

## Improving societal resilience through bottom-up approaches and cross scale interactions – *Resilient citizenship an initial discussion*

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**Abstract:** Natural disasters, extreme weather and compound events are more frequent and more severe than before. Their impact not only threatens life and health but also impacts critical infrastructures and essential public services. An important lesson from these events is that the established, top-down plans, procedures and systems for crisis management quickly proves to be insufficient, struggles to answer the scale and urgency of these disasters. Such events require broad mobilization, improvisation and coordination among various actors: central and local, public and private, formal and informal. This kind of crisis presents unique challenges, which demands actors to adapt and, if necessary, revise activities and reconfigure interactions creating resilient performance.

The objective of the research project Resilient Citizenship (RECITE) is to strengthen capabilities and preserve adaptive capacity to produce resilient performance in handling extreme weather events from the bottom-up, where in reciprocal collaboration with Civil Societies Organisations (CSOs) and public authorities, citizens are central in improving societal resilience. RECITE combines transdisciplinary, participatory and action research through resilience laboratories that create and use scalable and context sensitive “foresight” scenarios. These scenarios are designed so that participants may experience, practice, and develop their own capabilities to synchronize, collaborate and manage trade-offs in the face of uncertainties, time pressure and overload in future crisis.

This paper builds on the critical discussion about the combination of methods, challenges and opportunities when investigating how to build the potential of bottom-up resilient performance with cross-scale collaboration. It discusses how RECITE will integrate knowledge from diverse ongoing initiatives such as self-preparedness schemes, national projects, local experiences and European Commission projects. The expectation is to contribute theory and practice, by developing and operationalizing a set of practical methods and tools for citizen engagement, collaboration and training to facilitate a whole-of-society and whole-of-governance approach to emergency preparedness.

**Keywords:** Societal Resilience, Resilience Engineering, Crisis management, Preparedness, Governance.

### 1. Introduction

The landscape of crisis is rapidly evolving as extreme weather events, cascade and compound events and disinformation challenge our society.

These events are more frequent and severe than before, revealing that the established, top-down plans, procedures and systems for crisis management quickly prove to be insufficient, and

struggle to meet scale and urgency of disasters. The Resilient Citizenship (RECITE) project explores ideas, concepts, methods and local experiences in ways that reach people actively engaged in building capacity to respond effectively to a different kind of crisis. It links theory and practice, while recognizing constraints such as limited resource, trade-offs and the need to operate beyond margins, not by using more resources but using them more collaboratively and inclusively. RECITE seeks to contribute to bridge and operationalize a whole-of-society and whole-of-government approach. The project adopts a transdisciplinary approach combining different academic perspectives with non-academic stakeholders to co-produce new insights and practical solution production. Such a combination is essential for a deep understanding of the social, cultural, technical, organizational and ethical dimensions of crisis and societal resilience. This paper discusses needs, core ideas and collaborative approaches to inform the development of foresight scenarios. These scenarios will help explore citizen centric resilience (both involvement and coordination).

### 1.1. Why: scenarios and needs

RECITE focuses on two Norwegian cities Oslo and Trondheim. The municipalities of Oslo and Trondheim are responsible for ensuring the safety and security of their population. The cities maintain an annual risk picture providing an overview of potential crisis. This risk picture, together with risk and vulnerability analyses (ROS), forms the basis for preparedness plans and activities (Oslo kommune 2025; Trondheim kommune 2026).

RECITE work covers four types of scenarios: Scenario 1 (Trondheim): Climate-related natural hazards (e.g. extreme weather like Hans (2023) or Amy (2025) with heavy rain and the following cascade effects on diverse critical infrastructures, combined with misinformation. These types of events will undoubtedly become more frequent in the years to come. Scenario 2: Quick clay landslides in important infrastructure area (Oslo) - a national transportation hub for rail and road surrounded by commercial and housing areas. A quick clay slide there would affect transportation and damage infrastructure. This would split the city and cause catastrophic disruption to the city's infrastructure, as well as having regional and

national impacts (builds on results from [MEDiate project](#)). Scenario 3: Digital breakdown represented by electronic communication (EKOM) being unavailable (planned as part of the 2026 preparedness initiative across Norway) with diverse cascade effects on critical infrastructures and the population. Scenario 4: Unexpected event going beyond respond capacity specified in preparedness plans.

Extreme weather (exemplified in these scenarios) together with social instability and events (e.g. wars) leading to migration and humanitarian crisis, have further emphasized the need for more inclusive and effective collaboration among all formal and informal, organized and unorganized stakeholders involved in crisis management. Experience from the Trondheim Red Cross shows that organized volunteers often see early signs of how a crisis is unfolding and affecting people long before this is fully captured in official systems. During extreme weather, floods or communication breakdowns, citizens frequently turn to volunteers for practical help and trustworthy information. This can give important insights into emergency needs, misunderstandings and gaps between plans and real conditions. Volunteers may see that other citizens want to contribute but lack clear roles or channels for doing so. These volunteers can help connect these spontaneous efforts with the formal crisis management systems and strength cooperation across actors. In larger cities people may not know their neighbors well, there volunteers may help build trust and local connections that support resilience. These experiences underline the need for better ways to collect and use citizen knowledge, and to support collaboration across all levels of society during complex crisis.

There are several needs and requirements that must be present to handle such challenges: Authorities need up-to-date understanding of the situation and improved cross-scale collaboration protocols and practices, which require citizen involvement and reliable feedback. Civil Society Organizations (CSOs) need well-defined roles, efficient coordination, recognition, inclusion in all crisis management phases, and resources supported by clear communication with authorities. Citizens require information, trust, inclusion and clarity about their roles which

require accessible communication and mechanisms that empower their participation.

In this paper we ask *what practical approaches can empower citizens to contribute with their capabilities and facilitate cross-scale collaboration, discovering and enhancing resilient performance?*

The paper is divided into five main sections: Section 2 presents core concepts guiding this study. Section 3 outlines research methods. Section 4 discusses implications of the combination of these methodologies and added value for implementing foresight scenarios. Finally, conclusions are presented in Section 5. The paper provides an initial view of the RECITE work and does not cover all project methods.

## 2. Exploring resilient citizenship and related concepts

RECITE explores the role of citizens in improving societal resilience in preparedness and draws on adaptive capacities among various actors. Without an extensive systematic literature review, a selection of core concepts guiding this study is presented:

**Societal resilience** encompasses the potential capacity of all societal actors – both formal and informal, organized and unorganized – to effectively respond to challenging situations and the social contexts that influence this capacity. By the ENGAGE societal resilience model, resilient performance is understood as emerging from interactions between citizens, social actors and disaster management systems. This emphasizes the role of trust and citizens' individual and collective adaptive actions, shaped by the social context and experiences (ENGAGE 2023).

**Resilient citizenship** refers to a form of citizenship oriented toward governing uncertainty, crisis, and long-term societal transformation through shared responsibility between citizens and the state. Resilient citizenship emphasizes citizens as socially embedded and relational actors who contribute to collective preparedness, response, and adaptation, not as self-sufficient individuals replacing public authority. It rests on a dynamic social contract based on mutual obligations, trust, and participation, in which the state enables citizen capacity, provides coordination and protection, and remains a democratic backstop, while citizens engage in collective action, uphold solidarity, and

participate beyond electoral politics. A key distinction of resilient citizenship is its explicit grounding in the social contract between citizens and the state. While related concepts such as community resilience, adaptive capacity, civic preparedness, and social capital address capacities and relationships, they typically do not frame these in terms of mutual rights, obligations, and democratic accountability, or do so only implicitly. Building on this, resilient citizenship integrates agency, relationality, and governance: it views citizens as active agents, emphasizes resilience as emerging through social relations, and situates these dynamics within evolving state–society arrangements. We argue that resilient citizenship provides an operational lens for whole-of-government and whole-of-society approaches, highlighting how resilience emerges through evolving state–society relationships rather than through individual responsibilities or top-down governance alone (Bråten et al. 2025; Sahakian et al. 2025).

**Resilient performance** examines how to cope with complexity, how work is done and identifying possible ways to manage it. It involves finding ways to recognize, assess, improve and enhance its potential (Nemeth and Hollnagel 2022).

**Graceful extensibility and multilayer response**, addresses the foundations for designing the expansion of adaptive capacity to support and continue operations (Woods 2018). It recognizes that societies, organizations and entities, such as municipalities, always operate with finite resources (time, people, materials), while navigating in environments that are inherently dynamic, continuously changing, and evolving.

**Whole of government approach** brings together all relevant actors, across all levels of government (local, regional, national, and EU), to enhance collaboration, policy alignment and resource sharing. Whole-of-society approach promotes an inclusive culture of preparedness and resilience by engaging citizens, communities, businesses, social partners and the scientific community (European Commission 2025b; 2025a).

## 3. Research methods

The work uses a combination of the following approaches.

### 3.1. Action Research

Principles behind Action Research (AR) include community involvement and continuous improvement (Greenwood 2006). AR can be described as a process (Greenwood and Levin 2007):

*“Action research is social research carried out by a team that encompasses a professional action researcher and the members of an organization, community, or network (“stakeholders”) who are seeking to improve the participants’ situation. AR promotes broad participation in the research process and supports action leading to a more just, sustainable, or satisfying situation for the stakeholders.”*

AR involves participatory and co-creation methods that bring together the strengths of scientific and practitioners’ knowledge with the local resources of communities, such as local knowledge, social networks and adapting mechanisms. Action, research and participation are thus the three basic elements of AR (ibid.).

### 3.2. Resilience laboratories

Recognizing that end-users frequently struggle when evaluating the usefulness and impact of research, and researchers need to develop context sensitive and relevant solutions, RECITE will bring diverse actors involved in the management of crisis and citizen representatives into the resilience laboratories. This is an adaptation of the living lab concept: *“user-driven innovation environments where users and producers co-create innovation in a trusted, open ecosystem that enables business and societal innovation”* (Eskelinen et al. 2015). These labs will be implemented in Trondheim and Oslo as operative environments involving management and operational actors supporting co-design and co-evaluation influencing results and their use. Resilience labs will be implemented as an overall participatory research method stressing the importance of interactions and dialogue among citizens, authorities, volunteers and researchers. Experience from Trondheim Red Cross shows that resilient citizenship is strongly linked to trust and practical cooperation at the local level. Volunteers often help citizens understand what is happening, stay calm, and support each other. This strengthens social ties and makes people more able to manage what is happening and the uncertainty together. Volunteers often notice

early when information is unclear, when people are anxious, or when official messages do not reach everyone. Because volunteers meet citizens directly, many choose to ask them for help or clarification. This gives useful insight into what people need and where confusion may be developing.

Many citizens want to contribute during a crisis but do not know how to get involved. Volunteers can help organize this support and connect local initiatives with the municipality, especially when the situation is changing quickly and formal systems are under pressure.

In larger cities, where people may not know their neighbors well, organized volunteers can serve as an important link between citizens and public authorities. Their presence helps build the trust needed for shared responsibility during crises. The expected results from the labs include collection of knowledge on the conditions, challenges and opportunities for citizen contribution in forward-looking crisis scenarios, table-top and observation protocols including guide for implementation. Contributions to advance in knowledge and practice will be measured using quantitative and qualitative indicators, with a baseline established during the implementation of the first labs.

### 3.3. Understanding needs, opportunities and barriers

RECITE builds on previous work such as the Empower-Citizens project, which produced a book of methods presenting participatory approaches to capture citizens experiences and feedback to improve preparedness planning. (Bastini and et al. 2025). The project also co-designed an interview guide in collaboration with researchers, authorities and CSOs to i) identify formal and informal practices used to collect and integrate citizen knowledge into preparedness plans and ii) identified needs, barriers and opportunities to use citizens knowledge. The target users of this guide are local authorities responsible for preparedness plans. The guide explores past experiences, tools and practices with reference to specific events to ground the discussion in lived experiences.

### 3.4. Pentagon model

The pentagon model (Schiefloe 2025) facilitates the analysis of organizational performance

exploring the dynamic interplay between five mutually dependent factors. An important distinction is that two factors - formal structure and technology - can be managed, whereas the other three factors - culture, interactions and relations - can be influenced and stimulated but never fully controlled.

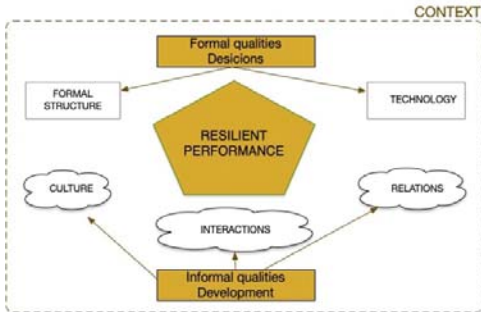


Fig. 1 Pentagon model

This holistic approach was selected because it is a well-established and continuously updated approach, refined over more than 20 years. Moreover, it follows the premise that challenges in complex organizations, or sets of organizations, seldom can be traced to a single factor alone and that performance cannot fully be understood by examining its parts in isolation. The resilience labs will benefit from this approach to data collection and theory-based analysis of resilient performance-related concepts as the model facilitates the analysis of organizations as open systems situated within its wider context.

### 3.5 Foresight scenarios

Foresight scenarios as part of disaster preparedness activities are critical for grabbing participants attention and establish what their contribution to resilient performance can be. Traditionally these scenario workshops include professional (formal) crisis management actors. By including citizens in participatory approaches, these foresight scenarios can combine citizen and professional's collective intelligence to better understand systemic aspects of crisis and their collective contribution and cross-scale collaboration.

The idea is to facilitate plausible future scenarios based on diverse aspects of crisis and triggers to explore possible adaptive responses involving different kinds of both public and private, organized and unorganized actors, exploring resilient performance and graceful extensibility.

Examples may be: how responses are created locally and do systems break out or re-prioritize and reconfigure, how individuals and organizations adapt to surprises and changes, integrating congestions, cascades, conflicting objectives, saturation, lag, friction, tempo, and dependencies. Then, it will be possible to explore whether the necessary back-ups and capabilities are available under new scales of the difficulty in organizing and synchronizing response. In the foresight scenarios, the focus will on the resilience capabilities to reprioritize, reconfigure and adapt to evolving conditions across scales as a network of interdependent actors.

## 4. Discussion

This section discusses added value of the diverse approaches and their input for the development of foresight scenarios. To illustrate its added value, quotations from the Hans extreme event will be used (Direktoratet for samfunnssikkerhet og beredskap 2024; Lunde and Taraldsen 2024).

AR and resilience laboratories will complement the research theoretical foundations integrating knowledge coming from the literature, past projects and practical experience. This combined approach takes the research out from academic sphere of publications and lectures into real world setting involving direct interaction among diverse participants including citizens, authorities, first responders, volunteers and researchers.

Interviews from the Empower-citizens project (Bastini and et al. 2025) have the potential to highlight aspects of informal relationships as well as the need and opportunities for citizen involvement: *"In many cases it's 'who knows whom'... That's what makes it effective."*, examples of resources existing in the population: *"We'll also need to bring in unaffiliated residents—retired nurses, auxiliary nurses, Red Cross veterans. Basically, all hands-on deck."* The interviews uncover stories and narratives written as short term statements. These narratives tell what took place, who and what was involved and the results. Story plots entail conflicts, predicaments and crisis that call for choices, decisions, actions, interactions, whose actual outcomes are often at odds with the characters intentions and purposes (Gabriel 2000). Analyses of these stories enable their impact on practices and crisis management.



Fig. 2 Flooding in Norway (From: Norwegian Red Cross)

As illustrated in Fig. 2, there are several examples of citizens' contributions during floodings. Informants highlighted citizen-driven initiatives like radios used in hunting as a backup network: "If the mobiles go down, the hunting radio comes up."

Events observed by Trondheim Red Cross show that crisis conditions can shift rapidly and that predefined plans seldom align perfectly with the unfolding situation. Volunteers often need to adjust, improvise, and work closely with local communities to address immediate needs. These situations also reveal systemic blind spots, such as individuals who fall outside standard communication channels, neighborhoods that become isolated, or resources that exist locally but are not coordinated.

Such observations underline the relevance of using foresight scenarios, as they help identify what is operationally important, test collaboration across actors, and highlight where systems require greater flexibility to support real-time adaptation. The Pentagon model, to be used as a tool to organize and analyze data, allows a systematic reflection on formal structures. Municipalities in Norway are responsible for the safety and security of their populations including the work of emergency preparedness. Preparedness plans address both strategic and operational levels focusing on events that exceed normal capacities and routines. Everyday events are addressed through established plans and routines and there are nuances across municipalities. For example, Oslo develops preparedness activities recognizing a dynamic and evolving risk picture by actively using foresight

analysis (sixteen scenarios in overall municipal risk assessment). These municipal foresight practices using scenario analysis increasingly support long-term planning, cross-sector dialogue, and strategic prioritisation under uncertainty. When used well, foresight can broaden risk assessments, legitimize difficult policy choices, and help municipalities anticipate structural pressures on critical societal functions. However, foresight can be detached from daily operations and decision routines, limiting its practical impact. Integrating resilience concepts, especially graceful extensibility, can offer a promising innovation. Combined with lessons from real incidents and operational experience at service level, this approach is expected to move municipalities from static planning toward adaptive capability. The result is not simply expected to give better scenario analysis, but stronger organisational awareness of limits, decision-making under strain, and scalable response mechanisms supporting operationalization of a whole-of-governance approach. Anchoring foresight scenario analysis within operational learning cycles can transform it from an incident driven event analysis into a living practice that strengthens preparedness, flexibility, and sustainable municipal governance and control. Governance capacity and control – as a societal value- includes crisis management capability, sustained operation and reputation. When experience, foresight, and resilience are integrated, municipalities can move beyond focus from better plans only (capacity) toward systematic focus on understanding contextual organizational limits and capabilities to manage the unexpected more effectively. This is increasingly critical as climate change, digital vulnerabilities, demographic shifts, and compound risk are among new emerging risks and vulnerabilities creating uncertainties cities and municipalities need to address more effectively. A wide range of technologies in terms of equipment, material infrastructure and digital infrastructure are used for addressing diverse types of crises. In accordance with general national principles, all formal activities are based on four national and local values. The four principles are: the responsibility principle states that the authority responsible for an area in normal circumstances also manages it during crisis; the conformity principle requires crisis structures and

organization to mirror everyday operations; the proximity principle ensures that crisis are managed at the lowest possible administrative level, closest to the incident and; the cooperation principle emphasizes the shared responsibility of all relevant public, private, and voluntary actors. Finally, self-preparedness is encouraged for individuals and households, enabling them to be able to manage short-term disruptions independently. Values prioritized in the municipalities are related to life and health, the environment, economic and material assets, and trust and reputation.

Concerning relationships, there are marked differences between small communities and larger cities in Norway. In small communities, people know each other and often possess diverse practical local knowledge and infrastructure available such as additional woods-burning stoves and generators. These additional resources have been proven vital in real events. There is a need to explore which kind of formal and informal relationships are vital in cities.

As already mentioned, municipalities have their annually updated risk and vulnerability analysis for diverse scenarios to define preparedness plans and associate activities including training. By acknowledging that no plan survives once a crisis is unfolding, the foresight scenarios provide a way to stress/test the capacity for response by introducing with futuristic scenarios combined with stressors. Resilient performance is local, and what matters is not the plan itself. RECITE acknowledges local communities and citizens as important actors and their responses as vital. There are many variabilities, stressors, pressures, potential for overload and the fact that everyone is under resourced all the time. The combination of approaches proposed by RECITE put together the diverse disciplines, experiences and resources, both formal and informal to explore resilient performance in action.

Citizen involvement requires collaboration, coordination and synchronization across scales. The foresight scenarios facilitate an exploration of a way that such coordination, coordination and synchronization can unfold. The purpose of these foresight scenarios is not to predict specific events

and actions. Instead, it is to introduce unexpected or challenging situations that test performance under different pressures, thereby enabling actors to discover new solutions, practice coordination and synchronize activities when conditions diverge from expectations. When standard ways of working are disrupted, discovery, coordination and synchronization need to be dynamically created. Through AR, the work explores iterative, systematic and transparent processes that enable authorities and researchers to reflect on citizens capabilities and their potential contributions to preparedness. Combined with foresight scenarios, AR and pentagon model help identify patterns and conditions that support resilient performance. The project will let actual – lived experience to tell the story and reveal patterns of conditions supporting resilient performance. RECITE will shed light on what matters for resilient performance and how organizations, communities and individuals can build a potential for inclusive action and it examines preconditions for performance across scales resulting in improved flexible capabilities for dealing with unexpected events.

## **5. Conclusions**

Preparedness plans enable a baseline for action, while the foresight scenarios, combining action research, interviews, pentagon analysis and resilience concepts such as graceful extensibility, offer an empirical approach to uncover the adaptive capacities needed when crisis exceed the planned activities. Foresight scenarios are built so that deep surprises during unexpected events can be better understood while sustaining and enhancing performance. The scenarios are not intended to predict the future, but to help see what already exists, such as citizens initiatives, existing capabilities and ways to support them e.g. through cross-scale collaborations. Preparing for the unexpected requires going beyond preparation for predetermined scenarios. The combination of methods highlights the need to design foresight scenarios drawing on general and specific adaptive capabilities. Specific capabilities are related to specific local knowledge, equipment and graceful extensibility for specific scenarios and stressors, while general capabilities such as relations, trust, shared knowledge serve as

baseline. The project will explore the capabilities existing among diverse citizens, including groups at risk as well as organizations involved in crisis management with attention to collaboration and cooperation across scales.

The exploration begins with the project's resilience laboratories, and by applying foresight scenarios and different practical approaches in these laboratories.

It is also important to consider differences and insights between cities and small municipalities. Large cities especially need good ways to involve citizens and volunteers as there are extra layers of trust necessary. Volunteers can help bridge these gaps and connect formal systems with real needs in the population.

By combining research with hands-on work in local communities, it will become possible to see what works today and what needs to be developed further. The empirical approach in the RECITE project will identify patterns of resilient performance and valuable insight into what people care about. The work is Norwegian and citizen centered, and future multi-country analyses are foreseen to scale -up results.

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