training materials on natural disaster management to community members, also through the most widely used institutional and social channels. In this step, the following guidelines are recommended:

- Share training materials on natural disaster management with community members. In conjunction with local law enforcement agencies, community leaders and authorities, practitioners can distribute training materials on natural disaster management throughout their communities and at events.
- Comprehending the potential contributions of authorities and local law enforcement agencies is crucial. Numerous law enforcement agencies have initiated programs to engage the community in preparing for natural disasters. It is imperative for community leaders and authorities to proactively establish communication with local agencies to ascertain the existence of such programs and explore opportunities for involvement.
- Encourage the dissemination of programs via community newsletters, as they serve as an effective means to impart information to the community regarding disasters such as wildfires, tropical storms, hurricanes, and earthquakes. These newsletters can also include specific details about potential adverse outcomes and guidance on their mitigation.
- Formulate and disseminate methods for promptly and effectively reporting information related to natural disasters. The development and assessment of communication systems tailored for disaster risk management are crucial, with an emphasis on enhancing usability. This entails incorporating mechanisms such as alerts and helplines to efficiently communicate essential information within the community. From large cities to small towns, many communities already have access to these systems. An increasing number of local agencies now offer the option to report information by text message, mobile phone

application, and/or secure web sites. In most cases, these methods can be used to timely report dangerous events.

- Encourage community leaders or local law enforcement officers to utilize widely adopted communication channels (such as phones, social media, and television) to convey information to the community regarding preventive and measures for natural hazard management.

Table 3 describes the key aspect to take into account for the Step 1.

Table 3: Description of the key features for the Step 1

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Share training materials. • Understand how authorities and local law enforcement agencies can help. • Promote programs through community newsletters. • Publicize ways to report information for timely natural disaster management. • Invite community leaders/local law enforcement officers to use the most popular communication channels to communicate prevention activities.	• Professionals bear the responsibility of disseminating training materials and advocating for preventive programs. • Authorities and local law enforcement agencies are tasked with sharing information about their distinct disaster response initiatives. • Disaster risk practitioners, along with authorities and local law enforcement, should publicize information to facilitate timely management of natural disasters.	• Brochures • Website • Newsletters • Reports All the tools must remain available to the community during all the stages of disaster risk management.	• Communication plans organized by community-based practitioners. • Communication plans organized by authorities and local law enforcement.	• Questionnaire • Survey • Interview

Step 2: Preparedness phase

In the preparedness phase, it might be crucial to organize information-sharing sessions, like public meetings or focus groups on natural disaster management topics. Inviting community leaders and local law enforcement officers to address community gatherings on diverse themes, including the

community's role in natural disaster management, might also be crucial. In this step, the following guidelines are recommended:

- Facilitate information-sharing sessions, such as public meetings or focus groups, focused on topics related to the management of natural disasters. These sessions serve to empower a larger segment of the community to disseminate information regarding reporting natural hazards throughout the community. Community members who possess both credibility and knowledge (e.g., for their role in the community) can contextualize the subject to make it pertinent to their neighbours.
- Extend invitations to community leaders or local law enforcement officers to address community gatherings. These officers can expound on various themes pertinent to neighbourhood associations, faith-based organizations, schools, and other community groups, covering aspects such as the community's role in natural disaster management and the responsibilities of the local law enforcement agency. Adequate time should be allotted for questions and discussions involving community members during these meetings.

Table 4 describes the key aspect to take into account for the Step 2.

Table 4: Description of the key features for the Step 2.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Conduct information sharing sessions. • Invite community leaders or local law enforcement officers to speak at community gatherings.	• Disaster risk practitioners have the responsibility to organize information sharing sessions on natural disaster management topics. • Community leaders or local law enforcement have the responsibility to participate at community gatherings.	• Focus groups • Slides • Reports All materials must remain available to the community during all the stages of disaster risk management.	• Public meetings report. • Communication tools implemented	• Questionnaire • Survey • Interview • Focus group

Step 3: Response phase

In the response phase, it might be crucial to involve the community in implementing natural disaster management plans, ensuring community engagement in appropriate ways when executing these plans. In this phase, it is imperative to utilize popular communication channels (e.g., phones, social media, television) to communicate promptly with the community regarding DRR actions. For instance, social media platforms serve as prime sources for real-time information during emergencies. In this step, the following guidelines are recommended:

- Engage the community in the implementation of natural disaster management plans: Involving the community appropriately during the execution of natural disaster management plans enhances trust. This approach fosters credibility, demonstrates integrity and responsiveness, and underscores the competence of institutions.
- Encourage community leaders and/or local law enforcement officers to improve the use of widely used communication channels (e.g., phones, social media, television) to convey timely and effective directives for disaster management to the community.

Table 5 describes the key aspect to take into account for the Step 3.

Table 5: Description of the key features for the Step 3.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Involve the community in executing natural disaster management plans. • Invite community leaders/local law enforcement officers to use widely adopted communication channels to guide the community in taking prompt actions during a natural disaster.	• The community actively participates in emergency management strategies. • Community leaders or local law enforcement bear the responsibility of communicating timely actions for managing natural disasters.	• Most popular communication channels (e.g., phones, social media, television).	• Community engagement in plans. • Emergency communication plans.	• Questionnaire • Survey • Interview

Step 4: Recovery phase

During the recovery phase, regular communication regarding the progress and performance of disaster management plans should be maintained, giving due credit to the community for its contributions and efforts in mitigating the effects of disasters. Consistent and clear communication is indispensable for keeping citizens informed and fostering trust within the community. A lack of transparency, even if unintentional, sows seeds of mistrust and misinformation. In this step, the following guidelines are recommended:

- Regularly communicate the progress and performance of natural disaster management plans, acknowledging the community's contributions to their success when appropriate. Consistent and clear communication is crucial for keeping citizens well-informed and fostering trust within the community. The absence of transparency, even if unintentional, can lead to mistrust and the spread of misinformation. Providing regular updates on both achievements and challenges after a natural disaster is imperative for cultivating trust.

Table 6 describes the key aspect to take into account for the Step 4.

Table 6: Description of the key features for the Step 4.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Communicate the progress and performance of natural disaster management plans on a regular basis.	• Disaster risk practitioners, community leaders or local law enforcement have the responsibility to communicate the natural disaster management plans' progress.	• Most popular communication channels (e.g., phones, social media, television) and various materials (brochures, website, newsletters, reports).	• Communication tools implemented	• Questionnaire • Survey • Interview • Focus group

4.1.2. CCA phases and instructions

Here the focus is on CCA cycle. The specific actions to contribute to the establishment of trust at various phases of climate change adaptation (*preparing the ground for adaptation, assessing climate change risks and vulnerabilities, identifying adaptation options, assessing and selecting adaptation options, implementing adaptation*, and *monitoring and evaluating adaptation*) will be explained.

Step 1: Preparing the ground for adaptation

In the *preparing the ground for adaptation* phase, it might be crucial to start the adaptation process by creating a favourable attitude on the climate change policies, especially in terms of credibility of information, for sharing evidence and data on current and potential future climate impacts, adaptation actions, good practice examples. In this step, the following guidelines are recommended to implement trust dynamics in the community:

- Clarify to the community the internal roles and responsibilities on climate change.
- Sharing with the community the existing information by identifying evidence and data on current and potential future climate impacts, adaptation actions, good practices examples.
- Creating a favourable institutional credibility for adaptation, bringing in the concept of resilience for the community, and disseminate information about it to the community.
- Sharing with the community the information on financing and funding sources for CCA.

Table 7 describes the key aspect to take into account for the Step 1.

Table 7: Description of the key features for the Step 1

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Clarify to the community the internal roles and responsibilities. • Sharing with the community the existing information on climate change. • Creating favorable attitudes among citizens for climate change adaptation. • Sharing with the community the information on	• Climate change practitioners, authorities and local law enforcement agencies have the responsibility to share information on CCA. • Climate change practitioners, authorities and local law enforcement have the responsibility to publicize information for timely climate change adaptation strategies.	• Brochures • Website • Newsletters • Reports All the tools must remain available to the community during all the stages of CCA.	• Communication plans organized by climate change practitioners. • Communication plans organized by authorities and local law enforcement.	• Questionnaire • Survey • Interview • Focus group

financing and funding sources.				

Step 2: Assessing climate change risks and vulnerabilities

In the *assessing climate change risks and vulnerabilities* phase, it might be crucial to examine reliable data on risks and share information on how climate change might affect people, sectors or systems. In this step, the following guidelines are recommended:

- Examining data concerning climate change risks from reliable sources.
- Disseminating information to the community about climate-related hazards and their anticipated future changes.
- Sharing information to the community on the vulnerability of the area, such as the tendency of the exposed place and its components to be adversely affected.
- Disseminating information to the community about the exposure of the area, such as the presence of people, livelihoods, infrastructure, or species and ecosystems in places and settings that could be adversely affected because of climate change.

Table 8 describes the key aspect to take into account for the Step 2.

Table 8: Description of the key features for the Step 2.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Examining data from reliable sources. • Disseminating information to the community about climate-related hazards. • Sharing information to the community on the vulnerability of the area. • Disseminating information to the community about the exposure of the area.	• Climate change practitioners, authorities and local law enforcement agencies have the responsibility to share information.	• Brochures • Website • Newsletters • Reports All the tools must remain available to the community during all the stages of CCA.	• Communication plans organized by climate change practitioners. • Communication plans organized by authorities and local law enforcement.	• Questionnaire • Survey • Interview • Focus group

Step 3: Identifying adaptation options

The *identifying adaptation options* phase has the goal to identify a set of adaptation options to tackle the climate challenges identified in the previous step. For instance, climate change practitioners might share information to the community on this step. In this step, the following guidelines are recommended:

- Sharing information to the community on the national, regional, and local levels chosen strategies.
- Disseminating information to the community about case studies from national, regional, and local levels worldwide, which can serve as evidence that the chosen strategies are effective.

Table 9 describes the key aspect to take into account for the Step 3.

Table 9: Description of the key features for the Step 3.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Sharing information to the community on the national, regional, and local levels chosen strategies. • Disseminating information to the community about case studies from national, regional, and local levels worldwide, which can serve as evidence that the chosen strategies are effective.	• Climate change practitioners, authorities and local law enforcement agencies have the responsibility to share information.	• Brochures • Website • Newsletters • Reports All the tools must remain available to the community during all the stages of CCA.	• Communication plans organized by climate change practitioners. • Communication plans organized by authorities and local law enforcement.	• Questionnaire • Survey • Interview • Focus group

Step 4: Assessing and selecting adaptation options

The *assessing and selecting adaptation options* phase requires a close collaboration with expert stakeholders for assessing and prioritizing the potential adaptation options. During this step, a regular communication regarding the assessing and selecting adaptation options with respect to climate change and hazard management should be maintained. Consistent and clear communication

is indispensable for keeping citizens informed and fostering trust within the community. The absence of transparency fosters mistrust and misinformation within the community instead. In this step, the following guidelines are recommended:

- Sharing information to the community on the effectiveness of adaptation options in reducing climate vulnerabilities and risks.
- Clarify to the community the socio-economic implications for different societal groups.
- Clarify to the community the timing/urgency for action, based on the speed of impact and/or time for the adaptation option to be implemented at scale or to become effective.
- Clarify to the community the costs-benefits analysis the analysis of costs and benefits, elucidating the potential impact on the community.

Table 10 describes the key aspect to take into account for the Step 4.

Table 10: Description of the key features for the Step 4.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Sharing information to the community on the effectiveness of adaptation options. • Clarify to the community the socio-economic implications. • Clarify to the community the timing/urgency for action. • Clarify to the community the costs-benefits analysis.	• Climate change practitioners, authorities and local law enforcement agencies have the responsibility to share and clarify information.	• Conferences • Official documents • Website • Reports All the tools must remain available to the community during all the stages of CCA.	• Communication plans organized by climate change practitioners. • Communication plans organized by authorities and local law enforcement.	• Questionnaire • Survey • Interview • Focus group

Step 5: Implementing adaptation

During the *implementing adaptation* phase, the effective implementation of adaptation strategies and action plans by regional or local authorities is crucial. During this phase, consistent and clear communication becomes indispensable for the fundamental execution of actions. In this step, the following guidelines are recommended:

- Disseminating information to the community regarding the details of each action (and sub-actions, if applicable) and associated processes and synergies.
- Disseminating information to the community regarding the roles and responsibilities in coordinating and undertaking actions.
- Sharing information on the timeframe for implementation.
- Disseminating information to the community regarding the estimation of human and financial resources needed and/or available funding schemes.

Table 11 describes the key aspect to take into account for the Step 5.

Table 11: Description of the key features for the Step 5.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Disseminating information and details of each action. • Disseminating information on the roles and responsibilities. • Sharing information on the timeframe for implementation. • Disseminating information on human and financial resources	• Climate change practitioners, authorities and local law enforcement agencies have the responsibility to share information.	• Conferences • Brochures • Website • Newsletters • Social media • Reports All the tools must remain available to the community during all the stages of CCA.	• Communication plans organized by climate change practitioners. • Communication plans organized by authorities and local law enforcement.	• Questionnaire • Survey • Interview • Focus group

Step 6: Monitoring and evaluating adaptation

During the *monitoring and evaluating adaptation* phase, assessing the effectiveness of adaptation measures and identifying any unforeseen side effects that may have occurred is fundamental. During this phase, regular communication regarding the progress and performance of CCA plans should be maintained, giving due credit to the community for its contributions and efforts in mitigating the effects of natural hazards. Consistent and clear communication is indispensable for keeping citizens as active participants in the initiatives and fostering trust within the community. In this step, the following guidelines are recommended:

- Collecting reliable data on the efficacy of initiatives and sub-initiatives.

- Provides citizens with the opportunity to communicate about potential barriers to, and difficulties in the implementation of initiatives.
- Disseminating information to the community regarding the progress towards reducing climate impacts.
- Disseminating information to the community regarding the progress towards reducing risks and vulnerabilities and increasing adaptive capacity.
- Disseminating information to the community regarding the progress towards meeting adaptation priorities.
- Disseminating information to the community regarding the progress towards addressing barriers to adaptation.

Table 12 describes the key aspect to take into account for the Step 6.

Table 12: Description of the key features for the Step 6.

Strategies	Actors involved	Tools	Expected output	Trust evaluation
• Collecting data on the efficacy of initiatives and sub-initiatives. • Citizens can communicate about potential barriers to the implementation of initiatives. • Disseminating information on the progress towards reducing climate impacts. • Disseminating information on the progress towards reducing risks and vulnerabilities. • Disseminating information on the progress towards meeting adaptation priorities. • Disseminating information on the progress towards	• Climate change practitioners, authorities and local law enforcement agencies have the responsibility to share information. • Citizens participate as active agents, by communicating with authorities about the effectiveness of initiatives.	• Website • Newsletters • Reports • Social Media • Brochures All the tools must remain available to the community during all the stages of CCA.	• Communication plans organized by climate change practitioners. • Communication plans organized by authorities and local law enforcement.	• Questionnaire • Survey • Interview • Focus group

addressing barriers to adaptation.				

It is important to note that actions to implement trust are substantial on all the phases of risk management or climate change adaptation strategies. This happens because the phases are intertwined, and they often overlap and support each other. Building a strong sense of trust is crucial for limiting damage and accelerating recovery, and communities with a strong sense of trust, solidarity, and active participation react to emergencies more efficiently.

These guidelines are developed to build a culture of trust in the community that serves to mitigate disaster effects and adapt to climate change. Cultivating a culture of trust is essential for enhancing community resilience, fostering a cohesive environment where all community members collaborate to ensure both individual and collective safety, while also promoting the collective perception that natural disasters can be anticipated, effectively managed, and ultimately overcome.

4.2. Implications of trust dynamics for psychological, sociological and behavioral aspects in decision making

This section aims to transfer the above reported outcomes into the various WPs and Tasks featuring internal partners in Task 5.3.

4.2.1. Implication of trust dynamics for improving risk perception

In this paragraph, trust dynamics can be considered in relation to risk perception as defined in the domain of natural hazards. Specifically, risk perception may be considered as the combining of different aspects, namely the perceived likelihood of an event to occur, the perceived negative consequences of the event, and the perceived personal vulnerability to the event (Wilson et al., 2019). The importance of studying risk perception lies in its role in determining protective behaviours, either before, during, or after a natural hazard event (van Valkengoed & Steg, 2019; Wachinger et al., 2013). Nevertheless, the aspects that contribute to risk perception are not yet fully understood (Wachinger et al., 2013). Task 5.1 was focused on establishing relevant antecedents of risk perception (see DV 5.1, see also Theodorou et al., 2024). A meta-analysis was conducted to quantitively summarize the available research findings. Results highlighted twenty significant predictors, among those already identified in the literature (see Theodorou et al., 2024). Results from Task 5.3, reported here, can be compared to previous ones from Task 5.1, showing a clear continuity for what concerns one specific result of the conducted meta-analysis: namely, the aspects related to the relationship between the

individual and the community. In Task 5.1, in fact, results were grouped into three clusters, following Bonaiuto and Ariccio (2020): 1) factors concerning the relationship between the individual and the risk, namely how the individual relates to the risk in their area of living, e.g., prior experience of the hazard; 2) factors concerning the relationship between the individual and the community, namely how the individual relates to the place and the community in which they live, e.g., social norms, trust in authorities; and 3) individual factors, less likely to be modified, namely a) sociodemographic (e.g., educational qualification) and b) dispositional factors (e.g., self-efficacy). Trust dynamics were considered among the factors within the second cluster, i.e., those pertaining the relationship between the individual and the community. More specifically, a positive effect was highlighted, namely a higher trust in authorities (local and national) is associated with a higher risk perception. A previous review (Wachinger et al., 2013) showed how some studies reported a negative effect, hypothesizing that people with high trust are relieved from the burden of responsibility of taking actions to protect themselves and see future disasters as less probable and less severe. The results of the meta-analysis from Task 5.1 were different and probably point to the higher trust in authorities as a way to exhibit higher awareness of a given risk.

Trust dynamics also involve the perceived trust in the community. In Task 5.1, this may be captured, at least partially, by another aspect within the second cluster of factors regarding the relationship between the individual and the community: namely, social norms. Studies in the context of risk perception in other circumstances (i.e., COVID pandemic) demonstrated that trust and norms are positively associated (Cabrera-Álvarez, et al., 2022). From the meta-analysis (DV 5.1) it emerges that social norms (both injunctive and descriptive ones) are related to a higher risk perception. In other words, top-down suggested behaviours (injunctive norms) as well as behaviours observed as adopted by significant others (descriptive norms) may sustain risk perception. This means that a higher reliability in other people within the community may result in a higher risk perception and, thus, higher adaptation in natural hazards situations. We can consider that both factors within the individual-community relation cluster refer to some degree of trust between the individual and its social context: in fact, the “trust in authorities” factor explicitly refers to a trusting relation of the persons with their authorities; while the “social norms” factor implies a trusting relation either vertical (i.e., of the person with her/his authorities, considering injunctive norms) or horizontal (with other persons like her/him, considering descriptive norms) within the relevant social and physical context (see Theodorou et al., 2024). All in all, it seems that trust is a transversal variable, able to predict risk perception both “vertically”, namely between the population and its authorities, and “horizontally”, that is by the relationship that individuals reciprocally have with one another within the community. Ultimately, trust is among the crucial variables to be considered when intervening in risk perception

and, ideally, protective behaviours, in the context of natural hazards; and it is the main social capital available in such a context. It is important to stress that trust as a social capital should be conceived both in terms of "vertical trust" (among the person and the authorities) and in terms of "horizontal trust" (among people): they both can be leveraged in order to nurture risk perception and consequently adaptation in the interested population.

4.2.2. Implications of trust dynamics in the development of the field of risk elicitation methods

Task 5.2 reviews the methods used by behavioral economists to elicit preferences under conditions of risk or uncertainty. The investigation of individual preferences under conditions of risk and uncertainty is fundamental to understanding decision-making processes across numerous sectors and domains, especially in DRR and CCA. The ability to elicit and measure individuals' risk preferences provides valuable insights into their willingness to take risks and informs crucial choices and strategies. In performing this task, we distinguish between elicitation techniques under conditions of risk and uncertainty, by moving beyond the traditional boundaries of normative theory à la Savage (1954). In doing so, we follow the canonical distinction of Knight (1921), according to which risk refers to scenarios where probabilities of certain outcomes can be objectively determined or estimated based on available data and statistical analysis. This is not the case in situations of uncertainty, where individuals at most have knowledge of the probability distribution. Under conditions of risk, decision-makers can employ quantitative models and techniques to assess and effectively manage risky outcomes. On the other hand, uncertainty pertains to situations characterized by a lack of reliable data or an inability to assign probabilities to potential outcomes. Knight argued that uncertainty is inherently subjective and cannot be reduced to measurable probabilities. Decision-making under uncertainty requires more qualitative and intuitive approaches, as decision-makers must rely on their judgment, experience, and qualitative analysis to navigate through the complexities of uncertain environments. By delineating risk and uncertainty, Knight's distinction provides a theoretical foundation for understanding decision-making processes in different contexts and underscores the need for nuanced strategies to address these distinct phenomena.

Based on this distinction, scholars in Task 5.2 have conducted a systematic literature review and shown that over the past 20 years, the research trend reflects more the consolidation of a thematic tradition than adherence to more complex and real issues, such as natural disasters and climate change.

For this reason, drawing upon the present Critical overview of models of trust insights, Task 5.2 researchers are currently designing a game in which risk and trust preferences are elicited in the

context of natural disasters. In particular, this game aims to increase trust among citizens through incentives that encourage them to adopt cooperative-based adaptation actions against catastrophes. Ultimately, this research focuses on exploring the dynamics of trust in the lab and their significance in developing effective strategies to address risks associated with disasters and climate.

4.2.3. Implications of trust dynamics for nudging effective DRR and CCA actions

Nudges are strategic tools designed to promote behavioral change, based on sound psychological knowledge, which can be adopted for a multiplicity of ends, in the best interest of their beneficiaries – aligned with the principle of "libertarian paternalism" (Thaler & Sunstein, 2021, Sunstein, 2014). Since their birth, nudges have been interpreted as instruments to be used for public policy, decision-making and law-making purposes (Viale, 2022). They tend therefore to be directly applied to facilitate the achievement of some policy ends held as desirable by policymakers. Studies from multiple disciplines show how nudge interventions can affect a wide range of variables across different domains.

Typically, trust is not considered as a direct policy goal by itself – rather, it is seen as an instrumental variable or condition that can influence the efficacy and sometimes the efficiency of other policies, including communication to the large public and specific groups or individuals. As the paper notes, trust is often a medium to a more tangible policy end – e.g. in the case of pro environmental behaviors, it is mentioned how "the relationship between trust and environmentally responsible behavior has been [already] extensively explored in the academic literature".

The role of trust as a facilitating factor also applies to the two domains of DRR and CCA specifically investigated by this paper. Particularly, the paper clearly recalls that, according to abundant scholarly literature, trust can be conducive (through some intermediate steps) to more effective emergency responses (para 1.1); consolidate the social skills that communities require to prepare for, mitigate, endure, and recover from disasters (Stoyan et al., 2014); increasing active engagement of communities with climate change, and consideration of information sources (Becker, 2018, Lorenzoni & Pidgeon, 2006); making a community more effective in reacting to emergencies (Islam, 2014), and more resilient and swifter in recovering from natural disasters (Bambals, 2015, Bian et al., 2022, Pollock et al., 2019, Joerin et al., 2018, Cologna & Siegrist, 2020), plus other likely desirable ends.

A question that should be posed as a basis of any identification of nudging options against such a background is to what extent nudging has been consciously studied and – even more interestingly – applied by policymakers so far, aiming to enhance, support or create a facilitating

factor such as trust, rather than pursuing a more classic, specific policy target. The question is especially valid for the domains of interest of this paper (DRR and CCA).

More precisely, the use of nudging for inducing trust within a community among its members, or towards one or more institutions can be considered a valid item for a screening of existing literature and experience both in design and application of nudges.

Ideally, nudging for achieving some type of trust within a group (or community) and towards some trustees (which may be institutional actors or more or less qualified members of the community under investigation) assumes therefore a special interest. Nudges could be part of novel, more comprehensive policies targeted at building community trust as a significant step towards enhancing local resilience (as noted, e.g. by Hémond et al., 2012) within a CCA or DRR process.

Nudge interventions have been used for a large number of purposes so far, including increasing trust within specific communities of users, beneficiaries, or residents towards specific institutions (e.g. banks and financial institutions) or group members (individuals entrusted with specific competences or responsibilities, such as politicians or policy makers).

For instance, a typical nudging approach significantly relying on the presence and intensity of trust within a community consists of using social norms to achieve behavioral change – i.e. informing people in a community about what a group of other members to the same community are doing, and thereby induce them to alter their behavior to the more desirable one shown by the group members. Norm-based solutions can be framed as trust interventions aimed to reduce the propensity of poor, inaccurately informed people in a community to make inefficient decisions in situations involving delayed payoffs, as reported by Jachimowicz et al. (2017) – notwithstanding the issues raised by some researchers on the efficacy of social norms compared to alternative nudging mechanisms (Entwistle, 2021, Rela, 2022, Szási et al., 2022).

The answers that this paper provides to its research questions disclose the thematic boundaries of alternative types of trust (community vs. institutional), the phase of DRR process where the presence of trust has been investigated, and the desirable effects that increased trust can bring about in the framework of CCA and DRR. By recalling other papers, the text provides significant information on the consequences of trust on a specific policy phase of DRR and CCA, sometimes on the dependencies of trust from other variables.

The paper specifically reports on which variables nudges aimed at enhancing community trust should focus. This represents a very insightful and useful guidance in the journey to identifying

specific categories and examples of nudges addressing those variables being conducive to community trust according to the study performed (see para 2.3 and particularly Tables 1 and 2).

The paper also offers an original conceptual framework of trust based on the basic social science notions of community awareness, decision-making and agency that aim at adapting communities to climate change, and minimizing disaster risks. In this framework, trust assumes a central role as a direct predictor of resilience (Bodas et al., 2022, Carone et al., 2019) and foundation for effective collaboration in face of disaster risks, in line with the conclusion of the prior sections of the paper. Thus, against this background, trust (and resilience, which appears to be mutually interlinked to trust and good community relationships) may need to be incentivized and enhanced through specific interventions, including through nudging.

More specifically, an interest is detectable on the possibility to use nudges to address both community and institutional trust, conceptually based on the different theoretical fields of interpersonal bonds, and legal and institutional frameworks, though both contributing to build the concept of general trust defined as "a relational adhesive, capable of either supporting or constraining formal and informal social interactions, knowledge sharing, and the innovation process", that would seem to be a required condition for adopting strategies in both the field of DRR and CCA (para 3.1). Many factors can influence individuals and create barriers impeding people from adopting a safe behavior in front of natural hazards, such as a general distrust in public institutions, officials and politicians. In this regard, several authors suggest designing measures, including nudges, to anticipate the biases and barriers that contribute to non-response in emergencies. For instance, in the case of promoting the adherence of people to the indications from early warning systems in Haiti, behavioral recommendations developed (such as simplifying and highlighting key information and procedures and disseminating messages in a timely manner) also include building trust with members of rescue and civil defence groups (Llopis Abella et al, 2020).

Thus, the paper provides the RETURN nudging research agenda, under Task 5.4, with valuable information suitable to identify a list of likely dependencies of community/institutional (C/I) trust from a number of items, a detailed list and description of the items influencing C/I trust, and some guidelines setting a list of methods available to enhance C/I trust as their target.

Based on the analysis of the three variables mentioned above, an innovative process of nudge construction is expected to be framed, as a significant outcome from the study of nudging for DRR and CCA. The present study suggests constructing a procedure for effective nudging directly addressing trust in communities exposed to natural risks. Such a procedure, aligned to the contents of the paper, could be based on the collection of evidence of nudging mechanisms (NMs) addressing or

affecting the relevant items for influencing C/I trust, and try to develop types of NMs being supportive of, or substituting to the methods targeted to enhance trust reported in the guidelines for policy makers both on DRR and CCA.

A categorization and organization of nudges aimed to enhance community and institutional trust by type (Beshears and Kosowski, 2020), mechanisms (Cariban et al., 2019) or other criteria can be assessed against the priority actions identified in this paper for the procedures suggested to policy makers to establish trust in the DRR and CCA processes (para 4.1), in order to build a validated toolbox collecting instruments, nudging schemes, models and examples for inducing community trust in the direction disclosed by the paper.

4.2.4. Implication of trust dynamics in integrated planning based on co-design processes for DRR e CCA policies

Community and institutional trust is peculiar in achieving the goal of Task 4.4., which is to outline methods and strategies that will allow relevant stakeholders (e.g., communities, authorities, public and private bodies, and agencies acting on the local, regional, and national levels) to define plans and policies aimed at Disaster Risk Reduction and Mitigation (DRR, DRM) and Climate Change Adaptation (CCA) towards built environment and public spaces based on a participatory approach. Therefore, the guidelines presented in this deliverable constitute robust support concerning building trust and awareness among the involved actors.

Since the task will trigger participatory co-design practices in the realms of the built environment, urban and rural landscapes, and open spaces, the guidelines presented in this deliverable will be integrated into the workflow as a support to the following aspects:

- The involvement of relevant stakeholders (especially local communities) as an active part of DRR, DRM, and CCA strategies, acknowledging their role in the co-design process and the subsequent application of planned practices;
- The design of an approach that enhances cohesion processes in communities concerning different DRR, DRM, and CCA strategies;
- The structure of an effective, people and place-based communication stream during all the phases of the co-design process, aimed at fostering transparency and enhancing trust among involved stakeholders;
- The definition of a feedback system in the monitoring and evaluation phase of the process, targeted on the engaged actors.

The final deliverable of task T.4.4. will illustrate, step by step, the designed and applied approach, conceived as a flexible tool, capable of being replicated and adapted to different contexts. Moreover, it will include the PoC of the methodology developed in relevant places demanding DRR and CCA policies.

4.2.5. Implications of trust dynamics for new models of education and communication for resilience to risks (WP6)

Communication and educational initiatives to enhance community resilience facing natural, environmental, and climate change-related hazards are the focus of WP6. Outputs from the project include guidelines for risk communication and the development and application of innovative and immersive risk education tools. Environmental, natural, and climate-risk communication tasks will be significantly impacted by the findings of this literature review and the guidelines outlined in this deliverable. Indeed, the "Risk Communication Tools and Strategies Design" task (Task 6.2) analyses audiences, stakeholders, and scenarios for risk communication. Various objectives and audiences will be considered when developing models and prototypes of risk communication. Public sector actors and institutions are examined, and their risk communication efforts are considered while top-down processes are activated.

In general, the results and suggestions proposed in this deliverable intersect with numerous conceptual dimensions of WP6. Specifically, the issues related to trust in the promoters of risk communication impact the design of communicative and educational tools.

The results presented in Deliverable 6.1.1 ("Identifying Best Practices in Risk Communication: A State-of-the-Art Review of International Literature") highlighted the importance of trust in the source disseminating risk information. This trust is related to two closely connected moments: the first concerns identifying the subjects authorized to communicate risk information; the second helps define the actors who can contribute to counteracting misinformation on risks and climate change.

The literature review conducted in task 6.1 regarding communicative tools aimed to isolate the elements of success or inhibitors in effective risk communication as presented in the international literature. Numerous contributions from the literature have highlighted how the perception of trust and the authority of information sources went hand in hand. From this, the literature has pointed out the need to actively collaborate with experts and scientists at every stage of the risk communication process. Conversely, some representations of disagreements or contradictions within the scientific community undermine trust in science and, consequently, the message's credibility.

At the same time, the literature review highlighted how there needs to be specific care in identifying the subjects appointed to disseminate alert and emergency messages, alongside the certification of the officiality of the channels used. Therefore, institutional subjects are relevant. For this reason, trust is essential, especially when, as in the Italian case, the planning of communication regarding risks and emergencies envisages that mayors and representatives of the local community are the principal drafters of risk communication. In this sense, communicative attention must be placed on distinguishing between institutional and political communication, avoiding the overlap between the two fields in issuing messages of general interest.

The future implications concerning the integration of the trust dimension will be addressed in the subsequent tasks of WP6.

In particular, all actions of research and empirical testing of concepts will incorporate the following aspects:

1. Structural reflection on the role of the message source and the perception of competence and authority. This will reflect on the nature of the messages (formal and stylistic aspects) and on the initiatives of communication and education on risks that will be carried forward.

2. Constant work on the factors that impact trust in the community in the activation of bottom-up processes, such as participation in archives and repositories of shared experiences on communication and education on risks or in the trust in the processes of crowd-sourced information production.

In the production of communicative and educational strategies, the three dimensions that characterize the “culture of trust” will also be considered:

1. Design of effective communication tools in line with the context and participants (concrete actions: knowledge of the audience/target and hypothesis of differentiated messages; socio-cultural analysis of the contexts in which risks occur)

2. Engagement of audiences (concrete actions: reflection on the weight of personal influence in contributing to the dissemination of information on risks within networks of physical proximity and/or interest; testing educational tools based on immersive reality technologies)

3. Feedback mechanisms (concrete actions: listening to audiences while evaluating the campaign and the educational tools).

Finally, the guidelines presented in this report will be used for planning campaigns and educational actions and implementing guidelines and operational plans regarding communication and

risk education. Various sources, data presentation methods, and ways of communicating uncertainty will be tested, integrating feedback from citizens collected in evaluation activities.

References

Ablah, E., Konda, K., & Kelley, C. L. (2009). Factors predicting individual emergency preparedness: a multi-state analysis of 2006 BRFSS data. *Biosecurity and bioterrorism: biodefense strategy, practice, and science, 7*(3), 317–330. https://doi.org/10.1089/bsp.2009.0022

Adams, R. M., Rivard, H., & Eisenman, D. P. (2017). Who Participates in Building Disaster Resilient Communities: A Cluster-Analytic Approach. *Journal of Public Health Management and Practice, 23*(1), 37–46. https://doi.org/10.1097/PHH.0000000000000387

Adams, R., Prelip, M., Glik, D., Donatello, I., & Eisenman, D. (2018). Facilitating Partnerships With Community- and Faith-Based Organizations for Disaster Preparedness and Response: Results of a National Survey of Public Health Departments. *Disaster medicine and public health preparedness*, *12*(1), 57–66. https://doi.org/10.1017/dmp.2017.36

Akinwale, Y. O., & Adepoju, A. O. (2019). Factors influencing willingness to adopt renewable energy technologies among micro and small enterprises in lagos state nigeria. *International Journal of Sustainable Energy Planning and Management 19*, 69-82. https://doi.org/10.5278/ijsepm.2019.19.7

Akter, S. (2020). Social cohesion and willingness to pay for cyclone risk reduction: The case for the Coastal Embankment Improvement Project in Bangladesh. *International Journal of Disaster Risk Reduction, 48*, 101579. https://doi.org/10.1016/j.ijdrr.2020.101579

Aldrich, D. P. (2023). How social infrastructure saves lives: a quantitative analysis of Japan's 3/11 disasters. *Japanese Journal of Political Science*, *24*(1), 30–40. https://doi.org/10.1017/S1468109922000366

Alves, P. B. R., Cordão, M. J. de S., Djordjević, S., & Javadi, A. A. (2021). Place-Based Citizen Science for Assessing Risk Perception and Coping Capacity of Households Affected by Multiple Hazards. *Sustainability*, *13*(1), 302. https://doi.org/10.3390/su13010302

American Psychological Association. (2023). *About APA style*. https://apastyle.apa.org/about-apa-style

Antronico, L., Coscarelli, R., De Pascale, F., & Di Matteo, D. (2020). Climate Change and Social Perception: A Case Study in Southern Italy. *Sustainability, 12*(17), 6985. https://doi.org/10.3390/su12176985

Appleby-Arnold, S., Brockdorff, N., Jakovljev, I., & Zdravković, S. (2021). Disaster preparedness and cultural factors: a comparative study in Romania and Malta. *Disasters, 45*(3), 664–690. https://doi.org/10.1111/disa.12433

Arlikatti, S., Lindell, M. K., & Prater, C. S. (2007). Perceived Stakeholder Role Relationships and Adoption of Seismic Hazard Adjustments1. *International Journal of Mass Emergencies & Disasters, 25*(3), 218-256. https://doi.org/10.1177/028072700702500302

Azadi, Y., Yazdanpanah, M., & Mahmoudi, H. (2019). Understanding smallholder farmers' adaptation behaviors through climate change beliefs, risk perception, trust, and psychological distance: Evidence from wheat growers in Iran. *Journal of environmental management, 250*, 109456. https://doi.org/10.1016/j.jenvman.2019.109456

Bakaki, Z., & Bernauer, T. (2016). Measuring and explaining the willingness to pay for forest conservation: Evidence from a survey experiment in Brazil. *Environmental Research Letters, 11*(11). Scopus. https://doi.org/10.1088/1748-9326/11/11/114001

Balliet, D., & Van Lange, P. A. M. (2013). Trust, conflict, and cooperation: A meta-analysis. *Psychological Bulletin, 139*(5), 1090–1112. https://doi.org/10.1037/a0030939

Bambals, R. (2015). Human security: an analytical tool for disaster perception research. *Disaster Prevention and Management*, *24*(2), 150–165. https://doi.org/10.1108/DPM-06-2014-0106

Basolo, V., Steinberg, L. J., Burby, R. J., Levine, J., Cruz, A. M., & Huang, C. (2009). The Effects of Confidence in Government and Information on Perceived and Actual Preparedness for Disasters. *Environment and Behavior, 41*(3), 338-364. https://doi.org/10.1177/0013916508317222

Becker, P. (2018). Dependence, trust, and influence of external actors on municipal urban flood risk mitigation: The case of Lomma Municipality, Sweden. *International Journal of Disaster Risk Reduction, 31*. https://doi.org/10.1016/j.ijdrr.2018.09.005

Berrang-Ford, L., Biesbroek, R., & Ford, J.D. (2019). Tracking global climate change adaptation among governments. *Nature Climate Change, 9*, 440–449. https://doi.org/10.1038/s41558-019-0490-0

Berry, H. L., & Shipley, M. (2009). *Longing to belong: personal social capital and psychological distress in an Australian coastal region*. Department of Families, Housing, Community Services.

Berry, H. L., Hogan, A., Ng, S. P., & Parkinson, A. (2011). Farmer health and adaptive capacity in the face of climate change and variability. Part 1: Health as a contributor to adaptive capacity and

as an outcome from pressures coping with climate related adversities. *International Journal of Environmental Research and Public Health, 8*(10), 4039–4054. https://doi.org/10.3390/ijerph8104039

Beshears J., & Kosowsky H. (2020). Nudging: Progress to date and future directions. *Organizational Behavior and Human Decision Processes, 161*, 3-19. https://doi.org/10.1016/j.obhdp.2020.09.001. (https://www.sciencedirect.com/science/article/pii/S0749597820303836)

Bhandari, R.B., Okada, N., Yokomatsu, M., & Ikeo, H. (2010). Building a Disaster Resilient Community through Ritual Based Social Capital: A Brief Analysis of Findings from the Case Study of Kishiwada.

Bian, Q., Liang, Y., & Ma, B. (2022). Once bitten, twice shy? Does the public adopt more disaster preparedness practices after experiencing more disasters? *International journal of disaster risk reduction*, *77*. https://doi.org/10.1016/j.ijdrr.2022.103057

Bodas, M., Peleg, K., Stolero, N., & Adini, B. (2022). Risk Perception of Natural and Human-Made Disasters-Cross Sectional Study in Eight Countries in Europe and Beyond. *Frontiers in public health, 10*, 825985. https://doi.org/10.3389/fpubh.2022.825985

Bonaiuto, M., & Ariccio, S. (2020). La resilienza comunitaria. Cornice concettuale e strumenti di misura. In Caravaggli L. (Eds.), *Progetto SISMI-DTC Lazio: Conoscenze e innovazioni per la ricostruzione e il miglioramento sismico dei centri storici del Lazio* (pp. 74-84). Quodlibet.

Bonfanti, R. C., Oberti, B., Ravazzoli, E., Rinaldi, A., Ruggieri, S., &Schimmenti, A. (2024). The Role of Trust in Disaster Risk Reduction: A Critical Review. *International Journal of Environmental Research and Public Health, 21*(1), 29. https://doi.org/10.3390/ijerph21010029

Briard, S., & Carter, C. (2013). *Communities_of_Practice_Interest.pdf*. Ontario centre of Excellence for Child and Youth Mental Health. https://www.niagaraknowledgeexchange.com/wp-content/uploads/sites/2/2014/05/Communities_of_Practice_Interest.pdf

Brown, K., & Westaway, E. (2011). Agency, Capacity, and Resilience to Environmental Change: Lessons from Human Development, Well-Being, and Disasters. Annual *Review of Environment and Resources, 36*. https://doi.org/10.1146/annurev-environ-052610-092905

Budhathoki, N. K., Paton, D., A. Lassa, J., & Zander, K. K. (2020). Assessing farmers' preparedness to cope with the impacts of multiple climate change-related hazards in the Terai

lowlands of Nepal. *International Journal of Disaster Risk Reduction, 49*. Scopus. https://doi.org/10.1016/j.ijdrr.2020.101656

Bullock, J. A., Haddow, G. D., & Coppola, D. P. (2013). Mitigation, Prevention, and Preparedness. In *Introduction to Homeland Security* (pp. 435–494). Elsevier. https://doi.org/10.1016/B978-0-12-415802-3.00010-5

Cabrera-Álvarez, P., Hornsey, M. J., & Lobera, J. (2022). Determinants of self-reported adherence to COVID-19 regulations in Spain: social norms, trust and risk perception. *Health Promotion International, 37*(6), daac138. https://doi.org/10.1093/heapro/daac138

Caraban, A., Karapanos, E., Gonçalves, D., & Campos, P. (2019). 23 Ways to Nudge: A Review of Technology-Mediated Nudging. *Human-Computer Interaction*, 1-15. https://doi.org/10.1145/3290605.3300733.

Carone, M. T., Melchiorri, L., Romagnoli, F., & Marincioni, F. (2019). Can a Simulated Flood Experience Improve Social Resilience to Disasters? *The Professional Geographer*, *71*(4), 604–615. https://doi.org/10.1080/00330124.2019.1611457

Castro-Correa, C.-P., Aldunce Ide, P., Wyndham Vásquez, K., Mena Maldonado, D., & Pérez Tello, S. (2020). Transformation of social capital during and after a disaster event: The cases Chañaral and Diego de Almagro, Atacama Region, Chile. *Natural Hazards*, *103*(2), 2427–2440. Scopus. https://doi.org/10.1007/s11069-020-04091-9

Chanley, V. A., Rudolph, T. J., & Rahn, W. M. (2000). The origins and consequences of public trust in government: a time series analysis. *Public opinion quarterly*, *64*(3), 239–256. https://doi.org/10.1086/317987

Cheng, X., Fu, S., & de Vreede, G.-J. (2017). Understanding trust influencing factors in social media communication: A qualitative study. *International Journal of Information Management*, *37*(2), 25–35. https://doi.org/10.1016/j.ijinfomgt.2016.11.009

Ching, A., Morrison, L., & Kelley, M. (2020). Living with natural hazards: Tropical storms, lava flows and the resilience of island residents. *International Journal of Disaster Risk Reduction, 47*, 101546. https://doi.org/10.1016/j.ijdrr.2020.101546

Choo, M., & Yoon, D. K. (2022). Examining the effects of the local communities' social capital on disaster response capacity in Seoul, South Korea. *International Journal of Disaster Risk Reduction, 75*, 102973. https://doi.org/10.1016/j.ijdrr.2022.102973

Choon, S. W., Ong, H. B. & Tan, S. H. (2019). Does risk perception limit the climate change mitigation behaviors? *Environment, Development and Sustainability, 2*1, 1891–1917. https://doi.org/10.1007/s10668-018-0108-0

Christenson, J. A., & Jerry W, R. (1989). *Community development in perspective* (1st ed). Iowa State University Press, Ames.

Cologna, V., & Siegrist, M. (2020). The role of trust for climate change mitigation and adaptation behaviour: A meta-analysis. *Journal of Environmental Psychology*, *69*, 101428. https://doi.org/10.1016/j.jenvp.2020.101428

Cologna, V., Berthold, A., & Siegrist, M. (2022). Knowledge, perceived potential and trust as determinants of low-and high-impact pro-environmental behaviours. *Journal of Environmental Psychology, 79*, 101741. https://doi.org/10.1016/j.jenvp.2021.101741

Cruz, M. R., & Sonn, C. C. (2015). (De)colonizing culture in community psychology: Reflections from critical social science. In R. D. Goodman & P. C. Gorski (Eds.), *Decolonizing "multicultural" counseling through social justice* (pp. 127–146). Springer Science + Business Media. https://doi.org/10.1007/978-1-4939-1283-4_10

De Cremer, D., & Tyler, T. R. (2007). The effects of trust in authority and procedural fairness on cooperation. *Journal of Applied Psychology, 92*(3), 639–649. https://doi.org/10.1037/0021-9010.92.3.639

De Vocht, M., Cauberghe, V., Uyttendaele, M., & Sas, B. (2015). Affective and cognitive reactions towards emerging food safety risks in Europe. *Journal of Risk Research, 18*(1), 21–39. https://doi.org/10.1080/13669877.2013.879486

Devine-Wright, P., & Batel, S. (2017). My neighbourhood, my country or my planet? The influence of multiple place attachments and climate change concern on social acceptance of energy infrastructure. *Global Environmental Change*, *47*, 110-120. https://doi.org/10.1016/j.gloenvcha.2017.08.003

Dinesen, P. T., & Sønderskov, K. M. (2017). *Ethnic Diversity and Social Trust* (E. M. Uslaner, Ed.; Vol. 1). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190274801.013.13

Dvir, R., Vedlitz, A., & Mostafavi, A. (2022). Far from home: Infrastructure, access to essential services, and risk perceptions about hazard weather events. *International Journal of Disaster Risk Reduction*, *80*, 103185. https://doi.org/10.1016/j.ijdrr.2022.103185

Dynes, R. R. (2002). *The Importance Of Social Capital In Disaster Response*.

Earle, T. C. (2010). Trust in risk management: A model-based review of empirical research. *Risk Analysis, 30*(4), 541–574. https://doi.org/10.1111/j.1539- 6924.2010.01398.x

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38*(4), 319–345. https://doi.org/10.1016/S0005-7967(99)00123-0

Ekici, A., & Peterson, M. (2009). The Unique Relationship between Quality of Life and Consumer Trust in Market-Related Institutions among Financially Constrained Consumers in a Developing Country. *Journal of Public Policy & Marketing*, *28*(1), 56-70. https://doi.org/10.1509/jppm.28.1.56

Ekoh, S. S., Teron, L., & Ajibade, I. (2023). Climate change and coastal megacities: Adapting through mobility. *Global Environmental Change, 80*. Scopus. https://doi.org/10.1016/j.gloenvcha.2023.102666

Entwistle, T. (2021). Why nudge sometimes fails: fatalism and the problem of behavior change. *Policy and Politics, 49* (1), 87-103. https://doi.org/10.1332/030557320X158320172208458

EU Mission on Adaptation to Climate Change Portal (2023). *Regional Adaptation Support Tool.* https://climate-adapt.eea.europa.eu/en/mission/knowledge-and-data/regional-adaptation-support-tool

Fairbrother, M., Arrhenius, G., Bykvist, K., & Campbell, T. (2021). Governing for Future Generations: How Political Trust Shapes Attitudes Towards Climate and Debt Policies. *Frontiers in Political Science, 3*, 656053. https://doi.org/10.3389/fpos.2021.656053

Faisal, M., Chunping, X., Abbas, A., Raza, M. H., Akhtar, S., Ajmal, M. A., & Ali, A. (2021). Do risk perceptions and constraints influence the adoption of climate change practices among small livestock herders in Punjab, Pakistan?. *Environmental science and pollution research international, 28*(32), 43777–43791. https://doi.org/10.1007/s11356-021-13771-3

Freudenburg, W. R. (1997). Contamination, Corrosion and the Social Order: An Overview. *Current Sociology*, *45*(3), 19–39. https://doi.org/10.1177/001139297045003002

Gero, K., Aida, J., Kondo, K., & Kawachi, I. (2020). Evaluation of Trust Within a Community After Survivor Relocation Following the Great East Japan Earthquake and Tsunami. *JAMA Network Open, 3*(11), e2021166. https://doi.org/10.1001/jamanetworkopen.2020.21166

Gillespie, N. (2012). Measuring trust in organizational contexts: An overview of survey-based measures. In F. Lyon, G. Möllering, & M. Saunders (Eds.), *Handbook of research methods on trust* (pp. 175–188). Edward Elgar Publishing.

Glasser, R. (2020). The Climate Change Imperative to Transform Disaster Risk Management. *International Journal of Disaster Risk Science, 11*, 152–154. https://doi.org/10.1007/s13753-020-00248-z

Goidel, K., Horney, J. A., Kellstedt, P. M., Sullivan, E., & Brown, S. E. V. (2019). Perceptions of disaster resilience in four Texas coastal communities. *Local Government Studies, 45*(3), 413–432. https://doi.org/10.1080/03003930.2019.1571999

Greer, S. L., King, E. J., da Fonseca, E. M., & Peralta-Santos, A. (2020). The comparative politics of COVID-19: The need to understand government responses. *Global public health, 15*(9), 1413–1416. https://doi.org/10.1080/17441692.2020.1783340

Haas, S., Gianoli, A., & Van Eerd, M. (2021). The roles of community resilience and risk appraisal in climate change adaptation: The experience of the Kannagi Nagar resettlement in Chennai. *Environment and Urbanization, 33*(2), 560–578. Scopus. https://doi.org/10.1177/0956247821993391

Hanibuchi, T., Kondo, K., Nakaya, T., Shirai, K., Hirai, H., & Kawachi, I. (2012). Does walkable mean sociable? Neighborhood determinants of social capital among older adults in Japan. *Health & place, 18*(2), 229–239. https://doi.org/10.1016/j.healthplace.2011.09.015

He, L., Dominey-Howes, D., Aitchison, J., Lau, A., & Conradson, D. (2021). How do post-disaster policies influence household-level recovery? A case study of the 2010-11 Canterbury earthquake sequence, New Zealand. *International Journal of Disaster Risk Reduction, 60*. https://doi.org/10.1016/j.ijdrr.2021.102274

Hémond, Y., & Robert, B. (2012). Evaluation of state of resilience for a critical infrastructure in a context of interdependencies. *International Journal of Critical Infrastructures*, *8*, 95–106. https://doi.org/10.1504/IJCIS.2012.049030

Henri, F., & Pudelko, B. (2003). Understanding and analysing activity and learning in virtual communities: Activity and learning in virtual communities. *Journal of Computer Assisted Learning*, *19*(4), 474–487. https://doi.org/10.1046/j.0266-4909.2003.00051.x

Hudson, J. (2006). Institutional Trust and Subjective Well-Being across the EU. *Kyklos*, *59*(1), 43–62. https://doi.org/10.1111/j.1467-6435.2006.00319.x

Humann, M., Collie, C., Bright, K., Thomsen, J., & Crook, P. (2022). Public engagement during full-scale exercises: Dimensions of trust and community resilience. *Journal of Contingencies and Crisis Management*, *30*(3), 317–326. https://doi.org/10.1111/1468-5973.12388

Imbulana Arachchi, J., & Managi, S. (2022). Social capital, household income and carbon dioxide emissions: A multicountry analysis. *Environmental Impact Assessment Review, 96*. Scopus. https://doi.org/10.1016/j.eiar.2022.106838

IPCC (2014). *Summary for policymakers. In Climate Change: Impacts, Adaptation, and Vulnerability; Part A: Global and Sectoral Aspects*. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University.

IPCC, Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K. B., Tignor, M., & Miller, H. L. (2007). *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change* (G. Rt12, Trad.; p. 996). Cambridge University Press.

IPCC. (2022). *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_FinalDraft_FullReport.pdf

Islam, E., Wahab, H. A., & Benson, O. G. (2020). Structural and operational factors as determinant of meaningful community participation in sustainable disaster recovery programs: The case of Bangladesh. *International Journal of Disaster Risk Reduction*, *50*, 101710. https://doi.org/10.1016/j.ijdrr.2020.101710

Jachimowicz, J. M., Chafik, S., Munrat, S., Prabhu, J. C., & Weber, E. U. (2017). Community trust reduces myopic decisions of low-income individuals. *Proceedings of the National Academy of Sciences, 114*(21), 5401-5406.

Jayasiri, G. P., Randil, O. P. C., Perera, G. M. C. A., Siriwardana, C. S. A., Dissanayake, P. B. R., & Bandara, C. S. (2020). *Important Aspects of Evacuation Planning for the Coastal Communities in Sri Lanka* (pp. 3–10). https://doi.org/10.1007/978-981-13-9749-3_1

Jin, B. (2023). The Antecedents of Collaborative Behavior for Climate Change Mitigation among South Koreans: The Moderation Analyses of a Sense of Community as Responsibility, Neighborliness, and Trust. *Sustainability (Switzerland), 15*(16). Scopus. https://doi.org/10.3390/su151612145

Joerin, J., Steinberger, F., Krishnamurthy, R., & Scolobig, A. (2018). Disaster recovery processes: Analysing the interplay between communities and authorities in Chennai, India. *Procedia Engineering, 212,* 643-650. https://doi.org/10.1016/j.proeng.2018.01.083

Kettle, N., & Dow, K. (2016). The Role of Perceived Risk, Uncertainty, and Trust on Coastal Climate Change Adaptation Planning. *Environment And Behavior, 48*(4), 579–606. https://doi.org/10.1177/0013916514551049

Kim, S. E. (2005). The Role of Trust in the Modern Administrative State: An Integrative Model. *Administration & Society*, *37*(5), 611–635. https://doi.org/10.1177/0095399705278596

Kitagawa, K. (2018). *Living with an Active Volcano: Informal and Community Learning for Preparedness in South of Japan* (pp. 677–689). https://doi.org/10.1007/11157_2015_12

Knight, F. H. (1921). *Risk, uncertainty and profit*. Houghton Mifflin.

Le, D., Becken, S., & Curnock, M. (2022). Gaining public engagement to restore coral reef ecosystems in the face of acute crisis. *Global Environmental Change, 74*, 102513. https://doi.org/10.1016/j.gloenvcha.2022.102513

Levi, M., & Stoker, L. (2000). Political Trust and Trustworthiness. *Annual Review of Political Science, 3*, 475-507.

Llopis Abella, J., Perge, E. B., Afif, Z., Soto Orozco, C. R., Padilla, L. M., & Hsu, J. (2020). *Using Behavioral Insights to Improve Disaster Preparedness, Early Warning and Response Mechanisms in Haiti*. World Bank.

Lo, A. Y., Cheung, L. T. O., Lee, A. K.Y., & Xu, B. (2016). Confidence and Trust in Public Institution Natural Hazards Management: Case Studies in Urban and Rural China. *The Professional Geographer*, *68*(3), 475–484. https://doi.org/10.1080/00330124.2015.1106325

Longstaff, P., & Yang, S.U. (2008). Communication Management and Trust: Their Role in Building Resilience to «Surprises» Such As Natural Disasters, Pandemic Flu, and Terrorism. *Ecology and Society*, *1*. https://doi.org/10.5751/ES-02232-130103

Lorenzoni, I., & Pidgeon, N. F. (2006). Public Views on Climate Change: European and USA Perspectives. *Climatic Change*, *77*(1), 73–95. https://doi.org/10.1007/s10584-006-9072-z

Ma, Z., Guo, S., Deng, X., & Xu, D. (2022). Place attachment, community trust, and farmer's community participation: Evidence from the hardest-hit areas of Sichuan, China. *International Journal of Disaster Risk Reduction, 73*, 102892. https://doi.org/10.1016/j.ijdrr.2022.102892

MacGillivray, B. H. (2018). Beyond social capital: The norms, belief systems, and agency embedded in social networks shape resilience to climatic and geophysical hazards. *Environmental science & policy, 89*, 116-125.

Makkai, T., & Braithwaite, J. (1994). The dialectics of corporate deterrence. *Journal of Research in Crime and Delinquency, 31*(4), 347–373. https://doi.org/10.1177/0022427894031004001

Marín, A., Vergara-Pinto, F., Prado, F., & Farías, C. (2020). Living near volcanoes: Scoping the gaps between the local community and volcanic experts in southern Chile. *Journal of Volcanology and Geothermal Research, 398*, 106903. https://doi.org/10.1016/j.jvolgeores.2020.106903

Marincioni, F. (2020). *L'emergenza climatica in Italia. Dalla paercezione del rischio alle strategie di adattamento*. Il Sileno Edizioni.

Masud-All-Kamal, Md., & Monirul Hassan, S. M. (2018). The link between social capital and disaster recovery: evidence from coastal communities in Bangladesh. *Natural Hazards*, *93*(3), 1547–1564. https://doi.org/10.1007/s11069-018-3367-z

Mathbor, G. M. (2007). Enhancement of community preparedness for natural disasters: The role of social work in building social capital for sustainable disaster relief and management. *International Social Work, 50*(3), 357-369. https://doi.org/10.1177/0020872807076049

Matthews, V., Longman, J., Bennett-Levy, J., Braddon, M., Passey, M., Bailie, R. S., & Berry, H. L. (2020). Belonging and inclusivity make a resilient future for all: A cross-sectional analysis of post-flood social capital in a diverse australian rural community. *International Journal of Environmental Research and Public Health*, *17*(20), 1–29. Scopus. https://doi.org/10.3390/ijerph17207676

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model of Organizational Trust. *The Academy of Management Review*, *20*(3), 709. https://doi.org/10.2307/258792

McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. Academy of Management Journal, 38(1), 24–59. https://doi.org/10.2307/256727

Mendonça, D., Amorim, I., & Kagohara, M. (2019). An historical perspective on community resilience: The case of the 1755 Lisbon Earthquake. *International Journal of Disaster Risk Reduction,* 34, 363-374. https://doi.org/10.1016/j.ijdrr.2018.12.006

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L. A., & PRISMA-P Group (2015). Preferred reporting items for systematic review and

meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic reviews, 4*(1), 1. https://doi.org/10.1186/2046-4053-4-1

Moreno, J., Lara, A., & Torres, M. (2019). Community resilience in response to the 2010 tsunami in Chile: The survival of a small-scale fishing community. *International Journal of Disaster Risk Reduction*, *33*, 376–384. https://doi.org/10.1016/j.ijdrr.2018.10.024

Moser, S.C., & Ekstrom, J.A. (2010). A framework to diagnose barriers to climate change adaptation. *Proceedings of the National Academy of Sciences, 107*, 22026 - 22031. https://doi.org/10.1073/pnas.1007887107

Muller, V. M., Burke, R. V., Berg, B. M., Lin, A. C., & Upperman, J. S. (2014). A Mixed-methods Pilot Study of Disaster Preparedness and Resiliency Among Faith-based Organizations. *Prehospital and Disaster Medicine, 29*(2), 127–133. https://doi.org/10.1017/S1049023X14000120

Murphy, S. T., Cody, M., Frank, L. B., Glik, D., & Ang, A. (2009). Predictors of Emergency Preparedness and Compliance. *Disaster medicine and public health preparedness*, Advance online publication. https://doi.org/10.1097/DMP.0b013e3181a9c6c5

Nasar, J. L. (2003). Does Neotraditional Development Build Community? *Journal of Planning Education and Research*, *23*(1), 58–68. https://doi.org/10.1177/0739456X03256224

Nelson, D. R., Adger, W. N., & Brown, K. (2007). Adaptation to Environmental Change: Contributions of a Resilience Framework. *Annual Review of Environment and Resources*, *32*(1), 395–419. https://doi.org/10.1146/annurev.energy.32.051807.090348

Nikolakis, W., & Guðjónsson, G. (2021). Building voluntary partnerships for climate action: An exploratory study from Iceland. *Cleaner and Responsible Consumption, 3*. Scopus. https://doi.org/10.1016/j.clrc.2021.100023

Nikolova, N., Möllering, G., & Reihlen, M. (2015). Trusting as a 'Leap of Faith': Trust-building practices in client–consultant relationships. *Scandinavian Journal of Management*, *31*(2), 232–245. https://doi.org/10.1016/j.scaman.2014.09.007

Odiase, O., Wilkinson, S., & Neef, A. (2020). Risk of a disaster: Risk knowledge, interpretation and resilience. *Jàmbá Journal of Disaster Risk Studies, 12*(1). https://doi.org/10.4102/jamba.v12i1.845

Pagliaro, S., Sacchi, S., Pacilli, M. G., Brambilla, M., Lionetti, F., Bettache, K., Bianchi, M., Biella, M., Bonnot, V., Boza, M., Butera, F., Ceylan-Batur, S., Chong, K., Chopova, T., Crimston, C. R., Álvarez, B., Cuadrado, I., Ellemers, N., Formanowicz, M., Graupmann, V., … Zubieta, E. (2021).

Trust predicts COVID-19 prescribed and discretionary behavioral intentions in 23 countries. *PloS one, 16*(3), e0248334. https://doi.org/10.1371/journal.pone.0248334

Park, E. (2021). Social Acceptance of Renewable Energy Technologies in the Post-fukushima Era. *Frontiers In Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.612090

Parkinson, D., Duncan, A., Kaur, J., Archer, F., & Spencer, C. (2022). Gendered aspects of long-term disaster resilience in Victoria, Australia. *Australian Journal Of Emergency Management, 37*, 59–64.

Paton, D., Bajek, R., Okada, N., & McIvor, D. (2010). Predicting community earthquake preparedness: a cross-cultural comparison of Japan and New Zealand. *Natural Hazards*, *54*(3), 765–781. https://doi.org/10.1007/s11069-010-9500-2

Pendergrast, C., Belza, B., Bostrom, A., & Errett, N. (2021). Examining the role of ageing-in-place organisations in building older adults' disaster resilience. *Ageing and Society, 41*(12), 2888–2913. https://doi.org/10.1017/S0144686X20000653

Percy, C., Chen, Y., Bibi, A., Coles-Jordan, D., Dodson, E., Evans, T.R., Klingberg, D., & Bruggen, M.V. (2011). The contribution of human psychology to disaster management: mitigation, advance preparedness, response and recovery. *WIT Transactions on the Built Environment, 119*, 195-208. https://doi.org/10.2495/DMAN110181

Pollock, M. J., Wennerstrom, A., True, G., Everett, A., Sugarman, O., Haywood, C., Johnson, A., Meyers, D., Sato, J., Wells, K. B., Arevian, A. C., Massimi, M., Berry, J., Riefberg, L., Onyewuenyi, N., & Springgate, B. (2019). Preparedness and community resilience in disaster-prone areas: Cross-sectoral collaborations in South Louisiana, 2018. *American Journal of Public Health*, *109*, S309–S315. Scopus. https://doi.org/10.2105/AJPH.2019.305152

Pratama, P. Y., & Nurmandi, A. (2020). Collaborating network in managing post the Mount Merapi's disruption, Indonesia. *Jamba (Potchefstroom, South Africa)*, *12*(1), 927. https://doi.org/10.4102/jamba.v12i1.927

Rahmani, A., & Bonyadi Naeini, A. (2023). Predicting intention in applying solar energy technologies in agriculture industry: A moderated and mediated model. *Cleaner and Responsible Consumption, 8*. Scopus. https://doi.org/10.1016/j.clrc.2023.100102

Rana, S., Kiminami, L., & Furuzawa, S. (2020). Analysis on the factors affecting farmers' performance in disaster risk management at community level: focusing on a Haor locality in

Bangladesh. *Asia-Pacific Journal of Regional Science, 4*(3), 737–757. https://doi.org/10.1007/s41685-020-00171-7

Rela, N. (2022). On nudges that fail. Behavioural *Public Policy, 7*(3), 758-772. https://doi.org/10.1017/bpp.2022.10

Riccucci, N., Van Ryzin, G., & Li, H. (2016). Representative Bureaucracy and the Willingness to Coproduce: An Experimental Study. *Public Administration Review*, *76*, 121–130. https://doi.org/10.1111/puar.12401

Rosenzweig, C., Solecki, W. D., Romero-Lankao, P., Mehrotra, S., Dhakal, S., & Ibrahim, S. A. (Eds.). (2018). *Climate change and cities: Second assessment report of the urban climate change research network*. Cambridge University Press.

Ross, V. L., Fielding, K. S., & Louis, W. R. (2014). Social trust, risk perceptions and public acceptance of recycled water: testing a social-psychological model. *Journal of environmental management, 137*, 61–68. https://doi.org/10.1016/j.jenvman.2014.01.039

Rotter, J. B. (1990). Internal versus external control of reinforcement: A case history of a variable. *American Psychologist*, *45*(4), 489–493. https://doi.org/10.1037/0003-066X.45.4.489

Rousseau, D.M., Sitkin, S.B., Burt, R.S. and Camerer, C. (1998) Not So Different after All: A Cross-Discipline View of Trust. *Academy of Management Review, 23*, 393-404. http://dx.doi.org/10.5465/AMR.1998.926617

Sadri, A. M., Ukkusuri, S. V., Lee, S., Clawson, R., Aldrich, D., Nelson, M. S., Seipel, J., & Kelly, D. (2018). The role of social capital, personal networks, and emergency responders in post-disaster recovery and resilience: A study of rural communities in Indiana. *Natural Hazards*, *90*(3), 1377–1406. https://doi.org/10.1007/s11069-017-3103-0

Saptutyningsih, E., Diswandi, D., & Jaung, W. (2020). Does social capital matter in climate change adaptation? A lesson from agricultural sector in Yogyakarta, Indonesia. *Land Use Policy,* 95. https://doi.org/10.1016/j.landusepol.2019.104189

Savage, L. J. (1954). *The Foundations of Statistics*. New York: John Wiley & Sons.

Scholz, J.T., & Lubell, M.N. (1998). Trust and Taxpaying: Testing the Heuristic Approach to Collective Action. *American Journal of Political Science, 42*, 398.

Scholz, J.T., & Pinney, N. (1995). Duty, Fear, and Tax Compliance: The Heuristic Basis of Citizenship Behavior. *American Journal of Political Science, 39*, 490.

Siegrist M. (2021). Trust and Risk Perception: A Critical Review of the Literature. *Risk analysis : an official publication of the Society for Risk Analysis*, *41*(3), 480–490. https://doi.org/10.1111/risa.13325

Siegrist, M., Gutscher, H., & Earle, T. C. (2005). Perception of risk: The influence of general trust, and general confidence. *Journal of Risk Research, 8*(2), 145–156. https://doi.org/10.1080/1366987032000105315

Slack, T., Parks, V., Ayer, L., Parker, A. M., Finucane, M. L., & Ramchand, R. (2020). Natech or natural? An analysis of hazard perceptions, institutional trust, and future storm worry following Hurricane Harvey. *Natural Hazards, 102*(3), 1207–1224. https://doi.org/10.1007/s11069-020-03953-6

Stone, J., Barclay, J., Simmons, P., Cole, P. D., Loughlin, S. C., Ramón, P., & Mothes, P. (2014). Risk reduction through community-based monitoring: The vigías of Tungurahua, Ecuador. *Journal of Applied Volcanology, 3*(1). Scopus. https://doi.org/10.1186/s13617-014-0011-9

Stoyan, A. T., Niedzwiecki, S., Morgan, J., Hartlyn, J., & Espinal, R. (2016). Trust in government institutions: The effects of performance and participation in the Dominican Republic and Haiti. *International Political Science Review, 37*(1), 18-35. https://doi.org/10.1177/0192512114534703

Sunstein, C. R. (2014). *Why nudge? The Politics of Libertarian Paternalism*. Yale University Press.

Sutton, S., Paton, D., Buergelt, P., Sagala, S., & Meilianda, E. (2021). Nandong smong and tsunami lullabies: Song and music as an effective communication tool in disaster risk reduction. *International journal of disaster risk reduction*, *65*. https://doi.org/10.1016/j.ijdrr.2021.102527

Szaszi, B., Higney, A., Charlton, A., Gelman, A., Ziano, I., Aczel, B., Goldstein, D. G., Yeager, D. S., & Tipton, E. (2022). No reason to expect large and consistent effects of nudge interventions. *Proceedings of the National Academy of Sciences of the United States of America, 119*(31), e2200732119. https://doi.org/10.1073/pnas.2200732119

Sztompka, P. (1999). *Trust: A sociological theory*. Cambridge: Cambridge University Press.

ter Mors, E., & van Leeuwen, E. (2023). It matters to be heard: Increasing the citizen acceptance of low-carbon technologies in the Netherlands and United Kingdom. *Energy Research and Social Science, 100*. https://doi.org/10.1016/j.erss.2023.103103

Terpstra T. (2011). Emotions, trust, and perceived risk: affective and cognitive routes to flood preparedness behavior. *Risk analysis: an official publication of the Society for Risk Analysis, 31*(10), 1658–1675. https://doi.org/10.1111/j.1539-6924.2011.01616.x

Thaler, R., & Sunstein, C. R. (2021). *Nudge. The final edition*. Penguin.

Theodorou, A., Milani, A., (shared first authorship) Dessi, F., Xie, M., & Bonaiuto, M. (2024). The Antecedents of Risk Perception in the Context of Natural Hazards: A Meta-Analysis. *Manuscript under evaluation*.

Thoresen, S., Birkeland, M. S., Wentzel-Larsen, T., & Blix, I. (2018). Loss of Trust May Never Heal. Institutional Trust in Disaster Victims in a Long-Term Perspective: Associations With Social Support and Mental Health. *Frontiers in Psychology*, *9*. https://doi.org/10.3389/fpsyg.2018.01204

Thouret, J.-C., Wavelet, E., Taillandier, M., Tjahjono, B., Jenkins, S. F., Azzaoui, N., & Santoni, O. (2022). Defining population socio-economic characteristics, hazard knowledge and risk perception: The adaptive capacity to persistent volcanic threats from Semeru, Indonesia. *International Journal of Disaster Risk Reduction, 77*, 103064. https://doi.org/10.1016/j.ijdrr.2022.103064

Torres, H. R., Alsharif, K. A., & Tobin, G. A. (2018). Perspectives on Adaptive Capacity to Climate Change in Hazardous Environments: Insights from Broward County, Florida. *Weather, Climate, and Society, 10*(2), 361–372. https://doi.org/10.1175/WCAS-D-17-0094.1

UNDP (2004). *UNDP Annual Report 2004*. https://www.undp.org/publications/undp-annual-report-2004

UNISDR. (2015). *Sendai framework for disaster risk reduction 2015–2030*. http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf.

Vainio, A., & Paloniemi, R. (2013). Does belief matter in climate change action? *Public Understanding of Science, 22*(4), 382–395. https://doi.org/10.1177/0963662511410268

van Valkengoed, A. M., & Steg, L. (2019). Meta-analyses of factors motivating climate change adaptation behaviour. *Nature Climate Change, 9*(2), 158–163. https://doi.org/10.1038/s41558-018-0371-y

Viale, R. (2022). *Nudging*. The MIT Press.

Wachinger, G., Renn, O., Begg, C., & Kuhlicke, C. (2013). The Risk Perception Paradox—Implications for Governance and Communication of Natural Hazards. *Risk Analysis, 33*(6), 1049–1065. https://doi.org/10.1111/j.1539-6924.2012.01942.x

Walker, M., Hills, S., & Heere, B. (2017). Evaluating a Socially Responsible Employment Program: Beneficiary Impacts and Stakeholder Perceptions. *Journal of Business Ethics*, *143*(1), 53–70. https://doi.org/10.1007/s10551-015-2801-3

Wang, W., Zhao, X., Li, H., & Zhang, Q. (2021). Will social capital affect farmers' choices of climate change adaptation strategies? Evidences from rural households in the Qinghai-Tibetan Plateau, China. *Journal of Rural Studies, 83*, 127–137. https://doi.org/10.1016/j.jrurstud.2021.02.006

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.

Wilson, R. S., Zwickle, A., & Walpole, H. (2019). Developing a Broadly Applicable Measure of Risk Perception. *Risk Analysis, 39*(4), 777–791. https://doi.org/10.1111/risa.13207

Yan, Z., Wang, T., Chen, Y., & Zhang, H. (2016). Knowledge sharing in online health communities: A social exchange theory perspective. *Information & management, 53*(5), 643-653.

Zander, K. K., Sibarani, R., Lassa, J., Nguyen, D., & Dimmock, A. (2022). How do Australians use social media during natural hazards? A survey. *International Journal of Disaster Risk Reduction*, *81*, 103207. https://doi.org/10.1016/j.ijdrr.2022.103207

Zhong, M., Xiao, L., Zhang, Q., & Jiang, T. (2021). Risk Perception, Risk Communication, and Mitigation Actions of Flash Floods: Results from a Survey in Three Types of Communities. *Sustainability, 13*(22), 12389. https://doi.org/10.3390/su132212389