PANTHEON

Community-Based Smart City Digital Twin Platform for Optimised DRM operations and Enhanced Community Disaster Resilience

D2.5

PARTICIPATORY GOVERNANCE MODEL AND RECOMMENDATIONS

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LIST OF ABBREVIATIONS

AAP	Accountability to affected and at-risk populations
CBDRM	Community Based disaster risk management
CBRNe	Chemical, Biological, Radiological, Nuclear, and explosives
CB-SD	Conceptualization Business System Dynamics
CDAC	Communicating with Disaster-Affected Communities
DM	Disaster Management
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
GDPR	General Data Protection Regulation
GMB	Group Model Building
IFRC	International Federation of Red Cross and Red Crescent Societies
NGO	Non-Governmental Organisation
OECD	Organization for Economic Co-Operation and Development
SD	System Dynamics
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
UNSDG	United Nations Sustainable Development Goals
USA	United States of America
USAID	United States Agency for International Development
VC	Vulnerability and Capacity

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EXECUTIVE SUMMARY

This Deliverable is the outcome of *Task 2.5 Participatory Governance Model and* Recommendations as part of *Work Package 2: Approach For Building Disaster-Resilient Communities.* The document aims to provide recommendations on approaches for effective and inclusive community participation in all aspects of disaster risk management (DRM). The goal is to inform, mobilize and organize communities, with a specific focus on vulnerable groups, to participate in preparedness, response, and recovery.

A comprehensive literature review was conducted covering key concepts such as participatory governance, community, vulnerability, and resilience. The state-of-the-art of decentralized and participatory governance was analysed in detail, discussing the opportunities and challenges of community-based disaster resilience based on academic discourse and practical evidence. Different modes of community engagement were systematically explored, ranging from simply informing communities to actively empowering them to take ownership. Specific considerations for engaging diverse urban communities were also discussed, based on examples of participatory urban governance initiatives.

The methodological approach rigorously combined an in-depth literature analysis with qualitative empirical research. Two two-hour interactive workshops were organized with 7 experts from fields like emergency management, civil protection, disaster research to gather on-the-ground insights and recommendations. Additionally, a survey was conducted to further capture experiences with community participation in DRM. The findings were thoroughly analysed using qualitative data analysis. Together with insights from literature, these findings were used to develop well-grounded recommendations.

Relevant existing policies, platforms, hazards, and vulnerabilities in the project's focus regions of Athens and Paris were summarized based on previous Work Package 2 deliverables of PANTHEON and interpreted regarding their implications for designing tailored community engagement approaches within the project's context. The proactive engagement of vulnerable groups was highlighted as a crucial aspect needing concerted efforts.

Key findings from the empirical research were insightfully structured along the process of community engagement. This covered understanding the focus communities, establishing trusted relationships by identifying facilitators and overcoming trust barriers, practically informing, and mobilizing communities across disaster phases using context-specific tools, and diligently ensuring sustainable impact through cultural awareness and inclusivity. Both facilitating factors and hindering barriers are discussed in nuance.

Highly tailored recommendations, coherently structured according to the community engagement process and disaster management phases, are presented in the last parts of the report. They cover vital areas like two-way communication, relationship building, participatory vulnerability assessments, inclusive citizen training programs, collaborative planning mechanisms, supporting grassroots initiatives, and proactively engaging vulnerable groups.

A comprehensive participatory governance model is proposed based on the findings encompassing an iterative approach of community profiling, leveraging local networks, installing community liaison officers, implementing tailored engagement initiatives, monitoring, evaluating, and adapting. Ensuring the inclusivity of vulnerable groups was emphasized as a cross-cutting priority.

In summary, this report rigorously develops a practical framework and actionable guidelines for implementing inclusive community participation programs within disaster risk management, specifically

considering the context of the PANTHEON project. The evidence-based recommendations can crucially guide efforts to actively engage all sections of communities, especially vulnerable groups, across all aspects of disaster preparedness, response, and recovery.

1 INTRODUCTION

This report aims to give recommendations on how to involve, mobilize, inform and organise communities to effectively participate in all aspects of preparedness, response and recovery. Part of this aim is a specific focus on vulnerable groups and ways to include, support and empower them in processes of disaster management. To achieve these goals, the report builds on the contextual framework established through previous reports of *Work Package 2: Approach for Building Disaster-Resilient Communities*. It applies both findings of state-of-the-art literature and qualitative empiric research conducted with stakeholders and experts in the fields of disaster management and community engagement and leads to the presentation of general recommendations, that will help in engaging the focus communities of PANTHEON in purposeful ways.

As part of this task, chapter 2 consists of a literature analysis that covers the state-of-the-art of research and approaches towards decentralised and participatory governance. Discussing key concepts, defining working definitions and considering chances and challenges of participatory governance leads to the presentation of different modes of engagement and methods to implement them. Further, specific aspects relevant for the work with urban communities are discussed.

In chapter 3, findings of related reports from PANTHEON are interpreted in regard to community engagement. Previous findings include relevant existing platforms and policies (D2.1), and identified risks and hazards in the focus areas (D2.2) as well as vulnerable groups (D2.3) and ways to involve them.

The methodological approach is outlined in chapter 4, starting with the description of the literature analysis. The empirical design is presented next, explaining the development of both empirical approaches, a stakeholder workshop, and an exploratory survey. As part of the sub-chapter on conduction and limitations, the actual implementation of the methods and its challenges are discussed and the limitations of collected data are critically reflected. Subsequently, the data analysis procedures applied to the empirical data are described.

The findings of the empirical research are presented in chapter 5. Here, relevant insights gained for the different phases of an effective and sustainable engagement process are discussed. These include: understanding the focus regions; establishing relationships; involving, mobilizing and informing; and ensuring sustainable impact of the engagement process.

A proposed participatory governance model and a table, collecting all recommendations derived from both literature and collected data, are presented in chapter 6 leading to the conclusions in chapter 7.

2. STATE-OF-THE-ART ANALYSIS FOR DECENTRALISED AND PARTICIPATORY GOVERNANCE

In recent years, the concept of participatory governance has gained great popularity, both in academic and public discourses, but also in actual political practice, for instance in the field of development and, more importantly for the present purpose, in the field of disaster and risk management (see chapter 2.2). The term essentially refers to a variant or subset of governance theory that "seeks to deepen citizen participation in the governmental process" and "puts emphasis on democratic engagement, in particular through deliberative practices" (Fischer, 2012, p. 457). Participatory governance calls for an effective participation by all stakeholders, especially at local levels of government, which "has come to be viewed as a necessary condition for promoting good governance" (Osmani, 2008, p. 1). Participatory governance has been embraced by major international and civil society organizations such as the US AID, the World Bank, the European Union, Oxfam, and the International Budget project, as an effective means to counter democratic shortcomings that should help overcome political apathy and social exclusion and foster social cohesion, especially in post conflict or other fragile societies (Fischer, 2012; Osmani, 2008). A lot of resources and energy have been invested in developing and promoting participatory processes across the globe (Fischer, 2012), whereby the nature and the degree of 'participation' are not clearly and universally defined and strongly depend on the underlying theories, concepts, methods as well as on the circumstances and potential obstacles for participation in concrete contexts during practical implementation. Theoretical constructs such as 'deliberative democracy' and 'empowered participatory governance' have been used by analysts "to scrutinize the scope and limitations of people's participation in the process of governance" (Osmani, 2008, p. 1).

Before discussing the gaps and challenges of participatory governance in disaster resilience in greater detail, the following section attends to and defines some of the key concepts relevant to the intersection of participatory governance and disaster resilience.

2.1 KEY CONCEPTS

This section presents the state-of-the-art analysis of key concepts related to PANTHEON. These are participatory governance, community, vulnerability, and resilience. A table with working definitions of these terms is provided at the end of this section.

According to political scientist Harry Blair (2008, p. 78), in the context of participatory governance 'participation' refers to citizens apart from the state, whether as individuals or in groups, who play a significant role in the governance process (ibid.). 'Governance', according to him, means "the whole range of state sector activity as it fits together, including branches of government at all levels […]" (ibid.). By analogy, Frank Fischer (2012, p. 457) defines participatory governance as "a variant or subset of governance theory that puts emphasis on democratic engagement, in particular through deliberative practices." He argues that the concept of governance has evolved to identify and explain new modes of problem solving and decision making and is seen as a way to deal with public problems that involves a high degree of flexibility and democracy (Fischer, 2006, p. 19). Building on these definitions, in the PANTHEON project we refer to 'participatory governance' as the engagement of communities/citizens in public decision-making as well as

in public policy-making processes through different measures and methods. As will be elaborated in greater detail below, in contrast to Blair (2008), our conceptualization of community comprises not only citizens apart from the state, but also local state institutions such as local municipal offices and local administration.

The term 'participatory governance' first occurred in the so called 'development epoch' in the aftermath of World War II, when both donors and developing countries launched numerous projects and programs that embraced participation in one way or another. At that time, "democratization has become a key component of almost all development strategies" (Blair, 2008, p. 78). The concept of participatory governance has gained prominence when in India in 1946 the Community Development (CD) program was implemented, an experiment that should help promoting development by immediately responding to needs at the local level. Even though this program failed in effectively employing citizen participation "as a means to effect accountability in governance, the basic concept of bottom-up citizen participation came to be […] a central component of development programs" (Blair, 2008, p. 79) across the globe. Subsequently, the concept of participatory governance was further elaborated and stressed the importance of focusing on participatory governance and local people's knowledge and opinions as a means of empowering otherwise often neglected and marginalized groups. While issues of democracy or democratic governance were not addressed in this phase, they became an important issue in the next phase of the participatory innovation. Democracy support programs promoting participatory governance were emphasized by almost all major donors by the late 1990s (Blair, 2008, p. 79). As Blair (ibid.) contends, the initial phase of community development has focused only on the local level, whereas the subsequent democratization movement covered the whole governance spectrum from village to national legislature, which also led to a more profound engagement with the process of governance itself.

In a similar vein, Fischer (2006, p. 20f.) discerns two prominent shifts in the development and dissemination of participatory approaches to governance. He argues that the most prominent shift "has been from state-centred activities to a proliferation of civil society organizations that deliver services and offer various forms of support to economic and social development". Since within this shift, NGOs have increasingly taken over public activities and responsibilities, some argue that they have partially replaced states "whose accountability has long been in question" (Fischer, 2006, p. 20).[3] The second shift refers to a transition from "professionally dominated to more citizen- or client based activities, often taking place within the new civic society organizations" (ibid.). In the spirit of 'people's self-development', these non-governmental organizations often served as representatives and facilitators for otherwise marginalized or excluded groups such as women, the poor, and the disabled, to help them create spaces to speak for themselves and develop abilities to negotiate directly with official decision makers (Fischer, 2006, p. 21). Consequently, participation has become a central feature of 'good governance' across the political spectrum in the 1990s (ibid.) and a transfer of resources and decision-making powers has occurred. Some countries, including India and Bolivia, have even enacted national laws that mandate citizen participation in local governance.

While the term 'governance' usually refers to new spaces for decision-making, it does not give any indication on what kinds of politics are being or can be implemented within these spaces, since there exists a wide range

[3] This increasing importance of NGOs is mainly explained either by the strong presence of supposedly 'weak' states in developing countries or by an alleged withdrawal of the welfare state in the wake of neoliberal welfare state reforms. It has been argued by some scholars that these organizations would undermine the state, particularly in developing countries (Brass, 2016).

of patterns of participation and non-participation, "from non-democratic elitist top-down forms of interaction to radically democratic models from the bottom up" (Fischer, 2012, p. 457). Participatory governance, as Fischer (ibid., 457f.) contends, offers a theory and practices of public engagement through deliberative processes. Therefore, participatory governance should not be conflated with 'mere' citizen participation. In the governmental processes, citizen participation has traditionally been a means that should help increase and facilitate public access to information about activities carried out by the government, "to extend the rights of the citizens to be consulted on public issues which affect them, and to see that the broad citizenry will be heard through fair and equitable representative political systems" (Fischer, 2012, p. 458). Participatory governance aims at expanding this participation "by examining the assumptions and practices of the traditional view that generally hinders the realization of a genuine participatory democracy" (ibid.). Thus, it "reflects a growing recognition that citizen participation needs to be based on more elaborate and diverse principles, institutions and methods" (Fischer, 2012, p. 458). Essential features of participatory approaches are a more or less equal distribution of power and resources, the decentralization of decision-making processes alongside the establishment of a transparent knowledge and information exchange system and collaborative and trustworthy relationships among the partners (ibid.).

Since the approach of participatory governance essentially aims at enhancing participation at local levels of government by including and attending to the 'local community', and the term 'community' also features prominently in the whole setup of the PANTHEON project, the concept and its usage in this project deserve some closer examination here as well.

Anthropologist Gerald (Creed, 2006, p. 1) claims that within the last decades, "the focus on community has become ubiquitous in the way we talk and think about life in the twenty-first century", whereas many political, economic and developmental initiatives seem to perceive the 'community' as the most appropriate target and vehicle of change. This also seems to hold true when it comes to participatory governance or community engagement, as already indicated above. Creed (ibid., 2) contends, however, that although used ubiquitously, the term 'community' is hardly defined but is rather applied in a self-explanatory manner – partly since "the term has become part of the common-sensical way we understand and navigate the world." What characterizes a group of people as a community is thus often left open and not further specified.

The Oxford English dictionary provides some definitions, whereby the term is used to describe quite a wide range of phenomena. 'Community' can be used, among others, in reference to a "body of people or things viewed collectively", to a "body of people who live in the same place, usually sharing a common cultural or ethnic identity or a religious belief, "a place where a particular body of people lives", or to "a group of people who share the same interests, pursuits, or occupation […]".[4] As these definitions indicate, the concept of 'community' comprises at least three component meanings which are a) a group of people, b) a quality of relationship and c) a place/locality. These definitions also imply that the term largely seems to be associated with notions of unity, social cohesion, homogeneity and an affinity among the people living within such a 'community', and also contains "the idea of shared knowledge, interests, and meanings" (Creed, 2006, p. 2). It is probably because it is assumed that these values and social cohesion have increasingly gotten lost within the course of modernity, that the term has almost only positive connotations and is hardly used unfavourably

[4] See: https://www.oed.com/viewdictionaryentry/Entry/37337;jsessionid=B8426DFCEEBF3C6806B35B207FB9CAF5 – [last accessed on May 11, 2023].

– unlike most of the other terms used when referring to forms of social organisations such as state, nation, or society (ibid., 3).

In the present case within the PANTHEON project, the term community refers to a group of people that is characterized by living in the same place/region (in the focus regions of the project, Athens and Paris, respectively) and may thus be affected by the same hazards and disasters. However, this does not reveal much about how the members of these communities are affected by and are able to prepare for, handle and react to these hazards and disasters. For the present purposes, we thus do not presuppose that the members of a community necessarily share the same values, ideals, characteristics or knowledge and skills when dealing with disasters. Rather, we argue, that the way people are prepared for, react to, and recover from disasters – although being part of the same 'community' as defined here – may vary significantly. When speaking of 'community' in the context of disaster management, we refer to both, 'mere' citizens, as well as to voluntary fire fighters, members of local administrations and local first responder organizations, who all may assume different roles and participate in various ways in the different phases of disaster management. Furthermore, we assume that people's varying experiences of both vulnerability and resilience, may differ according to socioeconomic status, class, gender, ethnicity, interests, power asymmetries, available access to resources, knowledge and information, physical impairment or disability, which makes certain individuals and groups within a community more vulnerable than others.

This is precisely what the concept of 'vulnerability' implies, namely that different groups of people within certain 'communities' may have different levels of susceptibility to being harmed or affected by hazards and disasters. As already indicated in *D2.3 Community vulnerability and capacity assessments*, 'vulnerability' is one of the key concepts in disaster research and refers to either people's physical or social vulnerability which both may make them more prone to being hurt or harmed in the event of a disaster. For the purposes of this project, in D2.3 'vulnerable groups' were defined as "people with characteristics that put them at higher risk of injury, death, financial or other ruin in or after a disaster situation. […] these characteristics can be physical, such as the construction material of the houses that people live in, and social, such as financial means or physical or mental disability" (see D2.3).

In conceptual terms, vulnerability is closely related to disaster resilience. Disaster resilience is part of the broader concept of 'resilience' and according to UNISDR (2015, p. 26), resilience is the "ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions." Disaster resilience can thus be defined as "the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses – such as earthquakes, drought or violent conflict – without compromising their long-term prospects" (DFID, 2011, p. 6). The UN Hyogo Framework for Action further specifies that disaster resilience essentially hinges on and is determined by the capacity of individuals, communities and private and public organisations to organise themselves in order to learn from past disasters and reduce their risks to future ones at international, regional, national and local levels (UNISDR, 2005).

The aforementioned key terms are defined in **Table 1**.

Table 1: Working definitions of key terms

Key-term	Working definition
Participatory governance	The engagement of communities/citizens apart from the state in public decision-making as well as in public policy-making processes through different measures and methods.
Community	A group of people that is characterized by living in the same place/region and may thus be affected by the same hazards and disasters. The way people are prepared for, react to and recover from disasters may, however, vary significantly across communities.
Vulnerability	A particular susceptibility to being harmed or affected by hazards and disasters.
Disaster resilience	The ability of a system, country, community, society or household that is exposed to hazards to resist, absorb, accommodate to and recover from the effects of the hazard in a timely and efficient manner, while preserving and/or quickly restoring its essential basic structures and functions.

Essential elements for building disaster resilience and reducing disaster risk are a good knowledge of the context ("whose resilience is being built"), the potential hazards, the capacities available to respond and react to disasters, including potential social, economic, physical and environmental vulnerabilities that may exist within a given community (cf. DFID, 2011, p. 6f.; UNISDR, 2005, p. 7). All these aspects have already been addressed in the previous tasks of this work package (see D2.1, D2.2, D2.3 and D2.4) and serve as a basis for this report. To best capture and assess these elements, the Hyogo framework further proposes promoting community participation in disaster risk reduction „through the adoption of specific policies, the promotion of networking, the strategic management of volunteer resources, the attribution of roles and responsibilities, and the delegation and provision of the necessary authority and resources" (UNISDR, 2005, p. 7). The potential strengths, benefits and limitations of such an approach will be discussed in the following section.

2.2 COMMUNITY-BASED DISASTER RESILIENCE: GAPS AND CHALLENGES

Many NGOs involved in participatory governance emphasize the aspect of people's self-development and empowerment as primary goals of the participatory approach which entails not a mere "talking for" poor or otherwise marginalized citizens, but rather assisting them so that they can develop their own capacities such as communicative skills, citizen empowerment and community capacity building, to negotiate with policy-makers (cf. Fischer, 2012, p. 459). Participation is thus seen by many to bring positive change and development of certain communities in regard to increased social justice, economic and social empowerment and more equity when it comes to the distribution of benefits and resources. In recent years, community participation has also been recognized as a supplementary element of disaster management necessary to reverse the global trend of exponential increase in disasters and losses from small and medium scale disasters, to build a culture of safety and to ensure sustainable development and disaster resilience for all.

The main benefits of involving communities in disaster resilience and risk management are seen to be building confidence, improved capacity for disaster preparedness and mitigation, greater development roles and responsibilities at the local level and pride in making a difference. In addition, the involvement of local

communities provides an opportunity to develop a wide range of appropriate innovative and workable mitigation solutions in a cost-effective and sustainable manner (cf. Fischer, 2012; Lorna, 2003). This last point of increased (cost)-efficiency is emphasized by Scully and Shaw (2022), who shows that the integration and active participation of communities in disaster resilience and risk reduction has found to be a means of reducing costs and of incorporating important competencies, networks, etc. to make response and recovery more effective (cf. Beldyga, 2022; Linnell, 2013). Likewise, Fischer (2012, p. 460) describes an increase of efficiency and effectiveness of the provision and management of public services as one of the main goals and potential benefits of capacity building by community engagement.

Electing representatives for running the government at the national (or provincial) level is an essential part of people's participation in the conduct of public affairs. However, a much more engaged form of participation is possible in running the affairs at community and local levels. Both top-down decentralization of administration and bottom-up growth of community organizations, often occurring in tandem with each other, can increase such possibilities of engaged participation. A growing body of evidence shows that when this happens, participatory institutions managing service delivery and common property resources at the community level can perform better in terms of both efficiency and equity (Osmani, 2008, p. 14).

If allocative decisions at the local level are taken directly by people themselves or their democratically elected representatives, the weaker groups should be better able to influence allocations in their favour, compared to the mode of decision-making by unaccountable local bureaucratic elites. The argument rests on the presumption that in participatory decision-making processes, even the weaker groups would be able to express their preferences and hopefully make them count (Osmani, 2008, p. 20). Participation is thus seen to bear the potential of combining efficiency with equity since it provides less powerful groups within a community with better chances for having a say in how resources are distributed. This is also because a primary goal of capacity building is to enable citizens to critically reflect on normative principles that underlie the provision of public services (Fischer 2012, p. 469). Fischer (ibid.: 460f.) contends that community participation has the potential to effectively improve the use, management and distribution of resources as well as the effectiveness of projects in terms of their achieved and intended outcomes. What is more, community participation can lead to faster responses to emergency situations in fields such as health care, forestry, education or environmental protection, it can potentially enhance the commitment and motivation in the implementation of programs and lead to a greater satisfaction with programs and policies alike. Capacity-building can thus also have the effect of enhancing people's sense of belonging and togetherness. Participatory governance – as opposed to citizen participation – can help in gathering competent individuals who have sufficient social capital for joint problem-solving (cf. Fischer, 2012, p. 461).

The UN Declaration of the Right to Development from 1986 claims a right to participate in development and sees this as an "inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to and enjoy economic, social, cultural and political development […]" (UN, 1986). This right is not to be seen as the simple right to "'enjoy' the fruits of development, but also as a right to participate in the process of realizing them" (Osmani, 2008, p. 3). The declaration even claims that "all human beings have a responsibility for development, individually and collectively", whereby the rights and duties for formulating appropriate national development policies are attributed to the respective states (see (UN, 1986).

The right to participate has quite universally and indisputably been accepted and the participatory approach – at least theoretically – has the potential to contribute to greater equity and a fairer distribution of resources as well as a fairer design of decision-making processes. Yet, actual participatory processes often fail in enabling such a broad participation for all (Osmani, 2008). Empirical studies on the topic suggest that achieving the alleged positive effects of participation is particularly difficult in contexts that are characterized by significant social and economic inequality. As Fischer (2012, p. 451) notes, "equitable outcomes more commonly occur in combination with other factors, such as those related to the distribution of power, motivation levels of the participants, and the presence of groups that can facilitate the process." Since participation is neither an easy nor a straightforward task and needs to be carefully organized, facilitated and cultivated (Fischer, 2006, p. 21), its role is not viewed in an entirely positive light: while some call for more participation, others believe it should be restrained. Still others point out the limitations and difficulties of participation, so there is not a universal agreement.

Gustafson and Hertting (2017, p. 538) for instance point out that despite a growing body of literature on participatory modes of governance, there is still very little knowledge available on the key players of such approaches, namely the participants and their capabilities and motives for and expectations of participation. This knowledge, however, would be urgently needed, since the implementation of participatory governance depends on the voluntary and often continuous cooperation of committed participants (ibid.). At this point Fischer (2012, p. 460) adds that in order to participate, people need an incentive to do so as the engagement in public affairs is not without costs. These costs should be outweighed by potential benefits resulting from citizen's participation. What is more, people may not see an immediate relevance for their participation or it may seem more important to outsiders than to the relevant communities themselves, and people may also simply lack the motivation, time or resources to take part in participatory processes.

Another related challenge with participation is that its success is often difficult to measure. On the one hand because "there is often no reliable information about the distribution of benefits and costs to households." On the other hand, as Fischer (2012, p. 461) contends, establishing a cause-effect relationship between efficiency and participation can be problematic, as "it is always possible that a positive association between efficiency and participation may only reflect a process of reverse causation—that is, community members had already chosen to participate in those projects which promised to be efficient" (ibid.). Furthermore, in the context of developing countries "in which community participation is related to external donor-funded projects […] participation can intentionally advance preferences that are seen to be more in line with the interests of the donors than local interests. The participants simply try to increase their chances of obtaining available resources by telling the donors what they want to hear" (Fischer, 2012, p. 461). In such cases, participatory approaches – although they are aimed at the opposite effect – tend to reproduce existing social hierarchies instead of eradicating or at least mitigating them.

Osmani (2008, p. 28) states that a careful analysis of previous approaches to participatory governance indicates that success depends largely on how well a society can deal with three distinct but inter-related gaps that stand in the way of effective participation. These are further referred to as the capacity gap, the incentive gap and the power gap.

- The **Capacity** gap "arises from the fact that meaningful participation in the process of governance requires certain skills which common people, least of all the traditionally disadvantaged and marginalized segments of the society, do not typically possess" (Osmani, 2008, p. 28). To bridge this

gap, participation must be made more effective by training and practicing general skills such as working in heterogenous teams or articulating one's view rationally and understandably over a longer period of time. Thereby it is important that "the transfer of knowledge must take place in a setting of fundamental equality and mutual respect between the providers and recipients of knowledge" (Osmani, 2008, p. 29).

- The **Incentive** gap refers to the various types of costs of participation. These include an opportunity cost of the time and effort that people have to put into participative activities, which usually is especially high for women because of their alleged "triple burden" – adding costs of participation to the burden of engaging in both productive and reproductive activities; further, a psychological cost of speaking out in public and the probable cost of retribution which refers to potential class hierarchies are named (cf. ibid., p. 30).
- The **Power** gap according to Osmani (ibid., p. 31) arises from "systematic asymmetries of power that is inherent in unequal societies", i.e. due to gender, age, ethnicity, class, religion or other differences that may make a difference in certain situations. He argues that "participation in such unequal societies is likely to be unequal too, with members of dominant groups wielding superior power to further their own narrow interests" (ibid.).

In order to close or at least narrow down the power gap, "some countervailing power in favour of the subordinate groups" must be created. Osmani (ibid., p. 32) proposes the "theory of deliberative democracy" as one way for creating such a countervailing power which should ensure a fair and equitable decision-making process by enabling all participants to effectively present their views and the actions they consider necessary. A basic prerequisite therefore is that people have the necessary education and economic security, as "poor illiterate people, whose livelihoods are insecure and whose very survival depends on maintaining an obsequious humility in the context of patron-client relationships, are not very likely to participate independently or assertively in the conduct of public affairs" (Osmani, 2008, p. 34). For participation to contribute to increasing social equity, it must be ensured that poor and other vulnerable groups are able to act and advocate in their own interests, even though this may go against the interests of their donors (cf. ibid.).

While participation may significantly contribute to greater efficiency and equity, there are certainly no guarantees and especially large-scale disasters continue to expose weaknesses in the communitarian dimension of crisis-management policy. The design of policy around participatory concepts is often problematic because of its ambiguous nature and connected romanticism while some initiatives may reflect a neo-liberal agenda (Stark & Taylor, 2014, p. 313). These are by no means arguments against citizen participation but rather for a careful design and implementation. Dibley et al. (2019) for instance stress the government's role in supporting community-led approaches to recovery and argue that it is paramount to enable and support collective self-efficacy and already existing capacities and to understand the capacity of governments to devolve responsibility and power and to share it with the respective communities. In a similar manner, Stark and Taylor (2014, p. 302ff.) propose a community decentralization model and argue that crisis management should remain in local state control. After locating the resources down to this lowest level on a vertical axis, remaining in government control, they should however be pushed out into the communities on a horizontal axis. Localized crisis-management units should be built that attend to the respective community's needs and hazards (Stark & Taylor, 2014).

In contrast, Linnell (2013, p. 399) suggests that instead of focusing on the potential risks and hazards, the focus should be on people and their capacity to act (see also UNDP 2022) since it is mainly the residents and first responders of areas that are affected by disasters who are the first to react to emergency events and quickly provide assistance and participate in the rescue of people (Beldyga, 2022; Linnell, 2013). This is partly because they are the first to arrive on the scene, and partly because living in disaster areas has given them the necessary skills and experience to deal with disasters. Moreover, according to the authors, the response to crisis events is predominantly organized by kinship, family and neighbourhood networks, each of which mobilize available resources (cf. Beldyga, 2022; Linnell, 2013). Linnell (2013) also highlights the effectiveness of established networks such as family, workplace, clubs, organizations, church congregations, which could and should be considered as important actors for emergency and disaster management. To be able to respond more effectively and efficiently to disaster events in the future, Beldyga (2022) recommends to develop emergency plans in collaboration with affected communities in an iterative process in order to enhance disaster resilience.

Yet, as already indicated above, including members of local communities in processes of building disaster resilience is not an easy task, and authors such as Alexander and Sagramola (2014), Andharia et al. (2023) and Geekiyanage et al. (2020) criticize that current disaster management plans and decision-making processes especially fail in sufficiently considering the views and needs of people with disabilities and other vulnerable groups, although they are often more severely affected by disasters than people with no disabilities and "they can suffer additional forms of discrimination or neglect" (Alexander & Sagramola, 2014, p. 7). The authors plea for an inclusive approach in disaster management that adequately considers people with disabilities and implements their special needs. Andharia et al. (2023) propose a participatory mechanism for community feedback that is tailored to the special needs of people with disabilities. The authors refer to a large-scale study that was conducted in Kerala in 2018 with people with disabilities/impairments after a major flood disaster. They present the work undertaken by the government and several partners using action research and methodological innovations during post-disaster recovery to implement the idea of AAP ("Accountability to affected and at-risk populations") within government systems that included a large sample of people with disabilities. This approach "underlined the assumption that people with disabilities are not mere victims or beneficiaries but have the potential to be actors, active participants and agents of change and opportunities must be provided for them to communicate" (Andharia et al., 2023, p. 56). The whole design and setup of the data collection process ensured that an app-based data collection platform was provided to people with disabilities that allowed them to give real-time feedback on their needs and concerns during disaster response and recovery. The research thus "created a reliable foundation for the government to understand the successes and shortcomings of its existing disaster management policies and their implementation. It also formed a rich source of reference for insights for future planning, preparedness and resilience building for the people with disabilities" (Andharia et al., 2023, p. 65f.).

While this is certainly an example of successful community involvement with special attention to vulnerable groups, there are numerous factors and hurdles that may significantly hinder the engagement of vulnerable groups. Geekiyanage et al. (2020) for instance state that vulnerable populations are often not considered in urban development decision-making processes because of barriers to community access and challenges to their inclusion. This neglect of vulnerable groups can subsequently also affect the disaster resilience of cities and urban environments. In their literature review, Geekiyanage et al. (2020) identify several challenges and

barriers to collaborative decision-making, mainly in relation to the categories of context (community capacity, quality of existing relationships, organizational culture, attitudes and knowledge), infrastructure (investment in infrastructure and planning to support community engagement) and process (stakeholder engagement process, inclusive and accessible practice). These barriers include, first and foremost, communities' lack of knowledge about how best to engage in participatory decision-making and development processes, and a lack of awareness of the benefits they can gain from being involved in these processes. The second most frequently cited barrier is a lack of meaningful community involvement by decision-makers. Unclearly defined goals and purposes of civil society engagement, as well as a lack of clarity, lack of transparency and unclear expectations of current stakeholder engagement processes were cited as the third most important barrier to engaging vulnerable communities in urban development. Through a synthesis of current research, the study found that these barriers can be tackled by changing attitudes and building capacity of both community and professionals, investing in community engagement, and making changes to current stakeholder engagement processes and policies. This last aspect shall be achieved by "incorporating bottom-up dimensions instead of having dominant top-down governance" and by decentralizing decision-making and management powers "with responsibilities spread over different stakeholder organizations" (Geekiyanage et al., 2020, p. 10).

As the PANTHEON project is focused on urban areas, mainly the areas of Paris and Athens, we will subsequently turn to the question of how to engage urban communities best and most effectively in processes of building disaster resilience, after discussing in greater detail concrete modes of participatory governance.

2.3 MODES OF COMMUNITY ENGAGEMENT

As already indicated above, participatory governance is embodied in processes that potentially empower citizens to participate in public decision-making, and it has been gaining increasing acceptance as a means of improving public accountability.

Around the world, a growing number of governments and their partners in civil society are experimenting with innovative practices that seek to expand the spaces and mechanisms for citizen participation in governance processes beyond elections and other types of "official" selection. There is evidence that participatory governance practices are contributing to stronger government transparency, accountability and responsiveness, and improved public policies and services. Participatory governance implies effective participation by all stakeholders, especially at local levels of government as a necessary condition for promoting good governance (Osmani, 2008, p. 1). Effective participation means one in which all the relevant stakeholders take part in decision-making processes and can influence the decisions. Modes of participation may vary between minimal consultation through shared working to shared decision-making and degrees of empowerment. Different approaches may require different mechanisms (Osmani, 2008, p. 28).

Geekiyanage et al., (2020, p. 1) state that community engagement is a "purposeful process which develops a working relationship between communities, community organizations and public and private bodies to help them to identify and act on community needs and ambitions."

According to Geekiyanage et al. (2021), most participatory methods are dedicated to informing, consulting and engaging communities, while only a few methods are available for interactive public participation that

supports genuine collaboration and empowerment. The case studies reviewed have shown that current community engagement practices are mostly in the preliminary design stages and that most projects aim to achieve levels of "inform" and "consult" engagement, with some aiming to achieve levels of "involve", "collaborate" and "empower". The research shows that community involvement is often overlooked in the professional design, development, and post-development phases.

Since different degrees of community engagement might be useful for various approaches of participatory governance within PANTHEON and throughout the whole cycle of disaster management, an overview of methods recommended in the literature is presented according to the levels of community engagement proposed by Geekinyanage et al. (2021).

2.3.1 INFORMING COMMUNITIES

Informing communities is a crucial part of participatory governance to ensure transparency, promote inclusivity, and foster active citizen participation. Approaches to informing communities are:

- **Open data and information sharing**: Governments should make relevant data, reports, and documents accessible to the public through online portals or public libraries. This enables citizens to access evidence-based information.
- **Clear and accessible communication**: Using multiple communication channels, such as websites, brochures, posters, and social media, to reach diverse audiences.
- **Community outreach**: Actively engaging with community organizations, local leaders, and stakeholders to disseminate information.
- **Public awareness campaigns**: Launching campaigns to raise awareness about key issues, policies, or initiatives through various media channels, such as radio, television, newspapers, and social media.
- **Collaborative platforms**: Creating online platforms or forums where citizens can access information. These platforms can also facilitate two-way communication between the government and the community. Questions can be discussed or consultation can be enabled. (The latter would mean a higher form of engagement than just 'informing')
- **Community meetings and workshops**: Organizing regular workshops to share information on specific projects or policy implementation.
- **Language and cultural considerations**: Considering diverse linguistic backgrounds within the community by providing information in multiple languages, using interpreters.
- **Education and capacity-building**: Providing opportunities for community members to develop knowledge and skills through training programs and educational materials.

The "inform" level of public participation provides the public with the information they need to understand the decisions made by agencies (International Association for Public Participation, 2021). Presentation and dissemination at the inform level are achieved through simple methods such as printed materials, websites, videos, infographics, advertising via media, presentations/live streaming and displays/model exhibits. These methods provide one-way communication through which practitioners can inform communities on upcoming developments.

As these methods do not serve as an opportunity to build a valid conversation with or to receive feedback from communities, satisfactory and meaningful information facilitation can be provided through social media platforms. In addition, public meetings can be used to inform larger groups of people and generate inter-community discussions about prospective development (Wanless, 2017). Similarly, public meetings also encourage two-way communication, as this method generally has a facilitator for community questions and a recorder who records suggestions and issues that are revealed at the meeting (ibid.). The Organization for Economic Co-Operation and Development (OECD) has pronounced that the use of social media platforms has already been used not only to inform but also to consult citizens. (Nuclear Energy Agency, 2016; on the role of social media in DM, see also Chan, 2013)

2.3.2 CONSULTING COMMUNITIES

Consulting communities is a fundamental aspect of participatory governance, as it involves actively seeking input and involving citizens in decision-making processes. Approaches to consulting communities are:

- **Public consultations**: Conducting public consultations to present information, gather community input, and address questions or concerns related to different decisions or projects (Zubir & Amirrol, 2011).
- **Public hearings and meetings**: These gatherings provide a platform for dialogue between decision-makers and citizens.
- **Surveys and questionnaires**: Conducting surveys and distributing questionnaires allows for collecting quantitative and qualitative data on community preferences, priorities, and feedback.
- **Focus groups**: Focus groups with community members who represent diverse perspectives and backgrounds provide an opportunity for in-depth conversations, exploration of ideas, and collection of nuanced feedback.
- **Stakeholder consultations**: Engaging with key stakeholders, such as community organizations, interest groups, and local businesses, to solicit their input and perspectives on specific issues or decisions.
- **Online platforms and social media**: Utilizing online platforms, websites, and social media channels to facilitate virtual consultations and collect input from a larger audience.
- **Participatory workshops**: Organizing workshops where community members can contribute their ideas to the decision-making process.
- **Citizens' assemblies**: This approach ensures diverse representation and in-depth discussions.
- M**obile outreach and community visits**: Taking consultation processes directly to the community through mobile outreach efforts and community visits for individuals who may have limited access to traditional consultation channels.

The “consult” level of public participation provides the basic minimum opportunity for bringing public input into a decision. Consultation with little interaction can be achieved through surveys, interviews and polls. A survey or an interview helps to understand the opinions of stakeholders on a particular topic in a structured way which can be extensively analysed. Polls, as a voting method, allow people to register their opinion and thus to quickly provide an assessment of a current situation (Queensland Government, 2010).

Consultation can be more interactive when it uses methods such as focus groups, citizen science or crowdsourcing. Focus groups are small group discussions that generate in-depth information on a specific topic. Citizen science facilitates the collection of data in an organized way from the members of the public, typically in collaboration with professional scientists (Rosenstock et al., 2017).

Crowdsourcing, on the other hand, offers a method to bring in people who are interested in an issue and actively engage them longitudinally until a sound solution is reached (Wanless, 2017).

In terms of quantity, surveys, polls and citizen science or crowdsourcing methods have shown potential in approaching a larger group of the public. In contrast, individual interviews and focus groups are much more effective for obtaining opinions about a particular problem. Nevertheless, this stage of community participation allows agencies to identify potential issues that need to be considered to guide the next stages of the development planning with the active involvement of the community.

2.3.3 INVOLVING COMMUNITIES

Involving communities as a mode for community engagement is essential for fostering active participation, creating shared ownership, and generating sustainable solutions to various challenges. Involving the community ensures that decisions are made jointly and diverse perspectives and needs of community members are being considered. Following are some tactics and methods for effective community involvement in community engagement.

- **Open communication channels**: Establishing open and transparent communication channels allows community members to share their ideas, concerns, and feedback easily. Town hall meetings, community/neighbourhood forums, social media platforms/sites, email lists, and newsletters can fall under this category.
- **Active listening**: Active listening to the voices of community members, what they have to say, and understanding their needs and challenges without making assumptions, builds trust and respect, encouraging more meaningful engagement.
- **Collaborative decision-making**: Including community members in the decision-making process involves creating committees, task forces, or focus groups that represent various segments of the community. These types of groups can work together to identify problems, develop solutions, and make informed decisions. As it is discussed in “Community-based participatory research for health: from process to outcomes”, building trust, promoting social justice, and addressing power imbalances when trying to engage community is very important. (Minkler & Wallerstein, 2011)
- **Capacity building**: Empowering community members by providing them with the necessary resources, knowledge, and skills to participate effectively is a key action. It can be conducted by offering workshops, training sessions, and educational programs to build their capacity to engage in community matters.
- **Technology use**: Utilizing technology to facilitate community engagement through online platforms, mobile apps, and virtual meetings can reach a broader audience and provide more flexible opportunities for participation.

- **Recognition and appreciation of contributions**: Acknowledging and appreciating community members contribution. Recognition of their efforts and valuation of their input reinforces their commitment to the engagement process.
- **Regular update**: Keeping the community informed about ongoing projects, initiatives, and decisions maintains interest of their engagement and demonstrates that their engagement makes a difference.
- **Flexibility and adaptation**: Being open for feedback and ready to adapt the engagement process based on the changing needs and preferences of the community ensures that the approach remains relevant and effective over time.
- **Long-term engagement**: Focusing on building long-term relationships and maintaining ongoing community engagement rather than one-time or token commitments will inspire the community for further involvement and contribution.

At the 'involve' level, the public is invited to take part in the decision-making process, typically from the beginning, and is offered multiple ongoing opportunities to provide input into the decision-making process as the development of solutions matures over time. However, the respective agencies are still the decision-makers, and there is no expectation of building consensus or offering the public any sort of high-level influence over the decision (International Association for Public Participation, 2021). This approach typically considers both community requirements and perspectives with government requirements to generate alternative design proposals.

Other methods that are being used to involve communities are workshops, placemaking and knowledge co-creation workshops, which not only involve communities but also facilitate collaboration to a certain degree.

2.3.4 COLLABORATING WITH COMMUNITIES

Collaborating with communities is a vital component of participatory governance, as it involves working together with citizens to address public issues and make decisions collectively. Approaches to collaborating with communities are:

- **Partnerships with community organizations**: Establishing partnerships and alliances with local community-based organizations, non-governmental organizations (NGOs), and civic groups to leverage their expertise, resources, and community networks.
- **Co-design and co-production**: Engaging communities in the design, development, and delivery of public services, policies, or projects. This approach actively involves citizens in decision-making.
- **Community task forces or committees**: Creating task forces or committees composed of community members, experts, and stakeholders to collaboratively address specific issues or challenges.
- **Community-based planning**: Adopting community-based planning approaches where residents actively participate in the development of local development plans, neighbourhood revitalization initiatives, or urban design projects.
- **Participatory budgeting**: Implementing participatory budgeting processes that involve community members in deciding how public funds should be allocated that allows citizens to directly influence budgetary decisions and prioritize projects that address their concerns.

- **Community-led initiatives**: Supporting and empowering community-led initiatives, grassroots organizations, and resident-led projects that address local needs and priorities. In their study, Amobi et al. (2019) state that community-based collaboratives bring together community members and local organizations from diverse fields to pursue shared goals.
- **Community engagement officers or liaison roles**: Designating community engagement officers or liaison roles within government agencies to facilitate communication, build relationships, and foster collaboration between the government and the community.

The 'collaborate' level in the engagement spectrum aims to partner with the public in each aspect of decision-making processes, including the development of alternatives and the identification of the preferred solution. The collaboration level promises to incorporate advice and recommendations from the public to the maximum extent possible, but decision-making still lies with the development-related organizations. Workshops and open-space events are most useful when bringing together representatives from diverse groups who share a common interest in an issue but bring different perspectives on how it should be addressed (Queensland Government, 2010). Placemaking is a method that is used for intensive planning sessions where citizens, designers and other participants collaborate on a vision for development, particularly re-modelling failing, abandoned or underused spaces in order to make them more attractive through temporary structures and installations (Wanless, 2017).

Collaborative methods such as expert panels and working groups are especially designed for stakeholders to work together towards a common objective while incorporating the scientific knowledge and experience of subject matter experts and specialized community groups.

2.3.5 EMPOWERING COMMUNITIES

Empowerment aims to build the capacity, confidence, and decision-making power of individuals and groups within the community. At this stage, the focus is on supporting community-led initiatives, developing local leadership, and fostering self-sufficiency. Empowering communities means that decision-making processes and initiatives are driven and guided by the active participation and leadership of community members. The key aspects of community-led participation within participatory governance are:

- **Community empowerment**: Communities are empowered to identify their needs, aspirations, and priorities in developing the skills, knowledge, and capacity to actively engage in decision-making processes.
- **Self-determination**: Communities have the autonomy to define and pursue their own development goals, strategies, and solutions, considering their unique cultural, social, and environmental contexts.
- **Participation in decision-making**: Community members have meaningful opportunities to be involved in all stages of decision-making processes, including agenda setting, policy formulation, and implementation, ensuring their perspectives are considered and respected.
- **Co-design and co-creation**: Communities collaborate with relevant stakeholders, including government agencies, civil society organizations, and private sector entities, to jointly design and implement initiatives, leveraging diverse expertise and resources.

- **Bottom-up approach**: Community priorities and initiatives emerge from the grassroots level, reflecting the needs, values, and aspirations of community members. This approach contrasts with top-down decision-making that may not adequately address local realities.
- **Inclusive representation**: Efforts are made to ensure the participation of diverse community members, including marginalized groups, ensuring that decisions and initiatives reflect the voices of all community members.
- **Knowledge sharing and capacity building**: Communities have access to information, resources, and opportunities for learning and capacity building to enhance their understanding of governance processes, policy issues, and effective participation.
- **Sustainable outcomes**: Community-led initiatives aim to achieve sustainable and long-term outcomes by building community resilience, fostering local ownership, and promoting the sustainable use of resources.
- **Accountability and transparency**: Community-led initiatives are characterized by transparency, open communication, and mechanisms for mutual accountability among community members and with external stakeholders.

Two specialised methods for community empowerment are community mapping and system dynamics (SD): Community mapping, sometimes known as asset mapping, is the process and product of a community getting together to map its own assets, values, beliefs, or any other self-selected attributes. A community map highlights people, physical structures, organisations and institutions that can be used to create a meaningful service project for the community. SD is a promising public involvement method that uses simulation modelling (causal loop diagrams) to capture the views and ideas of the stakeholders (Pejic Bach et al., 2019).

As the foregoing discussions elaborate, the first four levels of the community engagement spectrum range from no participation to interactive participation but do not provide an avenue for community-led decision-making. Community leadership in decision-making can be achieved by implementing participative empowerment methods such as citizen committees, citizen juries, visioning and community indicator projects. Citizen committees consist of a group of representatives from a particular community or a set of interested parties who are appointed to provide comments and advice on an issue. Unlike citizen committees, citizen juries only involve experts on a particular topic and bring expert knowledge and ideas together to build discussions and assist in making informed decisions on a focus area. Visioning is a method typically used in planning, wherein residents are brought in to participate in the creation of urban or landscape visions. Community indicator projects are those where communities have a vision for a sustainable future and have established ways of tracking their progress using indicators. The list of indicators varies, and is generally developed by the community itself. In this approach, indicators are selected either across topical domains or with a focus (e.g., children) to collectively track trends in the community's well-being and quality of life. When making development decisions related to available resources, participatory asset management methods can be employed. Asset-Based Community Development (ABCD) is an innovative methodology for assessing the resources, skills and experience available in a community; organising the community around issues that let it move its members into action; and then determining and taking the appropriate action (Wanless, 2017). It aims to exploit the community's own strengths and potentials to facilitate the sustainable development of the community. According to Aslin & Brown (2004) this method uses the community's assets

and resources as the basis for development; it empowers the people of the community by encouraging them to utilise the resources that they already possess.

As an example for a possible guideline on the implementation of Community Based Disaster Risk Management (CBDRM), Johnston et al. (2022) present the use-case of a community-led method to improve natural disaster preparedness. After qualitative semi-structured interviews with 30 community engagement practitioners, the authors propose the "iterative community-centred engagement model", consisting in looping over the five steps shown in **Figure 1**. The goal is the adequation of risk management plans as major protective action.

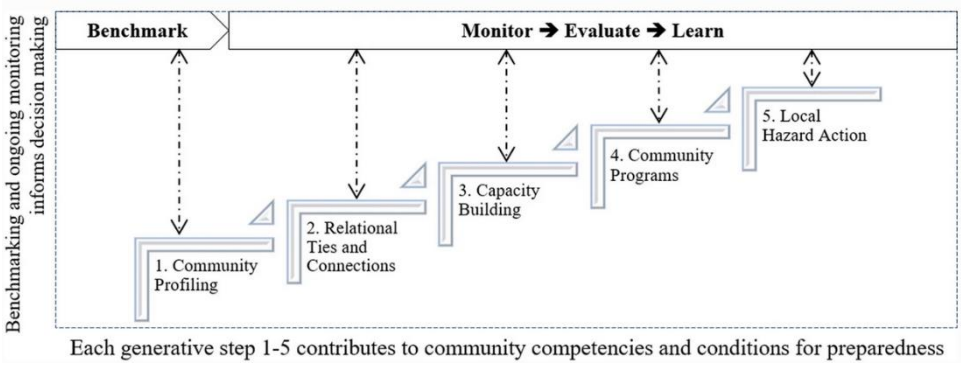


Figure 1: Collaborative community-led engagement approach (Johnston et al., 2022, p. 2842)

1. Community profiling gives insight into the community's issues, such as their resources, knowledge and structure, in such a way that practitioners can understand the accuracy of local risk knowledge and its perception. Only after this step they will achieve a deep understanding of the specific features of local communities.
2. Relational ties and connections aim at understanding the community's relationships and networks and granting access to different groups and types of people in a community.
3. Capacity building is done by agencies by providing expertise, resources and mentoring to the communities to build their preparedness to natural risks. The capacity building phase must be built on existing relationships, especially with those segments of the community that are most motivated.
4. Community programs are then established collectively by the community leaders with the support of the emergency agencies to make communities become responsible for the decision-making in the preparedness of their own local hazards.
5. While the first four steps reflect what is the engagement process used to build a sustainable community base, this last step refers to specific actions tailored to specific local risks.

The community-led engagement approach repeats these five steps iteratively, monitoring and evaluating the preparedness. The final objective is learning what worked and what needs to be changed, which makes it necessary to step back after each loop with practitioners and the community doing the evaluation together.

2.4 ENGAGING AND INVOLVING URBAN COMMUNITIES

Goal #11 of the UNSDG (United Nations Sustainable Development Goals) aims at making cities and human settlements inclusive, safe, resilient and sustainable. Many research works have aimed at elaborating the best methods for engaging the inclusive participation of citizens in urban development management. For this section we have done a bibliographic search of papers from 2020 that mention urban/city and community engagement/participatory governance. Ten documents were considered useful for our purposes, although most of the methods do not differ in the essence from the ones given in the previous section. Probably the most relevant concepts found in relation to urban communities are related to the community workers and with the urban setups for reaching the attention of citizens.

Geekiyanage et al. (2021) present a systematic review of the state of the art from the last two decades (2000-22). A total of 34 methods are described and mapped according to the level of the participation targeted. The level of participation targeted can be one of the following five, ranked according to increasing level of engagement from the public:

1. Information
2. Consultation
3. Involvement
4. Collaboration
5. Empower

This distinction was applied to structure the modes of engagement for this report (see 2.3 Modes of community engagement). The proposed methods go from printed physical materials (such as brochures, posters, etc.) to participatory workshops and engagement campaigns in stands. For each method the strengths and limitations are presented and the tools to be used are listed. Finally, Geekiyanage et al. (2021) provide a list of examples of the application of some of the methods in specific use-cases, and the corresponding degree of achievement obtained by each one. See **Figure 2** for a visual mapping of participatory methods proposed by the authors.

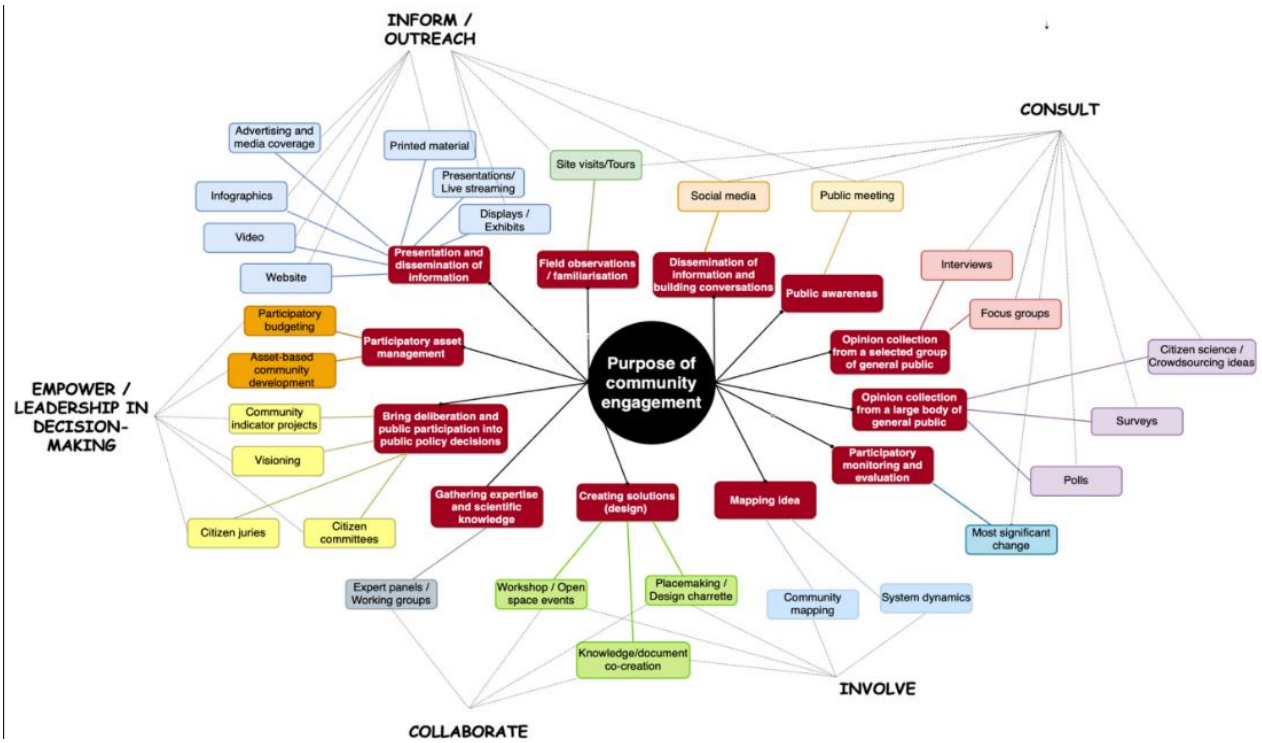


Figure 2: Mapping of Participatory Methods for Community Engagement (Geekiyanage et al., 2021, p. 14)

From the listed tools, those that are based in technology are: video streaming platforms, social media platforms, online survey/vote webs (such as SmartSurvey), drawing software, remote meeting tools, crowdsourcing sites, collaborative project tools (such as Box or Slack), system dynamics tools (Group Model Building (GMB), Conceptualization Business System Dynamics (CB-SD), etc.), indicators share-boards, workshop support tools (Slido, Mentimenter, ...), digital tools for modelling and visualization (Rhino, Grasshopper, Dynamo, SketchUp, etc.), geographical information systems and online budget simulators. The closest to digital twins is the mention of the generic concept of "open innovation digital platforms".

A useful review and description of the idea of digital twins is given by Nochta et al. (2021). The research includes a state-of-the-art analysis of city-scale digital twins, although it is not directly focused on disaster, but applied to urban management which is closely linked to the concept to be developed in the PANTHEON project. Digital twins are proposed, among others, for the monitoring of the city pollution, the relevant infrastructures, the energy demand, the traffic congestion, etc. The article also tackles the implementation of a digital twin of the city of Cambridge with different conclusions. On the one hand, the implementation requires collating data from both conventional, but also emerging sources, mainly sensory technology. The study highlights the difficulties involved in reframing broad policy goals into targets, and in translating model outputs into relatable and actionable narratives with the identified need for better understanding the functioning and the boundaries of data-driven decision-making support tools in terms of opportunities, limitations, risks, and uncertainties. On the other hand, the report also indicates the need to engage with a diverse set of societal actors which are described as a key point in the implementation of digital twins in urban areas.

Other tools and technologies that encourage citizens in the broader area of participatory governance are also referred to by Fredericks et al. (2015). The authors propose the term *algogratic governance* to denote the results of applying such tools.

An example of participatory governance is the study of the opinion of citizens, in a medium-size city in Poland, about the participatory urban development based in smart city idea (Lewandowska & Chodkowska-Miszczuk, 2022). This idea is understood as strongly linked to sustainable development, with the aim to increase quality of life with the use of innovation. Special attention is given to the participatory budget which means that the municipality set up a participatory budget as a mechanism to give social control of the city investments and to reduce corruption. This budget is a flagship for a pro-social and pro-environment city project, running since 2012. Additionally, the reality is that a limited budget is only available for proposals coming from citizens. The municipality must be involved in the process and this has to be a continuous process. Decisions are preceded by public debate and entities promoting the project must keep a degree of responsibility during the implementation of the project. The research shows that infrastructures (such as playgrounds or sports fields) and safety improvements are dominating the expenses linked with participatory budget.

Geekiyanage et al. (2020) select 46 solutions, or best practices, that the literature proposes to improve the engagement of vulnerable communities. The solutions are classified by the type of barrier they try to solve. As major activities found in the list of solutions, we can see words such as training/educate, advertising/disseminate/communicate, programmes/incentives/investment, rights/statutes/regulation, commitment/regularly, roles, trust/accountability, etc. Some of the solutions timidly introduce the digitalization capabilities and social media interaction.

In addition to tools, the role of social work is key in effective CBDRM (Verma & Guin, 2022). The role of social workers in disaster recovery is especially relevant for engaging at-risk communities to participate actively in all phases of DRM which is defined as the implementation of strategies and policies for reducing the risk of the disaster and the losses, and to prevent future new disaster events. The process can be considered to be community based when the work is carried out by and together with the community in all phases: planning, implementation, mentoring and evaluation. Priorities come from community needs, set by community groups and for the community benefits, in a classical bottom-up approach. Community groups shall include men and women, vulnerable and elderly people, marginal and specific needed persons.

The study by Verma & Guin (2022) emphasizes that social workers have a particularly important contribution to make in post-disaster recovery by facilitating community development, restoring livelihoods, providing psychosocial support, and strengthening the capacities of local communities. Although the authors do not specifically refer to the role of social workers in urban environments, their findings are still highly relevant for the urban contexts that we consider in PANTHEON since social workers are key to engage participation and they care about disadvantaged and vulnerable groups. The work collects information from previous disasters and connects disaster risk reduction with social work, in the attempt to develop an interrelationship between CBDRM and social work.

The paper highlights the appropriateness of the six methods of social work: casework, common practice, community organization, social action, social welfare administration and social work research, finding community organization and common practice as the most relevant in DRM. The objectives of social work are not focused on disaster risk preparedness, but on the improvement of the quality of live and social justice,

through social-economic development. Still, the methods social workers employ, which consist of helping the community to initiate their own process and to make this process conscious and understood, is applicable on community-based disaster risk management. A large list of the roles helps social workers with their tasks. They are communicators and mediators, enablers and catalyst, guides and educators, animators and motivators, counsellors, advocates, collaborators, facilitators and innovators. Social workers in DRM help to identify what puts people at risk in the first place. The main conclusion of the study is that a new curriculum is needed to train social workers in all these roles.

The particular case of flood management is tackled by Puzyreva et al. (2022), who studied the role of volunteers in four countries (Italy, Netherland, England and Germany). As stated above, there is a need of knowledge attainment by some members of the communities, which leads them to become somehow professionalized for the volunteer tasks in case of emergency. At the same time, they can serve as mediators and convey the local knowledge to the experts, to better adapt the risk response plans to the local region. But the professionalization of the community also has its drawbacks. By means of 124 semi-structured interviews with members of the volunteer groups of the community, the study shows the difficulties to keep the correct balance between the level of professionalization and the degree of organization of the community.

A different method is presented by Fredericks et al. (2016) that is also related to the improvement of the level of engagement of the citizens, although not necessarily in regard to risk management. The authors propose a methodology that they call "Middle-out". This methodology is a smart combination of the bottom-up and the top-down strategies and is proposed to develop more efficient governance.

A similar approach that is trying to merge top-down proposals with bottom-up priorities is taken in another study by Fredericks et al. (2015), but in a more practical way. The paper presents three different set-ups of digital stands that 'pop-up' in some busy area of the city to inform and facilitate the interaction with passing-by citizens. The objective of pop-ups is to change the nature of a place to surprise, stimulate and create public awareness. Results (from 7% to 30% of people noticing the pop-up) show the difficulty to capture the attention of citizens, proposing the interesting concept of 'time poor citizens' as a source of failure. To improve the attractiveness of the pop-up it seems relevant to have personnel on the stand. Also, the outfit of the persons shall be in accordance with the event where the pop-up is set.

The methods listed here may refer to either the process of engagement, but also to the context of preparation and infrastructure set up that facilitates the engagement. In this concluding section of this chapter on the engagement and involvement of urban communities in DM, we will refer to some concrete recommended steps that can help in the process of citizen engagement. Unless stated otherwise, the following paragraphs refer to Geekiyanage et al. (2020).

As the first step, a regulatory framework must exist to set the necessary participation split. This includes laws that protect freedom of expression, association, and assembly, as well as laws that require public consultation and public participation in governance to become the basis for the inclusion, with provisions governing the relation between public authorities and citizens directly involved in governance issues. For instance, propose a representative participation of all citizens, with correct balance between different profiles and without any exclusion. Techniques to address this representation are named as quantitative participatory methods (Gaillard et al., 2016). In addition, the regulation shall address the barriers for some

representatives to skip their duties, by giving permits from work, facilitating familiar conciliation with support for children or elder care or by paying allowances for the involvement.

The participatory process is always a long process. The planning of a participatory decision needs to be done with high anticipation. The planning shall organise the necessary participatory work, with several iterations of meetings and work rounds as necessary till converging the different views in a common solution. Realistic targets shall be kept in mind when reaching consensus across diversity. The budget is also a very important part of the planning, limiting the result to tangible and achievable goals. Participatory budgeting is a well-defined process that has showed good results in the literature.

In this sense the preparation of each consultation and participation process needs to be carefully prepared. Community work needs to be correctly publicised and informed, with materials distributed in advance to expedite the meeting time, language shall be free of technicism or other jargon but available in braille and minoritarian languages, etc. Also, the timing of the events, the childcare provision, wheelchair access and transport, etc. are necessary. The place for the meetings shall be relaxing, creating a familiar atmosphere that helps in the long process of decision taking.

The participation of decision makers and experts on the area in the community work is basic to obtain the necessary outcomes. Without the involvement of the relevant persons that have the obligations on the final execution, the process will not be seen as valuable by the community participants. Supporting a network of social workers, well trained in community engagement dynamics and with knowledge of the diversity of the area is also very important for the success of the community engagement activities.

At the same time, the discussions, alternatives and decisions of the participatory process shall reach the whole community, again using plain language and providing transparent access to any documentation used during the process. Proposed means for reaching the public shall lean on the use of modern technologies, such as social media and other online platforms.

Setting key indicators to evaluate the suggestions raised from the community is important to assess the public satisfaction, the functional/technical improvement of a proposal and the community empowerment in the development, maintenance and long-term care of the proposed assets. Again, the use of technology, such as using data analytics processing, are suggested to improve the assessment process.

Further use of technology includes the creation of models able to anticipate the outcomes of different options. These models may also help making the planning process more accessible, user-friendly and relevant. Models shall incorporate information about costs and can be useful to provide a clear community mapping, i.e., specialised methods for graphically representing different perspectives. Models can also include systems dynamics, a promissory public involvement method that uses causal loop diagrams to capture the views and ideas of the stakeholders (Király & Miskolczi, 2019).

Finally, structured intervention are activities that promote awareness, enable the community to ensure preparedness and enhance the understanding of participatory initiatives.

3. REQUIREMENTS FOR COMMUNITY PARTICIPATION IN PANTHEON

In this chapter, some specifics for the PANTHEON project are discussed. For this, previously completed reports concerning the contextual framework of PANTHEON were analysed with regards to community engagement. At the beginning, a brief overview of existing platforms and policies in the focus areas that are utilizing community engagement is given. After looking at the role of community participation in connection to specific hazards identified as important for PANTHEON, insights into the engagement of vulnerable groups are presented.

3.1 EXISTING PLATFORMS AND POLICIES IN THE FOCUS AREAS

The use of various tools in CBDRM and emergency response in Attica and Ile de France demonstrates a comprehensive approach to addressing risks and promoting resilience. These tools are designed to support decision-making, enhance coordination, improve information sharing, and engage the community in disaster management efforts. This part presents findings from *D2.1 Community based DRM analysis and regional ecosystems* that are relevant for D2.5.

3.1.1 EARLY WARNING FOR CITIZENS

- Civil Attica: Provides alerts, weather forecasts, and protection guidelines for extreme weather, wildfires, earthquakes, floods, and technological accidents in Attica. Offers evidence-based information from relevant authorities.
- Paris à la seconde: Offers real-time updates on incidents in Paris, including traffic conditions, weather forecasts, and pollution alerts. Utilizes a push alert system to provide citizens with general and localized information.

These initiatives demonstrate a proactive approach to disaster risk management, public safety, and community engagement in the focus areas.

3.1.2 EXISTING PLATFORMS

- ACTAREA: A tool that supports decision-making in CBDRM by providing maps and strengthening territorial cohesion. It involves stakeholders and complements existing structures.
- PUMA-X: Integrates various systems for first responders and agencies, offering real-time data processing and 3D maps. The platform improves response capabilities and urban civil protection planning.
- Predict: Platform that offers climate risk analysis tools and early warning alerts for hydrometeorological risks. It engages stakeholders and supports disaster risk management planning.
- Sahana Eden: An open-source platform tailored for CBDRM, it supports emergency coordination, volunteer management, and incident reporting. Its flexibility allows customization to meet specific needs.
- Open Foris: Provides tools for participatory mapping and data collection through satellite imagery. The collected data informs decision-making, risk assessment, and planning processes.
- Ushahidi: An open-source platform for crowdsourced data collection, visualization, and mapping. It improves situational awareness, collaboration, and data analysis.

- OSOCC: A platform that facilitates information sharing and coordination among disaster response professionals in real-time. It plays a role in coordinated coordination at local levels and integrates into national response planning.
- Copernicus Emergency Management Services (CEMS): Provides geospatial information and services, including rapid mapping and early warning systems, to support decision-making and response.

3.1.3 COMMUNITY-BASED PROJECTS

- C2IMPRESS Project: Aims to increase citizen awareness of multi-hazard risks through resilience frameworks, prediction models, early warning systems, and a decision support platform.
- FIRE-IN Project: Brings together stakeholders in disaster management to identify capability gaps, conduct research, and develop safety and security guidelines.
- MEDEA Project: Establishes a network of security practitioners to exchange knowledge and experience in incident management, focusing on interoperability and collaboration.
- BuildERS Project: Aims to enhance societal resilience against natural disasters, with a focus on vulnerable groups, through strategies, policies, and partnerships.

By leveraging technology, collaboration, and evidence-based information, these tools and projects contribute to informed decision-making, preparedness, and effective response.

Thus, the utilization of elements, innovative technologies and approaches of existing platforms and projects within the PANTHEON project will contribute to achieving the goals of the project: informing the society, involving the community in decision-making, participatory governance and increasing the resilience of communities during disasters in the focus areas.

3.2 APPROACHING IDENTIFIED HAZARDS

As stated previously, participatory governance "has come to be viewed as a necessary condition for promoting good governance" (Office of Policy Analysis, 2008) and this *good governance* is more critical when unexpected issues happen, like disasters, both in the prevention and in action once they have occurred.

The PANTHEON project has already identified some specific hazards that can cause different types of disasters and they are thoroughly analysed in deliverable *D2.2 Regional Multi-Hazards/risk data and assessment.* The deliverable identified some hazards depending on the source: geological, meteorological, hydrological and technological and within these categories, some specific risks have been studied in two specific regions: Athens and Paris.

The hazards identified in the previous activities are the following: Earthquakes, Floods, Heatwaves, technological hazards and terrorism. Taking into consideration the nature of the identified hazards, participatory governance at the level of prevention requires a sensibilization and education like for example the case of wildfires. Something different is the case for disaster preparedness which can be described as "The knowledge and capacities developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters" (UNDRR, 2017) and it is critical for disaster management. Thus, the strategies and procedures must be ready before the disaster occurs.

While contextual details of how to meaningfully implement participatory governance in the specific hazards approached with PANTHEON will need to be closely analysed once they are defined, an initial brief discussion highlights some different possibilities and concerns about the role of community engagement in managing some of the identified hazards:

- **Earthquakes**. Earthquakes not only have the potential to drastically devastate infrastructure in whole areas, they may also lead to large-scale blackouts and communication breakdowns while often coming with aftershocks that lead to persistent danger even after the initial dust settles. These aspects come with some specific implications for community engagement. For example, the re-establishment of communication should be highly prioritized during the response to earthquakes. This enables the communication of "[…] focused accurate information in their main language on how to stay safe and make critical decisions that impact their survival, coping, reunification and recovery" to affected people, who are the first to respond (CDAC, 2023 p. 2). Communication infrastructure is also crucial for the connection of affected with their loved ones and was therefore identified as major priority in earthquake response by the *Communicating with Disaster-Affected Communities* network (CDAC), in their learnings of the massive earthquake in Turkey and Syria in 2023 (ibid: p.3). Also, rumours were a common problem during the response phase to this disaster, which is suggested to be counteracted with active listening and two-way communication, implementing feedback opportunities and proactive conversation with the communities on site (ibid: p.6).
- **Floods**. In the case of floods, communities with zones identified as 'floodable' will need specific focus in the communication regarding preparedness, meaning that people living in those areas should receive increased measures of sensitisation and training, while being alerted during heavy rain episodes. A report of the Environment Agency of the United Kingdom Government indicates that high levels of community engagement with at risk communities for floods is needed, especially given the "process of changing the culture from flood defence to flood risk management" (Speller, 2005, p. 39). As part of this, it is highlighted that communicating the community specific risks has to be undertaken with much care, since "[…] it can heighten anxieties and feelings of helplessness, which in turn increase the need to blame someone", but have to address the 'state of denial' many at risk communities seem to be in (Speller, 2005, p. 41).
- **Heatwaves**. While the forecast of heatwaves in specific zones is possible with the current prediction models, it affects all members of affected communities. That said, dangers of vastly different degree and people with vulnerabilities towards dehydration, heat exhaustion and heat strokes should be of specific focus, when approaching this hazard. Next to awareness campaigns and the expansion of available spots of shade and water supply in public places, the *International Federation of Red Cross and Red Crescent Societies* (IFRC) promotes targeted assistance for the elderly, for example through outreach visits (IFRC, 2023). As a form of community engagement, measures like these visits may be implemented on a neighbourhood scale in time of extreme heat, strengthening ties of communities.
- **Technological hazards**. Within this category industrial accidents, transportation accidents, cyberattacks, chemical spills, etc. are included. Most of these hazards have to be addressed on an individual basis for each local community, since they are dependent on existing infrastructure. However, communities' individual risks may be used to specifically prepare their citizens for such at risk events. Though, the same carefulness in communicating and promoting preparedness for such region-specific risks has to be applied as with at risk of flood regions (Speller, 2005, p. 41).

- **Terrorism**. Even though some progress in new technologies for detection of CBRNe substances are implemented recently that can reduce the impact of terrorist attacks, terrorism was identified as one of the main threats of PANTHEON's focus regions and the identification of potential terrorists and terrorist acts is quite difficult for authorities for many reasons. While forms of participatory governance might serve as supporting factors for handling these issues by providing prompt communication of suspicious facts that can be implemented in the intelligent processing systems of authorities for early detection of potential terrorist acts, this has to be approached as a sensitive topic. Both the handling of false information and the creation of a culture of mistrust, specifically regarding minority groups, present issues that have to be addressed carefully. Therefore, the promising aspects of terrorist act prevention through government-initiated community engagement programs have to be analysed critically in anticipation in order to not create social tensions (cf. O'Toole et al., 2016).

As a summary, the efficient implementation of measures of DRR or DM before, during and after a disaster related to one of PANTHEON's identified hazards requires the active involvement of the respective communities. However, the ideal nature of engaging communities will have different strings attached for each of those hazards. An in-depth analysis of specific implications that the addressed hazards have on modes of community engagement should be done, before acting.

3.3 INVOLVING AND ADDRESSING VULNERABLE GROUPS

The identification of vulnerable groups and vulnerability and capacity factors in the focus regions Paris/France and Athens/Greece was covered in Task 2.3 (see *D2.3 Community vulnerability and capacity assessments*). Initially, relevant hazards for the two focus regions were identified in T2.2. The resulting list comprises Earthquakes, Volcanic Eruption, Tsunami, Landslide, Heatwave, Storm, Blizzard, Flood, Drought, Wildfire, Epidemics/ Pandemics, Technological accident, Cyber threat, CBRNe malicious act, and Terrorism attack. In T2.3, interviews and surveys were carried out with Community and Citizen stakeholders as well as DRM stakeholders. Additionally, vulnerability and capacity indicators (VCs) were devised to quantify vulnerability and capacity factors. Vulnerability is determined by physical, social, economic and environmental factors and is defined as the increase of susceptibility to the impacts of hazards (United Nations General Assembly, 2016). "Vulnerable groups" were defined in T2.3 as people with characteristics that put them at higher risk of injury, death, financial or other ruin during or after a disaster situation. Disasters often hit those people who are already in vulnerable situations, such as homeless people and people with disabilities, the hardest (Prieur, 2012). Capacity on the other hand describes the strengths, attributes and resources available to manage and reduce disaster risk and strengthen resilience (United Nations General Assembly, 2016).

Seven interviews and 39 filled out questionnaires were used to assess the view of experts from Paris/France and Athens/Greece on vulnerabilities. Respondents of both data collections did not indicate a significant gender effect on vulnerability. The most listed vulnerable groups were the elderly, people with mental or physical disorder/disability/illness, children, homeless people, people with low income, pregnant people, and migrants/refugees/asylum seekers. VC indicators were devised to include all mentioned vulnerabilities as well as additional factors identified through literature research. Twenty-one of the 50 resulting VC indicators were general vulnerability indicators, which relate mostly to social and economic factors, therefore covering

the vulnerable groups that should be involved in the participatory process. These general vulnerability indicators are the following:

Life-stage-related:

- Advanced age (the elderly, people over 65 years)
- Young age (children/minors)
- Family status (single parent families with minor children)

Health-related:

- Mental health (people with mental illness/disorders/disabilities)
- Physical health (people with physical illness/disorders/disabilities)
- Mobility (people with known mobility problems)
- Pregnancy (pregnant people)

Social connection-related:

- Migration background (migrants, refugees, asylum seekers)
- Language barriers (people without sufficient skills in the local language)
- Social isolation (people living alone, especially the elderly)

Resource-related:

- Financial resources (people with low income)
- Potentially affected agricultural areas (can be a potential threat for the livelihood of farmers and for food sources)
- Vegetation/ecosystem (Presence of especially vulnerable ecosystems/vegetation, nature reserves, might e.g. affect indigenous populations and the local wildlife)
- Potential job losses (increase vulnerability after a disaster)

Exposure and protection-related:

- Population density (people living in highly populated areas or overcrowded places)
- Increased exposure (e.g. healthcare workers, first responders, and those living nearest to the disaster)
- Homelessness (homeless people)
- Poor housing quality (people living in houses with insufficient regulations or bad building material)
- Special accommodations (e.g. people in prisons, homeless shelters, hospitals)

Knowledge and awareness-related:

- Lack of disaster awareness or disaster education (people with low disaster awareness or disaster education)
- Lack of familiarity with the environment/Local knowledge (people with low familiarity of the local environment, e.g. tourists)

Groups that fit more than one vulnerability category should be considered especially vulnerable. For instance, homeless people are additionally vulnerable because they may stay in homeless shelters or dilapidated buildings and have low income. Victims of domestic violence may stay in women's shelters, have small children, low income or a reduced social support network. Vulnerability should therefore be seen as intersectional (Chaplin et al., 2019).

Participants in activities as part of *D2.3 Community vulnerability and capacity assessments* were also asked about vulnerabilities after disasters. Pre-existing vulnerabilities, lack of support from authorities, and economic loss or poverty were identified as the factors that make people most vulnerable after a disaster. Participants further stated that rebuilding infrastructure is the action that helps people best to bounce back after a disaster, followed by building strong social ties in the community.

Fifteen capacity indicators were devised to summarize which factors make a community more resilient and helps to mitigate their vulnerabilities. Some of these capacity indicators also relate to vulnerable groups and should be kept in mind during the participatory process:

- Inclusion of vulnerable groups
- Capacity building of vulnerable groups
- Representation of vulnerable groups
- Confidence and initiatives taken by members of vulnerable groups
- Individual mobility
- Degree of social connectedness in the area
- Network of DRM and the community
- Enhancement of risk awareness

In PANTHEON T2.3, a common theme that emerged was the importance of education, trainings, (simulation) exercises and preparedness actions for capacity building among the community and especially among vulnerable groups. Interviewees stressed that training the locals in disaster management is particularly important to increase the capacities of a community, as they are usually the first who respond to a disaster. To better approach citizens for more effective community disaster management, it was recommended that the government and other agencies should improve their communication channels, and that local authorities such as mayors should be integrated stronger in the process, to enable a closer and more efficient network between DRM organisations and the community.

One of the most important steps in building capacities and empowering vulnerable groups is to ensure inclusion of members and representatives of these groups in disaster management. This helps to ensure that their needs are taken into account when planning for disasters while raising awareness and knowledge of the members of these vulnerable communities about disaster situations and utilizing their own capacities (Hilfinger Messias et al., 2012; IFRC, 2007; Pertiwi et al., 2019; Twigg, 2014; United Nations, 2015). The Sendai framework for Disaster Risk Reduction also emphasizes the importance of inclusion and active participation of vulnerable groups in disaster risk reduction (United Nations, 2015). Access to knowledge and proper communication is also a very important aspect which helps to increase capacities and lower vulnerabilities of vulnerable groups: warning messages that can be understood and received by everyone as well as inclusive disaster training are important factors to ensure this (Adams et al., 2019; Hansson et al., 2020).

In her influential paper on citizen participation in political decision making in the USA, Arnstein (1969) describes eight levels of participation, starting with forms that are actually nonparticipation (manipulation and therapy), followed by measures that according to her constitute tokenism rather than participation (informing, consultation, and placation), and finally leading to the levels that offer a real benefit as well as power and empowerment to the citizens involved (partnership, delegated power, and citizen control). These levels apply especially to vulnerable and marginalized groups in society, as they are in special need of meaningful representation and inclusion, and can also be applied to disaster risk management processes. Therefore, active participation of the community and the option to take part in decision-making is a crucial part of a proper participatory process. It may however be necessary due to certain restrictions in terms of time, access, or a lack of possibilities to include the community in a meaningful way within a project, to rely on less participative processes such as consulting. Inclusion and representation of vulnerable groups and the community as a whole can be done in multiple ways. Possible tools include focus groups, workshops, interviews, surveys and observations, and participation can be done on an individual- or household-level or also via representatives (IFRC, 2007).

When working with vulnerable groups, special methodologies may be warranted. For instance, children can be included in disaster risk management in the form of participatory mapping (identifying hazard-prone locations, vulnerabilities and capacities in the area) using child-friendly techniques: Traditionally, this can be done by letting children draw maps into the sand or on the ground and sketch mapping, while more modern solutions include mapping with drones, LEGO and Minecraft (Le Dé et al., 2020). Meyer et al. (2018) for instance incorporated high school students into their assessment of flood resilience in an urban area in the USA. The students were instructed in data collection and carried out surveys on standing water, took water samples and carried out household-survey in their area. They were also included in field trials where they tested a new mapping application. Student leaders who were already trained helped to facilitate the process. The participatory process culminated in the preparation of a plan for improving the neighbourhood which increased green space while strengthening the capability of stormwater detention and decreasing the number of unused parking lots. The United Nations Convention on the Rights of the Child (UNCRC) established that children have a right to participate in decision-processes that affect them (United Nations, 1989). However, those children and young people who face additional vulnerability factors, such as young people with mental or physical health issues or with a parent in prison, are often under-engaged in decision-making processes and require special initiatives for participation (Kelleher et al., 2014).

Vulnerable groups can also be included by consulting representatives. This may especially be warranted in larger areas such as cities where a great number of people must be assessed. Kirshen et al. (2018) for instance carried out a Supported Community Planning Process for flood adaptation plans for East Boston (USA), in which they included representatives of low- and middle-income residents. For this purpose, groups of neighbourhood-based delegates were invited to a number of workshops, at first only among themselves and the study team, and later in the form of multi-stakeholder workshops together with agencies, the City, other organisations, and the study team. In these workshops, the participants reviewed flood maps, identified vulnerable areas, and developed an adaptation strategy, including the construction of floodwalls with bike paths and walkways on top. Facilitators who were known and trusted by the delegates as well as translators were present during the workshops and supported them in their discussions. Technical facilitators were present to help with technical discussions. The authors note that the success of their project was partly owed

to the multi-stakeholder process, which gave the agencies and city officials access to the community in a non-threatening way, while at the same time allowing the community to engage directly with high-level representatives of agencies and the city – an opportunity which they were eager to use. Another group which should be included in disaster management processes is people with disabilities. Disability-inclusive DRR should involve including organisations of persons with disabilities in relevant committees and all levels of decision making, for instance as resource persons and mentor-trainers, as well as forming partnerships with these organisations. DRR which takes disabilities into account further includes the implementation of inclusive risk communication (e.g. broadcasting in sign language in case of an emergency) (Gvetadze & Pertiwi, 2022).

In *D2.3 Community vulnerability and capacity assessments*, interview partners and survey participants were asked about the sensitization of DRM organisations, special protocols concerning vulnerable groups, and the inclusion of representatives in DRM processes in Paris/France and Athens/Greece. Most respondents answered that they were not aware of any such measures being in place. Interviewees mentioned that special educational material is available online to reach specific vulnerable groups in terms of disaster education, and another interviewee mentioned that their educational material was designed with input from representatives of vulnerable groups. Survey participants stated that they provide training, information and education to vulnerable groups as well as primary health care, aid, and street work. According to responses from survey participants, representatives of vulnerable groups are rarely involved in disaster management plans, and the existing disaster management plans serve vulnerable groups rather badly. They further indicated that initiatives to reach vulnerable groups in terms of disaster education are only partly in place. Existing initiatives mostly target the elderly, people with mental or physical disorders/disabilities/illnesses, children and minors, homeless people, and migrants, refugees or asylum seekers. Some respondents mentioned the presence of disaster trainings in schools, targeting young people and students. This indicates that both representation of vulnerable groups in key decision processes as well as disaster education targeting these groups in particular are lacking in Paris and Athens. These are two important aspects, as they increase the capacities and decrease the vulnerabilities of otherwise vulnerable groups.

Geekiyanage et al. (2020) came to a similar conclusion in their literature review on the inclusion of vulnerable communities worldwide in disaster risk reduction (DRR) decision-making, stating that it is still largely lacking (see Chapter 2.2 Community-based disaster resilience: Gaps and challenges). Gvetadze and Pertiwi (2022) found a similar situation when looking at the inclusion of disabled persons in DRR processes in countries in Africa, Asia, and South/Central America. They found that although policies and legislations related to the inclusion of disabled people in DRR processes were increasingly introduced, the implementation of these policies was slow and uneven and largely initiated by NGOs instead of official bodies. Barriers preventing the direct representation of disabled people included: A lack of capacities of their organisations to be involved; socio-economic and cultural factors lowering their readiness to be involved; lack of awareness and commitment from key DRR stakeholders to disability inclusion; and lack of accessibility.

4. METHODOLOGICAL APPROACH

Following the presentation of the state-of-the-art of approaches to community engagement and participatory governance, the methodological approach of this report will discuss procedures as part of the literature research and analysis before presenting the empirical design, covering the development of both workshop and survey. The actual implementation of both methods as well as their limitations is discussed afterwards leading to the presentation of the analysis of collected data at the end of the chapter.

4.1 LITERATURE ANALYSIS

The state-of-the-art analysis was obtained from the contributions of all partners and involved providing a list of 34 papers. The literature search was conducted through universally recognised citation databases such as Scopus, Web of Science, Science Direct and Google Scholar. The keywords used were: <participatory>, <governance>, <community>, <distributed decision making>, <engagement>, <participate>, <inclusive>, <urban | local | regional>, <risk reduction>, <disaster management>. Filters were set to limit the years of the search from 2010 and sorted in decreasing order of year so the most recent papers were revised first.

The process of filtering the papers consisted of reading the title and partially the abstract of each paper. Special attention was given to select papers addressing disaster management in European regions, but since we found many papers on the topic based on Australia that proved to be very useful for our purposes, we decided to incorporate them into the list of papers as well. This process enabled us to find up-to-date papers on the topic. Upon the deep reading of the selected papers some additional references were added in our list. For instance, the United Nations Declaration on the Right to Development dated in 1986.

In the end we came up with a list of papers published from 1986 till 2023, with a high representation of papers from 2022 as shown in the following plot. **Figure 3** shows that the main papers are recent works and only older material found relevant for the present purpose was used as source of our state-of-the-art chapter.

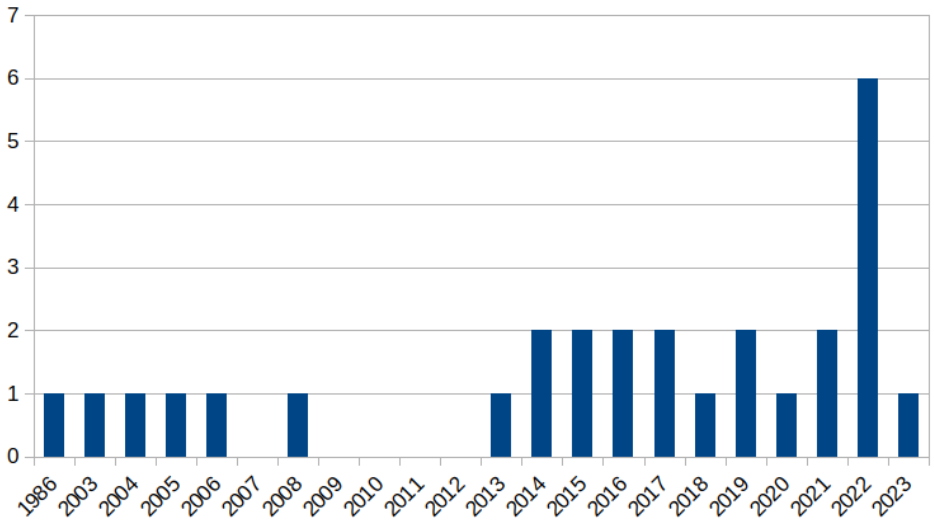


Figure 3: Publication dates of analysed literature for the state-of-the-art chapter

Finally, the list of source publications is quite extensive, with journals of the social science area such as Transactions on Ecology and the Environment, Australian Journal of Political Science, The International Journal of Community and Social Development or Journal of Urban Technology.

When revising the state-of-the-art chapters and for the other parts of this report, additional literature was added that was not included in the initial analysis and is not represented in **Figure 3**. However, all sources used are referred to within the text and are presented in chapter 7. Literature.

4.2 EMPIRICAL DESIGN

To get an insight into approaches and methods of community engagement and participatory governance in disaster management and disaster risk reduction applied for the focus regions and beyond, several exploratory empirical actions were applied. Those consisted of qualitative methods in the form of stakeholder workshops and a qualitative survey, which enabled participants and respondents to share and discuss their experiences. The specific design of these applied methods is discussed below. The focus of these actions was to collect and structurally analyse best practices and lessons learned from stakeholders, institutions and experts involved in community engagement processes concerning DM and DRR. The results of this analysis together with recommendations and advices derived from literature serve as the foundation for recommending participatory approaches to be applied as part of the PANTHEON participatory governance model.

4.2.1 WORKSHOP DESIGN

As core method for collecting data on approaches to community engagement and participatory governance, an online stakeholder workshop was developed.

The workshop was designed to be held online and in English, to make it most accessible for a broad spectrum of stakeholders. Although the focus areas (Athens/Paris) were considered and Greek and French stakeholders were the main recipients of the workshop invitations, the target group was defined as ‘European’. This broad scope enabled us to approach a bigger pool of stakeholders and helped to ensure participation.

The workshop was structured in two parts:

1. An interactive part using the browser-based collaboration tool ‘Conceptboard’, enabling participants to simultaneously write, comment and use markers on a shared online whiteboard. (see Appendix A: Community Engagement Workshop– Concept Board)
2. A group discussion guided via power point. Specific questions were displayed for all participants to see and input was noted on the slide during the discussion.

Foundation for the workshop design was the literature analysis covering the state-of-the-art of community engagement in DM and DRR. The workshop covered the following topics:

- Introduction and personal experience with participatory governance or community engagement in disaster management and disaster risk reduction
- Specific approaches and methods for the different phases of a disaster (Prevention/Preparedness, Response, Recovery)

- Best practices and lessons learned
- Recommendations on the degree of community participation in the different phases of a disaster
- Experiences and/or ideas regarding the inclusion of vulnerable groups in CBDRM
- Facilitating and hindering factors for community participation
- Ethical concerns and legal issues with community engagement
- Sustainable success of participatory governance approaches

4.2.2. SURVEY DESIGN

An online survey was developed as an approach to gain additional input on experiences in community engagement in DM and DRR, as well as to bridge several anticipated gaps of the workshop. Those gaps included the inaccessibility of the workshops for non-English speaking stakeholders, the limited reach of the workshops' participation possibilities due to restrictions in the practical implementation of the method itself and the limitation to participate for respondents due to time restrictions (some respondents could not participate at the proposed workshop dates).

Since the survey served as an exploratory tool to capture differentiated experiences with community participation, most of the questions were open-ended, to give respondents enough space to communicate their takes and approaches. While literature provided quite an array of possible ways and methods for community engagement to make closed-ended questions possible, multiple-choice questions were found to risk limiting the ability of respondents to express their own experiences. As a way to mitigate the potential risk of low response rates due to the open-ended nature of the questionnaire, the survey was developed as a short questionnaire (4 demographic, 1 closed-ended & 5 open-ended questions) and was estimated to take 10-15 minutes to complete.

The questions were developed after the conduction of the first stakeholder workshop and considered some discussions held there as well as gaps identified in the content generated. The survey was then reviewed and revised within the consortium and translated into Greek. It included the following questions:

- Demographic information: Organisation, Working region, Gender, Age
- Which representatives of the community did you work with? (closed-ended: NGOs; Local administration; Voluntary fire fighters; Other trained volunteers – please specify; Schools; Hospitals; Elderly homes; Vulnerable groups – please specify; other – please specify)
- Which approaches in community engagement do/did you use in the following phases of a disaster? - Prevention/Preparedness; Response; Recovery
- Can you explain which of the approaches of community engagement worked best and which did not, and why?
- From your experience, how does community involvement differ depending on the type of hazard?
- How can vulnerable groups (the elderly, children, homeless people, people with disabilities etc.) be engaged in disaster management?
- Which guidelines on how to safeguard the rights and accountabilities of community participants (both civilians and voluntary firefighters, NGOs…) do you know of?

For digitalization of the survey, the online survey platform LimeSurvey (Version 5.6.13+230327) was used. Respondents had the possibility to switch between English and Greek language in the final version of the

survey. An informed consent form had to be agreed on by all respondents in the beginning of the survey. (For a printable version of the survey as implemented in LimeSurvey see Appendix B: Printable version of the questionnaire as implemented in Limesurvey)

4.3 CONDUCTION AND LIMITATIONS

The target group for empirical approaches as part of this report was defined as people with experience in community engagement and participatory governance, ideally with a focus on disaster management or vulnerable groups. This target group included:

- Community administrations
- Emergency organisations
- Civil protection offices
- Experts in disaster management and/or community engagement
- Representatives of vulnerable groups

For both the workshop and the surveys, all partners of the consortium were approached to disseminate the invitation or provide contact details of representatives of the target groups in their respective networks (in accordance with GDPR – asking them for consent before providing the contact details). Further, the results of an online research for publicly available contacts for the previous Deliverables of PANTHEON was used to identify fitting contacts. Additionally, the invitation to the workshops was posted on the Crisis Management Innovation Network Europe (CMINE) platform, an online platform that aims to connect crisis management professionals in the EU and beyond.

For the survey, at least 40 people of the respective target group were personally contacted through email by different partners of the consortium. This led to a sample of five completed survey responses. For the workshops, a total of 48 stakeholders and experts were personally invited through email invitations. In two workshop sessions, a total of seven participants joined to share their expertise. All respondents of both the survey and the workshops gave their informed consent on the use of generated data (for the informed consent form, seeAppendix C: Informed Consent form used during data collection).

The workshops were conducted online, using the Zoom platform via the account of Johanniter Research and Innovation Centre (JOAFG). The workshop sessions lasted 2 hours each. They were recorded and subsequently transcribed for further analysis.

The chronological order of the data collection process ensured that the design of each step could benefit from the previous. For example, the survey could be used to look at specific issues that were identified during a workshop but could not be fully covered there.

Limitations regarding the informative level of collected data are prevalent for the following topics:

- Survey response rate: With five responses, very few people responded to the survey. On the one hand, this might be due to the target group which was very specific. On the other hand, the open-ended questions may have led to a discouraging effect in filling in the survey. However, the qualitative and explorative nature of the questions makes the responses useful for the report's purpose, although no statistical relevance can be given. The low number of responses to the survey

still has to be kept in mind when interpreting its results. Results of the one closed-ended question are not included in this report, due to the low number of responses.

- Regional specifics for the focus regions Athens & Paris: While experts from Greece and France were participating the workshops and responded to the survey, there was little focus given to specific regional aspects regarding Athens and Paris. While cultural differences and the relevance of the identification of regional specifics was discussed, attention was especially paid to best practices and experiences of participants. Further, a focus on regional specifics was seen to be more practical at a point where the actual neighbourhoods to be engaged in PANTHEON are identified. For now, the concluding participatory governance model may serve as more general recommendations on community engagement as part of CBDRM.
- Vulnerable groups: During the recruitment/invitation phase for the workshops, it proved to be difficult to reach representatives of vulnerable groups. Even though one expert on the engagement of vulnerable groups in disaster management participated in the second workshop and shared their insights and experiences, the extensive nature of this topic may need more focus when starting to narrow down on specific local communities to engage. As a compensation for this empirical limitation, chapter 4.3 Involving and addressing vulnerable groups provides not only a summary of the relevant aspects identified in D2.3, but also includes additional literature research specifically on how to engage vulnerable groups in all phases of a disaster.

Finally, it has to be stressed that empirical data collected for this report is exclusively qualitative and consists of input from a total of 12 experts in different fields connected with community engagement. While the diversity in professions might be of advantage by covering many perspectives, there is little to no room for identifying redundancies or different opinions within those professional perspectives.

4.4 ANALYSIS OF EMPIRICAL DATA

According to DeWalt & DeWalt (2011, p. 179), analysing interview material – and in our case workshop material – is primarily about summarizing large amounts of data into understandable information from which well-supported and well-argued conclusions can be drawn. "In other words, this is a process of reviewing, summarizing, cross-checking, looking for patterns, and drawing conclusions" (ibid.).

Regarding the reduction of data, the two workshops were first fully transcribed and then open-coded by assigning relevant text passages to the corresponding codes that were developed from the text material. According to DeWalt & DeWalt (2011, p. 183), this procedure can be described as a combination of indexing and coding, although these two processes cannot be clearly distinguished from each other: "In practice, both indexing and coding take place simultaneously and in similar ways [...]" (ibid.). By indexing the authors mean the use of theory-based, etic categories, which are related to the text. Indexing can be compared to the creation of descriptive codes, whereby text passages can be grouped into a category and roughly described. This is mainly used to quickly retrieve data for further analysis. Examples of categories created by indexing in this case are the categories "vulnerable groups" and "engagement of communities", which are based on theoretical implications and presuppositions. DeWalt and DeWalt (ibid.) refer to coding as the creation of emic categories, that is, categories obtained directly from the material, from which certain concepts and patterns can be derived. “For us ‘coding’ is more closely tied to the development of new theoretical

propositions, understanding of meanings, or patterns and ideas that emerge in the process of data analysis“ (ibid.). Categories obtained from the process of coding are, for example, "types of disasters" and "relationship communities/public institutions", which were derived directly from the existing material.

To arrive at a systematic presentation and a detailed description of community engagement in disaster management, which serves as the basis for the analysis, the text passages assigned to the respective categories were first paraphrased in accordance with qualitative content analysis according to Mayring (2002) in order to reduce the original text and to be able to identify initial connections and contradictions in the statements. Subsequently, the reduced text was arranged according to categories so that a certain structure could be filtered out of the existing data material. Concrete recommendations for participatory methods, which will be considered in the context of the PANTHEON participatory governance model, were derived by a recourse to already established methods (see chapters 2.3 and 2.4). This allowed that the text, which was summarized according to categories, could be assigned to different layers. Here, the focus was not yet on the interpretation of the data, but rather on its systematic representation, whereby DeWalt & DeWalt, (2011, p. 202) point out that the interpretation of data already begins during the research process, and the collection of data is inevitably implicitly interwoven with interpretation.

The explicit process of interpretation and verification, however, "[...] refers to the development of ideas about how things are patterned, how they fit together, what they mean and what causes them (description, interpretation, explanation), and then returning to the data to verify that those ideas are valid, given the data available" (ibid.). To be able to do this in the sense described here, after summarizing and structuring the workshops, theoretic literature was used to interpret specific parts of the text. Following the "bottom up strategy" of grounded theory (cf. Glaser et al., 1998), the theoretical approaches of participatory governance discussed above were used in the analysis in order to interpret the available data material and to identify certain patterns and correlations.

Given the qualitative nature of survey data collected, the analysis of these follows a similar pattern. For this approach the existing descriptive codes of workshop data analysis were used as categories to structure survey data, while staying open to establish new codes.

5. DISCUSSION OF FINDINGS ON COMMUNITY ENGAGEMENT

The state-of-the-art chapter has presented the different approaches to obtain the involvement of citizens with governmental stakeholders in the decision-making processes. This section tries to summarise the main findings of our empirical study on participatory governance and community engagement based on the state-of-the-art analysis above, before we move to giving concrete recommendations on how to inform, mobilize and involve citizens in all phases of the disaster management cycle actively and efficiently.

5.1 UNDERSTANDING THE FOCUS COMMUNITIES

Before starting the engagement processes, it is essential to understand the communities to be approached. Demographic, cultural, geographical and infrastructural aspects may have great influence on how to design participative governance. In the following part, some topics are discussed that were identified as relevant during the research.

5.1.1 DEFINITIONS/CONCEPTUALIZATION

What is meant by the term "community" can depend greatly on who you ask. During the workshop it became clear that the partners from France understood "community" as "citizens", while the Greek partners also included voluntary firefighters or parts of communities that are trained to respond to disasters as parts of "communities". One respondent from Greece said the following about the topic:

> "The way we conceptualize things is rather important. Because when I replied about communities, the way we conceptualize communities when we talk about response in Greece, it's not with the literal meaning. […] If you have a community of 10,000 people, we don't really mean that 10,000 people will be involved in the response phase. Rather, you use representatives or volunteers from the community. So, for example, if we use a hundred volunteer fire fighters from a local community, we actually believe that the community itself was involved in the response phase. It does not have to be every single member of the community involved in the response phase […]. A very popular and very effective tool that we use is the voluntary fire fighters. So, this people will be involved in the response phase, they will fight the fire next to the regular fire fighters, or they will work on less dangerous fronts of the fire – that's up to the local commander to decide. But these people are coming from the community, so we actually believe that the community itself is involved in the response phase although the majority of the community most likely will have evacuated the area."

Meanwhile, a respondent from France said that "in France, voluntary fire fighters or other voluntary first responders are considered to be part of the official response forces and are not considered to be part of the community." This differences in perception of who belongs to a community and who does not may be due to the fact that the term "community" is often used in a self-explanatory manner without further reflecting on what actually characterizes a group of people as a community (see chapter 2.1). That makes it clear once again that for our purposes at hand, a common language and uniform understanding of terms is necessary, which is why we provided some definitions of key terms in chapter 2.1 Key concepts.

Since participatory work with communities includes people with heterogenous cultural and professional backgrounds, it is crucial to define and discuss terms to find a common understanding that enables effective collaboration.

5.1.2 DIFFERENCES BETWEEN RURAL AND URBAN AREAS REGARDING COMMUNITY ENGAGEMENT

Depending on the kind of community, certain issues might arise and different engagement tactics may be necessary. One particularly stark difference is that between rural and urban communities. One respondent from Greece said:

> "Mostly throughout the last couple of decades my experience is with communities living in urban areas, and the problem with urban areas is that you have a lot of heterogeneity, you don't have a homogeneous population and it's very difficult to distinguish between different communities the same way you do in a rural area for example or in smaller communities like villages, mountainous areas or other areas that are less populated. And this is a huge challenge for first responders."

This heterogeneity and the sheer size of the population in a large city can lead to challenges in community engagement. The respondent stated that in Athens, including a good sample of the population in training exercises is challenging for the police, so in most cases they try to make them as interdisciplinary as possible, involving as many stakeholders as possible. They further pointed out that the community representatives in these cases are often not really representative of the population, as the community is very diverse in big cities. Another workshop participant also brought up the matter of subgroups in urban communities. They highlighted that language barriers often pose a problem when trying to communicate with small communities and language minority-communities within a city. They pointed out that it is important to engage with these communities as well, but taking into consideration the languages they speak. The participant also emphasized that "we should also consider the fact that we are talking to […] traumatized people, who don't have the level of consciousness or clarity and stability that we usually have in a peaceful situation, I think. The psychological factor is important too in this context."

Another respondent pointed out that although challenges exist in urban areas regarding the response phase, these problems are not as severe when it comes to the preparedness phase. They further said:

> "In an urban area it is very difficult to be able to have sustainability plans for every single neighbourhood or every single urban community. The population is heterogeneous, so there is no homogeneity […]. So, we found it easier, especially for my colleagues who work in rural areas, it's easier to connect with the communities. It always gets down to the community policing as we call it, the relationship between the police and the community is extremely important, to engage communities. And this connection - I am only talking about the police right now, other stakeholders might find it easier, but in urban areas this connection is less profound and is way weaker, it is not as strong as it is in rural areas. So, we try to work on it."

A related topic is the level of engagement, of which one respondent thought that there were "big differences between rural areas and cities, especially because of the quantity of people who live in cities. The level of engagement of the people in cities is also completely different from rural areas."

In general, the workshop participants highlighted factors that make community engagement apparently easier in rural areas than in urban areas. One participant also shared their belief that rural communities are generally more competent and knowledgeable when dealing with disasters: "Sometimes rural communities have a better response to disasters than urban communities, because they have something like an inherited knowledge on how to deal with disasters and how to recover from them. It's a completely different world of

competences and knowledge." Another respondent stated a similar belief, attributing rural communities' apparent advantage when dealing with disasters to their comparably harder lives: "In rural areas, people are usually having a hard life in comparison with the standard of living in cities. Even in situations of emergencies, for a lot of urban people to walk 4 km seems to be asking too much, whereas for rural people, this is usually not a problem."

Another participant pointed out the difficulties when operating in a big city. They stated that handling the whole city is not possible, so response teams must be connected to smaller parts of the city. "First, because this is what you know more or less, if you know nothing about the surrounding ecosystem, especially from the geographic point of view, where you have to go, where is the safe place, where is the place of the civic centre, the school, I mean everything is usually linked with the public, so you have to work in really small units of the city if you want to have any success about that." This highlights the difficulties that are faced by emergency responders when they have to work in a large, complex area – in disaster situations it is important to have detailed information about the area you are operating in, such as where elderly people live, which houses have elevators, and where the next hospital is.

It is evident that there are certain problems when trying to engage an urban community. The large population size and the heterogeneity of the community make it very difficult to engage a representative sample of the population. Because it is assumed by our respondents that urban communities often have a weaker relationship with authorities than those in the countryside, it seems especially important in cities to ensure a good collaboration between community and authorities and to strengthen trust in authorities, such as emergency response teams, police, and decision makers (more details on this topic can be found in Chapter Building/enhancing trust in public institutions). Respondents also pointed out that rural communities tend to have inherent knowledge on how to deal with disasters which is often lacking in urban areas, and we therefore recommend offering education on these topics, especially in the cities. Lack of social ties and local knowledge as well as difficulties to approach the 'whole community' may be approached by working with small-scale communities like neighbourhoods, sports clubs or cultural centres.

5.1.3 EXISTING AND POSSIBLE RISKS, VULNERABILITIES AND CAPACITIES

One respondent pointed out that the decision on whom to involve highly depends on the type of hazard. For instance, when working with areas at high risk for wildfires, "we involve the local communities, you know for example the local mayor, the local law enforcement, fire service, and also representatives from the communities". They stated that especially fires affecting tall buildings or wildfires can be a challenge for emergency responders in terms of deciding on prioritization. They also highlighted how local knowledge can be especially useful in the case of a wildfire, as local people have knowledge of the area and the local weather which sometimes external experts may be lacking.

Concerning capacities, one respondent pointed out that it is important to know the community and its capabilities. They listed as examples knowing who the retired firefighters and who the volunteer firefighters are, who the companies and factories belong to and who has responsibilities in these facilities, who has been in the army, whether companies have emergency plans, who the nurses and doctors are and who in the community already has experience with disasters. These are people who have emergency training and experience and who can be especially useful in emergency situations.

We recommend creating guidelines for community engagement that are specific to the hazards at hand, and collecting information about the inherent capacities of a community, so that people who already have

expertise in relevant areas can be optimally engaged and utilized in DRM processes. PANTHEON could implement a platform, where relevant professions and expertise within a local community can be registered. These people may help in developing plans, be community facilitators and could be used as local points of contact/civil coordinators.

5.2 ESTABLISHING RELATIONSHIPS

After understanding the individual features of a community, the actual engagement process can be started. For this, relationships must be established by approaching local networks and facilitators. This process serves as foundation for successful mobilization for participation and implementation of CBDRM programs.

5.2.1 BUILDING/ENHANCING TRUST IN PUBLIC INSTITUTIONS

As our discussions with different experts in the field of participatory governance/community engagement in DM have clearly shown, the relationship between the community and the authorities is extremely important for ensuring the efficient operation of the disaster management and the safety of the community. A workshop participant recalled an incident in Greece where a lack of coordination caused many preventable deaths:

> "Although I did not have immediate involvement from the beginning, I arrived at that place three days after a wildfire broke out in 2007. We had a huge wildfire in western Greece, in western Peloponnese that lasted about one week or so. Over there, there was an absolute lack of coordination between first responders and the local communities – people would literally hide in their houses so that the police would not find them. And although there was a wildfire only 200 meters away, they would hide and refuse to evacuate their houses. They insisted in staying there and some of them unfortunately were burnt alive because of this lack of communication. The police did not know who was where, they had no idea, first responders had no information on who had already been evacuated and this resulted in a really high toll, I think more than 80 people were burnt alive during that wildfire, and I think some of them could have been saved if there was a mechanism in place where the community would be actually involved in the response phase. And there was an absolute lack of community engagement."

The respondent further mentioned an example of what effective collaboration can look like, recalling an incident where the mayor sent civilian groups on patrol to identify areas of potential risk for loss of lives and property. This was implemented by installing a liaison officer as an intermediary between police and community (in this case the mayor). The civilian patrols would communicate to the mayor and the mayor was in direct contact with the liaison officer from the police, who were in charge of initiating evacuations. On the other hand, the respondent also stated that initiatives that are led by the community need collaboration with state agencies to be successful, as otherwise they can have "disastrous consequences". This may especially refer to the response phase, as grassroot initiatives e.g., in the recovery phase are often successful even without interference of official bodies, as the respondent recalled at another point during the workshop.

Another participant offered an explanation on why people may lack trust in authorities and prefer to rely on information circulating within their own community and choose to trust other community members instead, even though they may lack the required knowledge and expertise: The participant believed that this is partly due to the institutions not knowing how to engage with and communicate with the community, and partly

because people have had bad experiences with institutions in the past. They recalled an incident in L'Aquila in Italy, where after an earthquake the institutions did not give proper support to the people and told them to go back to their homes right after the earthquake. A second earthquake hit a few hours later, "which was devastating", eroding the people's trust in the institutions and shifting the trust to their own communities. The respondent also pointed out that neighbours are much closer to affected people than civil protection. Lastly, they stated that "the way communities communicate within them is much more effective, than the way institutions communicate with the citizens." They stressed that increasing faith in institutions is crucial, as this increases the likelihood that people will adhere to their plans and instructions.

We therefore recommend ensuring that efficient communication is possible between the authorities and the community and strengthening the community's trust in the institutions. This may involve installing liaison officers who can serve as intermediaries between the community and the authorities or emergency response teams. Liaison officers may be recruited from trained individuals (doctors, nurses, fireman etc.), who live in the addressed neighbourhoods (see 5.1.3).

5.2.2 DOING PHYSICAL MEETINGS

The workshop participants were asked about their opinions and recommendations on meetings with the community. One respondent recommended live meetings. They warned that it has to be expected that the people will also want to talk about other issues not necessarily related to the topic, as they do not often have the opportunity to bring their concerns about the community directly to the authorities or to people who they feel can implement changes. The participant recommended giving the participants the opportunity to do this for the first half of the meeting, after which the focus should be shifted to the actual topic at hand – disaster risk management. One should then explain to the participants the purpose and limitations of the meeting (e.g. "This is a consultation, we will probably not be able to follow exactly what you recommend, because there is previous work that has already established some possible measures to be taken, and certain regulations that establish certain responsibilities, but we are here to listen to you and hope to receive input from you about possible measures, hopefully giving us new ideas that we had not thought about before"). The respondent also warned to not expect a high rate of participation and said that 10% of the population of a quarter participating in such a meeting would already be a very good turnout. The respondent also underlined that those who participate are usually very committed members of the community, but also warned to expect a high number of elderly citizens as they tend to have more free time. The results of the meeting and the resulting recommendations should be presented to the authorities ("...a committee, usually have 4 or 5 people plus the president").

In the literature, a wide range of modes for physical meetings is presented that can be utilized depending on the phase in the engagement process, the hazards addressed and the degree of community participation aimed at. These range from community meetings with the goal to share information among their members all the way to community-led assemblies with decision-making power and the support of community-initiated grass-root movements. Different degrees of participation that may be implemented during physical meetings, as well as their benefits and disadvantages according to literature are described in chapter 2.3.

We follow the recommendation of the workshop participant and suggest organizing physical meetings with the community. In these meetings, citizens and other community members as well as authorities and disaster risk management personnel should be able to get together and discuss topics regarding disaster management, but they should also give the community the opportunity to discuss other topics which they might find important (for around half an hour at the beginning of the meeting).

5.2.3. CULTURAL AWARENESS IN COMMUNITY ENGAGEMENT

Participants offered their opinions on the role of cultural awareness for establishing relationships. One respondent stated that cultural awareness may be very important, especially when dealing with immigrant or refugee communities, "because you have communities with different religious or cultural backgrounds, so in certain religions for instance the role for sexes is not the same, for example men and women can be treated differently, or engaging men or women in certain activities can be forbidden or is not encouraged by the religion, so you need to be culturally aware of how to approach people and of how to talk to people, whether you can enter a person's home uninvited, whether you can address them uninvited, …" Not being aware of cultural norms may therefore lead to uncomfortable situations and certain behaviour might even be seen as rude or unacceptable, hindering efforts of community engagement in the area or the group. The respondent further recommended that the authorities should be trained accordingly, stating:

> "They should know how to address and how to approach communities, especially if they want the communities to be engaged. Otherwise you can endorse a very cynical approach and say "I don't want the communities to be engaged, I don't care." But if you want them to be engaged, you have to know them, you have to know specific sensitivities, their differences, their cultural or religious background, all of this are very important. Otherwise it would be very easy to help them feel more alienated and isolated and you know, distance themselves even more from the authorities."

The respondent further talked about the difficulty of dealing with refugees and migrants who have questionable legal status, recalling an incident where "during an evacuation, there was a great danger for people and we had to evacuate. And we identified 50 people who had no right to remain in the country, they didn't have documents. So, what do you do in that case? Do you arrest them, do you evacuate them, […] do you detain them?". Another participant mentioned the issue of language barriers that arises when dealing with immigrant communities: "Now with the huge influx of refugees, there is also a language barrier which can affect participation of certain communities. It is not intentional, it is just that they don't understand. You have to be able to reach out to every single community, even people speaking different languages. So, you have to make sure you have enough people or personnel who can speak foreign languages so they can talk to people and engage them in the process, whether you need to engage them in the preparedness or in the response phase, but you have to have people who are able to talk the language of other people to understand them." This reiterates a topic that the workshop participants brought up multiple times, namely that effective communication is key when attempting community engagement.

It is also important to be aware of regional differences in mentality. Several participants offered their views on this topic concerning certain regions in Europe: One respondent described the mentality in Southern Europe as a belief of "It will never happen to me", ... "and if it happens, I will manage", referring to disasters. Another said about the situation in Greece that, while many are "reluctant about the situation of the official state to manage disasters", the population is heavily dependent on them. They therefore suggested empowering the population through education, making them less dependent on the state. A third respondent described social media use and social networks in Italy, stating that social/community networks are very strong and rooted in tradition in Italy, therefore fewer people rely on Facebook or other social media. They believed that it is mostly the young people who use social media. Another participant mentioned how

culture can be a hindering factor for community engagement, speaking of Greece being "…the last country in Europe with the lowest percentage of people who participate in voluntary organizations, people who donate blood, people who recycle, so there is a lack of awareness in terms of volunteering."

We therefore recommend informing oneself thoroughly of the culture of the people one is trying to engage, making sure that all parties can communicate efficiently with each other in terms of language and communication channels, and setting up best practice rules for dealing with persons and groups with unclarified legal status.

5.3 INFORMING, MOBILIZING AND INVOLVING COMMUNITIES IN DRM

In general, the participants stressed the importance of community engagement as a valuable resource in DM. One respondent highlighted that especially in the future it will not be enough to rely on the experts, stating: "The community must be involved, that is clear. We cannot face the next 20 years ahead of us when the community is not strongly involved (in DM), […] because I think that we don't have the capacity – first we don't have the finances for that. We can see that all the risks, [for instance] wildfires, [that] is something that is not going to decrease but to increase in the next years, if you look at the current storms and floods, and I think the community must be involved from the beginning." Yet, in order to integrate communities into DM, they must be properly trained and take part in regular exercises. The respondent said: "I think it is one of the most important political investments to involve communities in disaster management and communities must find time to be present." The participant further expressed their strong belief that changes have to happen on a political level, saying that a strong political will is needed on a European level to more strongly engage communities. Community engagement is urgently needed, because "we will not be able to face the future [challenges] only with our different associations and professional rescuers."

Community engagement and participation does not only have advantages in terms of workforce, but it also has benefits for the community itself. One participant highlighted the desire of citizens to be involved in decision-making regarding which problems are tackled by the institutions. They also criticized that most of the current approaches that use participatory governance/citizen engagement usually end up in telling people what to do. Another participant mentioned the importance of community involvement in raising awareness and knowledge within a community, saying "What we have learned in [the EU-project] FireIn is that we have to negotiate the values with the communities before an emergency." The participant expressed their belief that very often, citizens do not understand why responders make certain decisions during an emergency, but these decisions may have a long-term impact on their lives. Thus, citizens should be involved in negotiations so that they understand which risks may arise and why certain decisions are made. The installation of more early alert systems could also help to enhance the response to and resolution of emergencies. Basically, citizens and first responders should talk more to better understand each other's actions and decisions.

One participant stated that changing the general focus from only informing the people to actively engaging them is key, especially in the prevention phase. They said that the current strategy of only informing the people of what they should do ignores the psychological aspect, which potentially leads to adverse outcomes while the authorities believe to be off the hook because they supposedly did their duty by instructing the citizens.

On the topic of how community engagement should be done, one respondent said "… education is the first thing that comes to mind because it's regulated by the government or the state. But maybe an extension of this to the private sector would also make sense, for example awareness about this in large companies and […] parts of community that a mayor regulates."

Another participant recommended working with small, local units, taking into consideration that when a disaster happens, people will have immediate contact with those living near them and will be able to group up with them. They also recommended utilizing structures that are already in place, such as locally organized groups (football teams, neighbourhood associations) or spaces for communication (e.g. a cultural centre). The organizers and people involved can be enlisted in cases of disaster, as they "have a lot of knowledge not only about the topic but they also know much better how to communicate", especially with the local community.

The respondent further pointed out that every community includes people who are already involved as volunteers and have therefore already shown their commitment, meaning "they will probably be the first ones to react, to try to organize, to be sensible if the public administration talks to them". They also mentioned that people who already have experience with managing or leading an organization will be well equipped to also be community leaders in a disaster situation. The respondent pointed out that "if you say that you are a doctor, you are a fireman, probably they [people in the community] will follow you easily", and their respect and prominence in the community will help to attract other people who can help. They recommended utilizing local festivities for playful disaster education or similar interventions, and to ask community members about opportunities like these and about how best to reach the community in terms of disaster education. They described the risk of what they call a "parachute attitude", wherein a lack of planning on how to approach the community might lead to opportunists abusing the effort for their own benefit, such as political popularity or financial gains.

In accordance with the respondents, Linnell (2013) also argues that established networks like families, workplaces, clubs, organisations and church congregations could and should be considered and engaged as relevant actors for emergency and disaster management. Emergency plans are also recommended to be developed in collaboration with such actors of affected communities by Beldyga (2022). However, Stark and Taylor (2014) argue that control over crisis management and their resources should remain on the lowest level of government, while building localized crisis-management units with close ties to the community, as part of what they call a 'community decentralization model'.

According to the experts community engagement will be crucial in the future to tackle the challenges that lie ahead. Our recommendations are to focus on training the public and offering regular exercises to make sure that communities know how to behave in disaster situations and to enable them to participate in DRM processes. Disaster education could be done in schools, by companies, or offered at local festivities or other events. Communities themselves can be asked about the best way to reach them, as they may often have valuable insight on opportunities that can be utilized. This may also involve actions on a political level, especially by local political figures such as the mayor. What is important is that there is a plan on how to engage the public and involve them more strongly in DRM processes. Communities should not only be taught and trained, but they have to be included in decision making processes and the development of emergency plans as well, enabling them to play an active part in the DRM in their region (especially in the preparedness and recovery phases, see next subchapters). This involves a more efficient communication between citizens/locals and first responders. An important suggestion is that of engaging smaller, more local groups,

and utilizing structures that are already in place such as local neighbourhood associations. Similarly, already existing skillsets should be utilized, e.g. doctors and firefighters can be used as community leaders.

Depending on the phase of disaster risk management, community engagement can be more or less helpful, and different methods may be required to engage the public.

5.3.1 COMMUNITY ENGAGEMENT IN THE PREPAREDNESS PHASE

Several participants stressed the importance of collaborating with the community in the preparedness phase. One stated that "Citizens are part of the solution (response) when they adapt to what they have learned in the preparedness phase, for instance not taking bad decisions and listening to the orders of the responsible authorities." Another said, similarly: "When I speak of the community as citizens – they have to follow the orders that they receive. For that they must be able to understand what's happening, and for that they must be part of the preparedness." They agreed that including citizens in the preparedness phase by informing them about potential hazards is crucial to ensure their safety for when disasters strike. When talking about specific practices, one participant working for the police in Greece stated:

> "The police is not the main tool of preparedness in terms of civil protection, but we work together with other stakeholders and we heavily rely on exercises, either table top or real-life exercises. This is a lesson we learned from the Athens 2004 Olympic Games where – in terms of preparedness – exercises turned out to be a very useful tool. So, in this case when we use exercises, we narrow it down a little bit and we focus on specific communities."

Another participant talked about ensuring the safety of vulnerable groups, saying: "[…] especially for earthquakes, which is a major challenge for most Greek urban areas, we try to have as much organized preparation as possible by reaching out to vulnerable groups like elderly or homeless people for example."

The respondents also mentioned challenges, with one claiming that it is hard to engage the community in the preparedness phase and raise awareness because usually the community has other priorities than disaster preparedness. People tend to be involved in the newest event, like the war in Ukraine, and disasters only become relevant for most people when they actually occur and cause a disruption to everyday life. Preparedness is different for emergency services because they are working in the field, being constantly exposed to this topic, but they constitute a minority in society. Another respondent suggested utilizing existing programs to raise interest in disaster risk management in the preparedness phase, listing the Canadian and US-American programs FireWise (https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA) and FireSmart (https://firesmartcanada.ca/). These programs are about "how to be prepared and how to engage communities in preparedness for wildfire."

The focus of community engagement in the preparedness phase should lie on informing them of potential hazards and teaching them how to act when disasters occur, e.g. making good, safe decisions and listening to the orders of the responsible authorities. Available programs were highlighted, such as FireWise and FireSmart, but it was pointed out that community members might not be very motivated to participate in such programs, as the majority has other priorities. One way to ensure that some people within the community are prepared might be to offer programs in schools or other learning facilities such as universities, perhaps offering credits for successful completion.

5.3.2 COMMUNITY ENGAGEMENT IN THE RESPONSE PHASE

The workshop participants agreed that community engagement in the response phase is largely out of place. For instance, one respondent said that the response phase "is not the right place for the community", and that the focus for community engagement should lie in the preparedness and recovery phase. A participant from the Hellenic police in Greece stated that their position on the engagement of untrained citizens in the response phase is very clear: "unless you are specifically trained or designated to do a specific task, you have to evacuate the area." They further specified that it is crucial for emergency responders and the community to collaborate in this phase but stated that for instance community-led approaches in this phase are not very successful in their experience. They recalled the 2007 wildfires in Southern Europe, where due to the large area affected by the fires and a lack of resources provided by the states, some local communities had to step up and lead the response. They stated that "... they had no other option, and the results were not really successful". Other respondents shared their opinion that "in the response phase, it should be about informing the community, like informing them about how to best evacuate, how to best get away, keep updated with the situation." One specified that informing the community in the response phase is especially important because "…the community is much more confused about what happened, and what is going to happen and it is the phase when the community is seeking for answers and they have much more questions because they are not aware."

One respondent specified why it is impossible to engage the population fully in the response phase in the field, saying it is because they lack the training for that. Community members with training from the preparedness phase may be able to assist in the response phase, but most of the work has to be done by responders who are trained specifically for this. They further stated that "People can help but when you are in an emergency phase that is very difficult to fight, you cannot ask the population to be a part of it."

The respondent from the Hellenic police recalled their experience with a wildfire. The respondent recalled that due to difficulties understanding where to reply and respond first, the police engaged the community in the response phase, and volunteers and members of the local community would "…help the police and identify areas where people were trapped or stranded so the police would respond by sending forces there to evacuate people. So, it was a very important role in terms of saving people's lives. At the end of the day, it was about making sure nobody would be left behind, nobody would be left trapped in a house, … because it was a very difficult situation." Another participant described the difficult position of the authorities in the response phase, who oversee the reaction to the disaster but should simultaneously inform the public on how to act.

The workshop participants agreed that community members should be informed rather than involved in the response phase, as they lack the proper training for such dangerous situations. In this phase, it is important to collaborate with the community to ensure their safety, e.g. by evacuating and informing them. Community members with special training can assist in the response phase, and in special situations community members can help to identify places where people might be trapped or stranded, but the focus of community engagement should lie in the preparedness and recovery phase.

5.3.3 COMMUNITY ENGAGEMENT IN THE RECOVERY PHASE

A respondent said of the recovery phase: "[It is] unfortunately, very unpleasant, because you have to deal with trauma, you have to deal with disaster, with loss of lives..." Several respondents stated that working with the community in this phase is crucial, that the community should be consulted or collaborated with

and that they should be more included than in the response phase. One person specified that decisions about recovery efforts, such as replanting trees, should be made by the authorities and the community together, for which participation is needed. They also highlighted that mechanisms of collaboration have to be established before a disaster happens and not afterwards. Another respondent pointed out that the awareness and capacity of the community is at its highest level during the recovery phase, "where the community actually has in mind what happened, what's going on and what's the best to do."

One participant claimed that unfortunately in Greece, the focus tends to be on the preparedness and response phases instead of the recovery phase. They believed that due to the rise in numbers of disasters, community engagement in this phase is becoming more and more important. The participant emphasized that community engagement should be a priority, "the engagement and collaboration with communities by state services, by government stakeholders, even by the local administration". It should be interdisciplinary, potentially with planning from the central government, civil protection, or the community itself. They also recalled grassroot-movements in the recovery phase which "did a really good job, even without any state assistance." They further stated that consultations with the community are likely to lead to better outcomes for the community, as at the end of the day, it's them that are the most affected by a disaster.

Regarding methods of engagement in the recovery phase, one person stated their belief that the community should be more involved in this phase than the institutions, since the community members have a better understanding of what needs to be done to rebuild their community, and that a possible way to ensure their participation is meetings.

Community engagement in the recovery phase is very important, as it is here that the community can often bring in the most relevant knowledge and input, while decisions during recovery may affect the communities' future resilience and living environment. Engagement should be a joint effort of different official bodies, such as the central government and civil protection authorities, and the community, facilitated by meetings. The mechanism of collaboration should be established before a disaster happens, not as part of the recovery phase. Meetings may be a good way of ensuring participation, while citizen committees and forms of participatory budgeting might be installed for community-led decision making. This is also a phase where grassroot movements are often successful, so those should receive support by official bodies.

5.3.4 THE ENGAGEMENT OF INFORMAL VOLUNTEERS

One respondent referred to the importance and the value of local voluntary first responders like voluntary firefighters. He emphasized that the importance of engaging the community (again, voluntary fire fighters but also the local mayor) in DM was not recognized in Greece for a long time, but this has changed over the last years:

> "So now, if we're talking about today, there are certain bodies of volunteers within the communities, even in big cities like Athens, you have the fire service for example, you have a body of volunteers, firemen, firefighters who work on a local basis for the local fire service to respond wildfires especially in rural areas but also in Athens. Last year for example or a couple years of ago we had a really big wildfire in the suburbs of Athens, in the outskirts of Athens, very close to the centre, roughly 20km from downtown Athens we had a huge wildfire. And certain bits of the community contributed to that, the body of volunteer fire fighters, people who worked with the police, the local administration, the local mayor had assigned some patrolling duties too – like normal people, residents of the area […] so in terms of evacuation, these people would help the police and identify areas where people were trapped or stranded so the police would respond by sending forces there to evacuate

> people. So it was a very important role in terms of saving people's lives. At the end of the day it was about making sure nobody would be left behind, nobody would be left trapped in a house, … because it was a very difficult situation."

The respondent believed, on the other hand, that the engagement of spontaneous volunteers who are not specifically trained is very dangerous and not recommended. He also said that it depends a bit on the culture whether people will spontaneously engage in the response phase or let the authorities respond. He emphasized:

> "We really discourage this practice in Greece and we highly advise against such an approach. But in the past, we have had quite a few instances where people didn't really comply with this and they […] spontaneously ran into the fire to help, although nobody asked them to do that, and this can be dangerous both for them and for the trained fire fighters, for the first responders, it can create huge hazards and dangers for everybody."

This respondent therefore highlighted the importance of volunteers in the response phase, but also urged to not engage untrained volunteers in this phase, except perhaps for tasks that are safe, such as patrolling and helping to identify areas where people might be trapped. Another participant argued that the involvement of spontaneous volunteers makes more sense in the recovery phase, but during the response phase, nobody will have time to manage these citizens who decide to help but have no idea of what needs to be done, again highlighting the importance of education and training of the public in the preparedness phase. One participant stressed that spontaneous volunteers also need to be coordinated, which can be especially challenging in the recovery phase: "Also, after a disaster, lots of people would like to help, but don't know how to help. Usually, people tend to give away whatever they have. Like I send lots of clothes, I send a lot of diapers, or other things that are actually not needed, so they create problems because the actual helpers have to deal with all the stuff they do not need but they have no time to do so. For instance, when people donate second hands clothes that then have to be washed or take care of any hygienic issues. People in charge do not have time for that, so it would be better to receive new clothes, and social media could be used to coordinate the donation." Effective communication with the public about what kind of help is needed and why certain items may cause more work than help might improve this situation and make the organizing of these efforts more efficient. The participant also stressed the importance of communication, stating: "From my perspective, communication is extremely important, and of course, a successful communication channel would also have a lot of potential in engaging with volunteers on how to raise awareness and then engage people in volunteering acts, providing aid, and so on."

Concerning volunteering, the participants stated that focusing only on crisis education is not enough, but a focus should also lie in the volunteering aspect of education, because "at least in Greece […] we're not trained or haven't really adopted this participation logic and this volunteering logic, so sometimes it seems that [people believe that] someone else is going to do it for us." This respondent believes, however, that the involvement of volunteers in disaster management is becoming increasingly indispensable and thus stressed the importance of involving volunteers to increase the workforce in disaster management, in a world of climate change and the resulting rise in the number of disasters.

One participant encouraged that volunteering and awareness campaigns should be done for younger generations in order to motivate them to participate. It should be considered, though, that in the response phase, informal volunteers might be more of a hindrance than a help and may even put themselves and others in danger if they lack proper training. Another responder further suggested that "municipalities must

be partners and organize workshops with citizens so that citizens understand what different hazards there are and what can be occurring in the future."

For the case of Greece, it was emphasized that volunteering is not done as extensively as in other countries, and one respondent followed up on this: "This [ed.: volunteering] is another keyword I think, awareness campaigns are very important […]. Some people don't volunteer because they don't know how to do it and others because they have some prejudice." He encouraged that volunteering and awareness campaigns should be done for younger generations. A participant replied that people in Greece are even biased against volunteerism, "in particular, […] they don`t know what civil society organizations do. This is something bad, something awful and […] I believe that the biases are a concern and have to be properly considered." This highlights a need for awareness campaigns and again refers to an important factor in community engagement, citizen's trust in institutions.

When looking at the literature, Nahkur et al. (2022) reveal that disaster management systems in some European countries are slowly beginning to open their structures towards participation of informal volunteers, although only Sweden and Norway, countries with an established culture of volunteering, have regulations in place that enable the insurance of spontaneous volunteers. Since complexities of disasters increase, the authors argue for more specific plans on informal volunteer's engagement. Thus, proper ways for registering might be needed to be in place for them to fulfil more complex tasks, since one of the biggest risks and challenges identified was the incomplete overview of informal resources. Furthermore, the potential benefit of the help from digital volunteers, providing and sharing information on the internet, is big but may be limited by the risk of the provision of incorrect information (Nahkur et al., 2022, p. 11).

We recommend offering volunteering and awareness campaigns, not only but also for younger generations, to prevent prejudice against the institutions and promote volunteering, especially in areas where this is not a big part of the culture. Furthermore, if the community is to be more strongly involved in PANTHEON, it would also be a great use of the system to use it to coordinate volunteers, available resources and capacities within communities, donations, maybe even hospital bed capacities, etc.

5.3.5 TOOLS AND METHODS FOR COMMUNITY ENGAGEMENT

The workshop participants had several suggestions from their experiences with different tools and methods for community engagement. One person stated:

> "We extensively use social media and we have emergency hotlines where people can also call and report any suspicious events that are related with man-made or natural disasters. […] So I would say in terms of tools, social media and exercises are heavily used. Especially exercises, we try to do them as often as possible, either table top or real-life exercise and some of them take place in Athens, in urban areas, where challenges, as you can imagine, are more difficult to address."

The participant further pointed out that social media is an effective tool for connecting with and involving the community. They also talked of their own experience as a member of the police force, saying "…the police often issue special advice through social media or sometimes door to door. By using community policing techniques, we try to identify the more vulnerable sections of the population, people who find it difficult to respond to a natural disaster like an earthquake – people living alone. And through the local police stations we try to at least have some communication, some connection so to speak with people who are more vulnerable in the case of a natural disaster like an earthquake or wildfire in a neighbourhood, like a big fire."

The participant stated that they would suggest using the two methods mentioned before, social media and exercises. Social media can be used to mobilize people and raise risk awareness, sharing videos, and giving advice. In addition to this, real life exercises should be organized at least every six months, "with the involvement of real people of the community so they know first-hand what they should do in the case of fire". They also suggested nominating liaison officers to communicate with the first responders, stating: "Knowledge is the key here. Knowing what to do can save lives. Most of the time what I have seen in the aftermaths of natural disasters is that the lack of knowledge resulted in a higher death toll. [...] If people don't know how to respond to a natural disaster, the risk of losing their lives is increasing dramatically. So, I think the keyword here is knowledge."

In accordance with the participants, we recommend using social media as well as exercises to engage the community. Social media can be used to connect a community or to facilitate communication between the public and the first responders, it can be used to inform, mobilize and connect people.

5.3.5.1 Use of social media

As mentioned above, social media can be used to mobilize people and raise risk awareness, sharing videos, and giving advice. One participant suggested using social media to communicate what first responders are doing, and why they decide on a certain strategy. They claimed that distributing information via social media also helps to avoid panic behaviour from citizens during the response phase. The respondent also suggested using social media, special games or apps, at school to teach children potential hazards and threats, how to react to them, and how to behave if they occur.

Regarding the use of social media in different phases of disaster risk management, one person stated that social media is extremely flexible in that regard. This respondent also stressed the importance of institutionalized social media profiles because there is a lot of fake news out there. They are currently working on a Prevention and preparedness handbook, in the context of which they also had the idea to use social media to remind people to be prepared, e.g. in the form of a monthly reminder to prepare a supply kit at home. They stated that "I do remember, when I was a kid, we used to have that kind of exercises in school on how to have your own supply kits. But most of these supply kits are already extremely old. They say for instance to use radio, but we don't use radios anymore, we use cell phones."

Although social media can be a very useful resource in disaster management, some respondents also highlighted potential problems with them. One stated that "all these things require electricity, and usually in the case of a disaster, the first thing that fails is electricity." This makes social media an unreliable tool for communicating directly during or after a disaster, i.e. in the response phase. The respondent also remarked that social media can easily be used for fake news, which is a big danger because someone with bad intentions can really disturb the whole disaster management cycle. Social media may be particularly unreliable in the direct aftermath of a disaster. However, interest in the topic decreases after a disaster, and when too much time has passed since a disaster ("when one year, two years, three years have passed"), people are not susceptible to the topic anymore. Therefore, the ideal time to use social media according to the participant is one or two weeks after a disaster. They further highlighted the importance of physical social networks within a community, as not every person has social media, and it is difficult to reach everyone by only using digital devices.

Social media can therefore be used to inform the community in case of a disaster to prevent panic behaviour and to share instructions. However, this is only effective if all the necessary infrastructure, like electricity and internet, is still functioning. Therefore, alternative communication channels during response have to be in

place. Social media can also be used in the preparedness phase, especially when trying to reach younger generations, to teach them how to behave in a disaster situation or to remind people to keep an emergency supply kit at home. When using social media after a disaster, the ideal phase might be approximately one or two weeks after it happens. Institutionalized social media profiles could be used to spread information, to counter the spread of misinformation.

5.3.5.2 Use of exercises

As mentioned before, one participant suggested real life exercises to be organized at least every six months, "with the involvement of real people of the community so they know first-hand what they should do in the case of fire". On the topic of which parts of the community they involve in the exercises, the participant stated that this depends on the disaster at hand. For earthquakes for example, they – in that case the police – try to involve as many representatives as possible, such as people from the local administration, someone from the mayor's office, decision makers, people from community organizations, from sports clubs, young people, etc. "We try to do like a sample and use people that are as representative as possible of the local communities. And again this is easier in smaller communities, in smaller cities."

We follow the recommendation of the participant, suggesting organizing real life exercises every six months with the involvement of as many community members and as representative a sample as possible. Due to the difficulty of achieving this in a big city, we again recommend focusing on smaller areas and communities (e.g. districts or neighbourhoods), therefore breaking the task down into smaller parts.

5.3.5.3 Education and trainings at schools

A participant suggested focusing on schools for disaster education for children, "...teaching them what is a crisis, what are new risks and how you have to (address them)." They also suggested conducting exercises that are mandatory for all citizens, like in Japan. They believed that schools are the most important places for people to learn disaster preparedness, and outside of school, "we can organize once a year or once every two years a specific day for preparedness training for crises and how to be prepared for that." Another participant also highlighted the importance of educating children about disasters. They recalled the case of the 2004 earthquake in Indonesia, accompanied by a devastating tsunami with many fatalities. A 10-year-old girl from England alarmed the guests of a hotel to evacuate, as she recognized the warning signs of a tsunami which she learned in school. The participant therefore stated their belief including disasters within the education system would be very beneficial. A third respondent said:

> "I guess education is the first thing that comes to mind because it's regulated by the government or the state. But maybe an extension of this to the private sector would also make sense, for example awareness about this in companies, large companies and other classes of communities apart from you know, the parts of community that a mayor regulates. Like a big company, private organizations could be encouraged to raise awareness about this maybe."

The participant therefore urged for action from the side of the government as well as businesses to offer more education and awareness campaigns on the topic.

A rather extreme but certainly effective measure may therefore be to put exercises in place that are mandatory for every citizen. A weakened version would be to install exercises at schools as part of the curriculum, where they at least reach people when they are young. As mentioned before, exercises could also be offered by companies and organized on a political level.

5.3.6 INVOLVEMENT OF VULNERABLE GROUPS

The workshop participants agreed that involving vulnerable groups in disaster management is important, mentioning existing initiatives as well as possible ways to involve vulnerable people, especially children. One participant stated that vulnerable groups can definitely contribute to disaster response and to the common cause, as they are also part of the community, and should be integrated into the education system and disaster response.

Regarding the current state in their region, one respondent said: "… especially for earthquakes, which is a major challenge for most Greek urban areas, we try to have as much organized preparation as possible by reaching out to vulnerable groups like elderly or homeless people for example. The city of Athens and other cities have specialized agencies that take care of homeless people and people who have nowhere to go in the case of a disaster." Another participant from Greece mentioned that they (the police) "try to reach out to them [refugees] and inform them of how to best prepare themselves in case of a disaster", for example for earthquakes. They use social media and leaflets to reach people and teach them how to react in case of a disaster. They also try to involve vulnerable groups in exercises, but the respondent stated that because "not all groups are homogenous, it can be difficult to have representatives", giving the example of homeless people. Homeless people are often not very connected amongst each other, making it hard to "just pick one and include them in the exercises." Therefore they "try to give them advice, make them aware of the threat, the risk and make sure that they respond effectively if need arises". The participant also mentioned that "[…] the police often issues special advice through social media or sometimes door to door. By using community policing techniques, we try to identify the more vulnerable sections of the population, people who find it difficult to respond to a natural disaster like an earthquake – people living alone. And through the local police stations we try to at least have some communication, some connection so to speak with people who are more vulnerable in the case of a natural disaster like an earthquake or wildfire in a neighbourhood, like a big fire." A third workshop participant mentioned the EU project ProActive that has specifically worked on vulnerable groups and NRBC hazards. Within the project, an APP was created through which vulnerable groups could give/receive information and request assistance.

One respondent worked on a project "on disaster risk perception and vulnerability issues, with focus on accessibility and mobility issues, and how to include vulnerable groups, i.e. how to reach them through social media." The participant criticized that the scientific community usually does not consider vulnerable groups. They stated that different vulnerabilities exist – physical vulnerabilities, such as blindness, and social vulnerabilities, such as low income or digital illiteracy – which all require different approaches when trying to include people with these vulnerabilities. They also argued that children should be involved more in terms of preparedness education, seeing children as a valuable resource. They warned that when engaging children, communication may be an issue, as not all children have social media for instance.

Another workshop participant said on the topic of involving children in disaster risk management:

> "Disaster management consists of prevention, action, and management. We can put it in every target group on a specific block. I mean we can involve children in the prevention by training them or involve the children in the aftermath when a fire [occurs] in the forest, organize events like planting trees or something like that. So, I believe that every person in spite of their age or their origin can participate within this stage of the process."

This again underlines the general opinion expressed by many of the workshop participants that community engagement should mainly happen in the preparedness and the recovery phase, while in the response phase, the work should be left to the experts.

Respondents also provided reasons why children are a very good group to target. One stated that children are a very important resource for disaster management and should be much more involved. They claimed that it is easier to give children instructions as they tend to follow orders without questioning them, more so than adults. They gave the example of COVID-19 in Italy, where "it was eas(ier) with children to teach them how to behave in social contact during the pandemic than educate adults", because "it's enough to say don't put your mask off, you should not put your mask off, because it could be dangerous. The adult could say- Ok, but I am outside, I`m in the garden, so I don't need a mask. Because adults do question everything, but children do not." They also stated that sometimes, children are more informed about the right behaviour in a disaster situation than adults, giving the example "[...] when you ask initially a child – "In case an earthquake occurs what do you do?" _ "Oh, I put myself under the table, of course, immediately", they know that. If you ask my mom the same question, she would say – "I would run away", it is exactly the opposite, she should not run away". They also added that "[...] you can engage them in educational activities, and creative activities because something they did by themselves is something they own [...]" They mentioned that they themselves had done research on this topic as part of a product they are developing.

Another participant mentioned two reasons why children are a good target audience for disaster education: they stated that firstly, they may not be as traumatized and "blocked" yet and may therefore be more open to learn about the topic, and secondly, they are better at using modern tools, e.g., for communication and navigation, than older generations. They pointed out that children should feel important and involved, as this increases their motivation to participate and learn.

The use of modern digital tools as an engagement tactic was a general trend among participants. One respondent talked about using social media to engage elderly people, saying "Yes, we made research about […] how to craft […] a social media post which could be accessible to people for instance the elderly, […] which should be very short, very concise […]."

The analysed literature also emphasizes that knowledge and proper communication is an important aspect for the inclusion of vulnerable groups and could be implemented by warning messages in accessible language or inclusive disaster trainings (Adams et al., 2019; Hansson et al., 2020). While the problem of tokenism should be critically reflected and measures of actual participation through partnerships, delegated power and citizen control should be prioritized (Arnstein, 1969), the consultation of representatives may be warranted, especially in larger areas where a great number of people have to be addressed (Kirshen et al., 2018). Especially for disabled persons, even though their inclusion in DRR processes can be found in many policies and legislation, official bodies are slow when it comes to implementing them (Gvetadze & Pertiwi, 2022).

We recommend making sure that vulnerable groups are also involved and engaged in DRM, by for instance making extra efforts to include them in exercises and by making the communication between first responders and the community as inclusive as possible. Through community policing techniques, more vulnerable parts of the population can be identified so special attention can be paid to their safety in a disaster situation. Special communication channels, such as APPs, may be used to ensure efficient communication between these vulnerable people (e.g., elderly people or people with a disability) and the first responders or the rest of the community. It is however important to keep in mind that vulnerability can have many different facets, such

as physical vulnerability (e.g., being a paraplegic) or social vulnerability (e.g., having few financial resources), and each of these groups may need special initiatives for involvement. Of course, vulnerable people should be educated and trained in DRM and be able to actively participate in DRM processes. The participants highlighted that children are one vulnerable group that is quite easy to engage, as according to the respondents, children may be more likely to listen to instructions than adults. Also, they are often motivated to learn new things and gain new skills, and may be especially keen to participate when it means gaining agency and responsibility. Their good understanding of modern technology may also facilitate the engagement process. When trying to engage other vulnerable groups with modern technology, e.g., when trying to reach elderly people with social media, one needs to adapt the methodology to the target audience, e.g., by using a very large font and a very easy-to-use user interface.

5.4 ENSURING SUSTAINABLE IMPACT

For ensuring a sustainable impact of participatory governance/community engagement and for ultimately contributing to an increased resilience of communities towards disasters, as our empirical study has clearly shown, it is indispensable to enhance the trust of citizens in public authorities and institutions. This is accompanied by benefits of building long-lasting relationships with and within communities.

5.4.1 FACTORS THAT FACILITATE COMMUNITY ENGAGEMENT

On factors that facilitate community engagement, the workshop participants mentioned several aspects that need to be kept in mind and mentioned several best practices that could be implemented. As mentioned before, two of the most important factors one has to ensure are effective communication between the community and the institutions and faith in institutions. Concerning communication one respondent said "[…] usually the institutions do not know how to actually communicate with the communities and this is also because of the strength of fake news. Fake news can be easily spread among communities because if you check the language they use, it's the language of the community, the type of language everybody can understand. This is why fake news are so popular and they reach a great number of people." It is therefore crucial for official institutions and disaster risk management to ensure that the language and modes of communications they use also reach the community, as otherwise fake news might gain the upper hand.

The respondent further talked about strengthening faith in institutions, saying "[W]hat can facilitate participation is faith in institutions. Having faith in institutions would make people be much more involved in institutional plans. Because what is also problematic sometimes is a deficit of volunteerism which is a phenomenon we have in Italy and which is extremely problematic for the first responders. […] For instance, if I want to help, then I take my car and go there, which would hinder the first responders` activities, but if you increase faith in institutions then you would increase also that type of volunteerism."

Regarding best practice, a respondent mentioned a best practice that is extensively used in the USA, namely the use of a liaison officer. This is a person who liaises between first responders and the community – a volunteer who is "responsible to mobilize the community and to work with the first responders to be prepared but also to know what to do when a disaster happens". Another mentioned a problem that sometimes arises "in very small villages where communities in the recovery stage relied on their own assets, on their own knowledge to recover from the disaster", stating that this is bad practice and best practice would be to instead "use specific guidelines and engage as many stakeholders as possible". The respondent further emphasized that spontaneous engagement in the response phase by untrained volunteers is also very

bad practice which they highly advise against, and that people who do not follow instructions can be very problematic in disaster situations.

We therefore recommend, as already written in other chapters, installing a liaison officer who can serve as a facilitator between authorities and the community, and/or using other tools to ensure efficient and effective communication with the locals (also considering specific vulnerable groups such as refugees and migrants, who might need a translator). We also recommend offering specific guidelines and engaging stakeholders, and we discourage emergency personnel from involving untrained volunteers in the response phase. Furthermore, it has been emphasized again that increasing trust in institutions is important for community engagement.

5.4.2 FACTORS THAT HINDER COMMUNITY ENGAGEMENT

The workshop participants highlighted a number of cultural factors that may hinder community engagement, which have also been mentioned in earlier chapters. One talked about Greece being the "country in Europe with the lowest percentage of people who participate in voluntary organizations, people who donate blood, people who recycle", blaming a lack of awareness and perhaps prejudice for the lack of volunteers. Another person said that "[...] And apart from that in Greece, they are heavily dependent on the emergency service of the state and they [note: the authorities] don't give enough room to civil society voices or actions.", highlighting that political factors and organizational issues can also hinder efforts in community engagement and disaster risk management as a whole. Furthermore, a participant stated that a lack of faith in institutions can hinder efforts of participation.

Another respondent stated that language barriers can be an issue when dealing with refugee communities, stressing that to communicate effectively, translators or other personnel that can speak the language may be needed. Another person added to this that many "people coming from outside of Europe are younger […] than the average population", stating that this is actually an advantage as they can react faster and may have more physical capabilities than older people. However, they also mentioned the language barrier, stating that even on social media one may have to use signs instead of working with text, as they may not understand much of the local language.

Looking at the analysed literature, Osmani (2008) identifies three inter-related gaps that tend to hinder effective participation. The capacity gap concerns a lack of certain skills in regard to working in heterogenous teams, especially within marginalized groups of society. The incentive gap describes the burden of various types of costs of participation, mostly regarding time and effort. The power gap refers to systemic asymmetries of power within unequal societies, which tend to be reproduced within forms of community participation.

As already mentioned, ineffective communication (e.g., because people do not speak the same language or do not use the same devices or platforms) can significantly hinder community engagement. Therefore, being aware of the communication channels that can be used and having personnel that speaks the language of the community one is trying to engage is crucial. Cultural factors such as a general lack of volunteering and lack of faith in institutions can also hinder efforts, which is something that one has to be aware of beforehand. Knowledge transfer regarding forms of cooperative work in heterogenous teams, the proactive addressing of costs of participation (e.g. offering child care or providing permits for absence of work) and establishing a setting of fundamental equality are recommended to enable equal possibilities for participation.

5.4.3 POSSIBLE ETHICAL/LEGAL CONCERNS

For ensuring a sustainable impact of community engagement, it is indispensable to consider potential ethical or legal issues. One participant for instance recounted an incident where people had to be evacuated because of great danger. “We identified 50 people who had no right to remain in the country, they didn’t have documents. So, what do you do in that case? Do you arrest them, do you evacuate them, […] do you detain them?” For these cases, concrete guidelines and best practices are necessary, to ensure the safety of everyone regardless of legal status. The participant further stated that authorities have to be aware of certain sensitivities that communities might have, which requires training, saying “the authorities should be trained in order not to raise legal issues or liabilities.”

We recommend putting guidelines and best practices in place for situations with legal uncertainty, so first responders can focus on protecting and saving lives instead of possible legal issues.

6. RECOMMENDATIONS FOR A PARTICIPATORY GOVERNANCE MODEL

After discussing the findings of the analysis of both empirical data and state-of-the-art literature, this chapter aims to collect all key recommendations identified to enable community engagement as part of CBDRM as well as give a general framework on how to approach communities using participatory governance.

Presented in **Figure 4**, the participatory governance model for PANTHEON serves as a general guideline for the implementation of Community-Based Disaster Resilience through the definition of several workflows. Inspired by the model of Johnston et al. (2022), community profiling will first establish the understanding of specific community features, local resources and risks as well as the perception and knowledge about them.

After building this foundation, relational ties and networks as well as individual facilitators are analysed, identified and approached in order to establish relationships and build trust with the community, increasing access and reach to community members. The utilization of local networks and organisations as well as the recruitment/instalment of liaison officers within the local community will help enabling capacity building and the opportunity for long-lasting relationships. The specifics of community engagement programs applied will depend on each individual case. Further, the whole process should be accompanied by an iterative loop of monitoring, evaluation and adaptation and keep inclusivity of vulnerable groups in mind at all steps.

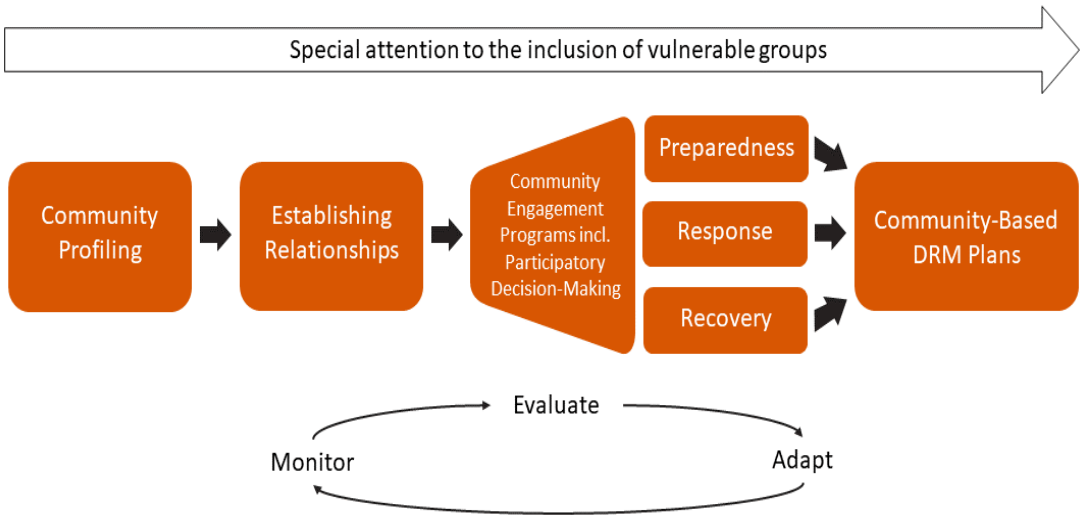


Figure 4: Participatory governance model for PANTHEON

Recommendations for all these steps, as well as approaches to community engagement and capacity building for different phases of the disaster management cycle are presented in **Table 2**. The recommendations are structured according to those steps and phases but do not follow any chronological order within these categories.

Table 2: Recommendations for participatory governance in CBDRM for PANTHEON

Recommendation	Description
Community Profiling	
Focus on small-scale areas	Especially in urban areas, community cohesion tends to be limited. Focusing on small-scale areas like neighbourhoods ensures connectiveness of community members, since they share their immediate living environment and know some faces. It also facilitates getting a representative sample of the population.
Overview of local hazards	Different hazards may require or enable different methods of community engagement. An overview of region-specific risks and hazards should be established and lead to the creation of hazard-specific guidelines for community engagement.
Identify local capacities	Analyse local organisations, networks and institutions. These may include relevant actors in DRM (like volunteer NGOs) or established institutions (administrations, elderly homes etc.) but also other community networks and places where community members connect. Local capacities also include skills possessed by individuals – it is beneficial to know where to find doctors or retired firefighters, as they can assist in certain processes.
Gain cultural awareness	It is important to know of cultural particularities as they may help or hinder community engagement. Analyse the community and find out which languages are spoken, what the attitudes towards volunteering and towards institutions are, what subcultures exist and which communication channels are frequently used. This also includes the identification of potential benefits community members may have from participation and how to communicate them. *Approaches: Meetings, surveys, interviews, workshops*
Establishing relations	
Approach local organizations and networks	Local NGOs but also cultural and sports organisations may serve as social hubs of local communities. These networks should be approached to establish relations and initiate meetings while reaching a broad part of local communities.
Identify and work with facilitators	Specific persons may have specifically good access to local community networks. People who are respected in the community and may possess some DRM knowledge, such as doctors or volunteer firefighters, can serve as intermediaries between institutions and the community. These people should be approached for helping to mobilize the local community for joining participatory programs.

Install community liaison officers	Liaison officers may again be people who hold high respect and trust within the community and maybe possess some DRM knowledge (though this last aspect can be trained later on). Examples include the mayor or other political figures, doctors, nurses, firefighters etc. Liaison officers may be appointed as community-based points of contact in all phases of a disaster, both for the community and institutions.
Organise physical meetings	Physical meetings between community members, authorities and DRM personnel should be organised. While these meetings should focus on discussions regarding DRM, space should be given to other topics important to the community. This is especially useful in the recovery phase, where the community should be actively involved in decision making.
Address potential barriers	Some barriers may hinder community participation and should be pro-actively approached. These barriers refer to gaps in capacity (low accessibility and high skills requirement for participation), incentives (higher perceived costs than benefits) and power (systematic asymmetries in unequal societies). *Approaches: Permits that enable the skipping of working duties, child care options or even forms of compensation (e.g. university credits, coupons) as part of specific events/meetings may drastically increase participation. This also includes providing inclusive settings for people with disabilities.*
Inclusive language and communication channels	All community members should have the opportunity to participate. Therefore, all languages needed to include participants should be provided. This includes languages spoken by refugee and migrant communities as well as those used by people with disabilities (i.e. sign language). In addition, not only the language but also the communication channels need to be inclusive and chosen to be able to reach a diverse and representative sample of the population (e.g. communication via twitter may not reach elderly people and children). *Approaches: Community members can be consulted beforehand to find out the best communication channels, and surveys can be used to find out which languages are used within the community.*
Awareness for inclusivity	Urban regions tend to be very heterogeneous. As part of successful community engagement, effective communication has to be possible for all parties. Specific plans on how to include all parts of the local community have to be developed. This includes for example: cultural minority groups, people with disabilities, refugees, homeless people etc. *Approaches: Preferential inclusion of subordinate groups in order to countervail existing power inequalities; establish settings of fundamental equality; promote knowledge exchange regarding ways of collaborative work*

Be aware of potential trust issues	Knowing the attitude of a community towards the authorities and emergency responders is crucial, as a lack of trust can greatly hinder DRM processes when disasters occur. *Approaches: Surveys can be used to get an idea of the community's relationship with the relevant institutions. Exercises, meetings and workshops can help to bridge the gap between the community and the authorities and can help the public to understand why certain measures are necessary in certain situations. Volunteering and awareness campaigns should be offered to prevent prejudice against the institutions and promote volunteering, especially in areas where this is not a big part of the culture*
Preparedness	
Modes of engagement	While educating and informing measures are seen as crucial for individual preparedness of community members, ways to enable more active participation of community members promise a higher risk-awareness as well as more specific disaster response plans based on local knowledge. Active engagement should especially be aimed for in the preparedness and the recovery phase. *Approaches: Meetings where decisions are made together with the community, encouraging and assisting grassroots-movements. The mechanism of collaboration should be established before a disaster happens, not as part of the recovery phase. Having a plan on how to engage the public is crucial.*
Informing about potential hazards	Raising risk-awareness as well as knowledge about the right behaviour in certain disaster situations present a central role in CBDRM. *Approaches: Workshops; Info-campaigns: Social Media, Leaflets, Pop-up stands; Local festivities can be used to reach the public.*
Utilizing the educational system	Schools and other educational institutions (such as universities) offer an ideal platform to integrate education about correct decision making and self-protection in case of a disaster. At universities and certain schools, motivation for participation might be increased when offering credits for successful completion. *Approaches: Workshops; Seminars; Exercises*
Exercises and trainings	Collaborative exercises between first responder organizations and community members may not only raise awareness and effectively train both professionals and civilians, but they also have the potential to raise trust in public institutions. Exercises should be offered regularly, e.g. in 6-month intervals. Disaster education and training may be especially necessary in cities, where a deep cultural knowledge on how to respond to disasters may be lacking. Exercises and trainings can be offered e.g., in schools, universities, or they can be organized by companies or on the political level.

	When doing exercises, local community-members with vulnerabilities (e.g. disabilities, foreign language) should be approached to participate. Crucial learnings in regard to their needs in actual disaster situations might be identified. *Approaches: Disaster response exercises; Table-top exercises*
Collaborative planning	Local knowledge may be of important contribution to DRM plans. Besides utilizing local knowledge, the collaborative development of disaster response plans serves multiple purposes: It builds individual capacities, it empowers through joint decision-making, and it raises awareness. *Approaches: Meetings, Surveys, Interviews with locals*
Vulnerability mapping	It is crucial to know where physical vulnerabilities lie in an area (e.g. where the floodplains are and where a dam might burst) as well as which social vulnerabilities exist, e.g., where low-income neighbourhoods are, and where critical infrastructure is located. *Approaches: Participatory Capacity and Vulnerability Analysis (PCVA) methods*
Response	
Community involvement in the response phase	Trained volunteers can be utilized. Untrained volunteers should only be used sparsely and when urgently needed, e.g. for helping emergency personnel to point out where people might be trapped or stranded. In general, however, the focus should lie on evacuating and informing the people. *Approaches: Prepare ways to include trained volunteers in response organisation; Focus on information and dissemination of instruction for citizens*
Volunteer and donation coordination	The big problem with spontaneous volunteers and donations is that they lack the information of what is needed and where and response coordinators lack information about their resources. Without this information, they may harm themselves or hinder ongoing operations. Therefore, ways that enable secure coordination of spontaneous volunteers and donations may be very useful and could contribute to their and the operations' safety. *Approaches: Digital volunteer coordination platform; Liaison officer may be used as point of communication*
Early Warning Systems	Early warning systems for relevant hazards must be put in place. Social media may be used to spread information but may be unreliable when disasters strike. Early warning systems need to be inclusive so that people with vulnerabilities (e.g., people with hearing problems) also receive the information.

	Approaches: Utilize differentiated communication channels for early warning of citizens – social media with inclusive approaches for vulnerable groups and backup options in case of infrastructure failures
Recovery	
Community involvement in the recovery phase	It is here that the community can often bring in the most relevant knowledge and input. Decisions during recovery may affect the communities' future resilience and living environment. This is why high degrees of community engagement in decision-making and planning are recommended. *Approaches: Involve the community in decision-making via meetings, workshops and by installing citizen committees; forms of participatory budgeting*
Support grass-root initiatives	If community-led initiatives form in the phase of recovery, these should be encouraged, supported and accompanied to build back (and build back better). *Approaches: Monitor emerging grass-root initiatives and offer support; Provide funding programs*
Vulnerable groups	
Identifying vulnerable groups	Vulnerability assessments can be carried out to identify vulnerable people in the area. Through community policing techniques, vulnerable parts of the population can be identified. *Approaches: Participatory Capacity and Vulnerability Analysis (PCVA) methods with a focus of identifying social vulnerabilities within a community; Engage local social workers/social institutions to identify vulnerable groups*
Engaging vulnerable groups	Make special efforts to include vulnerable people in exercises and meetings. Keep in mind that different vulnerabilities may come with different barriers to involvement, and each of these needs to be addressed. E.g. people with low income may not feel that they can afford to join, so they may have to be encouraged by renumeration (e.g. coupons). People with physical disabilities may require a wheelchair-accessible venue, and people with migration background may not understand the local language. Children, who are also particularly vulnerable in disaster situations, may be easier to engage than adults. *Approaches: Inform yourself, which measures must be taken to ensure participation of representatives of all groups. Hiring a translator may e.g., be necessary. To engage children, offer initiatives like exercises, trainings, and educational workshops at schools and e.g., scout organisations, or engage them using technology, like social media or APPs.*
Protecting vulnerable groups	Communication channels like social media or apps can be used to specifically prepare vulnerable groups (e.g. teaching children how to prepare an

	emergency supply kit) and to ensure open communication channels between them and the emergency responders or the rest of the community. Communication between first responders and the community must be as inclusive as possible to ensure that information reaches everyone (e.g. by using multiple languages as well as sign language or writing). When trying to reach vulnerable people, one needs to adapt the methodology to the target audience, e.g., by using a very large font and a very easy-to-use user interface when trying to reach elderly people. In addition, guidelines must be in place for dealing with people with questionable legal status, such as migrants without residency permits, so that first responders can focus on rescuing. *Approaches: Customize information material, communication channels and disaster response plans according to special needs of local vulnerable groups. Increase the accessibility of understanding and use the potential of inclusive participation.*

7. CONCLUSIONS

A governance model that involves joint responsibility in decision making is known as participatory. Participatory governance is the highest expression of democracy and a good way to foster human rights. When applied to disaster risk management, participatory governance improves society's resilience to natural and man-made disasters. Participatory governance is the best and most inclusive way to face disasters because it takes advantage of local knowledge, efficiently uses the available resources and serves all, including the most vulnerable parts of society. Of the different levels of community participation (information, consultation, involvement, collaboration and empower) most approaches of participatory governance are at the highest level, meaning communities are empowered to be part of the decision-making process.

However, participatory governance comes with a cost, especially in terms of time. Decisions will take longer because understanding and accepting the reasons of others is a time-consuming process, and consensual decisions may require several iterations. Measures must be taken to make the participation process as accessible as possible for all members of a community. In contrast, participatory governance builds trust and knowledge, both very important factors in disaster risk management.

In this deliverable, the state-of-the-art analysis of the literature related with participatory governance applied to disaster risk management and the involvement of vulnerable groups have been extensively presented and complemented with empirical work supported by twelve experts. All sources consulted agree on most of the associated challenges and approaches have been elaborated to address them. These include among others: the vocabulary to be used must be comprehensible for all parts of a community; the channels of communication need to be effective and supported by previously existing networks; the diversity in urban areas needs to be acknowledged and addressed in an appropriate way; volunteers are important assets but need training and coordination; and emergency exercises are a good way to complement other training and informative methods such as leaflets, apps, schools, door-to-door, social media, etc. There is also agreement on the different degrees of community participation that are appropriate at the various phases of a disaster management cycle. Participatory governance is highly recommended in the preparedness and the recovery phase, but in the response phase, experts strongly recommend a clear line of command, where orders need to be followed. For this reason, the experts suggest investing more effort in cooperative training and joint disaster planning in the run-up to a disaster and in community-based decision-making in post-disaster reconstruction. It was also highlighted that there is great potential in involving young citizens who may be more open to learning and more advanced in the use of technology than adults.

As a result of the research, a participatory governance model is proposed. This model presents the steps required to prepare and implement community-based disaster resilience programs and is complemented by a life cycle that iterates in three sequential phases: monitoring, evaluation and adaptation. A structured list of 26 recommendations provides guidance on how to best proceed in the defined working steps and how to implement community engagement in different phases of the disaster management cycle. Finally, the deliverable emphasizes the inclusion of vulnerable groups throughout the whole process and recommendations are proposed on how to best facilitate this.

8. LITERATURE

Adams, R. M., Eisenman, D. P., & Glik, D. (2019). Community Advantage and Individual Self-Efficacy Promote Disaster Preparedness: A Multilevel Model among Persons with Disabilities. *International Journal of Environmental Research and Public Health*, *16*(15), 2779. https://doi.org/10.3390/ijerph16152779

Alexander, D., & Sagramola, S. (2014). Major Hazards and People with Disabilities. *European and Mediterranean Major Hazards Agreement (EUR-OPA)*.

Amobi, A., Plescia, M., & Alexander-Scott, N. (2019). Community-led initiatives: The key to healthy and resilient communities. *Journal of Public Health Management and Practice*, *25*(3), 291–293.

Andharia, J., Puri, A., & Namboothiripad, A. (2023). Transforming Post-disaster Recovery: Participatory Mechanisms for Community Feedback and Responding to Government's Real-time Data Needs with a Focus on Persons with Disability. *The International Journal of Community and Social Development*, *5*(1), 47–70. https://doi.org/10.1177/25166026221150159

Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Institute of Planners*, *35*(4), 216–224. https://doi.org/10.1080/01944366908977225

Aslin, H., & Brown, V. (2004). *Towards whole of community engagement: A practical toolkit*. Murray-Darling Basin Commission.

Beldyga, N. (2022). A Review of Literature on Community Responses to Environmental Crises. *FILOSOFIJA. SOCIOLOGIJA.*, *33*(4), 397–406.

Blair, H. (2008). Innovations in participatory local governance. *United Nations, Department of Economic and Social Affairs, Division for Public Administration and Development Management, Participatory Government and the Millennium Development Goals*, 77–124.

Brass, J. N. (2016). *Allies or adversaries: NGOs and the state in Africa*. Cambridge University Press.

CDAC. (2023). *Lessons on communication, community engagement and accountability for the Türkiye–Syria earthquake response*.

Chan, J. C. (2013). *The Role of Social Media in Crisis Preparedness, Response and Recovery*. Vanguard.

Chaplin, D., Twigg, J., & Lovell, E. (2019). *Intersectional approaches to vulnerability reduction and resilience-building*. BRACED. https://cdn.odi.org/media/documents/12651.pdf

Creed, G. (2006). *The seductions of community*. Santa Fe, NM: SAR Press.

DeWalt, K. M., & DeWalt, B. R. (2011). *Participant observation: A guide for fieldworkers* (2nd ed). Rowman & Littlefield, Md.

DFID. (2011). *Defining Disaster Resilience: A DFID Approach Paper*. Department for International Development.

Dibley, G., Mitchell, L., Ireton, G., Gordon, R., & Gordon, M. (2019). *Government's role in supporting community-led approaches to recovery*. Department of Health and Human Services, Victoria.

Fischer, F. (2006). Participatory Governance as Deliberative Empowerment: The Cultural Politics of Discursive Space. *The American Review of Public Administration*, *36*(1), 19–40. https://doi.org/10.1177/0275074005282582

Fischer, F. (2012). *Participatory Governance: From Theory To Practice*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199560530.013.0032

Fredericks, J., Caldwell, G. A., & Tomitsch, M. (2016). Middle-out design: Collaborative community engagement in urban HCI. *Proceedings of the 28th Australian Conference on Computer-Human Interaction - OzCHI '16*, 200–204. https://doi.org/10.1145/3010915.3010997

Fredericks, J., Tomitsch, M., Hespanhol, L., & McArthur, I. (2015). Digital pop-up: Investigating bespoke community engagement in public spaces. *Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction*, 634–642.

Gaillard, J.-C., Cadag, J. R., Gampell, A., Hore, K., Le Dé, L., & McSherry, A. (2016). Participatory numbers for integrating knowledge and actions in development. *Development in Practice*, *26*(8), 998–1012.

Geekiyanage, D., Fernando, T., & Keraminiyage, K. (2020). Assessing the state of the art in community engagement for participatory decision-making in disaster risk-sensitive urban development. *International Journal of Disaster Risk Reduction*, *51*, 101847. https://doi.org/10.1016/j.ijdrr.2020.101847

Geekiyanage, D., Fernando, T., & Keraminiyage, K. (2021). Mapping participatory methods in the urban development process: A systematic review and case-based evidence analysis. *Sustainability*, *13*(16), 8992.

Glaser, B. G., Strauss, A. L., & Glaser, B. G. (1998). *Grounded theory: Strategien qualitativer Forschung*. Huber.

Gustafson, P., & Hertting, N. (2017). Understanding participatory governance: An analysis of participants' motives for participation. *The American Review of Public Administration*, *47*(5), 538–549.

Gvetadze, N., & Pertiwi, P. (2022). *Including Persons with Disabilities in Disaster Risk Reduction: A Research Study from Eight Countries of Africa, Asia and South/Central America. (Arbeiter-Samariter-Bund, Centre for Disability in Development, Christian Blind Mission, International Disability Alliance, and Malteser International).* https://www.didrrn.net/including-persons-with-disabilities-in-disaster-risk-reduction-a-research-study-from-eight-countries-of-africa-asia-and-south-central-america/uncategorized/

Hansson, S., Orru, K., Siibak, A., Bäck, A., Krüger, M., Gabel, F., & Morsut, C. (2020). Communication-related vulnerability to disasters: A heuristic framework. *International Journal of Disaster Risk Reduction*, *51*, 101931. https://doi.org/10.1016/j.ijdrr.2020.101931

Hilfinger Messias, D. K., Barrington, C., & Lacy, E. (2012). Latino social network dynamics and the Hurricane Katrina disaster. *Disasters*, *36*(1), 101–121. https://doi.org/10.1111/j.1467-7717.2011.01243.x

IFRC. (2007). *VCA toolbox with reference sheets*. International Federation of Red Cross and Red Crescent Societies. https://www.humanitarianlibrary.org/sites/default/files/2014/02/vca-toolbox-en.pdf

IFRC. (2023). *Heat waves and hot weather*.

International Association for Public Participation. (2021). *IAP2 Spectrum of Public Participation*.

Johnston, K. A., Taylor, M., & Ryan, B. (2022). Engaging communities to prepare for natural hazards: A conceptual model. *Natural Hazards*, *112*(3), 2831–2851. https://doi.org/10.1007/s11069-022-05290-2

Kelleher, C., Seymour, M., & Halpenny, A. M. (2014). *Promoting the Participation of Seldom Heard Young People: A Review of the Literature on Best Practice Principles*. Dublin Institute of Technology. https://arrow.tudublin.ie/cgi/viewcontent.cgi?article=1026&context=aaschsslrep

Király, G., & Miskolczi, P. (2019). Dynamics of participation: System dynamics and participation-An empirical review. *Systems Research and Behavioral Science*, *36*(2), 199–210. https://doi.org/10.1002/sres.2580

Kirshen, P., Ballestero, T., Douglas, E., Miller Hesed, C. D., Ruth, M., Paolisso, M., Watson, C., Giffee, P., Vermeer, K., & Bosma, K. (2018). Engaging Vulnerable Populations in Multi-Level Stakeholder Collaborative Urban Adaptation Planning for Extreme Events and Climate Risks—A Case Study of East

Boston USA. *Journal of Extreme Events*, *05*(02n03), 1850013. https://doi.org/10.1142/S2345737618500136

Le Dé, L., Gaillard, J. C., Gampell, A., Loodin, N., & Cadag, J. (2020). Participatory mapping 2.0: New ways for children's participation in disaster risk reduction. *Australian Journal of Emergency Management*, *36*(3), 34–42.

Lewandowska, A., & Chodkowska-Miszczuk, J. (2022). The role of participation in the development of the smart city idea: Frameworks, opportunities, mechanisms. *Bulletin of Geography. Socio-Economic Series*, *57*, 93–111.

Linnell, M. (2013). *Community approaches involving the public in crisis management A literature review*. Mittuniversitetet.

Lorna, V. (2003). *Community based approaches to disaster mitigation*. Asian Disaster Preparedness Center. https://www.preventionweb.net/quick/38482

Mayring, P. (2002). Einführung in die qualitative Sozialforschung [Introduction to qualitative social research]. *Beltz: Weinheim, Basel*.

Meyer, M. A., Hendricks, M., Newman, G. D., Masterson, J. H., Cooper, J. T., Sansom, G., Gharaibeh, N., Horney, J., Berke, P., van Zandt, S., & Cousins, T. (2018). Participatory action research: Tools for disaster resilience education. *International Journal of Disaster Resilience in the Built Environment*, *9*(4/5), 402–419. https://doi.org/10.1108/IJDRBE-02-2017-0015

Minkler, M., & Wallerstein, N. (2011). *Community-based participatory research for health: From process to outcomes*. John Wiley & Sons.

Nahkur, O., Orru, K., Hansson, S., Jukarainen, P., Myllylä, M., Krüger, M., Max, M., Savadori, L., Nævestad, T.-O., Meyer, S. F., Schieffelers, A., Olson, A., Lovasz, G., & Rhinard, M. (2022). The engagement of informal volunteers in disaster management in Europe. *International Journal of Disaster Risk Reduction*, *83*, 103413. https://doi.org/10.1016/j.ijdrr.2022.103413

Nochta, T., Wan, L., Schooling, J. M., & Parlikad, A. K. (2021). A socio-technical perspective on urban analytics: The case of city-scale digital twins. *Journal of Urban Technology*, *28*(1–2), 263–287.

Nuclear Energy Agency. (2016). *Stakeholder involvement in decision making: A short guide to issues, approaches and resources*. OECD. https://doi.org/10.1787/791983ee-en

Office of Policy Analysis. (2008). *Education Reform in the District of Columbia: The Modified Role of the Council of the District of Columbia*. District of Columbia City Council. http://www.dcwatch.com/council/opa080104.htm

Osmani, S. R. (2008). Participatory governance: An overview of issues and evidence. *Participatory Governance and the Millennium Development Goals*, 1–45.

O'Toole, T., Meer, N., DeHanas, D. N., Jones, S. H., & Modood, T. (2016). Governing through Prevent? Regulation and Contested Practice in State–Muslim Engagement. *Sociology*, *50*(1), 160–177. https://doi.org/10.1177/0038038514564437

Pejic Bach, M., Tustanovski, E., Ip, A. W. H., Yung, K.-L., & Roblek, V. (2019). System dynamics models for the simulation of sustainable urban development: A review and analysis and the stakeholder perspective. *Kybernetes*, *49*(2), 460–504. https://doi.org/10.1108/K-04-2018-0210

Pertiwi, P., Llewellyn, G., & Villeneuve, M. (2019). People with disabilities as key actors in community-based disaster risk reduction. *Disability & Society*, *34*(9–10), 1419–1444. https://doi.org/10.1080/09687599.2019.1584092

Prieur, M. (2012). *Ethical Principles on Disaster Risk Reduction and People's Resilience*. Council of Europe. https://edoc.coe.int/en/environment/7166-ethical-principles-on-disaster-risk-reduction-and-people-s-resilience.html

Puzyreva, K., Henning, Z., Schelwald, R., Rassman, H., Borgnino, E., Beus, P. de, Casartelli, S., & Leon, D. (2022). Professionalization of community engagement in flood risk management: Insights from four European countries. *International Journal of Disaster Risk Reduction*, *71*, 102811. https://doi.org/10.1016/j.ijdrr.2022.102811

Queensland Government. (2010). *Community engagement techniques*.

Rosenstock, T. S., Lamanna, C., Chesterman, S., Hammond, J., Kadiyala, S., Luedeling, E., Shepherd, K., DeRenzi, B., & van Wijk, M. T. (2017). When less is more: Innovations for tracking progress toward global targets. *Current Opinion in Environmental Sustainability*, *26*, 54–61.

Scully, J., & Shaw, D. (2022). *International Models of Emergency Management Involving Civil Society*.

Speller, G. (2005). *Improving community and citizen engagement in flood risk management decision making, delivery and flood response*. Environment Agency.

Stark, A., & Taylor, M. (2014). Citizen participation, community resilience and crisis-management policy. *Australian Journal of Political Science*, *49*(2), 300–315. https://doi.org/10.1080/10361146.2014.899966

Twigg, J. (2014). Attitude before method: Disability in vulnerability and capacity assessment. *Disasters*, *38*(3), 465–482. https://doi.org/10.1111/disa.12066

UN. (1986). *Declaration on the Right to Development*. General Assembly resolution 41/128.

UNDRR. (2017). *Preparedness*. https://www.undrr.org/terminology/preparedness

UNISDR. (2005). *Hyogo framework for action 2005—2015: Building the resilience of nations and communities to disasters*. UNISDR, United Nations, Geneva, Switzerland.

UNISDR. (2015). *Proposed Updated Terminology on Disaster Risk Reduction (August 2015)*.

United Nations. (1989). *Convention on the Rights of the Child*. https://www.ohchr.org/en/instruments-mechanisms/instruments/convention-rights-child

United Nations. (2015). *Sendai Framework for Disaster Risk Reduction 2015—2030*. https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

United Nations General Assembly. (2016). *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*. https://www.preventionweb.net/publication/report-open-ended-intergovernmental-expert-working-group-indicators-and-terminology

Verma, T., & Guin, S. (2022). Social Work Response to Community Based Disaster Risk Management (CBDRM). *Global Journal of Enterprise Information System*, *14*(3), 53–60.

Wanless, M. (2017). Index of Community Engagement Techniques. *Tamarack Institute: Waterloo, ON, Canada*.

Zubir, S. S., & Amirrol, H. (2011). Disaster risk reduction through community participation. *WIT Transactions on Ecology and the Environment*, *148*, 195–206.

9. APPENDIX

APPENDIX A: COMMUNITY ENGAGEMENT WORKSHOP– CONCEPT BOARD

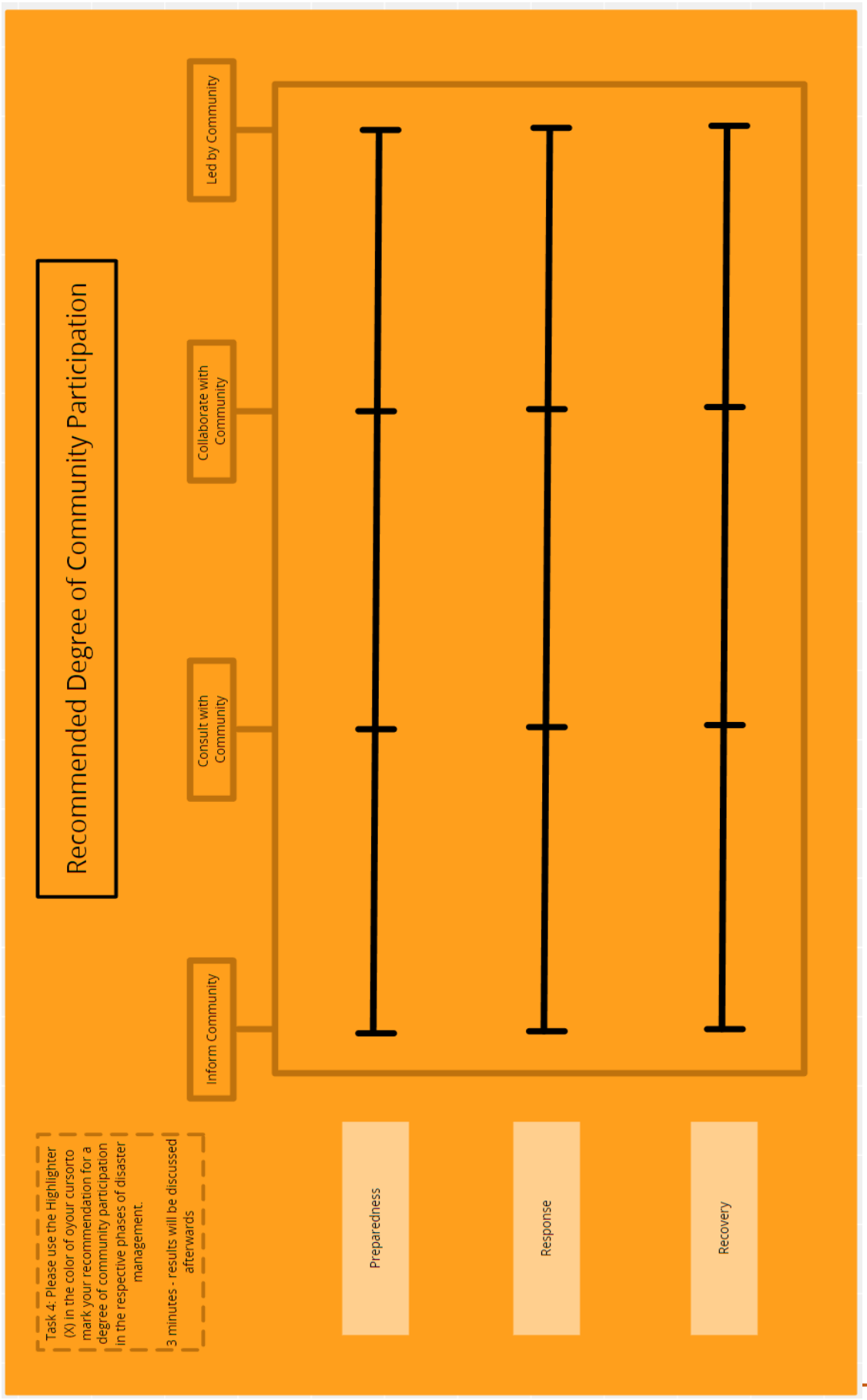
Introduction of Participants
Task 2: Please use Sticky Notes (N) in your cursor color to refer to parts of the community you did work with (e.g. NGOs, local administrations, school, hospitals, elderly homes, other vulnerable groups, etc.) and regional contexts (e.g. country, city - urban or rural)

Task 1: Please use Sticky Notes (N) in the color of your cursor to introduce your organization and a short overview of experiences with community engagement or participatory governance in Disaster Risk Management

Experiences in Community Engagement & Participatory Approaches

Response	Recovery	Other areas

Preparedness
Task 3: Please use "Sticky Notes" (N) to shortly describe participatory approaches you have experience with and place them on the phase of disaster management, it aimed at. The section "Other areas" is for experiences with community engagement and participatory governance in other areas than disaster management.
10 minutes time


Recommended Degree of Community Participation
Led by Community
Collaborate with Community
Consult with Community
Inform Community
Preparedness
Response
Recovery
Task 4: Please use the Highlighter (X) in the color of your cursor to mark your recommendation for a degree of community participation in the respective phases of disaster management.
3 minutes - results will be discussed afterwards

APPENDIX B: PRINTABLE VERSION OF THE QUESTIONNAIRE AS IMPLEMENTED IN LIMESURVEY

Questions on community engagement in disaster management

PANTHEON

The EU-funded project PANTHEON will design and develop a Community based Digital Ecosystem for Disaster Resilience. In more detail, the aim is to improve risk assessment, reduce vulnerability, and strengthen community disaster resilience. Part of this is the enhancement of operational capabilities of Community Based Disaster Resilient Management (CBDRM) teams. To this end, it will use Smart City Digital Twin (SCDT) technology and leverage new and emerging technologies and innovations.

This project has received funding from the European Union's Horizon Europe programme under Grant Agreement No 101074008.

There are 13 questions in this survey.

Please briefly introduce yourself:

Organisation:

Please write your answer here:

Working region:

Please write your answer here:

Gender:

Choose one of the following answers
Please choose **only one** of the following:

- ◯ female
- ◯ male
- ◯ diverse

Age (years):

Only numbers may be entered in this field.
Please write your answer here:

Experience with community engagement in disaster management:

Which representatives of the community did you work with?

Check all that apply
Please choose **all** that apply:

- ☐ NGOs
- ☐ local administration
- ☐ voluntary fire fighters
- ☐ other trained volunteers - please specify
- ☐ schools
- ☐ hospitals
- ☐ elderly homes
- ☐ vulnerable groups - please specify
- ☐ other - please specify

other trained volunteers - please specify:

Only answer this question if the following conditions are met:
Answer was 'other trained volunteers - please specify' at question ' [G02Q06]' (Which representatives of the community did you work with?)

Please write your answer here:

vulnerable groups: please specify:

Only answer this question if the following conditions are met:
Answer was 'vulnerable groups - please specify' at question ' [G02Q06]' (Which representatives of the community did you work with?)

Please write your answer here:

other - please specify:

Only answer this question if the following conditions are met:
Answer was 'other - please specify' at question ' [G02Q06]' (Which representatives of the community did you work with?)

Please write your answer here:

Which approaches in community engagement do/did you use in the following phases:

Can you explain which of these approaches of community engagement worked best and which did not, and why?

Please write your answer here:

From your experience, how does community involvement differ depending on the type of hazard?

Please write your answer here:

How can vulnerable groups (the elderly, children, homeless people, people with disabilities) be engaged in disaster management?

Please write your answer here:

Which guidelines on how to safeguard the rights and accountabilities of community participants (both civilians and voluntary firefighters, NGOs...) do you know of?

Please write your answer here:

07-21-2023 – 15:18
Submit your survey.
Thank you for completing this survey.

APPENDIX C: INFORMED CONSENT FORM USED DURING DATA COLLECTION

Informed Consent for participation

Project: PANTHEON Community-Based Smart City Digital Twin Platform for Optimised DRM operations and Enhanced Community Disaster Resilience

Topic: Approach for Building Disaster Resilient Communities

Participation: Workshop

Participant consent form

Before we start with the study, we would like to inform you about the data processing and ask for your consent. You need not worry about privacy as we will not share the information we have gathered from this study other than statistical and non-identifiable personal information in the report. Please tick the following:

- I am aware of the main aspects of the participation for the above PANTHEON project.
- I confirm that I have had the opportunity to ask questions.
- I understand that my participation is voluntary.
- I understand that my answers to any questionnaire will remain anonymous.
- I understand that if I don't wish to answer any particular questions, I am free to decline.
- I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the outputs that result from the research without my agreement.
- I agree to take part in the above mentioned activity.
- I give my consent to audio footage
- I understand, that I can revoke my consent at any time with effect for the future, whereby the lawfulness of the processing carried out on the basis of the consent until revocation is not affected. A revocation has the consequence that my data will no longer be processed for the above-mentioned purposes from that point on.

- I hereby confirm that I have read and understood this declaration of consent and that my questions were addressed properly.

Location and date:

……

Name of the participant: Signature participant:

…… ……

This form should be signed and dated. A copy should be saved by the participant and one for the project documentation.

Project information

The EU-funded project PANTHEON will design and develop a Community based Digital Ecosystem for Disaster Resilience. In more detail, the aim is to improve risk assessment, reduce vulnerability, and strengthen community disaster resilience. Part of this is the enhancement of operational capabilities of Community Based Disaster Resilient Management (CBDRM) teams. To this end, it will use Smart City Digital Twin (SCDT) technology and leverage new and emerging technologies and innovations. For the specific developments in the project, our research focuses on Greece (Athens) and France (Paris) as pilot regions. Input from other areas will also be welcome to broaden the scope.

In order to find out what can contribute to the improvement of community-based disaster resilience, the first step is to systematically elaborate the application-oriented approach. This includes:

- Analyzing existing legal and regulatory environment, i.e. **platforms and decision making systems** for community based DRM and Human, technical, material and financial resources
- **Mapping** of regional multi-hazard/risk assessments of all major hazards and risks
- Develop **indicators for community vulnerability and capacity** for all social, economic, physical and environmental, political, cultural factors
- Develop a **Participatory Governance Model**, giving recommendations on community involvement, mobilization and information in all phases of disaster management

In order to include the needs of individuals, recommendations for outreach are also asked. It should also be noted here that information on individuals must be clarified with them in order to protect their rights as well.

Methods: Conduction of surveys (interview, questionnaire and workshop) with members of community organisations, stakeholders in the pilot areas of Greece/Athens and France/Paris as well as experts in community engagement to get insights into the status quo of national hazards, risk assessment and disaster management tools used, potential approaches for improvements as well as recommendations for community outreach. The recorded workshop will be analysed using content analysis to address the research questions.

Project Partners:

1 TWI ELLAS ASTIKI MI KERDOSKOPIKI ETAIREIA (Greece)
2 AIRBUS DEFENCE AND SPACE SAS (France)
3 M3 SYSTEMS BELGIUM (Belgium)
4 SOFTWARE IMAGINATION & VISION SRL (Romania)
5 Mobility Ion Technologies SL (Spain)
6 FUTURE INTELLIGENCE EREVNA TILEPIKINONIAKON KE PLIROFORIAKON SYSTIMATON EPE (Greece)
7 ECOLE NATIONALE DE L AVIATION CIVILE (France)

8 UNIVERSITAT POLITECNICA DE CATALUNYA (Spain)
9 PRACTIN IKE (Greece)
10 ISEM-INSTITUT PRE MEDZINARODNU BEZPECNOST A KRIZOVE RIADENIE, NO (Slovakia)
11 INTEROPTICS S.A. (Greece)
12 JOHANNITER OSTERREICH AUSBILDUNG UND FORSCHUNG GEMEINNUTZIGE GMBH (Austria)
13 EPSILON MALTA LIMITED (Malta)
14 INSTITUT DE SEGURETAT PUBLICA DE CATALUNYA (Spain)
15 HELLENIC POLICE (Greece)
16 KENTRO MELETON ASFALEIAS (Greece)
17 Crisis Management State Academy (Armenia)

Information about generated data

Processing of data

All data collected in the course of the survey will be treated confidentially and will only be viewed or processed by the project-involved employees of Johanniter Österreich Ausbildung und Forschung gemeinnützige GmbH (in the role of data processor according to GDPR) and the other project partners (in the role of data controller according to GDPR). Information that could lead to an identification of the person will be changed (anonymisation / pseudonymisation) or removed. In scientific publications, the data is post-processed accordingly, so that the resulting overall context of events cannot lead to an identification of the person by third parties. The results will be further processed in the form of a report and possibly further scientific publications.

Voluntary nature of participation

Participation in this workshop is voluntary. Participants may withdraw at any time without giving reasons and without incurring any disadvantages. For this purpose please keep this document with the contact: dpo@pantheon.eu

Confidentiality and anonymity

Your information will be used solely by researchers for research purposes in the context of the above research project. Personal information will not be shared with anyone outside the research team of this project. The published research results (publications, research reports) have no personal reference and therefore do not allow any conclusions to be drawn about your identity.

Data protection

The data will be processed on the basis of your consent for the purpose of carrying out the above-mentioned research project (collection, evaluation, generation of results, publications). The legal basis for this is the EU General Data Protection Regulation (GDPR), namely in particular Art 6(1)(a) (consent) and Art 9(2)(j) (research purposes in the public interest) in conjunction with the Austrian Research Organization Act (FOG). Your personal data (name, contact, age, gender, duration in working area, role in disaster management, allocation of organisation and information about the disaster management plan) will be encrypted and stored for up to 10 years after the end of the project period (i.e. until 31.12.2032) and then deleted. The collected questionnaire ("raw data") will be kept for 10 years from the date of publication of the results of the project to demonstrate compliance with good scientific practice and then destroyed. Data required for the assertion, exercise and defence of legal claims will be stored for up to 30 years and subsequently deleted. You have the right to information, correction, deletion, restriction of processing, data portability, objection, and a right of appeal to the data protection authority at any time in accordance with legal provisions (in particular Art 15 to 22 DSGVO with the restrictions in § 2d paragraph 6 FOG).

Right of withdrawal

In order to be able to fulfil your right of withdrawal and to enable assignment of the correct record for this purpose, we urgently recommend to save this informed consent with the following contact address, to be able to contact us: dpo@pantheon.eu