Special Issue: LAMINATION

Vladimir M. Cvetković*, Dalibor Milenković, Tin Lukić and Renate Renner

Theoretical evolution of measuring community resilience to natural and technological disasters: past, present, and future – empirical insights from qualitative research in Serbia

https://doi.org/10.1515/geo-2025-0968
Received December 24, 2025; accepted January 21, 2026;
published online July 15, 2026

Abstract: In disaster studies, the measurement of resilience has developed through several conceptual phases, reflecting broader transformations in disaster risk research. It is clear that the initial approaches, rooted in ecology and engineering, defined resilience primarily as a system's ability to absorb shocks and return to equilibrium. Although such perspectives provided clarity and measurability, they often reduced complex social realities to simplified technical indicators. Indeed, this did not provide comprehensive and precise insights into levels of resilience to different types of disasters. Over time, critics emphasized that resilience cannot be captured solely through stability or recovery speed, since communities are not mechanical systems but socio-political entities shaped by governance, culture, and inequality. In contrast, second-generation models introduced multidimensionality, incorporating economic, institutional, infrastructural, and environmental factors. Nevertheless, these frameworks frequently faced problems of comparability, data availability, and context sensitivity. Composite indicators, such as the Baseline Resilience Indicators for Communities (BRIC), sought to operationalize resilience systematically. However, they faced limitations in weighting procedures, variable selection, and the neglect of qualitative dimensions such as trust, solidarity, and adaptive learning. Similarly, the Disaster Resilience of Place (DROP) model provided valuable theoretical grounding, yet its transferability across diverse socio-political settings remained a challenge. According to various theoretical analyses, resilience measurement continues to face methodological and practical limitations, such as conceptual ambiguity (the absence of a universally accepted definition), indicator overload (large sets of variables that reduce analytical precision), underdeveloped statistical assessments (overlooking the dynamic, process-oriented nature of resilience), and contextual gaps (insufficient adaptation to local governance and cultural conditions). To address these challenges on a theoretical level, research was conducted in Serbia applying a qualitative empirical approach. 19 experienced local-level disaster management practitioners were interviewed. Semi-structured interviews and thematic analysis revealed how resilience is perceived and operationalized in practice, highlighting the gap between formal strategies and local realities. Findings indicate limited awareness, fragmented institutional cooperation, and an over-reliance on central authorities. Such results underscore the need for flexible, participatory, and context-sensitive measurement models. By critically tracing the evolution of resilience measurement – its achievements and shortcomings – this research underscores that resilience cannot be fully understood through indicators alone. A synthesis of quantitative rigor and qualitative insight is required to link global frameworks with local experiences. Such a comprehensive

***Corresponding author: Vladimir M. Cvetković**, Department of Disaster Management and Environmental Security, Faculty of Security Studies, University of Belgrade, Gospodara Vučića 50, 11040, Belgrade, Serbia; Scientific-Professional Society for Disaster Risk Management, Dimitrija Tucovića 121, 11040, Belgrade, Serbia; and Safety and Disaster Studies, Department of Environmental and Energy Process Engineering, Technical University of Leoben, Franz Josef-Straße 18, 8700, Leoben, Austria, E-mail: vmc@fb.bg.ac.rs, vladimir.cvetkovic@unileoben.ac.at. https://orcid.org/0000-0002-3450-0658
Dalibor Milenković, Scientific-Professional Society for Disaster Risk Management, Dimitrija Tucovića 121, 11040, Belgrade, Serbia, E-mail: milenkovic.dalibor82@gmail.com
Tin Lukić, Faculty of Sciences, Department of Geography, Tourism and Hotel Management, University of Novi Sad, Trg Dositeja Obradovića 3, 21000, Novi Sad, Serbia; and Ruđer Bošković School, Kneza Višeslava 17, 11000, Belgrade, Serbia, E-mail: tin.lukic@dgt.uns.ac.rs. https://orcid.org/0000-0001-5398-0928
Renate Renner, Safety and Disaster Studies, Department of Environmental and Energy Process Engineering, Technical University of Leoben, Franz Josef-Straße 18, 8700, Leoben, Austria, E-mail: renate.renner@unileoben.ac.at. https://orcid.org/0009-0009-2853-9298

approach not only improves measurement but also strengthens governance and societal capacities, which are essential for addressing future risks.

Keywords: disaster resilience; resilience measurement; disaster risk reduction; DROP framework; BRIC indicators; community resilience

1 Introduction

Community resilience to natural and technological disasters is a vital aspect of modern disaster risk management and safety studies. Its theoretical development has been gradual, nonlinear, and characterized by numerous scholarly debates. Initial concepts originated in the ecological and engineering sciences, where resilience primarily meant a system's capacity to absorb shocks and restore equilibrium after disruptions [1, 2]. While these approaches offered clarity and measurable indicators, they often oversimplified complex social realities, overlooking factors like people, institutions, and cultural context.

According to widely accepted definitions, such as UNISDR [3], resilience is "the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate, adapt to, transform, 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." This highlights the dynamic, process-oriented nature of resilience – it is not an inherent, static trait but one shaped, modified, and tested over time through exposure to various hazards and social changes.

Research indicates that resilience lacks a single, universally accepted definition. Instead, it is understood differently across various disciplines and contexts [4, 5]. In some fields, resilience is seen as the psychological ability of individuals to recover from stress and crises; in others, as a social resource of communities – networks of relationships, trust, and solidarity; and in engineering, as the physical characteristic of infrastructure systems [6, 7]. This multidimensional nature makes resilience both conceptually complex and methodologically challenging: measuring it requires translating complex social, economic, and institutional phenomena into indicators that are precise yet adaptable across various contexts [8, 9].

Traditional disaster management primarily concentrated on prevention, emergency response, and recovery. Success was often gauged by the speed of restoring systems to normal and the amount of material loss reduced [2]. This "bounce-back" approach assumes that resilience means swiftly restoring pre-disaster conditions. Yet, current research highlights that communities face recurrent and long-term crises – such as natural disasters, industrial accidents, pandemics, and climate extremes – that not only cause temporary disruptions but also permanently alter social and economic structures [10]. In this view, resilience shifts from simply bouncing back to bouncing forward – embracing learning, adaptability, and transformation to create more sustainable and equitable systems [11, 12].

Over the past decades, a visible shift has occurred from narrowly technical to multidisciplinary models of resilience that incorporate social, economic, infrastructural, ecological, and governance dimensions [13, 14]. In particular, research highlights the importance of social factors – social cohesion, social capital, institutional trust, local knowledge, cultural norms, and self-organization – as fundamental components of adaptive capacity [12, 15]. This shift reflects the realization that engineering "resilience projects" (e.g., levees, barriers, dams) may be insufficient if communities lack trust in institutions, are marginalized, or lack the information and resources necessary for their own protection [13].

Global trends such as rapid urbanization and climate change have further driven the paradigm shift. Currently, over half of the world's population resides in cities, and this figure is expected to grow [16]. Simultaneously, the increased frequency and severity of extreme weather events – such as floods, storms, heatwaves, and droughts – substantially raise risks for local communities [10]. In these conditions, resilience shifts from being an optional policy choice to a crucial requirement for sustainable development, as highlighted in the Sendai Framework for Disaster Risk Reduction 2015–2030 and the United Nations Sustainable Development Goals [17].

On a theoretical level, particular importance is given to models that aim to organize and implement the complexity of resilience. One of the most influential is the Disaster Resilience of Place (DROP) framework, which views resilience as a location-based trait resulting from the interaction of natural, social, and built environments [18]. DROP focuses on analyzing existing community conditions – such as historical experiences, social structures, and institutional capacities – and how these influence disaster outcomes. In contrast, the Baseline Resilience Indicators for Communities (BRIC) methodology uses composite indicators to measure inherent resilience across several areas, including social, economic, institutional, infrastructural, and community-related factors [19].

This interaction between conceptual (DROP) and indicator-based (BRIC) approaches is central to the evolution of resilience measurement theory. While DROP offers a broad conceptual framework connecting vulnerability, capacities, and context, BRIC provides a tool for empirically measuring

and comparing communities across regions and countries. However, many studies highlight methodological and practical challenges: conceptual ambiguity, indicator overload, reliance on data availability, and insufficient adaptation to local specifics [20–22]. These limitations are especially apparent in countries of the Global South and post-socialist regions, where institutional capacities and data quality often diverge from assumptions underlying original models.

Serbia faces a wide range of natural and technological hazards, including floods, earthquakes, landslides, storms, wildfires, and industrial accidents. This makes it a key example where adapting existing resilience measurement models is vital. Research shows that factors such as social structure, social capital, community mechanisms, equity, beliefs, and demographics are key indicators of local resilience [23, 24]. However, a gap persists between formal disaster-risk strategies and their real-world application, hindered by limited budgets, dependence on the central government, fragmented sectoral cooperation, and low citizen participation [25–27].

Despite notable progress in developing theoretical models and indicator systems, resilience measurement still faces substantial challenges. There is no consensus on a universal definition; different authors use varying structures and numbers of resilience dimensions; composite indices are often criticized for arbitrary weighting and variable selection; and statistical procedures sometimes inadequately capture the dynamic nature of resilience [5, 9]. Furthermore, cultural context, local identity, informal support networks, and the political economy are frequently underrepresented in formal models, despite empirical evidence of their importance [12, 15].

Given these challenges, there is a need for a systematic examination of the theoretical evolution of resilience measurement – its historical roots, dominant conceptual phases, methodological constraints, and future directions. This study aims to provide a comprehensive analysis of past, present, and future approaches to measuring community resilience to natural and technological disasters, highlighting the transformation of the concept from static, infrastructure-oriented models to dynamic, multidimensional, and context-sensitive theoretical frameworks. Special emphasis is placed on critically examining what is actually being "measured" when resilience is quantified, what is inevitably lost when complex social processes are reduced to indicators, and how existing models can better support policy-makers across diverse hazard environments.

This study offers two main contributions. Firstly, it presents a structured overview of the development of community resilience measurement, highlighting the balance between indicator-based comparability and the need for capturing local context. Secondly, it builds on existing reviews by incorporating qualitative, practice-oriented evidence from Serbia: interviews with local disaster management practitioners identify which resilience aspects are most practically important – such as trust, coordination, and informal networks – and show where formal measurement methods and actual local practices differ. This approach helps translate theoretical debates into empirically grounded insights to enhance resilience evaluation, especially in post-socialist, multi-hazard environments.

1.1 Literature review

The development of measuring community resilience to natural and technological disasters has evolved from early models based on ecology and psychology to modern, complex, and multidimensional methods. Early research saw resilience as the community's ability to "return to their previous state" after a disaster, focusing on adaptation, recovery, and the interaction between social and ecological systems [28,18,12]. During this period, dominant models sought to quantify the fundamental characteristics of systems, such as the R4 framework (robustness, rapidity, resourcefulness, redundancy) developed by Bruneau and colleagues, which laid the foundation for structural and infrastructural resilience assessment [29–32].

Further development resulted in more advanced theoretical frameworks, notably the Disaster Resilience of Place (DROP) and PEOPLES models, which incorporate social, economic, institutional, and governance aspects [32–34]. These approaches shifted the focus from solely technical and physical elements to a broader social, governance, and economic view of resilience. The DROP model helped develop a conceptual framework that connects exposure, sensitivity, adaptive capacities, and institutional processes. Later models built on these ideas by adding cultural, health, and environmental factors.

Accordingly, resilience measurement has evolved from simple, qualitative, and often "top-down" methods to multidimensional, participatory, and data-driven models. Composite indices such as BRIC and CDRI attempt to quantitatively assess resilience across a broad spectrum of economic, infrastructural, institutional, and social indicators [34–36]. However, contemporary research emphasizes that such models are static and insufficiently sensitive to dynamic changes within communities. In this context, innovative approaches have emerged that use big data, mobility data, geolocation systems, dynamic modeling, and computer simulations to enable a more detailed understanding of spatiotemporal patterns and community behavior during disasters [32,33,37,38].

Recent literature places particular emphasis on participatory and subjective methods of measuring resilience,

which incorporate local knowledge, collective experience, and perceptions of risk [34,39–41]. These approaches complement quantitative models and enable a more accurate understanding of local contexts, especially in communities with limited capacity or where formal systems do not function adequately. This helps reduce the gap between institutional planning and the population's actual needs.

Theoretical models and empirical research also indicate that resilience depends on the specific characteristics of different disaster types (e.g., natural vs. technological) as well as on the distinct features of rural, urban, and coastal communities [42–45]. Issues such as equity, social capital, and access to essential services have been recognized as critical for building resilience, particularly among vulnerable and marginalized groups [37,46,47]. The integration of digital technologies, innovative platforms, and disruptive solutions further strengthens preparedness, response, and recovery [48,49].

Despite significant progress, numerous challenges in measuring resilience remain. Criticisms include a lack of consensus on definitions, excessive reliance on objective indicators, and insufficient consideration of dynamic, multi-hazard, and culturally specific factors [42,50]. The literature increasingly calls for integrated, interdisciplinary, and context-sensitive frameworks, accompanied by stronger empirical validation and the development of practical and actionable metrics for policymakers and practitioners [32,51].

Overall, the evolution of measuring community resilience reflects a clear transition from static, infrastructure-oriented models toward dynamic, multidimensional, participatory, and data-driven approaches [12,31,32,34]. High-quality evidence supports integrating social, economic, and institutional factors, while also emphasizing the importance of combining quantitative and qualitative methods to capture the complexity of modern communities [33]. Nevertheless, the field must continue to address conceptual ambiguities, inconsistencies in the use of vulnerability and capacity indicators, and challenges in translating theoretical models into practical tools applicable across diverse cultural and hazard contexts [50]. Contemporary literature emphasizes the importance of using interdisciplinary, adaptable, and context-aware methods for measuring resilience. It advocates for incorporating local knowledge, leveraging innovative digital technologies, and developing comprehensive models that consolidate different aspects of risk and community capacity [39,51].

This manuscript's literature review is a narrative (conceptual) overview that traces the development of community resilience measurement, synthesizing key debates, models, and methodological critiques. Relevant studies were mainly identified through searches in Scopus, Web of Science, and Google Scholar, as well as backward and forward citation tracking of key papers on resilience measurement (such as DROP, BRIC, R4, and related composite indicator methods). Search terms included combinations like "community resilience," "resilience measurement," "composite indicators," "BRIC," "DROP," "R4," "disaster resilience index," "qualitative resilience," and "governance/participation/trust." We focused on highly cited conceptual and methodological works, studies that introduce or validate widely used frameworks, and publications explicitly discussing the limitations of indicator-based measurement and the importance of context-sensitive approaches. This review aims for an analytical synthesis of influential research areas that directly support the qualitative aspects of the study and help interpret the findings, rather than an exhaustive survey.

2 Methods

2.1 Aims and objectives

This study's qualitative component aims to empirically explore how experienced local disaster management practitioners in Serbia perceive, understand, and implement community disaster resilience. This insight will complement and critically evaluate the evolution of resilience measurement frameworks such as DROP, BRIC, and R4. Specifically, the qualitative inquiry seeks to (Figure 1):

1. Understand practitioners' perceptions of key resilience components, including knowledge, preparedness, awareness, social capital, institutional trust, and environmental factors.
2. Identify gaps between formal disaster-risk frameworks and local realities, especially regarding prevention culture, preparedness practices, participation in drills, stockpiling, and emergency plan utilization.
3. Explore how practitioners assess current resilience levels among citizens, households, and local governments, noting strengths, weaknesses, and specific challenges.
4. Determine which factors – like education, experience, communication, institutional effectiveness, and socio-economic conditions – are seen as the main drivers or barriers to resilience.
5. Provide empirical insights to refine global resilience measurement models by highlighting overlooked elements such as informal networks, trust, cultural norms, and community connectedness.
6. Aid in developing a more context-aware, multidimensional, and practical resilience assessment approach rooted in lived experiences and professional judgment.

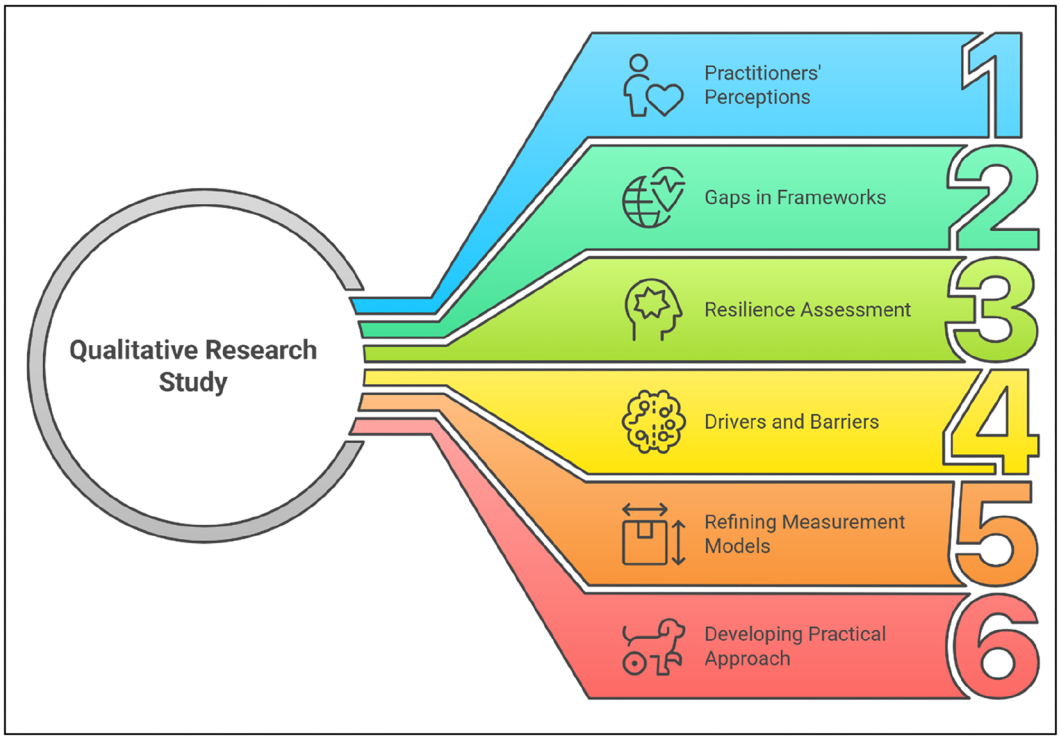

Figure 1: Thematic structure of the qualitative research process.

2.2 Analytical propositions (working assumptions)

Although this qualitative study does not test statistical hypotheses, it is guided by analytical propositions derived from the literature review and the identified gaps in resilience measurement. These propositions served to focus data collection and interpretation, while remaining flexible and open to revision as themes emerged during analysis:

P1. Practitioners are expected to perceive citizens' resilience as low to moderate, with variation across communities and demographic groups.

P2. Practitioners' accounts are expected to emphasize dimensions that are often underrepresented in quantitative indices, such as institutional trust, social cohesion, cultural norms, and informal support networks.

P3. Participants are likely to describe a gap between formal disaster-risk documents (plans, assessments, strategies) and their implementation at the local level.

P4. Prior disaster experience is expected to influence perceived resilience, knowledge, preparedness, and behavioral responses.

P5. Local governments are likely to be described as constrained by limited resources, reliance on central authorities, and an underdeveloped culture of prevention.

P6. Participants are expected to emphasize that resilience cannot be fully understood through indicators alone, underscoring the value of integrating qualitative insights with context-specific variables.

These propositions guided the analysis as sensitizing concepts rather than as deterministic claims.

2.3 Sample

The study employs a purposive expert sample, complemented by snowball sampling, targeting practitioners directly involved in local-level disaster management in Serbia. The final sample included 19 participants from municipal emergency headquarters, civil protection units, risk managers, local government officials, and professionals with several years of experience in disaster preparedness, response, or risk reduction. Inclusion criteria required active involvement in municipal disaster-risk management, experience with natural and/or technological disasters, and the ability to provide informed, practice-grounded reflections. The sample's diversity in geographic distribution, institutional roles, experience levels, and hazard exposure enhances the

validity and relevance of the findings, offering valuable insights into Serbia's local resilience context.

Table 1 presents the key socio-demographic features of all 19 participants in the structured interview phase. The group includes key administrative and operational stakeholders involved in defense planning, disaster risk reduction, emergency management, local governance, and related public administration functions across municipal and city levels. Most respondents are male, making up about two-thirds of the sample, while female participants hold several senior administrative roles, including Heads of Municipal Administration. Education levels are generally high, with most holding first-cycle (Bachelor) or second-cycle (Master/Specialist) degrees, typical for administrative and technical roles in local government. Income levels vary: many earn at or below the national average wage, while some senior officers and department heads report higher-than-average incomes. Nearly all respondents are married, except for one (ID 009) who is single. Overall, the sample reflects standard organizational structures in local disaster risk management, including leadership, operational units, and administrative support.

2.4 Questionnaire design

The semi-structured interview (Annex 2) was developed based on theoretical insights from the DROP and BRIC frameworks, gaps identified in the resilience measurement literature, and previous qualitative tools used in resilience research. It also aims to incorporate subjective, community-specific, and institutional aspects that are not captured by quantitative indicators. The questionnaire is organized into 13 thematic sections covering personal disaster experience, citizens' resilience perceptions, knowledge and preparedness, stockpiling practices, emergency plans, participation in evacuation drills, awareness and motivation, barriers to resilience, communication and trust in institutions, social capital and community networks, environmental factors, local government capacity, and household resilience. Questions are fully standardized and consistent across all respondents to ensure comparability, while still allowing for detailed, narrative responses. The instrument also includes: a demographic section, an interviewer guide, instructions for conducting interviews, and alignment with the study's conceptual model.

Table 1: Basic socio-demographic characteristics of interview respondents (*N* = 19).

Respondent ID	Gender	Job position	Education level	Income level	Marital status
001	Female	Secretary of the Municipal Assembly	Second-cycle studies (master/Specialist)	Average (≈€930)	Married
002	Male	President of the Municipal Assembly	First-cycle studies	Below average (<€930)	Married
003	Male	Head of Department – Defense Planning, DRR, Emergency Management, Fire Protection	Second-cycle studies	Below average (<€930)	Married
004	Male	Head of Section for Defense and Emergency Management	First-cycle studies	Below average (<€930)	Married
005	Male	Head of Department for Local Economic Development and Investments	Second-cycle studies	Below average (<€930)	Married
006	Male	Officer – Natural Disaster Protection Planning	First-cycle studies	Below average (<€930)	Married
007	Female	Head of the Municipal Administration	Second-cycle studies	Average (≈€930)	Married
008	Female	Head of the Municipal Administration	Second-cycle studies	Above average (>€930)	Married
009	Male	Head of Section – Defense, Emergency Management, Occupational Safety and Health	First-cycle studies	Below average (<€930)	Single
010	Male	Officer – Defense, Emergency Management, Occupational Safety and Health	First-cycle studies	Average (≈€930)	Married
011	Male	Head of the Municipal Administration	First-cycle studies	Above average (>€930)	Married
012	Male	Officer for Defense and Protection Affairs	First-cycle studies	Above average (>€930)	Married
013	Male	Head of Section for Emergency Situations – City Administration	First-cycle studies	Below average (<€930)	Married
014	Female	Officer – Emergency Management in the Municipal Administration	Second-cycle studies	Above average (>€930)	Married
015	Male	Head of the Municipal Administration	Second-cycle studies	Above average (>€930)	Married
016	Male	Head of Section for Defense Planning, Emergency Situations, and Natural Hazard Protection	Second-cycle studies	Average (≈€930)	Married
017	Male	Head of City District Administration (GO)	Second-cycle studies	Above average (>€930)	Married
018	Female	Officer – Defense and Emergency Management	First-cycle studies	Below average (<€930)	Married
019	Male	Head of Section for Security, Emergency Management, and Support Services	First-cycle studies	Above average (>€930)	Married

2.5 Study area

Disaster risks pose a significant challenge to the long-term stability, security, and sustainable development of modern society. Serbia, being vulnerable to various natural and technological hazards, has increased its efforts over recent decades to develop institutional and operational frameworks for disaster prevention and risk mitigation (Figure 2). There is also a growing focus on enhancing the resilience of local communities and the broader social system to protect the population, assets, and natural resources effectively, and to maintain social and economic stability after catastrophic events [29].

Serbia's unique vulnerability comes from its exposure to a wide range of natural and technological disasters, including floods, earthquakes, landslides, droughts, and fires. Historical records indicate that nearly 850 floods occurred over the past century (up to 2013), resulting in 133 deaths. The most notable and destructive of these was the catastrophic flooding of May 2014. In such situations, developing and strengthening community resilience is essential for effective risk reduction and disaster mitigation [27]. Although Serbia has officially committed to creating a comprehensive and integrated disaster risk management system, a unified index of local community resilience has not yet been implemented. The United Nations Development Programme identifies key weaknesses in institutional and governance structures, as well as limitations in risk-reduction efforts, that significantly hinder communities' ability to respond effectively to disasters. Significant issues include a fragmented institutional framework, disorganized procedures, and underdeveloped capacities at both local and national levels in prevention, preparedness, and response. These deficiencies directly impact the resilience and effectiveness of local communities [52].

2.6 Analysis

The collected materials were examined through a thematic qualitative analysis, following these steps: a) transcribing and becoming familiar with the data; b) conducting initial coding to identify recurring patterns in respondents' narratives; c) developing thematic categories aligned with the core concepts such as knowledge, preparedness, awareness, social capital, trust, and institutional capacity, and comparing responses

Figure 2: Photographic illustrations of natural and industrial hazards in Serbia include: (a) Flooding in Obrenovac (May 2014), showing large-scale urban flooding and everyday life disruptions. (b) Wildfire near Beočin (2022), highlighting the effects of extreme heat and drought on forests. (c) Landslide near Guča (2014), depicting terrain instability and damage to transport routes. (d) Thunderstorm with lightning over Belgrade, illustrating severe weather impacting the city. (e) Industrial chemical incident marked by a large smoke plume from a factory. (f) Explosion at an industrial storage site, demonstrating high-risk technological hazards with possible effects on nearby communities. Note: This composite image was created by the author for illustration purposes (no third-party photos used). Source: The author's own work.

across different respondents and municipalities, d) incorporating theoretical frameworks from the literature review; and e) and triangulating the interview themes with documentary sources (e.g., municipal risk assessments and protection/rescue plans) and descriptive quantitative outputs available from the broader research project, used to contextualize and corroborate practitioners' statements at an interpretive level (i.e., for convergence/divergence of patterns rather than statistical testing). Themes were identified both deductively, based on theory and research questions, and inductively, from respondents' lived experiences. Special focus was on differences between formal resilience frameworks (DROP, BRIC) and practitioners' interpretations of local conditions. The results helped refine theoretical insights, uncover gaps in current measurement systems, and suggest elements for developing future, context-sensitive resilience models.

Two research team members conducted the coding process. They initially developed a codebook based on the study goals and key concepts (deductive coding), then added new codes as patterns emerged from the interview data (inductive coding). Coding was done manually using structured tables, and the coders held regular meetings to compare interpretations, resolve disagreements, and finalize theme definitions (a peer-debriefing/consensus approach). To enhance reliability, a subset of transcripts was double-coded, with discussions to resolve differences until consensus was reached. Theme saturation was deemed achieved when additional interviews no longer yielded significant new codes or insights relevant to the study objectives.

3 Results

The thematic analysis is structured around key themes aligned with the interview guide and study goals: (T1) disaster experience and lessons learned; (T2) practitioners' views on community resilience; (T3) perceived overall resilience levels and their determinants or obstacles; (T4) preparedness activities such as knowledge, stockpiling, planning, and drills; (T5) communication, trust, and coordination among institutions; and (T6) suggestions for improving resilience measurement frameworks by connecting formal models with context-specific aspects. The sections below detail findings for each theme, with recommendations discussed separately in the Discussion.

When asked about personal experience with disasters, 14 respondents (73.7 %) reported having such experience, while five respondents (26.3 %) reported not being exposed to any natural or technological disasters. The most frequently mentioned type of disaster was flooding, experienced by 71.4 % of those who had experienced it (10 out of 14). In contrast, earthquakes, forest fires, severe storms, and extreme temperatures were cited much less frequently (each at 7.1 %). Regarding their reactions, 42.9 % of respondents (six out of 14) reported responding rationally, calmly, and in accordance with procedures, while 21.4 % (three respondents) emphasized emotional reactions such as fear, panic, or confusion. The rest described a combination of these reactions or provided an insufficiently precise answer. Participants mentioned both natural and technological hazards, but natural hazards, especially floods, were more frequently emphasized. This reflects their higher perceived occurrence and operational impact in the local settings studied. Technological risks were mainly discussed in the context of industrial accidents and infrastructure emergencies. Participants' comments indicate that key resilience aspects – such as preparedness culture, coordination, communication, and institutional trust – are applicable across different hazard types, even when specific preparedness measures vary.

Based on analyses of the narrative accounts, several different perceptions of responsibility and the causes of disasters were identified. In 28.6 % of cases, participants attributed responsibility to themselves and insufficient preparedness, while 21.4 % criticized institutions, primarily local authorities and the protection and rescue system. The collective responsibility of residents or the wider community was mentioned in 14.3 % of responses, and an equal proportion presented disasters as consequences of nature that cannot be fully controlled. These differences in perception indicate the presence of different cognitive models for interpreting risk, as well as potential for interventions aimed at strengthening personal and institutional responsibility.

Regarding learning from lived experience, 78.6 % of respondents (11 out of 14) reported drawing concrete lessons – primarily about the importance of planning, organization, and composure. Changes in habits, enhanced preparedness, and improved cooperation with institutions were cited as direct consequences of the situations experienced. Only one respondent stated that the experience did not lead to a change in behavior. In contrast, the others highlighted the acquisition of practical knowledge and increased understanding of how the protection system functions. Differences were also observed depending on whether respondents had an institutional role. Those professionally engaged in the protection and rescue system generally described organized, official responses, including evacuation, coordination with headquarters, and compliance with regulations. By contrast, individuals without a formal role in the system emphasized emotional reactions, the need for support, and shortcomings in preparedness.

The emotional aspect of experiencing a disaster was present in a significant number of accounts. In 21.4 % of cases,

respondents explicitly noted feelings of fear, panic, or confusion, while 35.7 % emphasized a sense of control, solidarity, and responsibility. A smaller share of responses (14.3 %) expressed pronounced helplessness, particularly in the context of poor preparedness or a lack of institutional support. Despite this, most respondents show a strong motivation to prepare better in the future and to contribute to community resilience. Based on all the analyzed elements, it can be concluded that personal experience with disaster plays an important role in shaping individual risk awareness, developing preventive behavior, and improving understanding of the role of institutions. At the same time, citizens' narratives reveal opportunities to improve communication, training, and support systems, which represent an important resource for designing more effective risk management policies (Table 2 and Figure 3).

Analysis of the narrative responses of 19 participants regarding their understanding of citizens' disaster resilience shows that most respondents possess a functional, practical, and multidimensional understanding of this concept. Resilience is most commonly defined as the ability to respond promptly, recover, and adapt to risks, with training, organization, information access, and psychophysical preparedness as its key components. A total of 63.2 % of respondents (12 out of 19) directly associate resilience with citizen training and education, including the need for practical exercises, simulations, and a systematic approach in educating all age groups. Preparedness as a key feature of resilience is explicitly mentioned in 47.4 % of cases (9 respondents). In comparison, 36.8 % of participants (7 respondents) emphasize the importance of organization and the functioning of the civil protection system.

The issue of communication and information dissemination is mentioned by 21.1 % of respondents (4 participants), who underline the need for timely information and for the inclusion of alternative communication methods accessible to vulnerable groups, such as the elderly and the technologically

Table 2: Analysis of respondents' answers by disaster experience: Have you personally experienced a natural or industrial (technological) disaster? If yes, how did you respond, and what did you learn from that experience?

ID	Key segments of the responses
1	Yes, floods, I learned a lot. Until I encountered the floods, I had no idea they could cause the kind of damage they did. I reacted emotionally and fearfully, while I should have reacted differently. I learned that composure and a proper sequence of actions can be helpful
2	Yes, natural disasters (earthquakes and floods), and I reacted in accordance with applicable regulations. During the earthquake, as a citizen, I protected my family and myself. During the 2014 flood, I did everything that my then role as a journalist and head of the local parliament's committee required
3	Yes. Since 2020, I have been working in this field, and since then, we have faced several emergencies: Floods, fires, water shortages, and COVID-19. I work in emergency management, so I am always on the front line and carry out all tasks related to the Municipal Emergency Headquarters, including conducting meetings, going into the field with teams, assisting citizens, etc
4	No. I have not experienced one
5	Flood. It is tough to protect oneself from this type of natural disaster on an individual level
6	Yes, floods. We followed the instructions. We learned that we should not take action on our own initiative
7	The respondent did not have personal experience with disasters
8	Floods. We were not at all well prepared. Although we believed that, as a municipality often facing floods, we had the capacity to deal with them, we found our preparations were inadequate
9	I experienced a natural disaster – a storm with strong winds and hail. It is necessary to have civil protection units, wardens and deputy wardens of civil protection units, and volunteer fire brigades ready for action
10	No
11	Natural disaster: a flood in the villages of Levosoye and Oslare, caused by heavy rainfall over a short period, which overflowed a stream through the settlements. Through the Emergency Management Headquarters, the population from affected households was evacuated and accommodated in unaffected households. Animals (livestock) were also evacuated. Conclusion: Human negligence is the greatest enemy – had the residents maintained the canal and not disposed of waste in it, the flooding would not have occurred
12	Forest fires and floods. I reacted in accordance with the organization's rules and the decisions of the competent authorities. I learned that not everything can be predicted – there is always some specific factor that affects the implementation of plans
13	I personally experienced a flood in my family's household. I managed to move my belongings to the upper floor in time, after which I relocated to a safe location. I learned that the reaction to a disaster must be planned, not spontaneous and panicked
14	In 2007, extremely high temperatures above 45 °C. Conclusion: a healthy lifestyle and spending time in nature help the body cope with such conditions.
15	Yes. I reacted consciously, in solidarity, and without panic
16	Yes, I took actions to mitigate greater damage. I realized the importance of preventive measures and good organization
17	No. Only a hailstorm occurred, which is not considered a natural disaster
18	I have not had the opportunity to participate in any disaster, either directly or indirectly
19	The respondent did not have personal experience with disasters

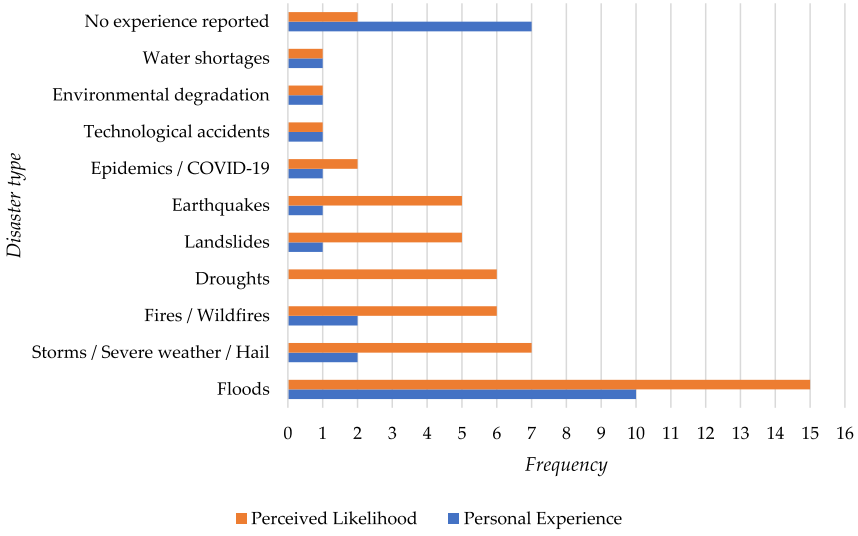

Figure 3: Thematic analysis comparing respondents' personal disaster experiences and perceived likelihood of disaster occurrence.

excluded. In this context, participants indicate that alert systems cannot rely solely on electronic media and social networks. However, they must also include field-based channels such as couriers and direct communication. A total of 26.3 % of respondents (5 participants) particularly highlighted psychophysical, mental, and material preparedness as an essential part of resilience. In comparison, 15.8 % (3 respondents) introduce broader systemic factors such as economic stability, ecological balance, and social cohesion.

In 31.6 % of responses (6 participants), a critical tone is evident regarding the current state of societal resilience, pointing to a decline in collective awareness, institutional inactivity, and educational gaps. These respondents express concern about the population's insufficient preparedness and the absence of a culture of prevention, often contrasted with earlier systems in which, according to their statements, stronger social mobilization existed. Two respondents (10.5 %) emphasize the need to restore value-based and disciplinary models of social behavior, linking resilience with citizens' responsibility toward the environment, public space, and community rules.

Notably, most responses do not offer simple or narrow definitions of resilience but instead strive for an integrative approach combining individual capacities, institutional support, and collective readiness. In 42.1 % of statements (8 respondents), resilience is defined as a process: from recognizing hazards to timely preparation, through effective response and recovery. Instead of formal or technical interpretations, respondents often use concrete examples and experiential descriptions that indicate a practical understanding of the concept.

The findings suggest that respondents perceive resilience as a multifactorial construct that extends beyond mere survival – it includes systemic support, education, solidarity, technical capability, trust in institutions, and adherence to procedures. At the same time, the narratives reveal a clear need to improve communication strategies, training, and the mobilization of local resources. Overall, respondents demonstrate a high level of awareness of what resilience should represent, but also a critical distance toward the current level of its implementation in their communities (Table 3 and Figure 4).

The analysis of the responses from 19 participants who assessed the overall level of citizens' disaster resilience indicates diverse viewpoints, ranging from moderate optimism to pronounced pessimism. Based on the provided explanations and assigned scores on a scale from 1 to 10, the average resilience score is 5.4, suggesting a perception of a low to moderate level of population preparedness for responding to emergencies. A total of 36.8 % of respondents (7 out of 19) rated resilience at three or lower, most frequently citing a lack of citizen interest, the absence of a preventive culture, institutional inefficiency, and insufficient education. These statements reveal a strong critical tone toward the broader social environment and toward individuals who, as noted, expect state protection without personal engagement (Table 4).

A moderate level of resilience (scores 4–6) was reported by 42.1 % of respondents (8 individuals), suggesting a certain degree of readiness in society. However, it is neither systematically supported nor evenly distributed. These respondents most often indicate that resilience depends on individual initiative and personal resources, and that citizens primarily rely on institutions, which reduces the impact of personal responsibility. It is also noted that younger generations are not sufficiently trained and lack the practical knowledge needed for swift, effective risk response.

A higher resilience rating (7–8) was given by 21.1 % of respondents (4 individuals), mostly those who believe in citizens' ability to adapt and survive even under limited resource

Table 3: Analysis of respondents' answers regarding the understanding of citizens' resilience: How would you define citizens' resilience in responding to disasters?

ID	Key segments of the responses
1	Timely notification. In our municipality, there are many single-member elderly households, so notification cannot rely solely on electronic and social media, or similar channels. Couriers are still needed… It is necessary to secure material resources and continuous training, especially for small businesses and economic entities that may appear minor in scale. However, together they make up a large number of citizens and agricultural households
2	Personally, I believe that we are currently in a vacuum that needs to be filled. In former Yugoslavia, no matter how retrograde it may seem now, social obligations required that the population, or at least its most active part, be informed on how to react in such situations… something needs to be done in that regard… but when children do not attend school, and students teach professors… it is difficult
3	Resilience is everything that enables us to prevent disasters, survive them more easily, and continue life afterward. Personally, I believe that citizens in our municipality generally lack awareness of these problems and that resilience in disaster response is either nonexistent or minimal
4	First of all, a well-organized civil protection system – that is, established general-purpose units, trained and equipped to respond to tasks related to any disaster – team-based confrontation with the disaster during and after the event
5	Citizens are resilient to disasters when they follow instructions. It includes institutions and existing regulations. That is the only thing that contributes to the preservation of people and property to the extent possible during disasters
6	Training citizens and enhancing their understanding of disasters contributes to their resilience in the face of disasters that may occur in their community. Citizens' resilience is, in fact, their preparedness. Preparedness implies civil training for disasters
7	Citizens' resilience is the ability to respond effectively to potential dangers and to recover from the consequences of a disaster as quickly as possible. Citizens' resilience should include absolutely all components
8	Citizens' resilience in responding to disasters primarily involves anticipating a disaster, preparing in time, reacting quickly, and finally efficiently mitigating its consequences and restoring the previous state
9	Citizens' resilience in responding to disasters is critical. It is achieved through education from preschool onward, raising awareness of how to adapt to climate change and take measures to reduce its harmful effects on people, plants, animals, and the environment as a whole. Teach the population of all ages how to behave during natural hazards (floods, earthquakes, fires). Conduct field simulation exercises (evacuation, sheltering, providing personal and mutual protection, first aid).
10	Psychophysical and material preparedness – individual, family, and social – within the framework of the organization of work in which an individual operates. Components include knowledge, experience, and established procedures regarding the causes, manifestations, and actions in the event of disasters, as well as the definition of hazards, their causes, dimensions, and consequences, so that material preparations can be timely and adequately executed using resources available in the initial phase of a disaster
11	Physical and mental preparedness of citizens to respond. No matter what happens, and regardless of the possibility of saving material goods. Human lives are the most important
12	Understanding environmental impacts and applying measures to be aligned with nature. This alone will influence citizens' resilience in the face of potential disasters
13	An organized civil protection system exists that can apply all its responsibilities, including preventive measures
14	Twofold – first as responsible behavior toward the environment and nature, and second as adherence to laws and community rules (illegal construction, public order…)
15	Training for action in situations of natural disasters to minimize consequences
16	Citizens' resilience implies organization in the event of disasters – meaning they undertake preventive measures, know how to organize themselves during disasters, who to notify, and what they can personally do
17	Psychophysical abilities of individuals, level of education, degree of communication and trust, capacity of the local community and society to respond to new challenges, social resilience, institutional, environmental, and economic components
18	Timely notification. In our municipality, there are many single-member elderly households, so notification cannot rely solely on electronic and social media, or similar channels. Couriers are still needed… It is necessary to secure material resources and continuous training, especially for small businesses and economic entities that may appear minor in scale. However, together they make up a large number of citizens and agricultural households
19	Personally, I believe that we are currently in a vacuum that needs to be filled. In former Yugoslavia, no matter how retrograde it may seem now, social obligations required that the population, or at least its most active part, be informed on how to react in such situations… something needs to be done in that regard… but when children do not attend school, and students teach professors… it is difficult

conditions. They justify their views with examples from practice, such as responses during the pandemic or experiences with floods, emphasizing that in crises, citizens demonstrate solidarity, practicality, and adaptability. These respondents highlight that resilience is not at an ideal level, but that there are positive shifts in awareness and behavior, particularly among those who have already been exposed to risks.

Only one respondent (5.3 %) assigned the maximum score of 8, offering an unreservedly positive assessment of society and emphasizing the population's ability to endure

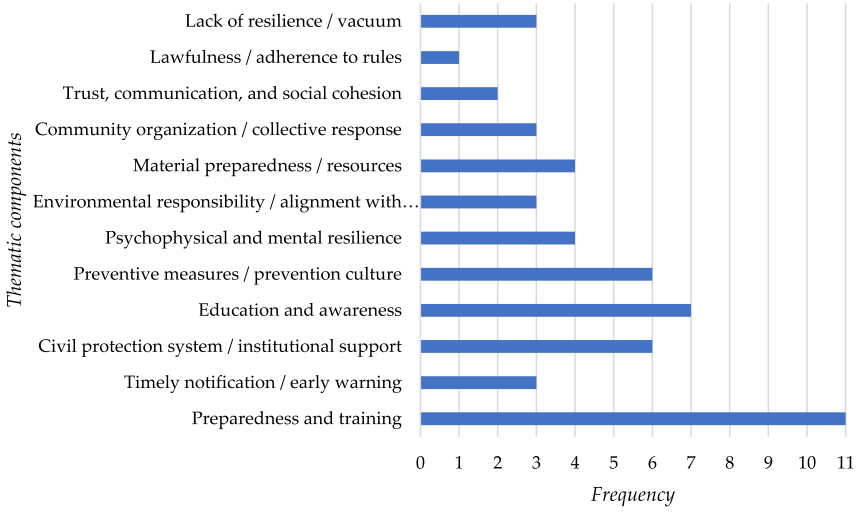

Figure 4: Frequency of thematic components identified in respondents' definitions of citizens' resilience, based on structured qualitative coding of narrative answers.

demanding conditions. Conversely, two respondents (10.5 %) gave negatively assessed scores of 3 or lower, but with complex explanations involving social, institutional, and structural factors. They cite the lack of environmental awareness, construction chaos, dysfunctional institutions, and the population's psychological vulnerability as critical obstacles to the development of resilience.

Notably, 84.2 % of respondents (16 out of 19) emphasized the roles of education, organization, and communication as key elements of resilience in their explanations. Although these factors are not always directly linked to the numeric score, their responses reflect a clear awareness of the necessity for a systemic approach and strengthening citizens' capacities through training, information dissemination, and participation in planning activities.

These results indicate moderate overall concern, with potential for improvement. Respondents recognize resilience as a dynamic category that cannot be observed in isolation from economic conditions, educational structures, institutional support, and citizens' personal initiative. Overall, the statements reflect a realistic, often self-critical assessment of the current situation, providing a valuable foundation for designing targeted risk management measures and strengthening social resilience (Table 4 and Figure 5).

The analysis of responses from 19 participants regarding citizens' knowledge of disasters indicates a dominant perception that this knowledge is underdeveloped and unevenly distributed across generations, experience, and types of disaster. Most respondents emphasize that citizens' knowledge is primarily based on personal or collective experiences from previous events, while formal education in this field has been significantly neglected. A total of 68.4 % of respondents (13 out of 19) assessed citizens' knowledge as low to average, frequently citing a lack of education, removal of relevant school programs, insufficient practical training, and neglect of the systemic need for learning in regular conditions rather than only during crises. A particularly critical view is noted regarding educational policies that have led to the discontinuation or marginalization of content related to protection and rescue in primary and secondary schools (Table 5).

Although a minority, 21.1 % of respondents (4 individuals) express moderately positive opinions, stating that citizens possess solid knowledge, particularly regarding natural disasters that are more common and directly experienced. However, even in such cases, knowledge is recognized as more experiential than systematically developed, and knowledge about technological, industrial, or complex risks is significantly lower. Only one respondent (5.3 %) considers citizens' knowledge to be at an enviable level, citing practical examples of good responses during floods in their municipality.

Generational differences are noticeable: 31.6 % of respondents (6 individuals) explicitly state that older generations are better prepared, either due to former school subjects and civil protection education, or due to life experience, while younger generations are perceived as insufficiently educated, uninterested, and institutionally neglected. In addition, more than one-third of respondents (36.8 %) cite systemic shortcomings as the primary cause of low knowledge levels – insufficient investment in training, limited local government budgets, formality in program implementation, and the absence of modern, citizen-oriented communication channels.

A total of 42.1 % of respondents (8 individuals) indicate that citizens are better informed about past disasters that more frequently affect their area, such as floods, fires, or epidemics. In contrast, knowledge about rare or complex

Table 4: Analysis of respondents' answers regarding the understanding of citizens' resilience: What is your overall opinion about the level of citizens' resilience in responding to disasters?

ID	Key segments of the responses
1	My overall opinion is that, despite everything, citizens are relatively resilient in the face of disasters. In every segment, there is a certain level of implementation of measures by individuals, institutions, and the state. The resilience level rating is 7
2	I repeat: "Every era has its burden," and today's era is highly complex – tell any young person who spends time blocking streets or schools that they should learn how to act in a disaster situation, and… I would not want to be in your place. My rating is 3
3	The level is low and barely at 3. It is low because there is no awareness among either citizens or local authorities
4	The level of citizens' resilience is average 5, because they primarily rely on the system to protect them
5	My rating is 6. There are many factors at the individual and local government levels that affect disaster resilience. Regardless of certain qualities, all factors must be viewed together because they influence each other
6	Citizens' resilience is at a commendable level. I support my view by noting that people survive wherever a disaster occurs. My rating is 8
7	My rating is 6. Citizens are incompletely resilient to disasters. One element is always missing – whether it is training, financing, organization, or regulations in the relevant field
8	Citizens' resilience is still good. New generations do not know how to cope, nor do they have the necessary knowledge about disaster response. Therefore, the resilience level is 5
9	Every citizen should know, based on their abilities, what their role is in an emergency. The level of citizens' resilience in the municipality is 8
10	The level of our citizens' resilience is quite high, as demonstrated most clearly by their response during the COVID-19 pandemic compared to that of citizens in more developed countries. From 1 to 10–8
11	Citizens' resilience in responding to disasters is weak. It is necessary to train the forces of the protection and rescue system: wardens, citizens, and civil protection units in municipalities to take active participation both in the preventive phase – to prevent disasters – and during events that cannot be prevented, as well as in the recovery phase to create conditions for normal life, work, and functioning. Resilience: level 4
12	The level of resilience continues to lag behind the times when civil protection was organized, funded, and prepared. Therefore, it relies more on ad hoc solutions by competent and associated state authorities and leaders who adapt to each specific disaster. When state authorities show initiative, citizens respond positively and often offer better solutions and proposals than the authorities due to support an appropriate disaster response. I assess the resilience level as 8
13	Citizens are aware of the danger of disasters and their possible consequences. The resilience level is 6
14	"3 is my rating. Citizens are 'spoiled' and do not respect the environment in which they live"
15	"Very poor, for several reasons, including that many channels are clogged and water causes damage, as well as the fact that houses are illegally built on riverbanks. Citizens are not sufficiently educated, and there is great disinterest. They mostly think that someone else should prevent and respond at a given moment. Level: 3"
16	Citizens' resilience to disasters is below the desired level. The first reason is the low level of environmental responsibility and limited knowledge of protection against natural hazards. The second reason is that decision-makers succumb to the demands of interest groups (construction of unsafe structures, building in riverbeds, redirecting watercourses, placing watercourses in pipes, affecting groundwater…). Preventive actions by authorities are insufficient; the training of emergency management staff and civil protection wardens is weak; the process of forming and equipping civil protection units is slow; and citizens are insufficiently informed about behavior and procedures in the event of various hazards… The overall resilience level is 3
17	A large number of older citizens received civil protection training during schooling. Young people do not even know what that is. Rating: 7
18	Considering the increasingly frequent challenges we face – mainly floods in our area – citizens are becoming more aware of the consequences and take preventive measures within their abilities. Year after year, people living in areas prone to flooding try various ways to defend themselves. Of course, there are also those citizens who do nothing to prevent significant damage but wait to receive compensation. The rating is 7
19	Insufficient individual resilience in an economically underdeveloped society. Insufficient information about risk. Inability to cope, resistance to change, lack of adaptability, and flexibility of citizens. Most people are not inventive or innovative; they seek protection from the state. Economic and financial resources are much more concentrated in urban areas and major cities. Citizens are not prepared for disasters; they recover with difficulty, are prone to depression, and are easily susceptible to post-traumatic stress. Citizens' faith and hope are shaken, and great fear prevents the implementation of preventive and other appropriate measures. Citizens' resilience level is 4

disasters is significantly lower. Additionally, several respondents (15.8 %) indicate that the media have become the primary source of information, but note that this is insufficient, as media messages are neither systematic nor oriented toward practical skill-building.

Based on the collected responses, it is concluded that citizens' knowledge about disasters is perceived as insufficient, unstructured, and unevenly distributed within the population. Many respondents strongly emphasize the need to restore formal education in this field, to introduce regular public awareness campaigns, to organize local drills, and to include citizens in institutional protection mechanisms. There is explicit agreement that knowledge is the foundation of resilience, but that without systemic support

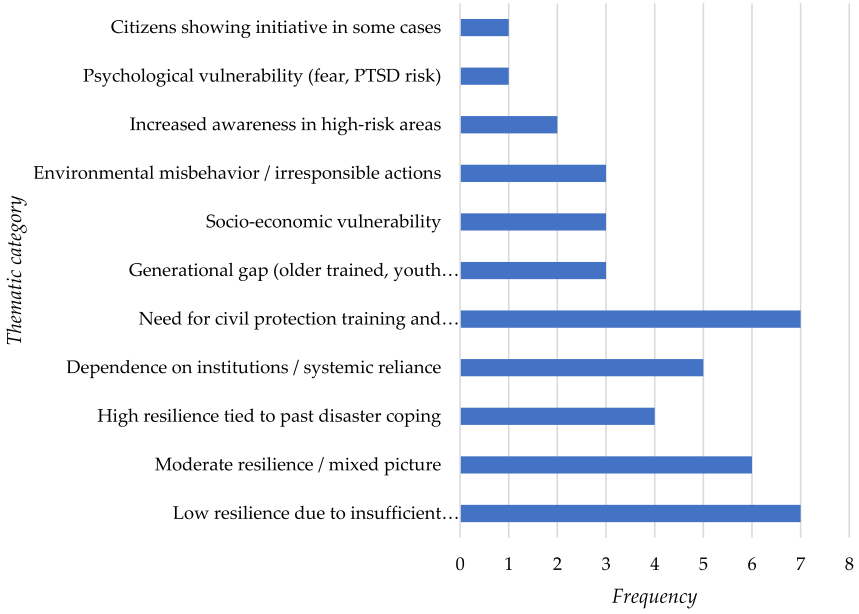

Figure 5: Thematic fraequency distribution of key elements shaping respondents' perceptions of citizens' resilience and summary of assigned resilience scores.

and long-term investments, it cannot reach a level that enables a rapid, efficient, and safe response in the event of disasters (Table 5 and Figure 6).

The analysis of narrative responses from 19 participants regarding the practice of stockpiling food and water as part of citizens' disaster preparedness indicates highly heterogeneous opinions and a predominantly moderate-to-negative view of the overall level of practical readiness among the population. According to respondents, only 26.3 % (5 out of 19) express moderate or high satisfaction with citizens' preparedness, noting that most households possess basic supplies or that citizens are culturally and historically accustomed to always having a minimum amount of essential resources at home. These responses highlight the influence of past collective experiences, such as wars and crisis events, which have contributed to the development of such habits among parts of the population.

Conversely, 63.2 % of respondents (12 individuals) evaluate citizens as being insufficiently aware of the importance of stockpiling supplies, rarely applying this measure, applying it inconsistently, or not applying it at all. It is particularly emphasized that younger generations are unfamiliar with this practice, do not believe in the possibility of shortages, and that crisis-time supply behavior often becomes impulsive, panic-driven, or lacking solidarity. In this sense, several respondents note that extreme behaviors occur in crises – from excessive purchasing and hoarding to complete disregard of recommendations and refusal to take any self-protection measures.

A total of 10.5 % of respondents (2 individuals) explicitly state that the practice of stockpiling is not institutionally guided, that there are no clear, publicly recognized recommendations on the minimum supply quantities per household member, and that the current situation is the result of personal intuition or tradition alone. At the same time, 15.8 % of respondents (3 individuals) emphasize that citizens maintain supplies more due to everyday habits rather than awareness of disasters, indicating a lack of intentional and planned preparedness for emergencies. Some responses – especially those referring to experiences during floods or the COVID-19 pandemic – suggest that citizens can adapt during a crisis, but that this ability stems more from situational reaction than from prior preparedness.

Most respondents believe that more institutional engagement is needed to define and communicate stockpiling guidelines, as well as to provide continuous education to the population, while noting variation in understanding and approach across generations and regions. Respondents frequently link preparedness to overall resilience, noting that insufficient stockpiling practices reflect broader issues – such as a lack of a culture of prevention and low personal initiative.

Based on the collected responses, it can be concluded that while there is some awareness of the importance of stockpiling supplies, this practice exists among a portion of the population, and it is not the result of systematic education or an established cultural norm, but rather of sporadic experiences or family habits. Many respondents emphasize the need to standardize recommendations, run public campaigns highlighting the importance of this measure, and incorporate logistical self-help elements into local protection and rescue plans. Overall, the practice of stockpiling is assessed as insufficient, unplanned, and often neglected,

Table 5: Analysis of respondents' answers regarding citizens' knowledge and preparedness: With respect to citizens' resilience in the event of disasters, how do you assess their knowledge about disasters?

ID	Key segments of the responses
1	I rate it 6 out of 10. It is mainly based on personal experience and does not include the institutional information they should receive before disasters occur. Citizens have less knowledge than resilience when a disaster happens
2	Not to repeat myself – the elderly are elderly and of little use, and the younger ones are of even less… my score again: 3
3	Based on my personal experience during the mentioned emergencies, I assess that citizens lack adequate knowledge in this area and that this topic is not given sufficient attention
4	Within the municipality, citizens' knowledge of disasters is relatively low because they are not frequently exposed to them
5	Citizens have solid knowledge of natural disasters, but less about industrial ones. Because natural disasters are often felt, people fear them
6	Citizens' knowledge is at a commendable level. When we had floods in the municipality, they followed the instructions and understood what they were told
7	Knowledge is not at the highest level. There is a lack of education and training for the population and for local authorities
8	Older generations have specific knowledge, partly from experience and partly from prior education and preparation. Today, young people do not have the opportunity to be trained, educated, or made aware of the importance of disaster preparedness
9	Citizens know the disasters they have experienced or those that occur more often. I believe they would act appropriately in the event of severe weather, fires, and epidemics
10	Knowledge is at a high level, mostly gained from experience, rather than from lectures and theoretical training
11	Citizens are not sufficiently informed or familiar with the causes of disasters, measures to reduce their impacts, and how to behave during such events. There should be more informative TV programs and educational magazines with instructions and suggestions for measures across all phases, with particular emphasis on preparedness and reducing disaster risk
12	Considering years of experience and schooling under different conditions and within state organizations, general knowledge about disasters and knowledge applicable to disaster response has been steadily declining with each new generation. There is no investment, no promotion, and no practice of education, training, and organizing young people into organizations that would interest them while allowing them to gain knowledge and skills about disasters and response actions
13	Citizens are familiar with the potentially harmful effects and consequences of disasters
14	Recently, citizens have been getting more information from the media. However, I believe they are insufficiently educated, and that lectures should be organized to address ways to prevent disasters, to the extent that circumstances allow
15	"Very scarce knowledge… Very little space is dedicated to the education of citizens on disaster situations and types of disasters. Everything is reduced to paperwork and formality"
16	"Low level of knowledge. The reasons are the removal of school subjects aimed at early education of citizens, as well as the insufficient engagement of institutions with this issue under normal circumstances (the problem is addressed only when a natural disaster occurs; otherwise, we do not address it). The establishment of the civil protection system is very slow, making it impossible for citizens to become familiar with the issue and to participate directly in drills Funds allocated for these purposes in municipal budgets are below any minimum due to the lack of understanding of the importance of the protection and rescue system"
17	Generally solid, because of the subjects they received in earlier education. For younger generations, I am not sure how much they have been taught about this and about the need to organize locally through various mandatory and voluntary groups and association systems
18	I rate it 6 out of 10. It is mainly based on personal experience and does not include the institutional information they should receive before disasters occur. Citizens have less knowledge than resilience when a disaster happens
19	Not to repeat myself – the elderly are elderly and of little use, and the younger ones are of even less… my score again: 3

which represents a weakness in the system of individual and community resilience to disasters (Table 6 and Figure 7).

The analysis of narrative responses from 19 participants regarding the existence and effectiveness of verbal and written emergency preparedness plans indicates the presence of formal foundations in the form of documents, but also significant challenges related to their implementation, understanding, and accessibility for citizens. A total of 42.1 % of respondents (8 out of 19) state that plans do indeed exist, are well developed, and are included in documents such as Risk Assessments and Protection and Rescue Action Plans, but that their functionality depends on how they are applied in practice. Respondents highlight the need not only for plan adoption and formal alignment, but also for active training of the actors to whom they apply, as well as regular updates and adaptation to local specificities and risk types.

At the same time, 36.8 % of respondents (7 individuals) express doubt about the practical value of these plans, stating that they are often "only on paper" or part of a bureaucratic framework without substantial effect. These respondents point out that in real situations, improvisation is often used, that plans are not sufficiently transparent or accessible to citizens, and that institutions do not devote enough attention to their implementation and operationalization. A noticeable perception is that written plans do not reach end users – the citizens – and that citizens lack

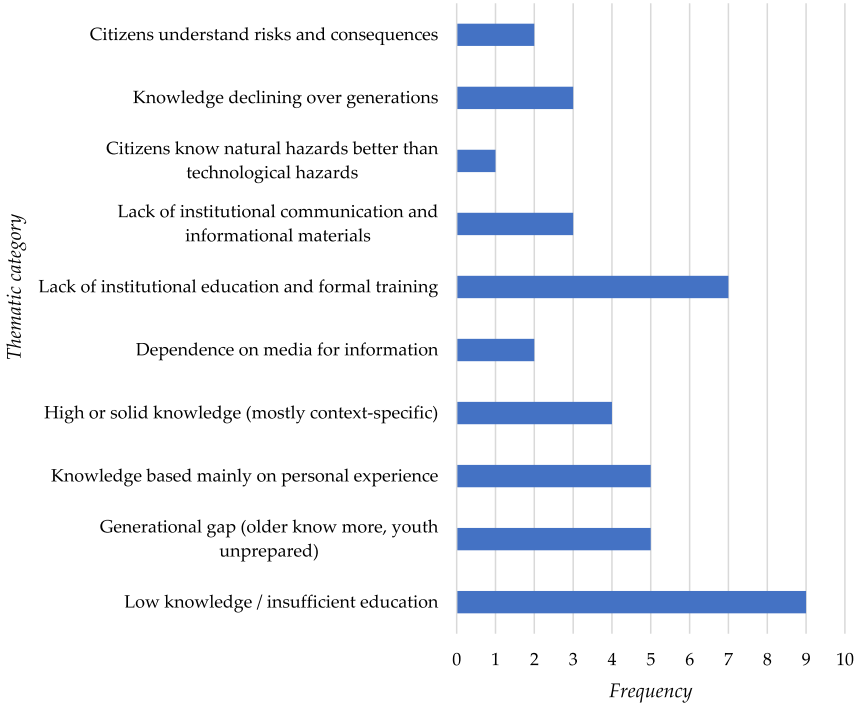

Figure 6: Thematic analysis of respondents' assessments of citizens' knowledge about disasters.

sufficient information about their existence, their content, and their own responsibilities within planned procedures. This view is directly expressed by 26.3 % of respondents (5 individuals), indicating a need for serious intervention in public communication and in citizen engagement in planning processes.

Several respondents (15.8 %) indicate that verbal plans or orders are often more effective in practice, as they allow faster adaptation and better understanding by local communities. However, they emphasize that verbal instructions must be part of a predefined and communicated scheme, rather than an unplanned reaction. A positive tone is evident in responses from those who claim their municipalities are well organized and that clear roles are defined. However, even in such cases, the condition "if the plans are implemented" is stressed. It is also noted that the specificity of each disaster cannot be fully captured by plans, which limits their applicability in unpredictable situations.

A specific segment of responses refers to the lack of transparency and public availability of plans, mentioned by 21.1 % of respondents (4 individuals), who suggest that written plans should be displayed in visible places, made public, and communicated in an accessible manner. Although most respondents acknowledge the existence of plans at the institutional level, only a small number believe these plans are truly operational, reflected in citizens' consciousness, or implemented through concrete activities.

Overall, the responses indicate that the emergency planning system exists in a formal sense but lacks functionality in implementation, training, communication, and practical application. Respondents most frequently criticize the lack of enforcement of existing plans, insufficient citizen awareness of procedures, and poor involvement of the local population in plan preparation and execution. In conclusion, planning is perceived as a necessary but insufficient condition for resilience, with a clear emphasis on the need for systematic education, strengthening institutional accountability, and increasing transparency in risk management processes (Table 7 and Figure 8).

The analysis of narrative responses from 19 participants on citizen participation in evacuation drills shows that this form of preparedness is notably low in most local communities. As many as 68.4 % of respondents (13 out of 19) state that in their municipalities, there are no organized evacuation drills in which citizens actively participate, or that such activities exist only on paper, without implementation in the field. Many responses repeat that drills are not part of regular practice, that local governments do not organize such events, and that residents have no opportunity to gain experience through these activities. Respondents frequently associate this situation with a lack of motivation, poor organization, and systemic neglect of preventive training measures.

Approximately 15.8 % of respondents (3 individuals) describe experiences in which citizens respond positively and actively participate in drills when they are organized, but emphasize that such cases are rare. In one case, it was noted that citizens primarily act as observers rather than active participants during drills, suggesting limited practical

Table 6: Analysis of respondents' answers regarding citizens' knowledge and preparedness: When it comes to citizens' preparedness for disasters, how do you assess their practice of stockpiling food and water? Do you believe they are sufficiently aware of the importance of this measure, and to what extent do they apply it in real circumstances?

ID	Key segments of the responses
1	The rating is 5, somewhere in the middle. Younger people absolutely do not know what supplies are and why they should have them. Believe me, you can recognize refugee families who survived the war based on this. Whoever gets burned will be cautious for life
2	To take the situation seriously, they should (unfortunately) find themselves in it… So, citizens have very few personal supplies or none at all
3	This is perhaps the only segment in which we, as a nation, adequately manage. In our municipality, no matter how poor it is, people always have basic supplies with which they can and know how to survive for an extended period
4	Citizens have weak stocks of food and water
5	Satisfactory in my municipality
6	Citizens' preparedness is commendable; they always have some supplies on hand in case of disasters
7	It is not entirely satisfactory. People in our municipality ignore whether they have anything ready for use and how much
8	In our municipality, citizens are not sufficiently prepared for disasters, as evidenced by the recent floods. They do not have supplies that would remain safe during floods and allow a minimum level of functioning until more substantial assistance arrives
9	Every household has food supplies for several days and water supplies for one day
10	Preparedness is generally appropriate, and citizens prepare food and water in time in case of disasters
11	Outstanding response in collecting food and water to help the affected population
12	Stockpiling is subject to spontaneous, momentary panic, in which it is possible to act correctly. However, equally possible to loot and empty certain goods, hoard far beyond need at the expense of others, or to ignore official advice and take no action
13	Citizens ensure necessities for everyday use, which will also be used during disasters
14	They do not think about it and do not believe that shortages can occur in the event of a disaster
15	Due to certain wartime events, that awareness has remained among the people – that food supplies must always exist in the home – but it is not at a satisfactory level
16	Under today's circumstances, citizens' attitudes toward supplies vary and depend on individual approaches to the problem. To ensure a uniform attitude across the entire population, expert institutions need to provide guidance and recommendations regarding supply quantities per person
17	Solid. People in southern Serbia generally live in constant fear of shortages and therefore always have enough food, regardless of its quality
18	During the COVID-19 epidemic, we saw that people were not unfamiliar with the need to secure basic necessities in crises
19	Citizens are aware of the need to stockpile food and water

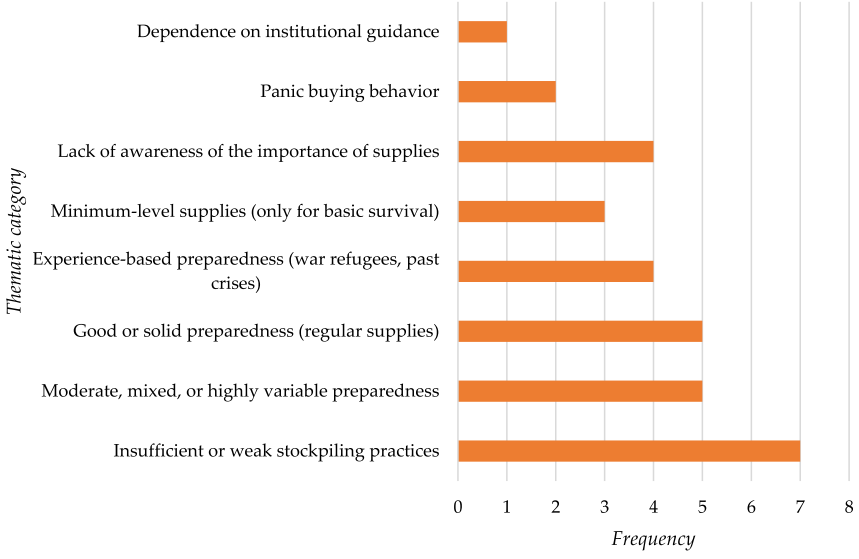

Figure 7: Thematic analysis of respondents' assessments of citizens' stockpiling practices and preparedness for food and water shortages during disasters.

involvement and the possibility that formal drills do not necessarily lead to the development of functional skills.

Only 10.5 % of respondents (2 individuals) believe that if drills were organized more frequently and properly communicated, more citizens would willingly respond and participate, suggesting that part of the problem lies in the insufficient number of drills rather than solely in a lack of interest. Still, the overall impression is that citizen

Table 7: Analysis of respondents' answers regarding citizens' knowledge and preparedness: When it comes to citizens' preparedness for disasters, how do you assess the effectiveness of verbal or written emergency preparedness plans? Do citizens possess such plans, do they apply them, and how functional are they in practice?

ID	Key segments of the responses
1	My rating is 7. Plans exist, but their applicability and regular updating are questionable
2	Plans should be higher-level and modernized
3	I am not familiar with them. We have not used them
4	The effectiveness of verbal or written disaster plans is well developed through the Risk Assessment and the Protection and Rescue Plan
5	Verbal 8, written 6
6	At a commendable level. The municipality undertakes all necessary steps to ensure this. We have ready plans and prepared verbal orders in case of disasters. It is known who should say what
7	It is not entirely satisfactory. The main problem is citizens' understanding of what they are told
8	Plans exist and are effective, but someone needs to implement them. They exist only on paper
9	Every local government unit has disaster preparedness plans (Risk Assessment and Protection and Rescue Plan), which are very effective – they receive approval from the ministry of Interior, Sector for Emergency Management
10	Somewhere around average – if the indicator is the situation during the COVID-19 pandemic in Serbia, there was non-compliance with verbal and written plans, including police curfew violations, etc. Indeed, given the mild sanctions for non-compliance, punitive measures should be revised
11	Disaster preparedness plans are excellent, but, in my opinion, they are not transparent or visible enough to ordinary citizens, to whom they apply in the event of disasters
12	Suppose they are appropriately developed and regularly updated, and communicated to those who need to act on them. In that case, they are of immeasurable importance for immediate response, especially in the early moments and during the dynamic phase of disasters, when there is no time for analysis or communication may be hindered. The existence of plans and their knowledge increases the likelihood that appropriate methods will be anticipated and implemented in advance
13	The plans contain purposeful instructions on how citizens should act during a disaster
14	Written plans should be publicly displayed in visible places or otherwise made accessible to citizens so they can know and apply or follow them when necessary
15	They exist on paper, but the possibility and compliance with their implementation in real situations is questionable, as much is reduced to improvisation
16	Plans often become documents that mainly serve themselves, satisfying formal requirements. Without their operationalization through training and equipping the actors, the system is seriously at risk
17	Effectiveness is solid if the plans are implemented
18	I believe plans can guide both citizens and decision-makers to some extent, but in general, every disaster has characteristics that cannot be fully predicted in plans
19	Protection and rescue plans are not familiar to citizens, and they are very poorly informed about them

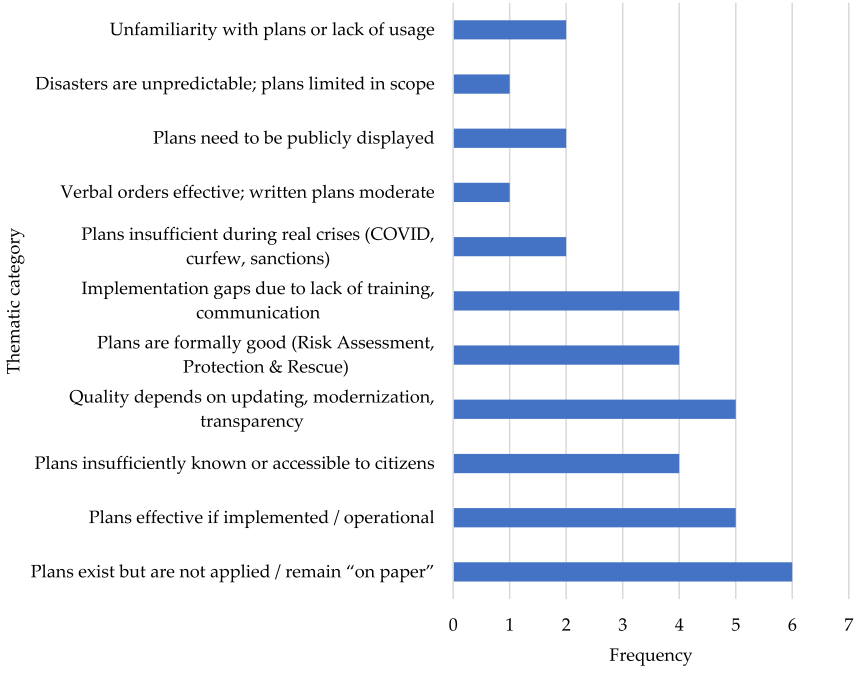

Figure 8: Analysis of respondents' narrative responses on the existence and functionality of citizens' emergency preparedness plans: Verbal and written practices in the context of disaster readiness.

motivation and awareness are insufficient to ensure participation in drills, further weakening community resilience to disasters.

Several respondents state that citizens generally show unwillingness to participate in non-mandatory activities and perceive evacuation drills as irrelevant to them personally. A total of 21.1 % of respondents (4 individuals) critically refer to the institutional aspect, pointing out the lack of initiative from local authorities to initiate drills, resulting in general passivity and a lack of practical preparedness. It is also highlighted that the systemic lack of visible, regular activities leads citizens not to recognize such measures as relevant or important to their safety.

In summary, the responses indicate that citizen involvement in evacuation drills is not part of established practice in most local environments, and that this form of practical training is largely neglected. Respondents most often cite the absence of organized drills as the main reason for citizens' non-participation, adding that even where drills exist, citizens are neither sufficiently motivated nor trained to engage actively. These findings clearly show the need for a systematic approach to promoting, planning, and conducting evacuation drills as a key component of practical disaster resilience. Introducing regular field activities, public simulations, and educational campaigns may raise awareness, build skills, and strengthen cooperation between citizens and institutions during crises (Table 8 and Figure 9).

The analysis of narrative responses from 19 participants regarding citizens' awareness of preventive measures in disaster response reveals varying perceptions and numerous factors influencing readiness to act. Most respondents (63.2 %, 12 out of 19) believe that citizens' awareness is low or very low. These responses are dominated by views that point to a general lack of personal responsibility, reliance on institutions, insufficient education, a lack of collective spirit, and the belief that "it will not happen to us." Several respondents state that citizens react only after a disaster occurs and that under normal circumstances, they undertake almost no preventive actions.

On the other hand, around 26.3 % of respondents (5 individuals) express the view that some level of awareness exists, but that it is insufficient to implement concrete measures or varies depending on previous disaster experience. Such responses usually suggest that fear may be a motivator for short-term reaction, but also that media influence is significant, often in a negative context. It is also observed that awareness does not always translate into practice, indicating a discrepancy between knowledge and action.

Only 10.5 % of respondents (2 individuals) state that citizens' awareness is at a satisfactory or commendable level. These

Table 8: Analysis of respondents' answers regarding citizens' knowledge and preparedness: When it comes to citizens' preparedness for disasters, how do you assess their involvement in activities such as evacuation drills? To what extent are citizens motivated, informed, and willing to actively participate in these forms of preparedness?

ID	Key segments of the responses
1	My rating is 5. Citizens are unwilling to participate in something that is not mandatory. That is why such drills do not involve citizen participation and are conducted only on paper through documentation checks
2	Disastrous (in a very negative context). There is no interest in such activities
3	There have been no organized drills in our municipality's territory. However, it would be wise to organize them given the increased risk of river overflow during heavy rainfall or sudden snowmelt
4	I have no experience with them
5	Satisfactory
6	We have not had evacuation drills
7	It is not entirely satisfactory. More precisely, we do not have drills organized by the municipality
8	There are no organized evacuation drills, nor any other drills
9	Evacuation drills are essential – every citizen should know the evacuation point and the items needed to carry out an evacuation
10	Positive – citizens respond readily to such activities
11	Citizens respond immediately to calls and participate in evacuation drills
12	During drills, mostly as observers
13	I am not familiar with it. In our municipality, there are no evacuation drills that the public can participate in
14	Poor. That is why they are no longer held. Now they are only formal, so-called "on paper" drills, without citizen participation
15	There are no drills or organization by the local government on this issue. Consequently, the population does not participate in such activities
16	It is desirable to involve as many citizens as possible in the protection and rescue system, which emphasizes the importance of this segment
17	There are no drills in our municipality that involve citizens
18	I believe that most citizens have not had the opportunity to participate in a drill, but that many would respond if such drills were organized more often
19	Citizens are very little involved in evacuation drills

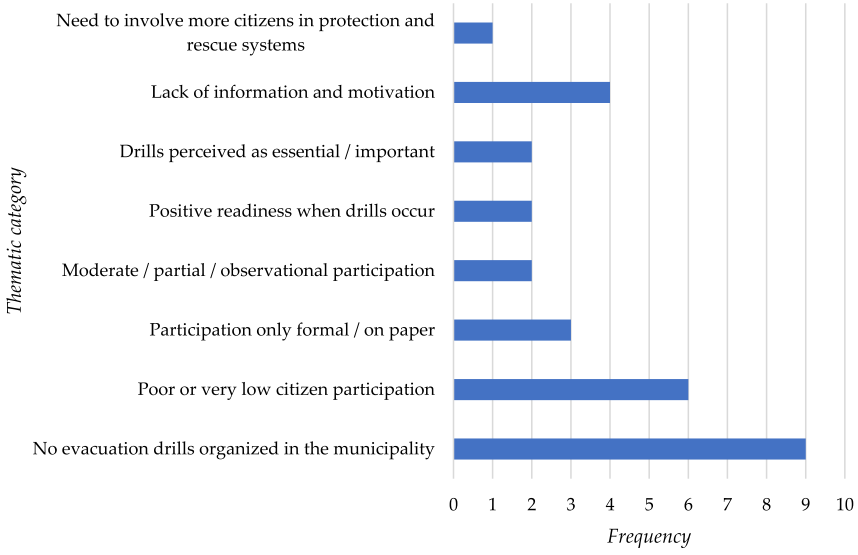

Figure 9: Thematic analysis of respondents' assessments of citizen participation, motivation, and involvement in evacuation drills.

responses particularly emphasize the importance of direct communication, past disaster experience, and a sense of personal contribution to the community. However, even in these cases, limitations related to the ability to undertake measures due to financial or other structural barriers are noted.

Among the key factors influencing awareness, the following were identified: education (mentioned in 31.6 % of responses), media (26.3 %), previous disaster experience (21.1 %), cultural patterns (15.8 %), and institutional support (10.5 %). Some respondents indicate that preventive activities are sometimes met with ridicule, especially when linked to political interests or suspicions of corruption, further discouraging participation.

More than half of the respondents emphasize the need for systematic education, strengthening educational content from the earliest age, and developing relevant informational campaigns. A particular need is recognized for a change in communication approach – with less formality and more concrete messages that reach every individual, tailored to modern communication channels, especially social media.

Overall, the analysis shows that low awareness of preventive measures is one of the key limiting factors of citizens' disaster resilience. Obstacles are not solely due to a lack of information, but primarily to an absence of motivation, trust in institutions, and a sense of personal responsibility. This indicates the need for a deeper, long-term strategy to strengthen the culture of prevention through education, institutional transparency, and community engagement in risk response (Table 9 and Figure 10).

The analysis of narrative responses from the participants (N = 19) identified several key factors influencing citizens' motivation to undertake resilience measures in response to disasters. The responses were categorized into four primary aspects: personal, social, institutional, and economic.

Personal aspects are the most represented, appearing in the responses of 15 participants (78.9 %). Direct threats to life, health, or property are most frequently mentioned as the main drivers of motivation. Respondents emphasize that measures are most often taken only after experiencing danger or damage. Emotional reactions such as fear and stress are also present, as well as a low level of empathy and collective awareness among most citizens. Apathy, lack of interest, and insufficient personal initiative are also highlighted.

Social aspects were identified in the responses of 7 participants (36.8 %). Respondents emphasize the importance of strengthening collective spirit, social responsibility, and community solidarity. A particular focus is placed on the need for educational activities for children and youth from preschool age onward. According to some respondents, systematic education can contribute to the long-term development of a culture of safety and responsibility.

Institutional aspects appear in the responses of 8 participants (42.1 %). The key role of national and local institutions in enhancing citizens' motivation and building trust in the system is emphasized. Respondents highlight the need for clearer, fairer sanctions, better public information, and more active institutional involvement in promoting resilience measures. Some participants express trust in institutional capacity, while others point to inconsistency or absence of institutional engagement.

Economic aspects are present in the responses of 5 participants (26.3 %). Financial incentives, economic security, and access to support for implementing resilience measures are considered important motivational factors. There is a noticeable perception that investment in

Table 9: Analysis of respondents' answers regarding awareness, motivation, and barriers: How do you assess citizens' awareness of specific preventive measures in responding to disasters? In your opinion, which factors influence the level of this awareness, and to what extent does it affect citizens' willingness to undertake concrete protective actions?

ID	Key segments of the responses
1	I rate it 6 out of 10: fear – and only fear for life and health, which is much greater than fear for property
2	There is awareness, but not at a level where residents take measures they could take themselves. They always expect help from others – the municipality or the army
3	Disastrous (in a very negative context). There is no interest in such things. Let me repeat my previous answer
4	Awareness almost does not exist. I generally believe a lack of education and training in this field influences this
5	There is awareness of preventive measures among citizens. The main influencing factors are financial
6	Direct communication through appropriate communication channels
7	Citizens' awareness is at a commendable level, and they do everything in their power to take measures to respond to disasters
8	Training needs to be implemented. There is no awareness that each individual contributes to the community's safety and well-being, and that every individual is important to the system
9	There is no citizen awareness – everyone thinks only of themselves. The conclusion is that in our municipality, given the experience, there is no collective spirit, or very little of it. People acted individually during disasters. Training and the implementation of measures and regulations by local authorities are needed
10	Citizens are aware of preventive measures in disaster response, depending on the disasters they have experienced and the degree of threat
11	Citizens' awareness varies from person to person and largely depends on the community in which the disaster occurs. The most important factor is education from school days
12	Citizens' awareness of certain preventive measures is very low. Nothing is undertaken until a disaster occurs. Everything is expected to be done by someone else. When a disaster occurs, blame is again directed at higher authorities and the local level for doing nothing. The essence is that every capable citizen must do what is within their power and act in an organized and systematic way. The belief that "it will not happen to us" leads to irresponsible, careless behavior
13	Citizens' awareness is influenced by spontaneous factors that may or may not affect the effectiveness of preventive measures. A negative stance toward a preventive measure may exist simply because of suspicion of corruption, regardless of truth or results, and often some ordinary actions are viewed with ridicule – such as clearing watercourses and banning dumping of bulky waste into them, which is the most common cause of repeated flash floods – and in the same places. A factor that can influence citizen awareness is a properly designed and implemented information campaign through social media, and less aggressively through public information media
14	Citizens know about the importance of preventive measures in disaster response. Influencing factors include: Citizens' awareness of the impact of disasters
15	Awareness is at a low level. The media have a significant negative influence. Fear of material damage can have a positive influence, but it is temporary and quickly forgotten once the situation passes
16	Very weak. The overall societal situation and today's lifestyle significantly contribute to the near absence of awareness of disasters and resilience
17	The low level of citizen awareness is caused by cultural patterns promoted by mass media and a low level of education from primary school onward
18	It should be higher. Education and electronic media negatively affect awareness in our municipality
19	I believe many people do not attach importance to preventive measures until a disaster occurs. More investment is needed to promote the importance of preventive measures through the educational system, the media, and the organization of civil protection drills

resilience would be significantly higher if citizens had better financial conditions and accessible support mechanisms.

In conclusion, respondents indicate that citizens' motivation to undertake resilience measures is primarily driven by personal experience of risk and fear of losses (78.9 %). However, respondents also recognize the importance of education (36.8 %), effective institutional action (42.1 %), and economic support (26.3 %) as key systemic mechanisms that can influence motivation in the long term and strengthen societal resilience (Table 10 and Figure 11).

The analysis of responses from 19 participants on the main obstacles to implementing citizens' disaster resilience measures identified a broad spectrum of personal, social, institutional, and economic factors that influence public engagement. The most frequently mentioned obstacle, cited by 47.4 % of respondents (9 out of 19), is economic factors – primarily financial difficulties, low income, limited material resources, and limited municipal budgets. These responses indicate that even when awareness of the need to take action exists, citizens often cannot implement measures due to insufficient financial means.

Lack of knowledge and information was identified as a barrier in 42.1 % of responses. Participants noted that citizens often do not know what they should do or do not understand their role within the resilience system. Additionally, 21.1 % of respondents cited the prevailing belief that "the state is responsible for everything," which breeds passivity and a lack of personal initiative. It is also noted that citizens typically

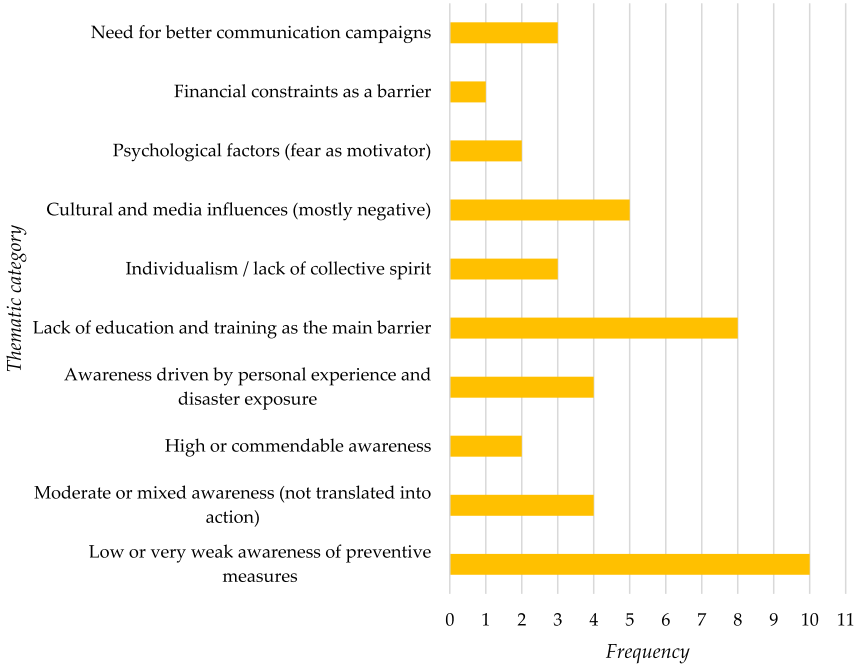

Figure 10: Thematic analysis of respondents' assessments of citizens' awareness of preventive measures, influencing factors, and willingness to undertake protective actions.

expect an institutional response only after a disaster occurs, indicating the absence of a preventive culture.

Psychological and social factors – such as fear, panic, apathy, indifference, and the assumption "it will not happen to me" – appear in 36.8 % of responses. Respondents emphasize that citizens often fail to apply even what they already know in crises, which further complicates the implementation of preventive measures. Cultural aspects are also highlighted, including a lack of community spirit, individualistic behavior, and a weak sense of responsibility toward the local environment.

Institutional barriers were present in 31.6 % of responses and included inadequate system functionality, insufficient sanctions, limited availability of inspection services, the absence of organized awareness campaigns, and insufficient training provided by relevant authorities. Respondents particularly stress that in many cases formal plans exist only "on paper," while their practical application is lacking.

Some respondents pointed to broader sociocultural dynamics as barriers – such as "altered value systems," lack of disaster awareness education in schools, and absence of a "culture of accountability" that would discourage irresponsible behavior.

Overall, the analysis shows that barriers to implementing resilience measures are complex and interconnected. Financial constraints and lack of knowledge are dominant issues, but institutional shortcomings and low motivation are equally important. These findings underline the need for a systemic approach that includes improvements in education, reinforcement of personal responsibility, institutional transparency, and financial support for measures that strengthen community resilience (Table 11 and Figure 12).

The analysis of the responses from 19 participants indicates diverse viewpoints regarding citizens' trust in institutions responsible for disaster management. A majority of respondents (68.4 %) stated that citizens' trust in institutions is conditional, moderate, or partially present, often depending on specific past experiences, political context, or perceived effectiveness of institutional activities. Only 21.1 % of participants ($N = 4$) assessed that citizens' trust is high or satisfactory, usually emphasizing that citizens see institutions as the only realistic source of help in crises, regardless of how functional they actually are in practice.

Conversely, 26.3 % of respondents ($N = 5$) explicitly stated that trust is low or practically non-existent. The reasons cited include beliefs about corruption, excessive administrative formality, minimalist institutional approaches, and the low real-world impact of their measures. It is particularly stressed that trust often does not depend on actual service delivery but on citizens' political stances or prevailing perceptions of public sector performance.

A significant influencing factor on the level of trust, mentioned by 42.1 % of respondents, is citizens' experience with institutional response during crises. Several respondents also pointed to institutional transparency, information accessibility, and the level of engagement during disasters as key determinants of trust. A few participants (15.8 %) highlighted generational differences, noting that older generations tend to have higher trust in institutions, while younger people display greater skepticism.

Table 10: Analysis of respondents' answers regarding awareness, motivation, and barriers: In your opinion, what are the key factors that influence citizens' motivation to undertake specific resilience measures in response to disasters?

ID	Key segments of the responses
1	Droughts, storms, heat waves in recent years, and the polluting recycling plants. All of this motivates citizens to start taking measures. Everything happens only when they feel the consequences of something, never before that
2	Lack of interest, which kills motivation. Citizens will not take measures on their own unless they are forced to
3	I am not sure, perhaps if they had more money
4	The most significant influence on citizens' motivation to undertake certain resilience measures in response to disasters is immediate danger. Only then do they realize that it concerns them and their lives
5	The more directly they are threatened, the more motivated they become
6	Citizens' motivation is commendable – faith in their state and its institutions
7	The attitude of the municipality toward the population, but also the attitude of the population – individuals – toward the community
8	Education influences motivation. It is necessary to start working on this already in primary schools. Only in that way will people be motivated to undertake measures to increase resilience, whether it concerns collective spirit, stockpiling supplies, or participating in drills
9	Citizens are motivated to undertake certain resilience measures in response to disasters because they protect their own lives and health, the lives and health of their loved ones, and their property
10	The seriousness of potential damage, the value of endangered property, and similar factors
11	Ignorance, irresponsibility, lack of discipline, lack of interest. If financial support existed, participation and motivation would be higher
12	Motivation is influenced by a well-designed information campaign and by extremely assertive, fair, and effective misdemeanor and criminal action by investigative and judicial authorities, accompanied by a special information campaign about offenders and violations in the implementation or non-implementation of resilience measures
13	Protection of human safety, the environment, and their property
14	They are not ready unless the disaster personally affects them. Motivation is fear for one's life or property. There is no other motivation – neither social nor collective responsibility
15	There is no system and no functioning institutions. The greatest motivation is punishment, which must be adequate for any form of endangerment, abuse, or usurpation. Also, the greatest motivators for the population are endangered lives and property, but only when a disaster has already occurred
16	Raising the reputation of the community and collective values while reducing the promotion of individualism and self-sufficiency. Influencing individuals' value systems through various activities
17	Citizens' motivation, unfortunately, is not directed toward the community and society, but only toward protecting life and personal property. So that is the only thing that influences motivation. Empathy is not at a high level
18	Citizens who are directly affected by recurring disasters over the years are the most willing to prevent the occurrence of a hazard so they do not face stressful situations again, along with the need to recover from and remediate the consequences
19	It is necessary to systematically guide citizens through education in preschool, primary, and secondary schools to increase awareness. An adequate level of awareness and knowledge is sufficient motivation, along with material support and economic growth of society and the local community

Interestingly, several respondents linked citizens' trust to expectations of financial assistance after a disaster (10.5 %), rather than to preventive or operational activities. This points to a passive form of trust that is driven by institutions' role in recovery rather than in risk reduction or preparedness.

Overall, the analysis confirms that citizens' trust in institutions is unstable and often conditioned by individual experiences and the general social climate. Insufficient transparency, limited effectiveness, and the politicization of institutional action represent significant obstacles to building lasting trust. At the same time, during emergencies, institutions remain the expected and dominant actors of intervention – indicating a clear need to improve their visibility, consistency in performance, and communication with citizens (Table 12 and Figure 13).

The analysis of responses from 19 participants indicates that most recognize the need to use multiple communication channels to ensure timely, reliable, and comprehensive dissemination of information to citizens before and during disasters. The most commonly recommended channels include television (68.4 %), social media (73.7 %), SMS notifications (57.9 %), radio (36.8 %), as well as local online portals, mobile applications, and direct communication through civil protection wardens.

Respondents emphasize that a multimodal approach is essential due to the heterogeneous structure of the population. Older generations rely more on traditional media such as television and radio, while younger generations tend to get information through social media, mobile apps, and online platforms. SMS notifications are highlighted as an essential tool because of their direct reach and effectiveness

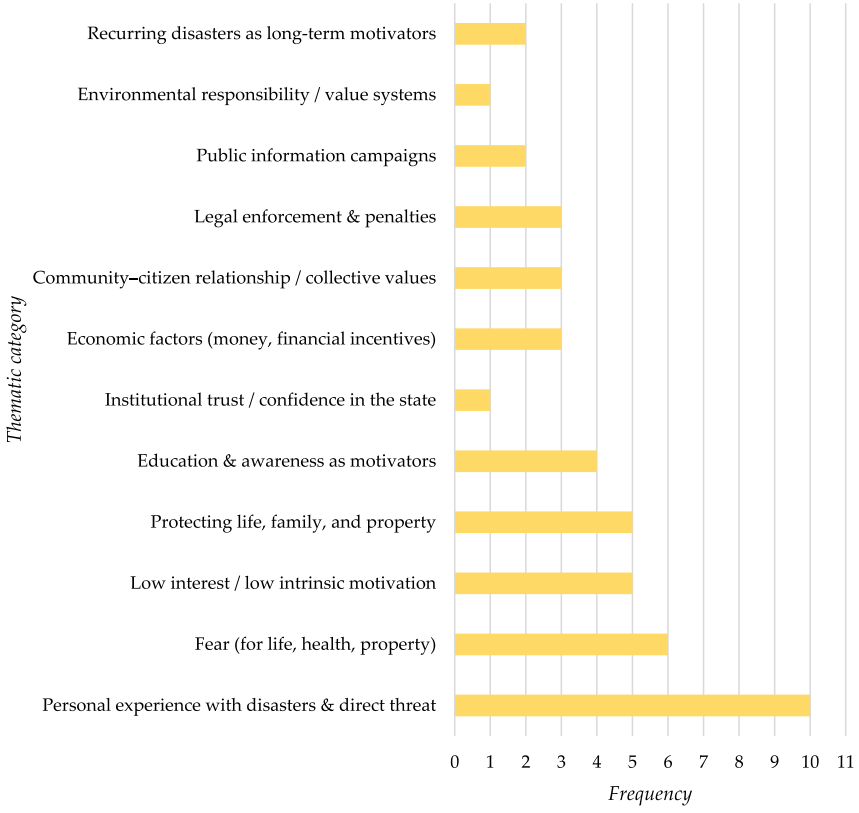

Figure 11: Thematic analysis of key factors influencing citizens' motivation to undertake disaster resilience measures.

in emergencies, with 42.1 % of respondents considering this channel the most reliable for urgent messages.

Approximately 26.3 % of respondents emphasize the importance of localized, personalized communication networks, such as civil protection wardens and Viber groups, noting that in smaller municipalities, direct contact and field presence are significant. Additionally, 21.1 % of responses emphasize the need to tailor information to different age and social groups in the community, demonstrating awareness of varied access to information.

Several respondents warned about the importance of information quality and credibility. It is noted that media must be timely, reliable, and consistently aligned with official sources to avoid spreading panic or misinformation. Public forums and educational events are also proposed as supplementary – yet important – communication channels during normal conditions.

Overall, the analysis shows that an integrated communication approach – combining digital and traditional media with direct field communication – is recognized as the most effective model for timely informing citizens across diverse risk contexts. Such an approach should be based on the principles of accessibility, reliability, and audience adaptation, which represent essential prerequisites for building trust and ensuring adequate response in emergencies (Table 13 and Figure 14).

The analysis of responses from 19 participants on the adequacy of institutional communication with citizens regarding preparedness and response measures for disasters reveals divided opinions. A slight majority of respondents (52.6 %; N = 10) stated that institutions do not provide timely, clear, and accessible information, while 47.4 % (N = 9) believe that institutions do provide adequate information – at least within their current capacities.

Among those expressing dissatisfaction, key issues identified include formalism without substance, passive communication, outdated and bureaucratic messaging, and a lack of consistent, purposefully designed awareness campaigns. Several respondents noted that communication is often either politically influenced or overly technical, making it difficult for the general population to understand and accept the messages conveyed. Additionally, 21.1 % of respondents emphasized that institutions do not sufficiently utilize modern communication channels – particularly social media – which are essential for effectively reaching younger demographics.

On the other hand, respondents with more positive perceptions (N = 9) predominantly come from communities where institutional engagement is more proactive and collaborative. In such contexts, communication is better organized within available resources, and citizens are at least partially familiar with emergency procedures, which enhances their readiness to respond.

Table 11: Analysis of respondents' answers regarding awareness, motivation, and barriers: In your opinion, what are the main obstacles that prevent citizens from implementing specific resilience measures in response to disasters? Please explain your opinion, taking into account personal, social, institutional, and economic factors.

ID	Key segments of the responses
1	Negligence and carelessness. It all begins with the attitude: "It probably will not happen to me"
2	The current situation we are in, meaning the completely altered scale of social values. Because of this, citizens do not consider the possibility of a disaster happening to them
3	Lack of education in this field, as I already mentioned above
4	The biggest obstacle for citizens in implementing specific resilience measures is finances
5	Financial obstacles. Low income and limited local government resources for these matters
6	There are no obstacles to implementing measures that contribute to resilience in local communities within our municipality
7	Panic. The population loses rational thinking in critical situations, even forgetting what they know, and behaves completely lost
8	Lack of knowledge, lack of interest. This is most evident during emergencies, when people do not know how to act and are unwilling to learn
9	The main obstacle to citizens implementing specific resilience measures in response to disasters is a lack of financial resources
10	Lack of planning, organizational structure, and material resources
11	Finances. If a way were found to support the implementation and execution of preventive measures financially, disaster risk would be significantly reduced. Clearing and maintaining canals and streams would prevent overflows and, consequently, flooding of households and agricultural land. Increased field engagement by agricultural engineers and community meetings would help educate farmers on how to reduce damage from high temperatures, droughts, hail, and strong winds
12	Ignorance, which creates the illusion that someone else is always responsible for resilience measures – ultimately the state – and that nothing should be done until something actually happens, and only then mobilize all forces and spend resources. The lack of an information campaign leads to a situation in which persons, organizations, or settlements that act irresponsibly toward prevention and preparedness – doing the opposite – are not recognized or criticized. As in many other aspects of life, there is a lack of a "culture of shame"
13	Insufficient financial and material resources are required to undertake measures
14	Insufficient information. Citizens live without awareness of disasters. They hear about them on TV periodically, but only in brief reports, not through educational programs that would actively influence the population
15	The absence of a functional system, the lack of penalties, and the inadequate performance of inspection services. Also, financial conditions and material limitations
16	Lack of knowledge, lack of interest, and lack of time to engage in socially beneficial activities, as well as weak promotion of personal opportunities for influencing potential hazards
17	Immediate danger to life, clumsiness in handling specific tools or resources. Often, fear and lack of knowledge are decisive in crises, and people take a narrow perspective. It would be more beneficial if a person decided to take concrete action rather than think about fleeing or moving away from a risky location
18	I believe the main obstacle is insufficient awareness of the importance of applying specific measures
19	Insufficient awareness, insufficient knowledge about risks, hazards, and consequences of natural disasters, an introverted approach, the belief that "this happens to someone else," i.e., lack of understanding of the importance of the local community, cooperation, solidarity, and the common good

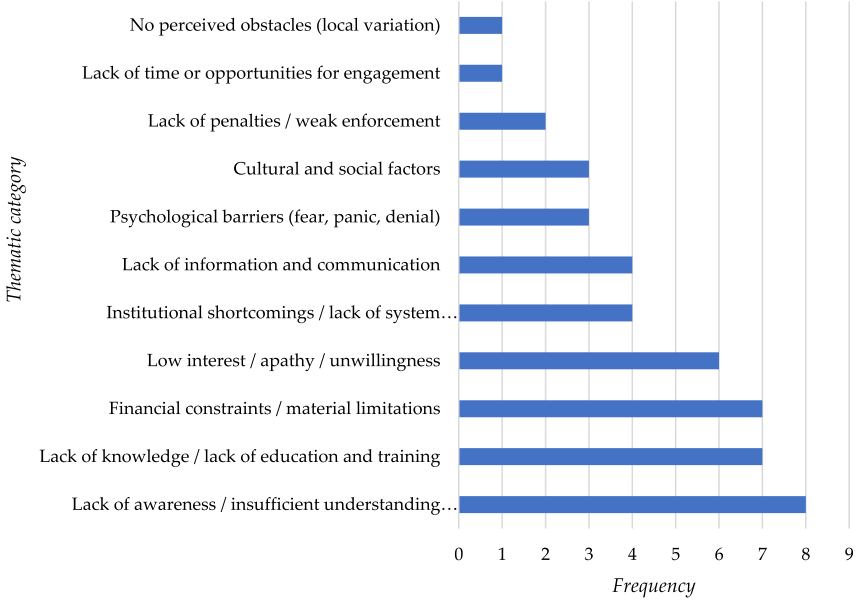

Figure 12: Thematic analysis of key barriers preventing citizens from implementing disaster resilience measures.

Table 12: Analysis of respondents' answers regarding communication and trust in institutions: In your opinion, how much trust do citizens have in institutions when it comes to disaster management? Do you believe that this trust is stable, conditional, or insufficient, and what influences it the most – experience, transparency of institutional work, response efficiency, or something else?

ID	Key segments of the responses
1	Enough. They always rely on institutions; whatever happens, they expect a response from them
2	In smaller communities, they still trust institutions, but in larger ones, absolutely not. Whether this depends on the current political situation or on the institutions' actual performance, I do not know
3	They have minimal trust
4	Average
5	To a great extent, they rely on institutions, and therefore trust is high – not because of quality, but because of the awareness that only institutions can help, no matter how effective they are
6	Citizens' trust is at a commendable level
7	The population has partial trust. This is due to previous negative experiences and the fact that institutions are viewed through a political lens, not as organizations that exist to serve the people regardless of which political option leads them
8	Older generations have trust because of past experiences and the way institutions operated. Younger generations do not understand the purpose of institutions and, given everything that is happening, do not perceive that institutions should or could help
9	Citizens trust the Municipal Emergency Management Headquarters and the forces under its command in case of danger (public utility companies, volunteer fire brigades, civil protection wardens, and deputy wardens…)
10	Fairly high trust
11	Trust is at a satisfactory level. The problem again lies in institutions' insufficient financial capacity to implement planned measures and tasks.
12	Expectations toward institutions are maximal, while initial trust is mostly minimal. As the situation develops, and depending on the institutions' response, trust – as far as I know – is usually fully restored
13	To obtain an objective answer, ask the citizens. Trust depends more on politics than on the actual function that municipal authorities essentially perform and implement
14	Trust is low because institutions implement measures and procedures only to the extent required by law and obligations, so that their leaders are not personally held responsible
15	At a minimal level or even negative. Citizens have at least some trust only in the Serbian Army
16	They lack sufficient trust due to the general perception of corruption at all levels
17	Average – they honestly do not expect much. However, later anger and blame are directed toward the local government without considering that they themselves did not take personal measures that they should have, not only because they were obliged to, but because common sense dictates it
18	I think citizens expect the most help from institutions in the form of financial assistance to repair damage from disasters. However, institutions do make efforts to implement preventive measures within their capacity and what is financially feasible
19	Accordingly, citizens do not have much trust in institutions and generally expect financial support from them

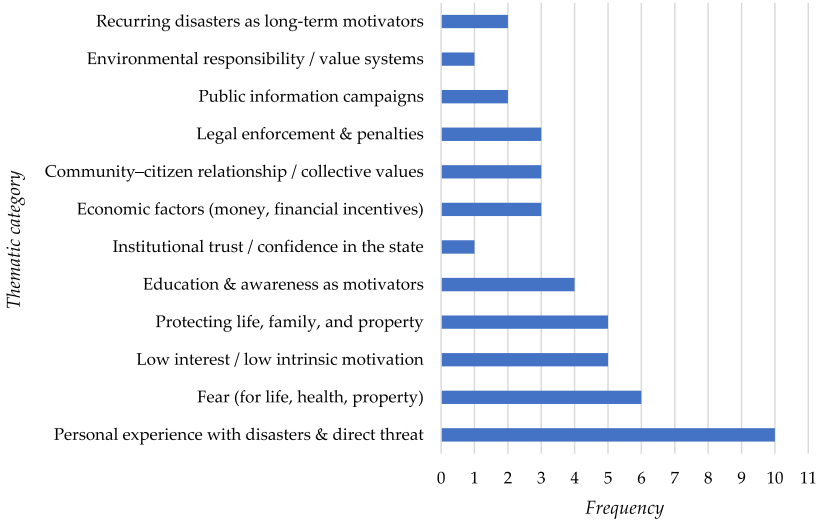

Figure 13: Thematic analysis of key factors influencing citizens' motivation to undertake disaster resilience measures.

Moreover, several participants (26.3 %) highlighted that the adequacy of communication is strongly linked to institutions' financial capacity and the specific characteristics of the local environment. They also underscored the

Table 13: Analysis of respondents' answers regarding communication and trust in institutions: In your opinion, which communication channels are the most effective for informing citizens before and during disasters (television, social media, radio, SMS alerts, etc.)?

ID	Key segments of the responses
1	Include all channels, given the diverse population structure, which uses different communication means depending on age
2	Primarily local news portals, and then all types of social media
3	Social media, the municipal administration website, local media portals, and notifications through civil protection wardens and similar channels, given that this is a small municipality
4	All of the above, as well as the involvement of civil protection wardens and deputy wardens in settlements, are to inform their communities
5	Local TV stations and social media
6	TV, social media, radio, and SMS notifications
7	SMS notifications, social media
8	Social media
9	Everything listed is effective; however, SMS notifications are perhaps the most efficient
10	SMS, applications, telephone, and TV
11	Announcements through local radio and TV stations, through Viber groups with wardens, and on social media
12	Social media – if the information sources are relevant in terms of number of followers, then TV, if the reports are credible, indisputable, and up to date (informative), while also following what is happening on social networks. Radio and SMS – to support the first two media or to take over if, for any reason, the two most influential media are not widely accessible
13	SMS notifications
14	TV and the Internet
15	TV, SMS, and then social media
16	Every form of communication is important because the media are represented differently among various demographic groups
17	TV
18	All the listed channels are appropriate for a specific population category. In other words, communication methods should be tailored according to age groups
19	Television, radio, social media, SMS notifications, organizing community forums and conferences – from the lowest local level to professional gatherings at the national level – and informing citizens as much as possible, daily

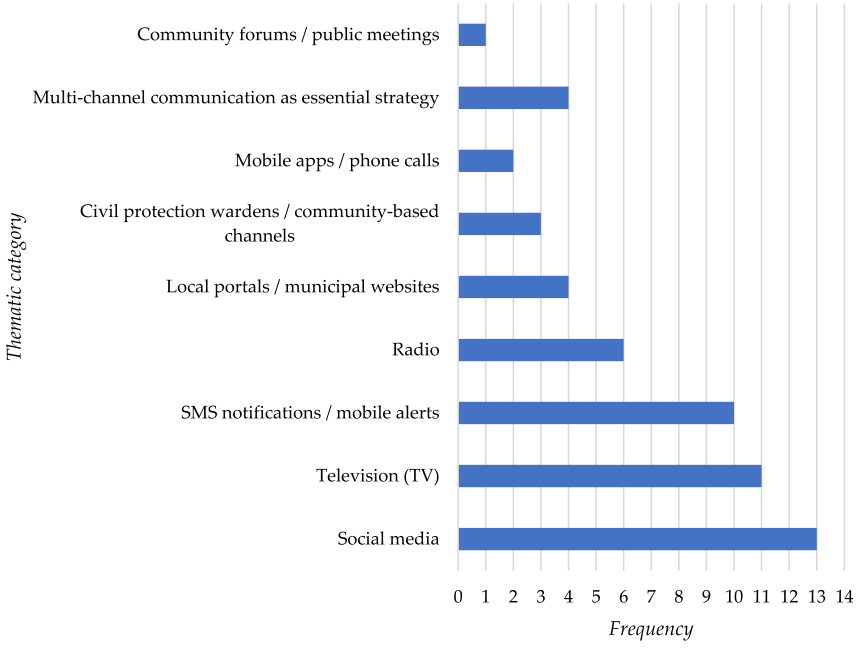

Figure 14: Thematic analysis of preferred communication channels for disaster Information.

need for continuous public education and for simplifying information so it is accessible to all citizen groups – including the elderly and socially vulnerable populations.

Overall, the findings indicate substantial room for improving institutional communication through the adoption of proactive and innovative approaches aligned with modern communication trends and the diverse needs of different

social groups. Effective communication is recognized as a fundamental prerequisite for strengthening community resilience and increasing trust in institutions within the context of disaster risk management (Table 14 and Figure 15).

The analysis of responses from 19 participants regarding social capital and the level of citizen connectedness during emergencies shows that most respondents (63.2 %; N = 12) believe that citizens communicate and cooperate significantly during crises. These responses indicate spontaneous solidarity, engagement through civil protection wardens, local community structures, and online groups, as well as a traditional tendency toward self-organization in critical moments. It is particularly emphasized that in smaller communities, cooperation occurs more quickly and directly, which is explained by closer interpersonal relations and personal acquaintance (21.1 %).

Table 14: Analysis of respondents' answers regarding communication and trust in institutions: Do you believe that institutions adequately inform citizens about preparedness and response measures in the event of disasters?

ID	Key segments of the responses
1	No. Institutions only comply with formal requirements; there is no proactivity
2	No. Communication could always be better and more active
3	Yes. Specifically in our municipality, based on my personal experience, I believe so
4	Yes
5	Yes
6	Institutions in our municipality adequately inform the population
7	Yes
8	Institutions provided insufficient information
9	Yes
10	No, a good practice example should be taken from a country with better results
11	I believe institutions regularly inform citizens, but not sufficiently
12	Communication is inadequate, outdated, bureaucratic, and not separated from other politically motivated messaging, which further prevents it from reaching parts of the population. Communication still resembles the self-management socialist era of the 1980s, even when using the internet. Informational campaigns and promoting proper attitudes and values about preparedness and disaster response on social media remain unfamiliar concepts
13	They inform adequately
14	No. Institutions do not conduct adequate communication, neither at the local nor at the national level
15	Insufficient – it should regularly and appropriately reach every individual
16	No
17	Yes. To the extent that it falls within their jurisdiction and is financially feasible to organize
18	I believe institutions could communicate more clearly and in a timelier manner about the threat of a disaster
19	Communication with citizens about the need for risk assessment, protection, and rescue planning, as well as appropriate behavior in crises, is generally insufficient

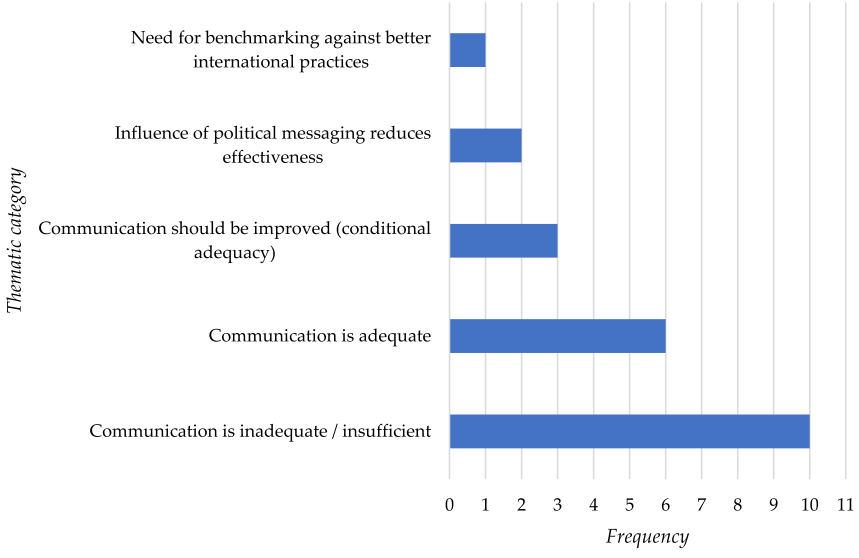

Figure 15: Thematic analysis of institutional communication adequacy in disaster preparedness and response.

However, 36.8 % of respondents (N = 7) reported limited or insufficient communication and cooperation among citizens. The reasons provided include preoccupation with personal issues, a lack of formalized communication mechanisms, and insufficient initiative and coordination on the part of institutions. In some cases, cooperation exists only in moments of imminent danger, while long-term, systematic connectedness is lacking.

Examples of good practice include communication through phone calls and the warden network, coordination via local community councils, and volunteer engagement by individuals in villages and small settlements. Respondents also stated that with adequate institutional support – training, and provision of resources – citizen participation would be much higher. The role of local media and online platforms in maintaining communication during emergencies is highlighted in 26.3 % of responses.

Overall, the findings show that the potential for collective action and solidarity exists, but structural and organizational factors often condition its full realization. Strengthening social capital through formalizing communication channels, promoting joint activities, and educating the community on the importance of collective resilience could significantly improve the local community's capacity to respond to disasters (Table 15 and Figure 16).

The analysis of responses from 19 participants regarding the presence of local organizations and informal networks contributing to community resilience shows that slightly more than half (52.6 %; N = 10) confirmed their presence in their communities. Examples include volunteer fire departments, the Red Cross, citizens' associations, hunting and agricultural associations, mountain rescue services, and environmental protection initiatives. Respondents emphasized that the role of these organizations is not necessarily tied to their primary activities, but to their willingness to respond in an organized manner and provide assistance in crises, where mutual communication and cooperation are key determinants of effectiveness.

Conversely, 47.4 % of participants (N = 9) stated that there are no active local organizations or informal networks

Table 15: Analysis of respondents' answers regarding social capital and community connectedness: To what extent do citizens in your community communicate and cooperate when emergencies occur?

ID	Key segments of the responses
1	To a great extent, our people generally rely not only on the state but also on their neighbors and relatives – essentially on themselves
2	In smaller communities, communication happens much faster, both through information channels and direct personal contact. In larger communities, that is not the case
3	Given that entire settlements in our municipality have been affected by floods, citizen cooperation is high, both among themselves and with key response actors
4	To a great extent, communication and cooperation occur during emergencies
5	There is room for improvement in this regard. I believe that this segment is not sufficiently developed
6	Communication among citizens is at a commendable level, and this contributes to resilience
7	There is cooperation at both the personal and organizational levels
8	They do not communicate enough
9	Citizens in our municipality communicate well with one another because we are a relatively small community where "everyone knows everyone"
10	Indeed, to a significantly higher level than in everyday communication, primarily thanks to local internet groups and online portals
11	During an emergency, citizens most often communicate by phone with wardens – the presidents of local community councils – and with the Chief of the Emergency Management Headquarters and the Commander of the Headquarters
12	The general impression is that the number of potential volunteers and those curious to help – if they were called upon, trained in what to do, and given sufficient material resources to work with – would be large, at least in the initial phase. In most areas, self-organization, joint action, and mutual communication among citizens have occurred during emergencies. Such behavior is traditionally regarded as positive
13	They cooperate and communicate through civil protection wardens and the Emergency Management Headquarters
14	To the extent necessary to protect property or life if endangered. However, there is no long-term, continuous communication and cooperation regarding disaster preparedness
15	To a sufficient degree – spontaneous and unorganized – though it should be formalized and guided by local institutions
16	They try, but are primarily focused on solving their own problems and protecting their own property
17	Through announcements issued by local governments and local media
18	When there is a threat of or an ongoing emergency, the central coordinating body is the Emergency Management Headquarters, which comprises representatives from the leading institutions responsible for emergency response. They maintain communication among themselves and with the presidents of local community councils. Citizens communicate with their council presidents to inform them, warn them, and exchange information, which is then forwarded to the Emergency Management Headquarters
19	There is solid cooperation and communication aimed at addressing existing challenges

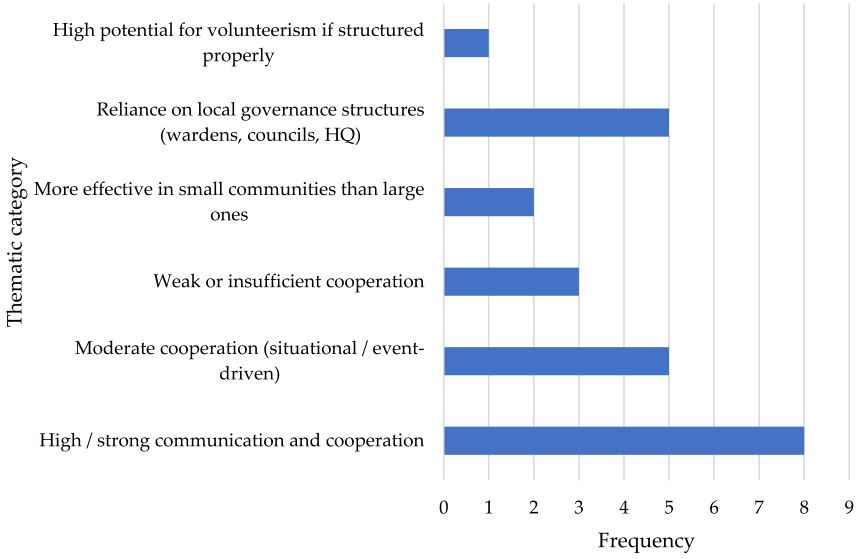

Figure 16: Thematic analysis of community communication and cooperation during disasters.

in their communities that could significantly contribute to resilience. These responses highlight a firm reliance on institutional structures, most often referring to the Emergency Management Headquarters as the only organized actor. Some respondents also expressed doubts about the capacity of existing associations, noting their limited functionality even in regular activities, which further reduces their potential responsiveness in emergencies.

A notable finding is the recognition of latent potential for spontaneous self-organization in crises – mentioned by 5.3 % of respondents – noting that such structures can form ad hoc, but that their effectiveness depends heavily on institutional cooperation and adequate support.

Overall, the results indicate that while potential exists, there are substantial differences in the development of local networks across communities. Strengthening community resilience requires formal recognition and support of these organizational forms, as well as active engagement of the civil sector in planning, training, and disaster response processes (Table 16 and Figure 17).

The analysis of responses from 19 participants regarding local community awareness of environmental factors that may influence disaster risk indicates substantial diversity in perceptions and experiences. A majority of respondents (63.2 %; N = 12) reported that community awareness does exist but is insufficient or limited in its practical implementation. These responses emphasize that communities recognize risks such as floods, landslides, and droughts, yet the undertaking of preventive measures is often constrained by financial resources (participants 7, 8, 11, 14, 15, 18). In several cases, a clear gap is noted between awareness and concrete actions to reduce risk exposure.

Notably, a portion of respondents (36.8 %; N = 7) highlighted that communities previously affected by disasters are significantly more aware of these environmental factors (participants 4, 5, 6, 9, 10, 19). These findings indicate that personal experience strongly influences risk perception and motivates awareness-building.

On the other hand, nearly half of the participants (42.1 %; N = 8) stressed that awareness is insufficient, especially in areas where disasters are not frequent or where risks tend to be underestimated (participants 2, 3, 10, 16, 17). A concerning insight from some responses (10.5 %; N = 2) points to systemic shortcomings in institutional approaches to environmental risk management. It was emphasized that obvious causes of floods and landslides are neglected – such as inadequate maintenance of drainage systems, culverts, and embankments – while unregulated construction further increases risks (participants 12, 16). This indicates deeper structural problems extending beyond individual or collective community awareness.

Overall, the results show that most respondents recognize environmental risk factors (84.2 %; N = 16), but this awareness often does not translate into practice due to financial limitations and insufficient institutional support. A smaller portion (15.8 %; N = 3) believes that awareness is entirely insufficient or overlooked. To strengthen local community resilience, it is necessary not only to increase awareness further but also to enhance institutional capacities systematically, ensure regular maintenance of critical infrastructure, and actively involve citizens in risk assessment and management processes (Table 17 and Figure 18).

The analysis of respondents' answers regarding the existence and implementation of local environmental protection measures that may contribute to disaster resilience indicates divided opinions. The majority of participants

Table 16: Analysis of respondents' answers regarding social capital and community connectedness: Do local organizations or informal networks exist that contribute to community resilience?

ID	Key segments of the responses
1	Yes, hunting associations and agricultural associations
2	Personally, I think there are none in my municipality
3	They do not exist
4	Yes, there are; specifically, in our territory, these are Volunteer Firefighting Associations
5	Yes. A larger number of associations – regardless of their primary activities – is important, as long as they provide help when needed
6	There are no local organizations or informal networks that contribute to community resilience
7	Yes. All types of associations can contribute to disaster resilience; all that is needed is mutual communication and for an organization or informal group to start acting
8	Here, we only have the institutional Emergency Management Headquarters. There are no other organizations capable of helping. There are local associations that barely manage to carry out the activities for which they were established. Therefore, I believe they would not be able to respond in an organized way during a disaster
9	The Municipal Emergency Management Headquarters contributes most to community resilience because its members come from all entities involved in protection and rescue
10	No, but there is a Disaster Response Plan that is regularly updated and under the jurisdiction of the local Emergency Management Headquarters, which then defines individual actors and their scope of response (medical sector, public utility companies, accommodation facilities, etc.)
11	They do not exist.
12	They always exist. Their role and intention may be positive, but they may also be (unintentionally) negative. If competent institutions do not respond in a timely and correct manner, such organizations or informal networks may emerge spontaneously – even where they did not previously exist
13	Volunteer Fire Brigade, Red Cross, civil protection wardens, and humanitarian associations
14	TV and internet pages. There are no formal or informal local organizations that would contribute to resilience when needed
15	Mountain Rescue Service and several citizens' associations
16	I am not aware of any such communities
17	Yes. Various associations and groups. They can organize more easily and gather to assist the local government in emergencies
18	There is an association in the municipality whose goal is river protection, and therefore, they are also partly engaged in flood protection
19	There are local organizations that contribute to community resilience (e.g., the municipality's Volunteer Fire Brigade), with which we have excellent cooperation. However, we are not sufficiently familiar with the work of other organizations or informal networks that also contribute to community resilience

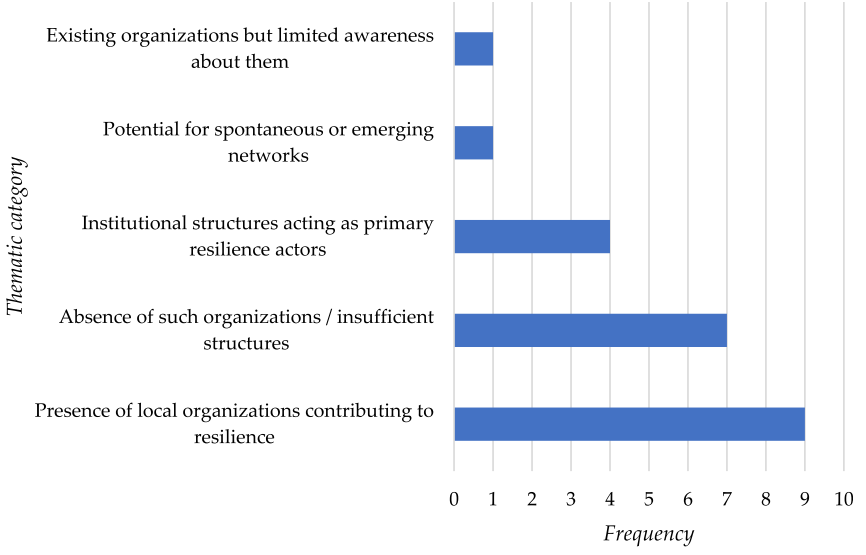

Figure 17: Thematic analysis of local organizations and informal networks contributing to community resilience.

(57.9 %; $N = 11$) stated that specific measures do exist in their communities, most frequently mentioning activities such as riverbed maintenance, construction of retaining walls, prohibition of burning crop residues, waste management, landfill maintenance, removal of illegal dumping sites, and involvement through school and environmental initiatives.

Table 17: Analysis of respondents' answers regarding environmental factors and awareness: In your opinion, how aware are local communities of environmental factors that may influence disaster risk (e.g., landslides, floods, droughts)?

ID	Key segments of the responses
1	Insufficient. There are no forests or reforestation efforts, and waste is thrown into drainage channels, blocking them and increasing the risk of flooding
2	Insufficient (to the extent that they would take personal responsibility to implement measures to prevent such events)
3	Insufficient
4	When directly exposed to such risks, local communities are well aware of the factors that lead to these disasters
5	Those who are directly threatened are aware
6	The local community is highly aware of environmental factors that may influence disaster risk
7	Local communities and those who manage them are aware of environmental factors, but limited financial resources constrain action
8	Local communities are aware of these issues, but the implementation of measures depends on allocated funds for this purpose, and is therefore insufficient
9	There are no landslides in the municipality, as it is a flat area. The risk of flooding is low as well; the Danube River flows only along the edge of the municipality (about 2 km) and is well protected by a levee. Droughts are the biggest threat, along with fires (which often accompany them)
10	Those who have experienced such events are aware and learn from experience. Those who have not experienced them expect they will not occur, relying on that assumption without emphasizing that such disasters can also happen
11	They are fully aware and willing to reduce risks, but do not take action due to a lack of financial resources
12	The factors are considered by a narrowly specialized local body responsible for disasters, which usually fails to instill risk awareness, resulting in obvious recurrent causes being ignored. At the same time, rumors exaggerate other risks with little or no likelihood of occurring. In the municipality, there is a fear of tailings dam failure, but watercourses, culverts, dams, and drainage systems are not maintained – they are destroyed, buried, and degraded by illegal construction. The tailings dam has never failed, yet the municipality is affected by local floods, landslides, and droughts almost every year due to contamination of water sources
13	They are sufficiently aware
14	They are aware but do not take adequate measures. There are no financial resources for them
15	They are aware, but actions do not match the level of awareness
16	Insufficient, with particular reference to landslides. In the Republic, in the City of Belgrade, and in city municipalities, no one addresses the problem of landslides other than by recording their occurrence
17	There is a certain level of awareness, but not enough for consistent, concrete action
18	Local communities are increasingly aware of disaster risks and are working on initiatives that can enhance community resilience, but financial constraints often limit key projects
19	Local communities are generally aware of environmental factors that may influence disaster risk, such as landslides, erosion, soil collapse, flooding, drought, hail, and other hazards

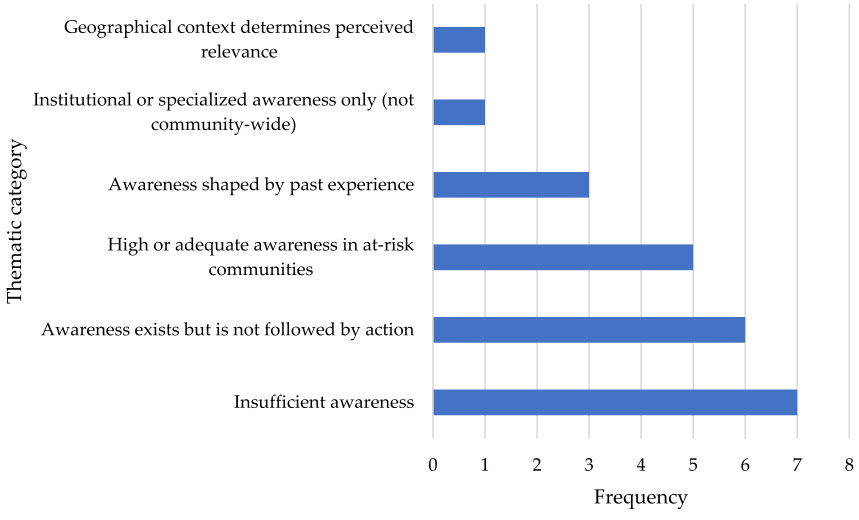

Figure 18: Thematic analysis of community awareness of environmental factors influencing disaster risk.

According to respondents, these measures have the potential to reduce the risks of floods, fires, and other environmental disasters.

However, many responses highlight insufficient implementation, limited visible results, and a formalistic approach. Thus, 26.3 % of respondents (N = 5) believe that

although such measures exist, they are not sufficiently effective or are applied selectively and without real impact. Respondents point to standard practices of symbolic implementation aimed at meeting formal requirements or following higher-level instructions, without achieving meaningful risk reduction. Additionally, some comments refer to systemic barriers, such as conflicts of interest between investors and the community, and the bypassing of legal procedures and regulations.

On the other hand, 21.1 % of participants (N = 4) stated that there are no local environmental protection measures that could enhance community resilience, frequently noting reliance solely on national-level actions and a lack of concrete initiatives at the local level.

Overall, the responses indicate that although a foundation exists for developing environmental protection measures that contribute to resilience, there is a clear need for consistent implementation, improved monitoring of outcomes, and active citizen and institutional engagement in promoting and implementing these measures. Enhancing the transparency, efficiency, and inclusiveness of such measures could significantly strengthen resilience to environmental and natural disasters (Table 18 and Figure 19).

The analysis of respondents' narratives about the most likely disasters in their local communities indicates a strong awareness of the dominant risks, shaped by specific environmental conditions. The majority of respondents (84.2 %; N = 16) identified floods as the most probable disaster, with several specifically highlighting flash floods resulting from heavy rainfall and unfavorable terrain configuration. The geographical setting, particularly in municipalities where mountainous and hilly areas descend into plains, was highlighted as a key driver of frequent flooding, resulting in damage to infrastructure, agricultural land, and residential structures.

In addition to floods, a considerable number of respondents pointed to fires as a significant threat, especially during summer months, making them the second most frequently mentioned hazard (42.1 %; N = 8). Due to climate change and prolonged periods of drought, respondents noted an increasing frequency of fires, regardless of whether the environment is rural or urban. Droughts were also recognized as a growing risk (31.6 %; N = 6), with direct impacts on agriculture, water supply, and the environment.

A smaller but still notable group of participants (26.3 %; N = 5) mentioned earthquakes as a potential hazard, although no specific events were cited; instead, the responses reflected awareness of seismic vulnerability in certain regions. Landslides were reported in 21.1 % of responses (N = 4), indicating soil erosion, land instability, and inadequate land-use management. Additionally, some respondents cited environmental hazards such as illegal waste disposal sites and disease risks (10.5 %; N = 2), as well as technological/technical accidents, particularly in relation to local infrastructure.

Overall, the responses reflect a high level of awareness of local conditions and risks, as well as the diversity of perceived disasters arising from natural, climatic, infrastructural, and social factors. Notably, the majority of respondents not only identified types of disasters but also linked their likelihood to specific risk factors present in the community, offering valuable insight for the development of tailored disaster risk reduction measures (Table 19 and Figure 20).

The analysis of respondents' answers regarding differences in preparedness measures by disaster type indicates relatively high agreement on the need for differentiated approaches. The majority of respondents (78.9 %, N = 15) stated that preparedness measures vary depending on whether the disaster is natural or industrial. They emphasized that, due to their scale and frequency, natural disasters generally require broader community involvement, whereas industrial disasters typically rely more on professional emergency services and specialized technical procedures.

Respondents noted that evacuation is often the primary and immediate measure in industrial emergencies. At the same time, natural disasters such as floods, earthquakes, or wildfires require longer preparation, public communication, education, and the availability of necessary equipment. Examples include differences in required resources and in the roles of local institutions. Several respondents highlighted that large industrial companies formally comply with regulatory requirements, yet practical implementation often lacks transparency and remains questionable.

Conversely, 15.8 % of respondents (N = 3) expressed the view that they do not observe significant differences in preparedness, arguing that measures fundamentally pursue the same goal – the protection of life and property. Some explained that industrial disasters are not considered a realistic threat in their communities due to limited industrial presence, which consequently reduces related preparedness efforts.

Specific responses also pointed to institutional shortcomings in raising awareness and informing citizens, a factor that undermines the effectiveness of tailored preparedness measures across hazard types. In addition, several respondents emphasized common preparedness elements – such as trained personnel, equipment, and communication systems – noting that essential differences arise primarily in operational specifics and technical protocols.

In summary, respondents' prevailing opinion is that differentiating preparedness measures is necessary and appropriate. However, in practice, systematic implementation

Table 18: Analysis of respondents' answers regarding environmental factors and awareness: Are there local environmental protection measures in your community that can contribute to disaster resilience?

ID	Key segments of the responses
1	Yes. Construction of retaining walls, riverbed maintenance…
2	Regardless of their existence, their effectiveness depends on how willing citizens are to respect them, and the level of compliance is unsatisfactory
3	As far as I am aware, such measures do not exist in our municipality
4	Yes, one example – every year, a municipal order is issued prohibiting the burning of crop residues, precisely to reduce the risk of open-area fires
5	Yes. Construction of retaining walls, riverbed maintenance…
6	There are no local environmental protection measures that could contribute to disaster resilience
7	There are no environmental protection measures in my municipality
8	Yes, they exist, they are implemented, and they are aligned with national policies
9	Yes – proper waste management and regular landfill maintenance
10	I am not sure they exist, except for those imposed at the national level
11	There is an Environmental Society that gathers school-age children and elementary and secondary school students and organizes workshops and activities to clean up and collect waste, as well as to procure waste bins
12	There are bureaucratic and legal measures, but none that would prevent the ways they are bypassed
13	Yes, maintenance and cleaning of watercourses, removal of illegal dumping sites
14	Those that exist are formalized to comply with procedures and instructions, but their impact is not visible
15	They exist, but they are insufficient and applied selectively
16	Since these issues are usually under the jurisdiction of construction-related departments, the interests of the community often collide with those of investors, who tend to prevail
17	Yes, in accordance with regulations, they contribute to community resilience in the face of disasters
18	The local community has implemented specific measures, including monitoring waste disposal sites, organizing waste collection, and raising awareness among citizens about fires and their consequences
19	There are local environmental action plans, and measures are generally implemented, although they are not sufficient in scale

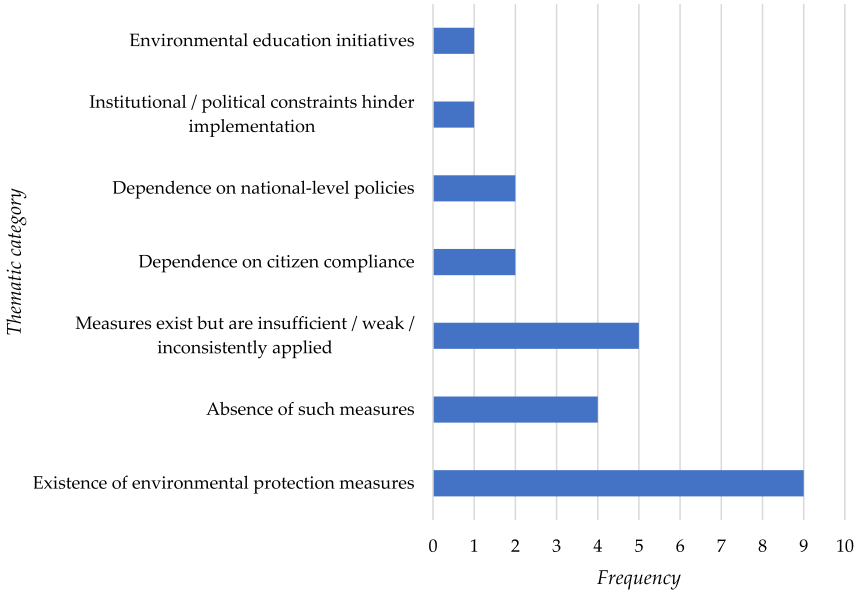

Figure 19: Thematic analysis of local environmental protection measures contributing to disaster resilience.

of such tailored strategies is often lacking – particularly in areas with limited industrial hazards. This highlights the need for more apparent institutional prioritization, increased public education, and better integration of various hazard types into disaster risk management plans (Table 20 and Figure 21).

The analysis of respondents' narrative answers regarding the resilience of local governments to disasters reveals a broad spectrum of perceptions, ranging from strong praise to pronounced dissatisfaction, indicating significant differences in capacities, organization, and resource engagement across municipalities. The average resilience score on a scale of 1–10 is 6.9, suggesting moderate confidence in local governments' ability to respond effectively to disasters (Table 21).

Table 19: Analysis of respondents' answers regarding local specificities and types of disasters: Which types of disasters do you consider most likely to occur in your local community?

ID	Key segments of the responses
1	Storms, heatwaves, droughts
2	Environmental disasters (numerous illegal dumpsites, disease outbreaks)
3	Floods, shortage of drinking water
4	Landslides, droughts, and hail
5	Floods and landslides, and in the last decade, also droughts
6	Floods, earthquakes, landslides, epidemics of infectious diseases, etc
7	Floods
8	Floods, earthquakes, and strong windstorms
9	Severe weather events and fires
10	Drought
11	The most likely disasters in the municipality are floods caused by flash torrents resulting from heavy rainfall. Due to the terrain configuration – mainly mountainous and hilly areas draining into the flat zone – such floods cause material damage to infrastructure, agricultural land, and residential buildings
12	Floods, earthquakes, and fires
13	Natural disaster – flood
14	Floods and fires
15	Floods and fires. Storms and hail
16	Floods, landslides, and droughts
17	Floods and earthquakes
18	In our local community, floods have been the most destructive disasters in recent years, affecting citizens, the environment, and the local economy. After floods, fires are the next most significant threat
19	There is a moderate risk of floods, flash floods, and groundwater flooding (especially in certain parts of the settlement), fires and wildfires, technological accidents, and earthquakes

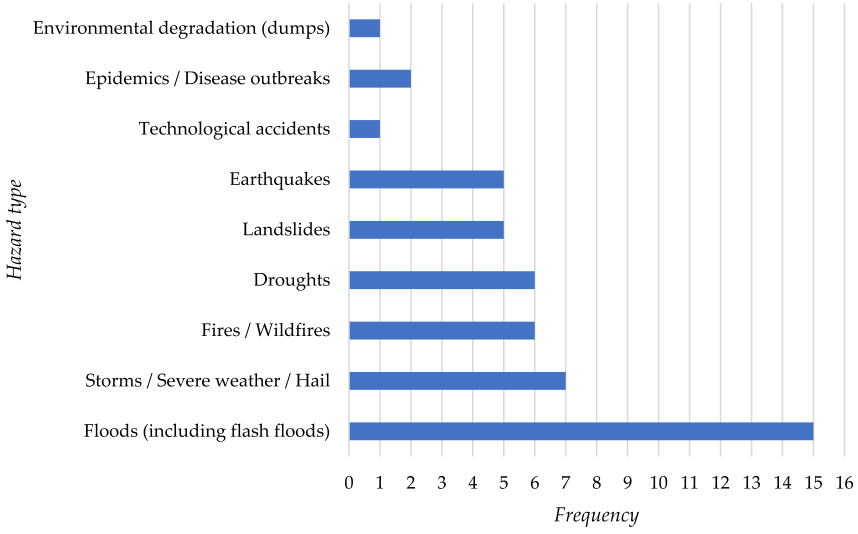

Figure 20: Thematic frequency of the most likely types of disasters identified by respondents in their local communities.

High scores (9 and 10) were given by 21.1 % of respondents (N = 4), who emphasized the existence of functional emergency headquarters activated during crises, well-developed plans, preparedness of businesses and key actors important for emergency response, and experience gained from previous disasters that contributed to institutional maturity. These responses highlight coordination, resource availability, and readiness for rapid mobilization.

Moderately high scores (7 and 8) were assigned by 42.1 % of respondents (N = 8), who also recognized the presence of formal resilience mechanisms but noted the need for further improvement, particularly in education, funding, and exercises.

Table 20: Analysis of respondents' answers regarding local specificities and types of disasters: In your opinion, do preparedness measures differ depending on the type of threat (for example, industrial disasters versus natural disasters)?

ID	Key segments of the responses
1	Yes, absolutely. Large companies generally comply with the regulatory framework, but implementation is always questionable
2	I do not notice that in my municipality
3	They differ to some extent
4	Yes
5	We do not have problems with industrial disasters
6	Yes
7	Yes
8	Yes
9	There are similarities and differences. In the case of an industrial disaster, evacuation is mostly the primary response, since mitigation and recovery are usually handled by professional services (depending on the type of disaster)
10	I do not think so, because they are aimed at the same goal – protection
11	In the municipality, preparedness efforts are primarily focused on natural disasters. There is almost no industry in the municipality
12	To a small extent. The most significant and most expensive part – trained personnel, equipment, vehicles, shelter capacities, and medical capacities – is standard. At the same time, specific material resources constitute a smaller portion that must be prepared and used only for certain types of disasters
13	Yes
14	They differ, but citizens are insufficiently aware and poorly informed
15	Yes, they differ
16	No
17	Yes
18	They differ. For some disasters, it is possible to prepare and mitigate the effects to some extent
19	Industrial disasters usually occur suddenly, but preventive measures can also reduce their impact

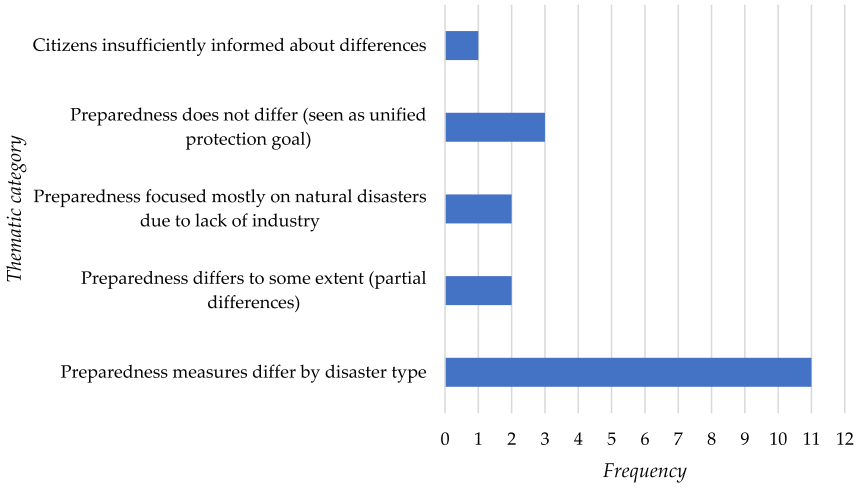

Figure 21: Thematic analysis of differences in preparedness measures for industrial versus natural disasters.

On the other hand, 21.1 % of respondents (N = 4) rated resilience at 5 or lower, with several reporting the marginalization of disaster-related issues, staff incompetence, insufficient professional training, and the lack of practical implementation of planning documents. Particularly concerning are responses indicating the absence of drills, untrained civil protection officers, and a lack of financial support for concrete measures such as watercourse cleaning and landfill remediation. Notably, 15.8 % of respondents (N = 3) emphasized the strong dependence of local communities on national-level institutions, which they see as a structural barrier to achieving genuine autonomy in disaster response.

Overall, the responses suggest that while institutional foundations for resilience exist, practical limitations are evident, including insufficient funding, incomplete training, and a lack of regular coordination and practical exercises. Although formal structures are in place in many communities, the question of their operational effectiveness remains a key challenge for strengthening local government resilience (Table 21 and Figure 22).

The analysis of respondents' answers regarding measures local self-governments should undertake to improve citizens' disaster resilience reveals several dominant themes. The majority of participants (84.2 %, $N = 16$) believe that existing activities need strengthening or new measures introduced, with public education as the most frequently emphasized priority. Respondents highlight the need for systematic training – from elementary school age to older adults – including both theoretical and practical knowledge on emergency response. Suggested approaches include implementing training programs in schools, workplaces, and local communities, as well as through digital platforms and social media.

In addition to education, respondents frequently emphasize the need to increase budgets for civil protection and to finance projects aimed at reducing disaster risk. In this context, several participants underline the importance of constructing or maintaining infrastructure such as retaining walls, waste disposal sites, water supply systems, and road networks. Infrastructure improvements are recognized as fundamental prerequisites for community resilience, especially in areas exposed to natural hazards such as floods and landslides.

Another key theme is improving communication with citizens, particularly regarding rights, duties, and procedures in disaster situations. Several respondents suggest establishing dedicated communication channels on social media and implementing more effective mechanisms to enforce laws and implement preventive measures. Organizing and training civil protection units and community

Table 21: Analysis of respondents' answers regarding local governments and public policies: How would you assess the resilience of local governments in responding to disasters?

ID	Key segments of the responses
1	Varied, depending on location and proximity to major centers. My rating is 6. Many short-term variable factors can significantly affect resilience. Regardless of fluctuations, resilience is slightly above average
2	The question is highly complex to answer. Everything is interconnected; local communities depend greatly on national-level response, and without considering this relationship, an effective solution cannot be found. Therefore, it is below 5 – let it be 4
3	When it comes to floods, my local government is exceptionally well prepared, given our past experiences. All relevant actors are organized and ready – the municipal emergency management headquarters, operational expert teams, and reserve sandbag supplies. My rating in this case is 8
4	Rating: 6. There is a significant problem in implementing specific solutions needed to strengthen disaster resilience
5	10. The municipal emergency headquarters functions excellently
6	10. The state and municipalities do everything necessary, and there are no shortcomings in their work. Therefore, the resilience of municipalities in Serbia to disasters is at the highest level
7	There is preparedness and resilience, with a rating of 8. Formal structures exist, such as regulations, plans, and protocols; communication channels are established; and local food reserves can be used. The population can also self-organize when needed, a characteristic of our people
8	Local governments have a civil protection headquarters, a protection and rescue plan, and resources – rating 8
9	Some disasters can be prevented, some partially, and some are barely influenced (such as severe weather and earthquakes). Resilience level: 8
10	10. In line with available resources, personnel, and training
11	The local government takes all measures within its jurisdiction to the best of its abilities. Rating: 8
12	The resilience of local governments, aside from the nature and scale of the disaster, depends significantly on personnel decisions. Municipalities with trained and competent personnel, and with enterprises whose resources can be used in emergencies – and that assign such personnel to disaster-related bodies and establish procedures – respond best. Rating: 8
13	Resilience depends on the preparedness, organization, and functioning of the civil protection system. Rating: 8 for the municipality
14	Politically, they fight only for power and resistance. They do not adequately advocate for disaster preparedness. This field is often marginalized and reduced to mere formality, without the objective measures that would strengthen resilience. Rating: 6
15	Rating: 5. Risk is often underestimated, institutional responsibilities are not respected, and employee incompetence is typical. Funding is lacking, and real shortcomings become visible only when a problem arises
16	The resilience of local governments to disasters is low (rating 3-), primarily due to insufficient funding for prevention programs and operational measures to strengthen the system
17	There is resilience, rating 7. To improve performance, many factors need to be advanced – education, exercises, and financing projects and activities that continually enhance resilience
18	Our community's resilience is 7/10. Some measures have been taken, but many gaps remain that need to be addressed
19	The local government has not participated in professional disaster risk reduction training. Civil protection commissioners and deputy commissioners have not been trained; general-purpose and specialized civil protection units have been formed but not equipped. No drills or simulation exercises have been conducted. No funds were allocated to enhance community capacity for quality prevention and response (equipment procurement, watercourse cleaning, illegal dump remediation, greening, educational materials, etc.). Although planning documents exist (Risk Assessment, Protection & Rescue Plan, External Emergency Plan), resilience can be rated 4 out of 10

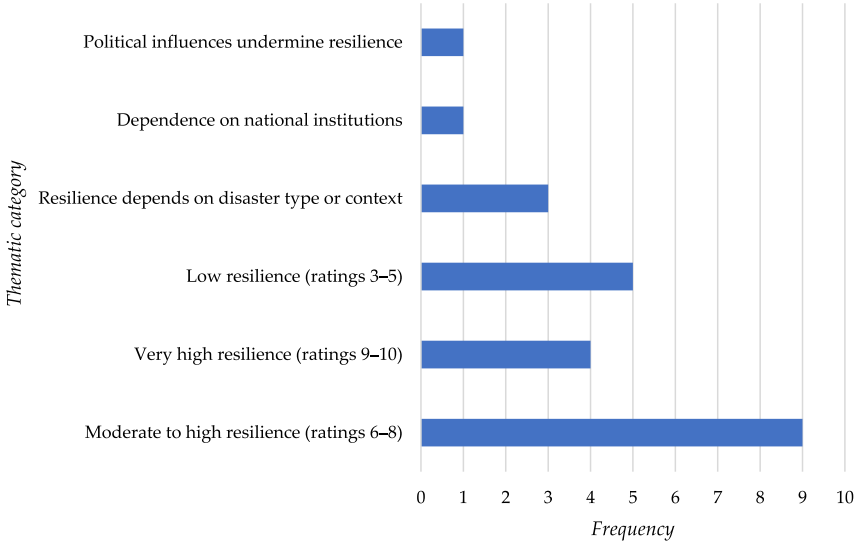

Figure 22: Thematic analysis of local government resilience in responding to disasters.

members is also highlighted as a key step in strengthening operational readiness.

On the other hand, 15.8 % of respondents ($N = 3$) expressed the opinion that existing measures are already functioning adequately and that there is currently no need for new interventions. These perspectives generally come from municipalities where civil protection is effectively functioning or where preventive measures are sufficiently applied.

Overall, the recommendations indicate a need for a systematic approach that includes education, financial investment, infrastructure improvements, and enhanced communication with citizens, as well as a clear division of responsibilities between local and national authorities – an issue mentioned repeatedly as a limitation in implementing measures on the ground (Table 22 and Figure 23).

The analysis of respondents' answers regarding potential strategies for improving citizens' resilience to disasters indicates a high level of awareness of the importance of a systemic approach, education, and institutional coordination. Of the 19 respondents, 84.2 % ($N = 16$) provided concrete suggestions for improving resilience, while the remaining respondents either stated they did not know the answer or believed this responsibility lies solely with national authorities.

The most frequently suggested strategies relate to citizen education and information dissemination, highlighted in 42.1 % of responses ($N = 8$). Respondents emphasized the need for continuous public training, including integrating relevant content into school curricula and workplace programs, and promoting preparedness measures through social media. The importance of regular drills and simulations as an obligatory element of resilience-building strategies was also emphasized.

Approximately 36.8 % of respondents ($N = 7$) stressed the need to strengthen institutional and regulatory frameworks, including the adoption and implementation of Risk Assessments and Protection and Rescue Plans, as well as clarifying procedures and responsibilities at all levels. The role of municipal emergency management committees was particularly highlighted, along with the necessity of their active involvement in public education.

Additionally, 26.3 % of participants ($N = 5$) suggested improving material and logistical resources, primarily through establishing local stockpiles and ensuring adequate supplies of food and equipment. Respondents stressed the importance of having real capacities in place to enable an effective emergency response.

A smaller proportion of participants (15.8 %, $N = 3$) highlighted the need for intersectoral cooperation, particularly in environmental protection and waste management, underscoring that resilience strategies should be integrated into broader local public policies. Overall, the responses reflect respondents' awareness of the multidimensional nature of resilience, encompassing knowledge, institutional capacity, resource availability, and active citizen engagement. There is a clear need to systematize and operationalize the proposed measures through institutional mechanisms at both the local and national levels (Table 23 and Figure 24).

The analysis of respondents' narrative answers shows a clear dominance of the view that citizens are better prepared for natural than for industrial disasters. As many as 89.5 % of respondents ($N = 17$) stated that public preparedness is greater regarding natural disasters, primarily due to the frequency of these events, personal or collective experience, and stronger media visibility of natural hazard topics. Only one respondent (5.3 %) believed that citizens are better prepared for industrial

Table 22: Analysis of respondents' answers regarding local governments and public policies: What specific measures should local self-governments implement to improve citizens' resilience to disasters?

ID	Key segments of the responses
1	Municipal emergency stockpiles, training from elementary school age to pensioners' associations
2	I would not like to repeat myself – a great deal still depends on national institutions and their jurisdiction
3	I believe it would be desirable to first organize various forms of citizen education to increase public awareness about disasters, and only then speak about improving resilience levels
4	To improve citizens' resilience to disasters, it is necessary to increase financial investments in the civil protection system and in projects that enhance community resilience (e.g., constructing retaining walls at all landslide-prone locations)
5	At present, the system functions very well. There is no need for additional or new measures
6	A larger budget should be allocated for emergency management
7	Continuous citizen training
8	It is necessary to organize training for both competent authorities and institutions, as well as for citizens, to the fullest extent possible at the local government level
9	Maintain road infrastructure in proper condition (to prevent traffic accidents and accidents during the transport of hazardous materials), maintain water supply systems and wells (to ensure sufficient water for firefighting), and maintain waste disposal sites (to prevent environmental pollution and frequent landfill fires)
10	Theoretical education and practical training. This is lacking in the national system and local governments should supplement this component
11	Allocate more funds to implement and undertake preventive measures to reduce disaster risk
12	Develop, finance, create, and maintain social media channels that provide relevant information, explain procedures, and guide and assist the public during disasters. Each local government must address chronic violators of preventive measures who have built systems to bypass laws, inspections, and accountability
13	Raising public awareness about the harmful effects of disasters, increasing readiness and training of citizens for disaster response. All of this was identified as a shortcoming during disasters that previously affected the municipality – this conclusion is based on both personal and institutional experience
14	Public education and posting protective measures in visible places. Only continuous education and awareness-raising can sustainably improve community resilience
15	Municipal emergency stockpiles, training from elementary school age to pensioners' associations
16	I would not like to repeat myself – a great deal still depends on national institutions and their jurisdiction
17	I believe it would be desirable to first organize various forms of citizen education to increase public awareness about disasters, and only then speak about improving resilience levels
18	To improve citizens' resilience to disasters, it is necessary to increase financial investments in the civil protection system and in projects that enhance community resilience (e.g., constructing retaining walls at all landslide-prone locations)
19	At present, the system functions very well. There is no need for additional or new measures

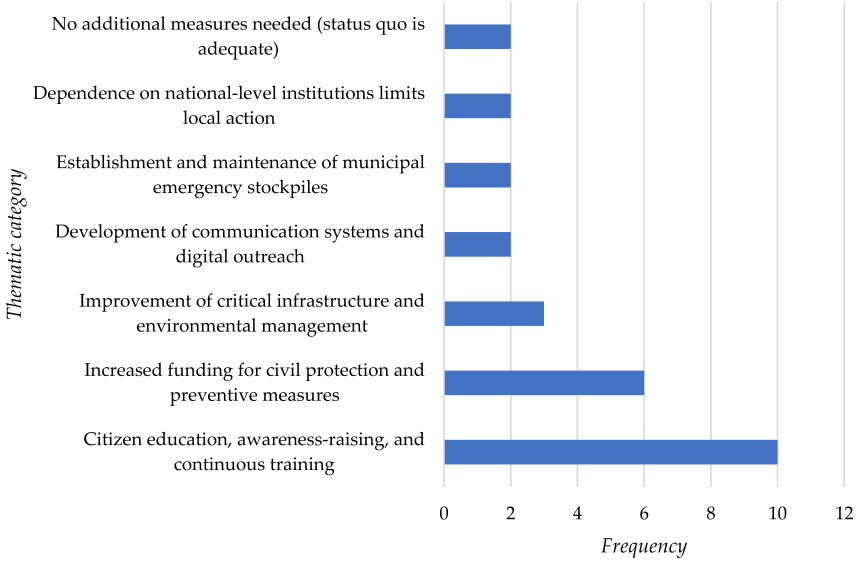

Figure 23: Thematic analysis of suggested measures for improving citizens' disaster resilience.

Table 23: Analysis of respondents' answers regarding strategies for improving resilience: In your opinion, which strategies could be applied to improve citizens' resilience to disasters, particularly regarding knowledge, preparedness supplies, preventive measures, and action plans?

ID	Key segments of the responses
1	Municipal emergency stockpiles would be necessary, in my opinion
2	I do not know the specific answer to this question. National authorities should develop this, and local governments should implement it
3	Citizen education
4	Strategies for informing citizens not only immediately before a disaster occurs, but also in the period beforehand
5	The municipality already has strategic documents and action plans covering this area, which are being implemented
6	All strategies that exist and that we receive as a municipality to implement from the ministries and the Government of the Republic of Serbia
7	A strategy for improving knowledge and a strategy for implementing preventive measures
8	I do not know the answer to this question; national-level strategies are not familiar to me
9	Each local government must have a Disaster Risk Assessment and a Protection and Rescue Plan (related to identified risks). The Municipal Emergency Management Headquarters is responsible for implementing protection and rescue measures and, among other tasks, educating citizens
10	Same as the previous answer – there should be a strategy for raising awareness and comprehensive population training
11	A waste-management strategy and a strategy for environmental protection and conservation
12	Education, information, and rehearsing procedures as mandatory components of school curricula and employer obligations, verified through drills and competitions. Engagement through social media to promote and support planned and implemented measures
13	A strategy for improving the civil protection system, raising awareness and citizen preparedness for response, ensuring sufficient reserves of essential supplies, and developing a Protection and Rescue Plan
14	Strategies for education and financing efforts to build community resilience to disasters.
15	A strategy for educating citizens and local communities about disasters and resilience-building
16	A strategy for strengthening the capacities and competencies of local governments in responding to disasters
17	Introducing mandatory subjects on this topic into the education system
18	Prescribing adequate procedures, rules, and obligations for each stakeholder group
19	Ensuring the ability of all institutions responsible for disaster risk reduction to carry out their mandates

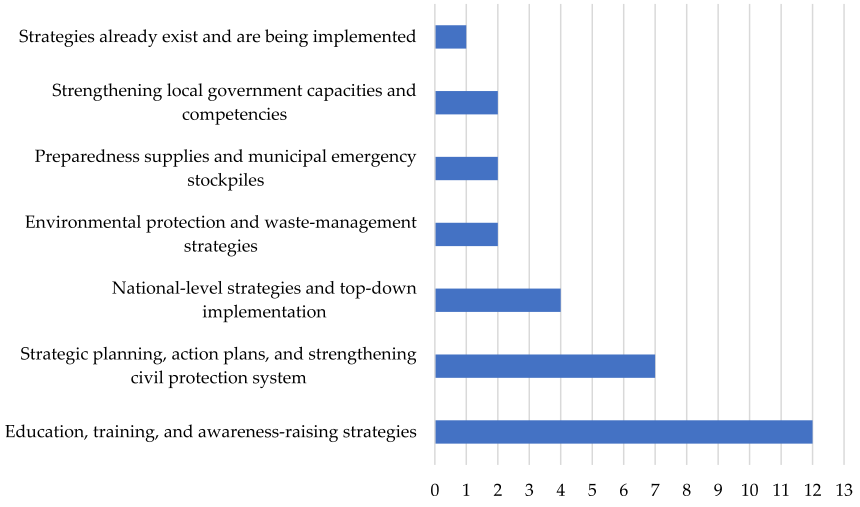

Figure 24: Thematic analysis of strategies for improving citizens' disaster resilience.

disasters, emphasizing that such risks are often localized and that industrial entities are better technically prepared. One respondent (5.3 %) indicated an equal level of preparedness within workplaces, although limited in broader society.

The most common reasons for this difference in preparedness relate to the more frequent exposure of citizens to natural hazards such as floods, droughts, storms, and earthquakes, as well as greater perceived likelihood of their occurrence in local communities. In 63.2 % of responses (N = 12), experience was explicitly mentioned as a decisive factor. In comparison, in 42.1 % of responses (N = 8), participants pointed to low levels of industrial development in their municipalities, making industrial risks appear "abstract" or distant.

Although several respondents recognized the need for more education and training in industrial disaster response, none mentioned specific measures or institutional mechanisms to be implemented at the local level. Instead, there is a

general impression that preparedness for industrial accidents relies almost entirely on individual enterprises, while the broader community lacks knowledge, equipment, and response protocols.

In conclusion, the findings indicate a structural imbalance in community preparedness that favors natural disasters, resulting from their greater presence in public and personal life. At the same time, there is a clear need to integrate industrial risks into education systems, public communication, and local protection plans to reduce the evident gap in perception and preparedness (Table 24 and Figure 25).

The analysis of respondents' perceptions of household resilience in Serbia indicates a moderately low level of preparedness among citizens to act in the event of a disaster. Based on subjective ratings, the average resilience level of households is 5.5 out of 10, suggesting that most respondents recognize some degree of capacity, yet also significant limitations in the practical application of resilience measures.

The largest share of respondents – 36.8 % (N = 7) – rated resilience at 4 or below, pointing to insufficient education, weak proactive behavior among citizens, lack of emergency supplies and financial reserves, and limited cooperation with institutions. These responses commonly note that households do not perceive disaster risks as a priority and rely heavily on state protection mechanisms.

Approximately 42.1 % of respondents (N = 8) assigned ratings of 5 or 6, indicating household resilience as *average* or *moderate*. Here, territorial disparities were emphasized – urban households were perceived as less resilient because of their dependence on infrastructure and public services. In contrast, rural households were viewed as more self-reliant but with limited access to assistance during crises.

One-fifth of respondents – 21.1 % (N = 4) – assigned scores of 7 or higher, indicating basic awareness, prior experience with disasters, access to information, and partial implementation of protective measures. These responses highlight the roles of local initiatives, strategic documents, and community cultural patterns in achieving higher levels of resilience.

Several responses pointed to structural barriers, including corruption in construction, illegal settlements in high-risk zones, institutional inefficiency, and the lack of shelters, training, and logistical support, all of which further reduce household preparedness. 68.4 % of respondents

Table 24: Analysis of respondents' answers regarding strategies for improving resilience: Do you believe that citizens are better prepared for natural or for industrial disasters?

ID	Key segments of the responses
1	A personal impression – citizens are better prepared for natural disasters because they are aware of them and experience them more often. Industrial disasters seem "imaginary" to them
2	No. Today, everyone expects someone else to do what they themselves should do. In general, citizens are more accustomed to responding to natural disasters because they encounter them more often and are affected by them
3	In my opinion, they are better prepared for natural disasters, since industrial disasters are almost nonexistent in our territory
4	Citizens are better prepared for industrial disasters because these events are more localized, and industrial enterprises themselves are, to varying degrees, ready to respond to specific hazards or disasters
5	For natural disasters, we have no experience with industrial ones, as we are a spa town and do not face such problems
6	Yes, for natural disasters, because they occur frequently
7	For natural disasters, yes – public policies and citizen awareness initiatives are in place
8	They are better prepared for natural disasters. In our municipality, there are not many industrial facilities
9	Citizens are better prepared for natural disasters because they occur more frequently, and industry is not highly developed and is concentrated in isolated industrial zones, away from residential areas
10	For natural disasters, based on previous experience
11	In the case of natural disasters, the industry is underdeveloped
12	Generally, citizens are better prepared for natural disasters, while those working in high-risk industries are equally, or even better, prepared for workplace industrial emergencies
13	In natural disasters, events occur more frequently than in industrial accidents
14	Poorly prepared for both. Citizens believe such events will not happen to them. Generally, people are better prepared for natural disasters
15	Natural disasters. Industry is still developing, along with awareness of industrial risks. In rural areas, people are primarily prepared for natural disasters, whereas industrial risks occur only in limited, very localized contexts in Serbia
16	For natural disasters, due to the limited availability of protective equipment for chemical, biological, and other agents
17	For natural disasters, due to the greater likelihood and experience
18	In our region, people are definitely better prepared for natural disasters, as we have no large industrial facilities
19	Citizens are better prepared for natural disasters than for industrial ones, as they are more familiar with natural disaster risks, many have personally experienced such events or suffered damage, and natural hazards are more frequently discussed (in the media and through other sources)

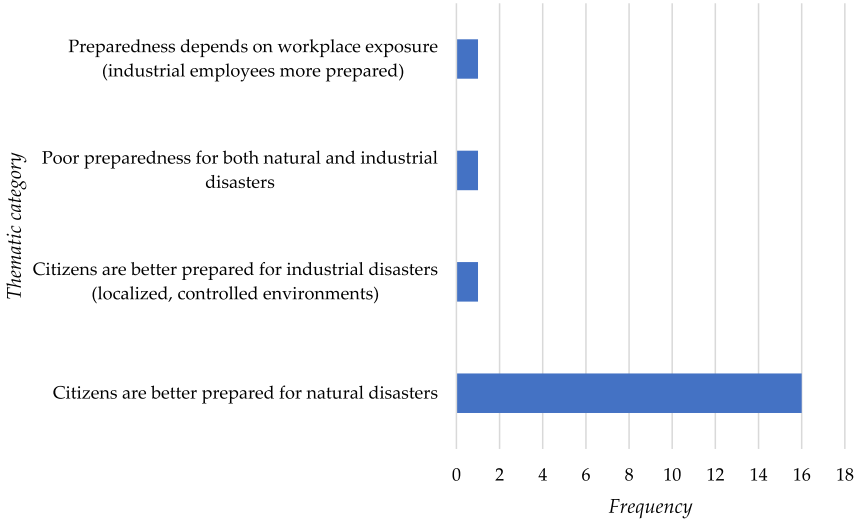

Figure 25: Thematic analysis of citizens' relative preparedness for natural versus industrial disasters.

(N = 13) explicitly identified financial and organizational factors as key barriers to improving resilience.

Overall, the findings indicate a baseline level of awareness of the importance of preparedness, yet underscore the need for stronger institutional support, population education, financial incentives, and localized strategies to elevate household resilience to a more stable, functional level (Table 25 and Figure 26).

The analysis of final recommendations made by respondents to the citizens of Serbia, aimed at improving disaster resilience, demonstrates a high level of awareness regarding the importance of both individual and collective responsibility. The most frequently emphasized recommendation concerns knowledge and education, cited by 52.6 % of participants (N = 10). Respondents emphasized the need for continuous learning, formal and informal training programs, the inclusion of disaster preparedness topics in the education system, and increased public awareness. Some respondents underlined that knowledge must be coupled with "conscientiousness," meaning personal dedication and responsibility to ensure tangible impact in crises (Table 26).

Approximately 26.3 % of respondents (N = 5) provided recommendations on community behavior, cooperation, and solidarity, emphasizing the importance of collective action, following institutional guidance, and adhering to instructions from competent authorities. These recommendations range from practical advice ("follow guidelines," "act in accordance with instructions") to broader societal values such as mutual assistance, trust, collective engagement, and patriotism ("be united and supportive," "love your country").

Additionally, 10.5 % of respondents (N = 2) highlighted financial and preventive actions, emphasizing the importance of timely investment in resilience at both household and community levels. Phrases such as "a dinar invested in prevention saves 10 in damage costs" reflect a pragmatic, risk-management-oriented mindset.

Some responses offered integrative messages combining multiple aspects of resilience – knowledge, organization, cooperation with institutions, and personal motivation. These often included memorable, slogan-like statements ("Knowledge + Community = Protection," "Think globally, act locally"), making them effective messages for public education and resilience-building campaigns.

Overall, results indicate that respondents recognize resilience as not solely an institutional responsibility but a shared societal process in which every individual plays a role – through knowledge, engagement, preventive actions, and responsible behavior toward the community and the environment. These recommendations may serve as a basis for developing public communication strategies, awareness campaigns, and educational programs to foster a culture of resilience and preparedness in Serbia (Table 26 and Figure 27).

4 Discussion

The qualitative analysis offers a rich, layered view of community resilience, illustrating both conceptual depth and practical fragility. Consistent across all findings is a clear pattern: experts perceive resilience as a complex, process-driven concept, yet they often describe actual resilience as low to moderate. There are notable gaps between formal strategies and everyday realities, heavily relying on individual experience, institutional actions, and broader socio-economic factors. The sample primarily includes highly educated, experienced professionals occupying key local government roles, such as department heads, municipal

Table 25: Analysis of respondents' answers regarding household resilience: Based on your observations, what is the current level of household resilience in Serbia in responding to disasters?

ID	Key segments of the responses
1	Respondents emphasized significant differences between urban and rural households, as well as regional disparities (e.g., between Vojvodina and Eastern Serbia). Their average rating was 5
2	There is a noticeable variation depending on the location and proximity to major centers. My rating is 6. Many factors are highly variable in the short term and significantly affect resilience. Despite changes, resilience is slightly above average
3	The issue is highly complex and cannot be easily assessed. Everything is interconnected, and local communities depend significantly on national-level responses. Without that perspective, proper solutions cannot be reached. Therefore, I rate it below 5 – let it be 4
4	When it comes to floods, my local government is well prepared due to past negative experiences. All key actors are organized: the municipal emergency headquarters, operational teams, and sandbag stockpiles. My rating here is 8
5	Rating 6 – There are significant challenges in implementing measures that would improve disaster resilience
6	10 – The Emergency Management Headquarters functions excellentl
7	10 – The state and municipalities do everything necessary, with no operational weaknesses. Resilience in Serbia is at the highest level.
8	There is preparedness and resilience – rating 8. Regulations, plans, communication channels, and the ability to use local food reserves are in place. Citizens are capable of organizing when needed, which is also a cultural trait
9	Municipalities have civil protection headquarters, protection and rescue plans, and resources – rating 8
10	Some disasters can be entirely prevented, others partially, and some minimally (e.g., extreme weather and earthquakes). Rating: 8
11	10 – considering available resources, personnel, and training
12	Local authorities undertake all measures within their jurisdiction – rating 8
13	Resilience depends on preparedness, organization, and civil protection systems. Municipalities with trained personnel and clear procedures react best – rating 8
14	Resilience depends heavily on political and personnel decisions in each municipality. When trained staff and company resources are available, response capacity is most significant – rating 8
15	Politicians fight for power, not disaster resilience. This field is often marginalized and reduced to formality. Rating: 6
16	Rating 5 – risks are underestimated, institutional responsibilities are ignored, and incompetence is typical. Financial resources are lacking, and fundamental weaknesses only surface after a disaster
17	Rating 3 – low household resilience due to insufficient investment in prevention and operational preparedness
18	Rating 7 – improvement is possible through education, exercises, and better financing
19	Household resilience is around 7/10. Some measures exist, but many gaps still need to be addressed

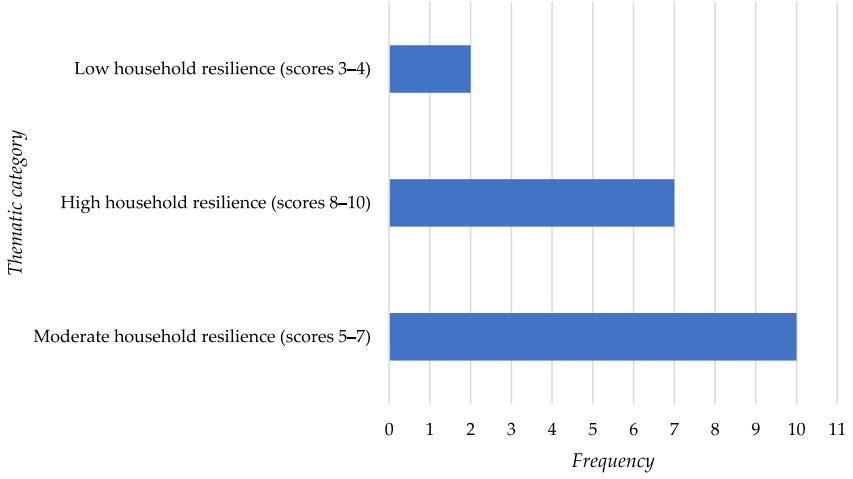

Figure 26: Thematic analysis of respondents' answers regarding household resilience in Serbia.

chiefs, and leaders in defense, emergency management, and local development. Given their backgrounds, it is expected that their views on citizen resilience closely follow current theories: resilience as a dynamic ability to anticipate, absorb, respond, recover, and adapt to challenges – supported by interconnected elements like education, organization, communication, psychological and physical preparedness, social cohesion, and institutional backing [7,8,23, 27,53].

However, when these experts evaluate the actual resilience of citizens, the average score of 5.4 out of 10 reflects a perception of low to moderate preparedness, with over a third of respondents rating it very low (≤3). Common explanations

Table 26: Analysis of respondents' answers regarding the final question: If you could give one recommendation to the citizens of Serbia to improve their resilience to disasters, what would it be?

ID	Key segments of the responses
1	A dinar invested in prevention saves 10 in recovery – meaning that resilience requires financial investment first and foremost
2	He who protects himself, God protects – do everything in your power; do not expect others to solve what you should prepare for yourself
3	Increase awareness through education
4	Think globally, act locally
5	Let us be united and show solidarity
6	Stay calm and follow instructions
7	Pay more attention to recommendations from competent authorities
8	Live and work as if there will be peace for 100 years, but prepare as if a disaster might strike tomorrow
9	Education
10	Education and mandatory training for all groups – from schools to employers
11	Engage as much as possible in prevention to reduce risks and impacts
12	Do not underestimate the probability and consequences of disasters – be mindful of actions and inactions that can influence risk
13	Raise awareness about the harmful effects of disasters and the importance of preparedness
14	Protect the environment, build energy-efficient structures, and promote disaster-risk education – without political interference
15	Educate yourselves, stay informed, and be responsible stewards of public infrastructure and national assets. Our country is our home – it will remain for future generations. Love your country and do not give it away cheaply
16	Knowledge + Community = Protection
17	Follow the guidance of local authorities and experts during emergencies and disasters
18	Become more aware of everyday threats and risks, especially considering the significant climate changes that bring severe destruction. Recognize your personal role – by improving your immediate environment, you contribute to wider community resilience
19	Actively promote awareness, responsibility, and education on resilience, and insist on cooperation between citizens and local authorities

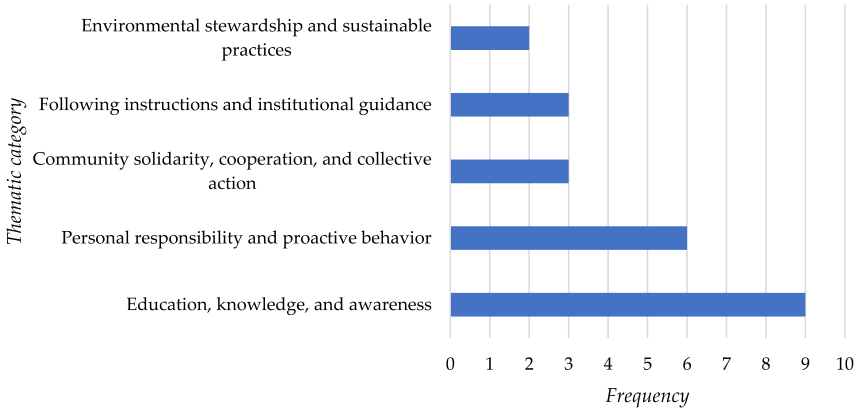

Figure 27: Thematic analysis of respondents' final recommendations to improve citizens' resilience to disasters.

point to the lack of a preventive culture, citizens' dependence on the state without personal engagement, institutional inefficiency, and gaps in education. This paradox – where highly sophisticated resilience concepts coexist with pessimistic assessments of real-world resilience – is in line with international research distinguishing "resilience on paper" from "resilience in practice" [54–59]. It also empirically supports criticism of index-based models (like DROP, BRIC), which tend to overestimate resilience by focusing on structural indicators while underrepresenting lived experience, motivation, and trust [56–58,60–62].

Further findings reveal a strong connection between past disaster experiences, knowledge, and perceived resilience. Many respondents state that citizens' disaster knowledge is mostly experiential, built from previous floods, fires, epidemics, and similar events rather than systematic education. Two-thirds describe this knowledge as generally low to moderate, fragmented, and unevenly distributed, with older generations usually better prepared due to past civil protection curricula and life experiences. Conversely, younger generations are seen as insufficiently educated and less interested.

This aligns with studies indicating that disaster exposure can boost awareness and practical skills but does not automatically lead to formal learning or preparedness strategies [63–68]. The recurring critique of the removal or

marginalization of disaster-related content from school curricula highlights a long-term decline in the educational foundation of resilience. Nonetheless, a minority of respondents report that citizens respond well during floods, suggesting that experience-based learning can effectively foster adaptive behavior when supported by institutional backing and local organization [64,65,67–69].

Additional insights refine the picture of preparedness. Stockpiling food, water, medicines, and other essentials is described as partial and inconsistent: some groups and households maintain reserves – usually driven by past crises – but it is neither widespread nor systemic. While municipal-level emergency plans (such as risk assessments and protection and rescue strategies) are in place, respondents often emphasize that these are "on paper," rarely updated, inadequately communicated to the public, and seldom put into practice through training or drills.

Evacuation drills and practical exercises are notably weak: most local communities either do not conduct them at all or perform them solely to fulfill formal requirements, without active citizen involvement. When drills are held, citizens sometimes respond positively, but such instances are rare and lack consistency. Overall, these findings indicate a significant imbalance in preparedness: while institutional policies and formal structures are relatively well-established, daily practices like household stockpiling, personal planning, drills, and routine training are underdeveloped. This mismatch is similar to patterns observed in other countries, where "procedural resilience" (legal frameworks, plans, protocols) far exceeds 'practical resilience" (skills, routines, drills, household readiness) [70–72].

The barriers outlined in Table 11 are multifaceted: lack of time and money, low trust in institutions, fatalism ("whatever happens, happens"), and the belief that disasters are rare or someone else's responsibility. Participants also highlight structural challenges, such as limited budget allocations, fragmented institutional roles, and the politicization of disaster management. These perspectives support the view that resilience cannot be boosted through individual effort alone; it requires addressing social, institutional, and economic barriers simultaneously [29,64–68,73].

Furthermore, findings reveal the complex nature of citizens' trust in institutions [74]. Respondents describe trust as fragile, conditional, and influenced by past experiences and the wider political environment. Some report relatively high trust – particularly in smaller communities or specific entities like municipal offices or the army – while others express low or even negative trust, often linked to perceptions of corruption, inefficiency, and bureaucratic formalism. A key insight is that many citizens rely on institutions in crises despite criticizing them during normal times. In essence, trust during disasters can be "passive": people expect aid, especially financial support during recovery, but do not necessarily trust institutions' preventive efforts or their ability to reduce risks. This pattern aligns with findings from other contexts where institutional legitimacy is challenged, yet the state remains the main actor during emergencies [64,65,67–69,75,76].

Although not all social capital-related data are detailed here, the narrative segments suggest that informal support networks – such as family, neighbors, and volunteers – play a significant role, especially in smaller communities. However, respondents seldom describe strong, organized community structures; instead, they mention informal solidarity that is mobilized during crises but not systematically maintained during normal times. Compared to studies emphasizing social capital as a core component of community resilience [66,67,69,77,78], these findings point to a fragile and episodic form of solidarity that may not suffice for long-term adaptation.

Results also indicate that local experts possess a clear understanding of hazard patterns and environmental drivers in their communities. Floods, fires, droughts, landslides, and, to a lesser extent, earthquakes and technological incidents are recognized as relevant hazards, with floods identified by the majority of respondents as the most likely disaster. Consequently, risk awareness regarding which disasters are probable and their causes (such as terrain features, climate patterns, and land-use practices) is relatively high. However, when discussing whether preparedness measures vary across different threat types, many respondents highlight that, in practice, local efforts mainly target natural hazards. Industrial and technological risks, especially in municipalities with minimal industry, are often overlooked. Others note that the most costly components of preparedness – trained personnel, equipment, vehicles, shelters, medical capacities – are "hazard-neutral", with specific material provisions seldom tailored to particular threats.

This reveals a partial disconnect between risk awareness and risk-specific preparedness strategies. Compared to international discussions on "multi-hazard, multi-risk" approaches [79–82], these findings suggest that Serbian local communities are still shifting from a single-hazard, flood-focused mindset towards more integrated, all-hazards planning.

Results highlight a key difference: citizens' resilience averages 5.4/10, while local governments are rated more favorably, with an average of 6.9/10 and many high scores (7–10). Informants highlight strengths such as a functional headquarters, formal plans, established communication channels, and experience from previous floods. However, the data also reveal significant challenges: marginalized disaster-related issues, inadequate professional training, poor implementation of planning documents, and a lack of

regular drills and coordination. Several respondents directly blame these weaknesses on excessive reliance on national institutions and political influences affecting staffing and priorities. This mixed picture aligns with international studies on decentralization and disaster governance, which find that local governments often hold formal responsibilities but lack the autonomy, resources, and capacity for effective action [25,83–87]. The Serbian example shows that while institutional "foundations of resilience" exist, they have yet to translate into consistent, daily practices.

Taken together, the results support several broader conclusions relevant to the theoretical evolution of community resilience measurement:

- Resilience is viewed as both a process and a multi-level concept. Respondents naturally describe resilience in stages – anticipation, preparation, response, and recovery – and connect these stages across individual, household, community, and institutional levels. This shift emphasizes moving away from static, outcome-focused measures toward dynamic, process-oriented frameworks [24, 88–92].
- Limitations of purely quantitative metrics. The moderate scores for citizens and local governments conceal significant internal differences, inequalities (across generations, regions, socio-economic groups), and intangible factors such as trust, motivation, cultural attitudes towards prevention, and political influences. Conventional indices such as the DROP or BRIC indices, which rely on secondary data and proxies, often fail to capture these nuances [22,93–96]. The detailed qualitative evidence in the tables illustrates why such indices need to be supplemented with in-depth narratives and participatory approaches.
- The importance of education, communication, and trust. Throughout the tables, education, information dissemination, and trust consistently emerge as fundamental factors influencing resilience. Respondents refer to these regardless of the specific topic – be it knowledge, stockpiling, planning, drills, or local government effectiveness. This aligns with global research that recognizes knowledge, risk perception, and social capital as key mediators between structural capacities and actual behavior [97–100].
- Discrepancy between formal structures and lived resilience. A common theme is the presence of laws, plans, command centers, and protocols – yet their limited impact on citizen behavior, drills, and everyday preparedness. This gap between formal arrangements and actual resilience is precisely what many scholars warn about when contrasting "resilience rhetoric" with "resilience reality" [22,31,37,101–103].

This study faces typical constraints of qualitative, expert-based research. With a small sample size (N = 19) and a purposive/snowball recruitment method, there may be selection bias toward practitioners who are more involved or easier to access. The findings reflect perceptions influenced by participants' institutional roles and local experiences. As a result, the insights are specific to the Serbian local disaster-management context and should not be seen as statistically generalizable. Nonetheless, the study provides analytical generalization by pinpointing practice-relevant resilience dimensions (such as trust, coordination, and prevention culture) that can enhance resilience measurement frameworks and support future comparative studies in other post-socialist and multi-hazard environments.

The empirical insights highlight several practical and research implications. Practically, they emphasize the need to: (1) reintroduce disaster risk reduction and civil protection content into formal education at all levels; (2) create targeted, locally tailored awareness campaigns and drills that address specific hazard profiles; (3) enhance transparency, communication, and participatory planning to rebuild trust; and (4) support local governments with stable funding, training, and clearer division of responsibilities across governance levels. From a research perspective, the study shows the value of structured qualitative analysis in resilience measurement. Future work could combine indicators identified by local experts (such as education, trust, drills, stockpiling, institutional coordination, environmental management, etc.) with existing quantitative frameworks to develop hybrid indices that are more context- and practice-sensitive. Longitudinal and comparative studies – across regions, hazard types, and governance systems – would further clarify how these factors interact over time and under different stressors. In sum, the analysis of all empirical tables confirms that community resilience in Serbia is neither uniformly low nor robust; rather, it is uneven, contingent, and strongly influenced by education, experience, institutional behavior, and socio-political context [103–110]. By situating these findings within current global debates on resilience measurement, the study contributes to a more realistic, process-oriented understanding of what it means for communities not only to "bounce back" but to learn, adapt, and transform in the face of increasing risks.

Furthermore, two practical insights can be drawn from the findings. Firstly, building local resilience should focus on

ongoing risk communication and community training. For example, drills and practical education for all ages, as practitioners consistently associate preparedness and effective response with learned behaviors and readily accessible information. Secondly, enhancing resilience depends on better institutional coordination and trust, achieved through clearer roles, transparent planning, and regular interaction among local authorities, civil protection agencies, and residents, ensuring that official plans and strategies are effectively implemented rather than just written documents.

5 Conclusions

This study explored how community resilience measurement has evolved in theory, supported by real-world insights from disaster management experts in Serbia. By combining a thorough literature review with qualitative data, the research reveals a growing gap between existing frameworks, such as DROP, BRIC, and R4, and the challenges communities and local authorities actually face. While global models offer functional structure and analysis, they are only partly relevant without adaptation to local cultural, socio-economic, and institutional specifics.

The interview data clearly show that practitioners see community resilience as limited, uneven, and heavily reliant on personal disaster experience. Citizens' knowledge is often described as inadequate and disorganized, shaped more by past disasters than by systematic education or preparedness efforts. Knowledge of preventive actions, participation in drills, awareness of emergency plans, and stockpiling all show significant gaps that hinder the development of a prevention culture. Respondents frequently cite institutional fragmentation, insufficient training, poor communication, and infrequent community engagement as major barriers. Nonetheless, the qualitative results highlight some strengths. Personal and collective experiences, especially with floods, have fostered a practical understanding of risk in specific communities. Respondents also point to solidarity, adaptability, and quick learning as potential assets for resilience. However, these strengths tend to be sporadic rather than widespread and lack reinforcement through long-term policies or institutional backing.

Overall, the findings confirm that resilience cannot be fully captured by quantitative indicators or composite indices alone. These models often miss critical contextual factors, such as trust in institutions, social cohesion, informal networks, cultural norms, and lived experiences, all of which influence real-world resilience. Therefore, a mixed approach that combines the analytical clarity of indicator-based models with the contextual depth of qualitative and participatory methods is recommended. The study also emphasizes the need for a paradigm shift in disaster risk governance. Resilience should be viewed as a dynamic, evolving process rooted in knowledge, preparedness, communication, social capital, and effective institutions.

Improving resilience in Serbia requires ongoing investment in risk education, revitalizing civil protection training, making emergency plans more transparent and accessible, conducting regular drills, and fostering stronger cooperation between institutions and communities. Without these steps, resilience will remain just an ideal rather than a reality. By tracing the evolution of resilience theory and comparing it with local conditions, this research shows that meaningful progress depends on both refining concepts and implementing practical measures. A future-oriented, context-sensitive model – flexible, participatory, and multidimensional – offers the best chance to enhance community resilience against natural and technological disasters. This approach not only improves measurement but also strengthens governance structures and societal capacities needed to face increasingly complex and interconnected risks.

Acknowledgments: This study was supported by the Scientific-Professional Society for Disaster Risk Management and ProSafeNet – The Global Hub for Safety, Security, Risk & Emergency Professionals and Scientists (https://prosafenet.com/).

Research ethics: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of the Scientific–Professional Society for Disaster Risk Management and the International Institute for Disaster Research (protocol code 003/2025, 15 July 2025).

Informed consent: Informed consent was obtained from all subjects involved in the study.

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and consented to its submission to the journal, reviewed all the results and approved the final version of the manuscript. V.M. Cvetković conceived the original idea for this study, developed the theoretical and methodological framework, coordinated the research process, and supervised the preparation of the manuscript. V.M. Cvetković and D. Milenković contributed to the development of the research design, the qualitative interview framework, and the conceptual integration of community resilience measurement models. D. Milenković participated in the collection, organization, and preliminary interpretation of qualitative data obtained from local disaster management practitioners in Serbia. T. Lukić contributed to the literature review, theoretical contextualization, interpretation of findings, and discussion

of spatial, environmental, and community resilience aspects. R. Renner contributed to the conceptual refinement of the manuscript, critical review of the theoretical arguments, and improvement of the international relevance of the study. V.M. Cvetković, D. Milenković, T. Lukić, and R. Renner contributed to the analysis and interpretation of the findings, the discussion, and the concluding remarks. V.M. Cvetković additionally contributed to methodology improvement, software support, supervision, manuscript revision, and final editing. All authors critically reviewed the manuscript, contributed to its revision and finalization, and read and approved the final version of the manuscript.

Use of Large Language Models, AI and Machine Learning Tools: The authors acknowledge the use of Grammarly Premium and ChatGPT 4.0 to improve the English in this manuscript. The AI tools were used to assist with language enhancement but were not involved in developing the scientific content. The authors take full responsibility for the originality, validity, and integrity of the manuscript.

Conflict of interest: Informed consent was obtained from all subjects involved in the study.

Research funding: This research was funded by the Scientific–Professional Society for Disaster Risk Management, Belgrade (https://upravljanje-rizicima.com/, accessed on 10 January 2026), International Institute for Disaster Research (https://idr.edu.rs/, accessed 10 January 2026), Belgrade, Serbia, and ProSafeNet - The Global Hub for Safety, Security, Risk & Emergency Professionals & Scientists (https://prosafenet.com/, accessed 10 January 2026).

Data availability: Data are contained within the article.

Annex 1. Structured interview

1. Basic information about the respondent
   - Full name:
   - Age:
   - Gender:
   - Job title/position:
   - Place of work (institution/organization):
   - Level of education:
   - Income level (according to national statistics): below average/average/above average
   - Marital status:
2. Experience with disasters
   - Have you personally experienced any natural or industrial (technological) disaster?
   - If yes, how did you react, and what did you learn from that experience?
3. Understanding of citizens' resilience
   - How would you define citizens' resilience in responding to disasters? Which components do you believe it should include?
   - What is your overall opinion about the level of citizens' resilience in responding to disasters?
   - Please explain your view in detail and, at the end, assign a rating on a scale from 1 to 10.
4. Citizens' knowledge and preparedness
   - With respect to citizens' resilience in the event of disasters, how would you assess their knowledge about disasters?
   - Please explain your opinion.
   - Regarding citizens' preparedness for disasters:
     - How do you assess their practice of stockpiling food and water?
     - Are they sufficiently aware of the importance of this measure and its application in real circumstances?
     - How do you assess the effectiveness of verbal or written emergency preparedness plans?
     - Do citizens possess such plans, do they apply them, and how functional are these plans in practice?
     - How do you assess their involvement in activities such as evacuation drills?
     - To what extent are citizens motivated, informed, and willing to actively participate in these forms of preparedness?
5. Awareness, motivation, and barriers
   - How would you assess citizens' awareness of specific preventive measures in responding to disasters?
   - In your opinion, which factors influence this awareness, its level, and to what extent does it affect citizens' willingness to undertake concrete protective actions?
   - In your opinion, which factors influence citizens' motivation to undertake specific resilience measures in responding to disasters?
   - Please explain your view in detail, taking into account personal, social, institutional, and economic aspects.
   - In your opinion, what are the main barriers that prevent citizens from implementing specific resilience measures in responding to disasters?
   - Please explain your view in detail, again taking into account personal, social, institutional, and economic aspects.

6. Communication and trust in institutions
   - How much trust do citizens have in institutions when it comes to disaster management?
   - Do you consider this trust to be stable, conditional, or insufficient, and what influences it the most – experience, transparency of work, effectiveness of response, or something else?
   - Do you think institutions adequately inform citizens about preparedness and response measures?
   - Please explain your view, with reference to the clarity, timeliness, and accessibility of this information.
   - In your opinion, which are the most effective channels for informing citizens before and during disasters (TV, social media, radio, SMS alerts, etc.)?
   - Please explain your choice, taking into account the availability, reliability, and reach of these channels across different parts of the community.
7. Social capital and community connectedness
   - To what extent do citizens in your community communicate and cooperate when emergencies occur?
   - Please describe examples of cooperation and solidarity, or the lack thereof, as well as factors that influence the degree of connectedness among citizens in crises.
   - Are there local organizations or informal networks that contribute to community resilience?
   - If yes, please describe them briefly.
8. Environmental factors and awareness
   - In your opinion, to what extent are local communities aware of environmental factors that may influence disaster risk (e.g., landslides, floods, droughts)?
   - Are there local environmental protection measures that can contribute to disaster resilience?
   - Please specify which measures exist, to what extent they are implemented in practice, and how they affect the reduction of risks from environmental and natural disasters.
9. Local specificities and types of disasters
   - Which types of disasters do you consider most likely in your local community?
   - Please explain the reasons for your opinion, taking into account the geographical, climatic, infrastructural, and social characteristics of your area.
   - Do preparedness measures differ depending on the type of threat (e.g., industrial vs. natural disasters)?
   - Please explain your view and provide concrete examples of different approaches to preparedness for various types of risks in your community.
10. Local governments and public policies
    - How would you assess the resilience of local governments in responding to disasters?
    - Please explain your opinion in detail, taking into account capacities, organization, preventive measures, cooperation with other institutions, and resource mobilization.
    - At the end, please rate the local government's resilience on a scale of 1–10.
    - Which specific measures do you believe local governments should undertake to improve the level of citizens' resilience in responding to disasters?
    - Please explain your opinion, taking into account factors such as education, infrastructure, information provision, the organization of civil protection, and community cooperation.
11. Strategies for improving resilience
    - Which strategies, in your opinion, could be implemented to improve citizens' resilience in responding to disasters, particularly in terms of knowledge, emergency stockpiles, preventive measures, and the existence of plans?
    - Please explain your view in detail, providing concrete proposals and examples of good practice.
    - Do you think citizens are better prepared for natural or industrial (technological) disasters?
    - Why do you think so?
    - Please explain your view, taking into account the level of information, experience, training availability, and the role of institutions in preparing the population.
12. Household-level resilience
    - Based on your observations, what is the level of household resilience in Serbia in responding to disasters?
    - Please explain your view in detail, referring to different aspects – such as financial reserves, food and water stockpiles, knowledge of protocols, and access to training – and, at the end, rate this level on a scale from 1 to 10.
13. Final question
    - If you could give one recommendation to the citizens of Serbia to improve their resilience, what would it be?
    - Please formulate the advice you consider most important, whether it relates to knowledge, preparedness, organization, or cooperation with the community and institutions.

Annex 2. Semi-structured interviewer guide and instructions

The structured interview guide has been designed as part of a study to adapt BRIC community resilience indicators to disasters in Serbia and to develop a predictive model based on the DROP theoretical framework.

The goal is to collect qualitative insights from respondents with relevant experience, knowledge, or responsibility in disaster contexts.

General instructions

- The interview is conducted in person or online.
- The respondent should be clearly informed about the anonymity of the interview.
- Questions should be asked in the order provided in the guide.
- The respondent should be encouraged to elaborate on their answers, especially for questions that ask for attitudes, examples, or reflections.

Preparation

- Prepare basic information about the respondent in advance (if available).
- Ensure that the respondent understands the purpose of the research and agrees to participate.
- Inform the respondent that they may skip any question if they feel uncomfortable or do not know the answer.

Recording responses

- Record responses as completely and accurately as possible.
- If possible, and with the respondent's consent, the interview may be audio-recorded for precise transcription.

Focus during the interview

Pay particular attention to parts of the interview related to:
- Environmental factors and risk awareness;
- Social capital and local support networks;
- Trust in institutions and the effectiveness of communication;
- Specific characteristics of the local community and dominant types of disasters.

Closing the interview

- Thank the respondent for their time and contribution.
- Explain that the collected data will be used exclusively for research purposes and that their identity will remain anonymous.

Conceptual framework of the structured interview questionnaire

1. How would you define citizens' resilience in responding to disasters?
2. What is your overall opinion about the level of citizens' resilience in responding to disasters?
3. How would you generally assess citizens' knowledge related to disasters?
4. How would you generally assess households' food and water stockpiles in relation to disasters?
5. What is your view on the effectiveness of written and verbal guidance regarding disaster preparedness?
6. What is your general view of citizens' involvement in preparedness activities such as evacuation drills?
7. Which factors do you consider most important when assessing their influence on citizens and their motivation to undertake specific resilience measures in responding to disasters?
8. What are the main barriers for citizens in implementing concrete measures that would constitute a response to disasters?
9. How would you assess the resilience of local governments in responding to disasters?
10. Which strategies could be implemented to improve citizens' resilience to disasters?
11. What is the level of household resilience in Serbia when it comes to disasters?
12. Which actions do you believe local governments should take to increase the level of resilience to disasters?
13. What is, in your opinion, the general level of household resilience to disasters in Serbia?

References

1. Holling SC. Resilience and stability of ecological systems. Ann Rev Ecol Syst 1973;4:1–23.
2. Cimellaro GP, Reinhorn AM, Bruneau M. Framework for analytical quantification of disaster resilience. Eng Struct 2010;32:3639–49.
3. UNISDR. Terminology on disaster risk reduction. Geneva: United Nations International Strategy for Disaster Reduction; 2009. Available from: https://www.undrr.org/publication/2009-UNISDR-terminology-disaster-risk-reduction.
4. Bhamra R, Dani S, Burnard K. Resilience: the concept, a literature review and future directions. Int J Prod Res 2011;49:5375–93.
5. Parker DJ. Disaster resilience – a challenged science. Environ Hazards 2020;19:1–9.
6. Hochrainer-Stigler S, Velev S, Laurien F, Campbell K, Czajkowski J, Keating A, et al. Differences in the dynamics of community disaster resilience across the globe. Sci Rep 2021;11:17625.
7. Cvetkovic VM, Boškovic N, Öcal A. Individual citizens' resilience to disasters caused by floods: a case study of belgrade. Acad Perspect Procedia 2021;4:9–20.
8. Milenković D, Cvetković VM. Rethinking disaster resilience: conceptual framework, core dimensions, and key actors. Preprints 2025. https://doi.org/10.20944/preprints202510.1051.v1.
9. Ostadtaghizadeh A, Ardalan A, Paton D, Jabbari H, Khankeh HR. Community disaster resilience: a systematic review on assessment models and tools. PLOS Curr: Disasters 2015;7. https://doi.org/10.1371/currents.dis.f224ef8efbdfcf1d508dd0de4d8210ed.
10. Masson-Delmotte V, Zhai P, Pörtner H-O, Roberts D, Skea J, Shukla PR. Global warming of 1.5 °C. Geneva: Intergovernmental Panel on Climate Change; 2019. Available from https://www.ipcc.ch/sr15/.
11. Manyena SB. The concept of resilience revisited. Disasters 2006;30:434–50.
12. Norris F, Stevens S, Pfefferbaum B, Wyche K, Pfefferbaum R. Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. Am J Community Psychol 2008;41:127–50.
13. Cvetković V, Filipović M. Koncept otpornosti na katastrofe-theory of disaster resilience. Ecologica, 202–7. 2018. Available from: https://www.ecologica.org.rs/wp-content/uploads/2018/06/SADRZAJ_BROJ_89_2018.pdf.
14. Paton D, Johnston D. Disaster resilience: an integrated approach. Springfield: Charles C Thomas Publisher; 2017.
15. Aldrich PD. Building resilience: social capital in post-disaster recovery. Chicago: The University of Chicago Press; 2012.
16. Department of economic and social affairs. Retrieved February 7, 2025, from UN: https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html. 2018. Available from: https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html.
17. United Nations Office for Disaster Risk Reduction. Sendai framework for disaster risk reduction 2015–2030. Geneva: United Nations Office for Disaster Risk Reduction; 2015. Available from: https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030.
18. Cutter SL, Barnes L, Burton M, Evans C, Tate E, Webb J, et al. A place-based model for understanding community resilience to natural disasters. Glob Environ Change 2008;18:598–606.
19. Cutter SL, Burton CG, Emrich CT. Disaster resilience indicators for benchmarking baseline conditions. J Homeland Secur Emerg Manag 2010;7. https://doi.org/10.2202/1547-7355.1732.
20. OECD/European Union/EC-JRC. Handbook on constructing composite indicators: methodology and user guide. Paris: OECD Publishing; 2008.
21. Sharifi A. A critical review of selected tools for assessing community resilience. Ecol Indic 2016;69:629–47.
22. Camacho C, Bower P, Webb R, Munford L. Measurement of community resilience using the Baseline Resilience Indicator for Communities (BRIC) framework: a systematic review. Int J Disaster Risk Reduct 2023;95:103870.
23. Milenković D. Integrated disaster risk reduction system in Serbia. Int J Contemp Secur Stud 2025;1:175–89.
24. Cvetković V, Miladinović S. Spremnost sistema zaštite i spasavanja Republike Srbije. Ecologica. 2018;25:995–1001.
25. Cvetković VM, Tanasić J, Ocal A, Kešetović Ž, Nikolić N, Dragašević A. Capacity development of local self-governments for disaster risk management. Int J Environ Res Publ Health 2021;18:10406.
26. Boon H, Cottrell A, King D, Stevenson R, Millar J. Bronfenbrenner's bioecological theory for modelling community resilience to natural disasters. Nat Hazards 2011;60:381–408.
27. Milenković D, Cvetković V, Ivanov A, Renner R. Impact of cyberspace on security in armed conflicts. Int Yearb Fac Security 2024;1:29–53.
28. Chang S, Shinozuka M. Measuring improvements in the disaster resilience of communities. Earthq Spectra 2004;20:739–55.
29. Koliou M, Van De Lindt J, McAllister T, Ellingwood B, Dillard M, Cutler H. State of the research in community resilience. Sustain Resil Infrastruct 2020;5:131–51.
30. Tseng TH, Stojadinović B. CI-STR interface for disaster resilience assessment. Int J Disaster Risk Reduct 2024;93:104763.
31. Marasco S, Kammouh O, Cimellaro G. Disaster resilience quantification of communities. Int J Disaster Risk Reduct 2022;67:102778.
32. Tariq H, Pathirage C, Fernando T. Measuring disaster resilience at local levels. Int J Disaster Risk Reduct 2021;60:102358.
33. Aksha S, Emrich C. Benchmarking community disaster resilience in Nepal. Int J Environ Res Publ Health 2020;17:1985.
34. Yoon DK, Kang J, Brody S. A measurement of community disaster resilience in Korea. J Environ Plann Manag 2016;59:436–60.
35. Hong B, Bonczak B, Gupta A, Kontokosta C. Measuring inequality in community resilience. Nat Commun 2021;12:1870.
36. Melendez A, Caballero-Russi D, Soto MG, Giraldo L. Computational models of community resilience. Nat Hazards 2021;111:1121–52.
37. Cox R, Hamlen M. Community disaster resilience and the Rural Resilience index. Am Behav Sci 2015;59:220–37.
38. Oza H, Nanavati A, Clasen T, Salinger A, Freeman M, Sinharoy S. Measurement tools of urban and community resilience. Int J Disaster Risk Reduct 2025;98:105267.
39. Zander K, Sibarani R, Abunyewah M, Erdiaw-Kwasie M, Moss S, Lassa J, et al. Community resilience across Australia towards natural hazards: an application of the Conjoint Community Resiliency Assessment Measurement. Disasters 2023;48:e12590.
40. Almutairi A, Mourshed M, Ameen R. Coastal community resilience frameworks for disaster risk management. Nat Hazards 2020;101:595–630.
41. Li Y, Wang S, Zhang Y, Du G. Measurement of rural community resilience in China. Sci Rep 2024;14:70719.
42. Lin YM, Lin BC, Lee C. Enhancing resilience in isolated island communities. Nat Hazards 2025. https://doi.org/10.1007/s11069-024-07103-0.
43. Marshall A, Wilson CA, Dale A. Telecommunications and natural disasters in rural Australia. J Rural Stud 2023;97:365–77.

44. Logan T, Guikema S. Reframing resilience: equitable access to essential services. Risk Anal 2020;40:1538–56.
45. Uddin M, Haque C, Walker D, Choudhury MUI. Community resilience to cyclone and storm surge disasters: evidence from coastal communities of Bangladesh. J Environ Manag 2020;264:110457.
46. Luciano F, De Oliveira Lima E. Entrepreneurship and natural disasters. Cyrus Global Business Perspect 2025;9. https://doi.org/10.52212/cgbp2025-v9i1m6.
47. Müller CC, Elzomor M. Disruptive technologies in disaster response and resilience. Int J Disaster Resil Built Environ 2025. https://doi.org/10.1108/IJDRBE-12-2024-0136.
48. Saja A, Teo M, Goonetilleke A, Ziyath A. Social resilience properties in disaster management. Int J Disaster Risk Sci 2021;12:790–804.
49. Suleimany M, Mokhtarzadeh S, Sharifi A. Community resilience to pandemics. Int J Disaster Risk Reduct 2022;80:103248.
50. EU za Srbiju otpornu na katastrofe. UNDP Serbia; 2024.
51. Cvetković VM, Šišović V. Capacity building in Serbia for disaster and climate risk education. In: Disaster and Climate Risk Education: Insights from Knowledge to Action. Singapore: Springer Nature Singapore; 2024:299–323 pp.
52. Cvetković VM, Šišović V. Community disaster resilience in Serbia. Belgrade: Scientific-Professional Society for Disaster Risk Management; 2024.
53. Barasa E, Mbau R, Gilson L. What is resilience and how can it be nurtured? Int J Health Pol Manag 2018;7:491–503.
54. Cohen M, Cui S, Doetsch S, Ernst R, Huchzermeier A, Kouvelis P, et al. Bespoke supply-chain resilience: the gap between theory and practice. J Oper Manag 2022;68:515–31.
55. Kolte R, Goswami S, Kumar A, Pipralia S. Challenges in practical implementation of urban resilience. Int J Disaster Risk Reduct 2023;87:104142.
56. Manyena B, Machingura F, O'Keefe P. Disaster resilience integrated framework for transformation (DRIFT). World Dev 2019;123:104587.
57. Shamsuddin S. Urban resilience implementation challenges. Cities 2020;103:102763.
58. Tasic J, Amir S, Tan J, Khader M. A multilevel framework for organizational resilience. J Risk Res 2020;23:713–38.
59. Chen R, Xie Y, Liu Y. Defining, conceptualizing, and measuring organizational resilience. Sustainability 2021;13:2517.
60. Hillmann J. Disciplines of organizational resilience. Rev Manag Sci 2020;14:617–48.
61. Saulnier D, Blanchet K, Canila C, Muñoz C, Zennaro LD, De Savigny D, et al. Health systems resilience research agenda. BMJ Glob Health 2021;6:e006779.
62. Cong Z, Feng G, Chen Z. Disaster exposure and patterns of disaster preparedness. J Environ Manag 2023;339:117798.
63. Hoffmann R, Muttarak R. Impacts of education and experience on disaster preparedness. World Dev 2016;96:32–51.
64. Karim A. Knowledge, perception or disaster experience? J Int Dev 2024. https://doi.org/10.1002/jid.3922.
65. Ryan B, Johnston K, Taylor M, McAndrew R. Community engagement for disaster preparedness. Int J Disaster Risk Reduct 2020;49:101655.
66. Sahadev S, Malhotra N, Kannangara L, Ritchie B. Disaster planning intentions of tourism managers. J Trav Res 2023;63:175–94.
67. Tuquero BN, Tan RN, Tango GJ, Tinasa KR, De Leon Torres AI, Torres AS, et al. Select demographic data, disaster-related experience, and disaster attitudes as predictors of disaster preparedness among student nurses. Public Health Nurs 2025;42:1335–42.
68. Goniewicz K, Goniewicz M, Burkle F, Khorram-Manesh A. Disaster preparedness and nurse training. PLoS One 2021;16:e0244488.
69. Cvetković V, Gačić J. Evakuacija u prirodnim katastrofama. Beograd: Zadužbina Andrejević; 2016.
70. Fischer HW, Stine GF, Stoker BL, Trowbridge ML, Drain EM. Evacuation behaviour. Disaster Prev Manag 1995;4:30–6.
71. Mumović N, Cvetković V. Factors influencing evacuation decisions during residential fires. Vojno Delo 2019;71:142–63.
72. Guo L, Fang M, Liu L, Chong H, Zeng W, Hu X. Disaster preparedness education for public. BMC Public Health 2025;25:645.
73. Nikolić N, Cvetković VM, Renner R, Cvijović N, Gačić J. Disaster risk perception and local resilience near the 'Duboko' landfill. Open Geosci 2025;17:20250850.
74. Aslanoğlu A, Bilgiç N, Murad A, Elshatarat R, Abujaber DA, Qasim EA, et al. The impact of educational and training programs on disaster awareness and preparedness among health sciences students. Int J Disaster Risk Reduct 2024;113:104888.
75. Said N, Chiang V. Disaster preparedness of nurses. Int Emerg Nurs 2019;45:100806.
76. Appleby-Arnold S, Brockdorff N, Callus C. Developing a culture of disaster preparedness: the citizens' view. Int J Disaster Risk Reduct 2021;56:102133.
77. Hoffmann R, Muttarak R. Disaster experience and education. Vienna Inst Demogr; 2021.
78. Miller D. Public trust after natural and technological disasters. Int J Sociol Soc Pol 2016;36:410–31.
79. Monteil C, Simmons P, Hicks A. Post-disaster recovery and sociocultural change. Int J Disaster Risk Reduct 2020;45:101356.
80. Pooyan Z, Hokugo A. Community resilience and social capital. Int J Disaster Risk Reduct 2025;98:105213.
81. Sadri A, Ukkusuri S, Lee S, Clawson R, Aldrich D, Nelson M, et al. Social capital and post-disaster recovery. Nat Hazards 2018;90:1377–406.
82. Bae Y, Joo Y, Won SY. Decentralization and collaborative disaster governance: evidence from South Korea. Habitat Int 2015;52:50–6.
83. Das A, Luthfi A. Disaster risk reduction in post-decentralisation Indonesia. In: Disaster Risk Reduction in Indonesia; 2017:85–125 pp.
84. Goyal N. Disaster governance and community resilience. Int J Disaster Risk Manag 2019;1:71–87.
85. Marks D, Lebel L. Disaster governance and scalar politics of decentralization. Habitat Int 2016;52:57–66.
86. Tolessa T, Fana C, Gadissa D, Takela E, Tesso G. Decentralization of disaster risk management in Ethiopia. Int J Disaster Risk Sci 2024;15:321–36.
87. Milenković D, Cvetković V, Renner R. A systematic literary review on community resilience indicators: adaptation and application of the BRIC method for measuring disasters resilience. Int J Disaster Risk Manag 2024;6:79–103.
88. Emami SG, Lorenzoni V, Turchetti G. Towards resilient healthcare systems. Int J Environ Res Publ Health 2024;21:286.
89. Houston J. Community resilience and communication. J Appl Commun Res 2018;46:19–22.
90. Leite M, Ross H, Berkes F. Interactions between individual, household, and fishing community resilience. Ecol Soc 2019;24:2.
91. Min O, Dueñas-Osorio L, Min X. Three-stage resilience analysis framework for urban infrastructure. Struct Saf 2012;36:23–31.
92. Nguyen HL, Akerkar R. Modelling, measuring, and visualising community resilience. Sustainability 2020;12:7896.
93. Derakhshan S, Blackwood L, Habets M, Effgen J, Cutter S. Prisoners of scale. Sustainability 2022;14:6927.

94. Derakhshan S, Emrich C, Cutter S. Degree and direction of overlap between social vulnerability and community resilience. PLoS One 2022;17:e0275975.
95. Matin N, Forrester J, Ensor J. What is equitable resilience? World Dev 2018;109:197–205.
96. Mikulewicz M. Thwarting adaptation's potential? Geoforum 2019;104: 267–77.
97. Cvetković V. The relationship between educational level and citizen preparedness for responding to natural disasters. J Geograph Inst "Jovan Cvijić" SASA. 2016;66:237–53.
98. Cvetković V, Tarolli P, Roder G, Ivanov A, Ronan K, Ocam A, et al. Citizens' education about floods: a Serbian case study. In: Archibald Reiss Days. Belgrade; 2017.
99. Cvetković V, Dragašević A, Protić D, Janković B, Nikolić N, Milošević P. Fire safety behavior model for residential buildings. Int J Disaster Risk Reduct 2022;69:102981.
100. Cvetković VM, Öcal A, Ivanov A. Young adults' fear of disasters. Int J Disaster Risk Reduct 2019;39:101095.
101. Copeland S, Comes T, Bach S, Nagenborg M, Schulte Y, Doorn N. Measuring social resilience. Int J Disaster Risk Reduct 2020:101799. https://doi.org/10.1016/j.ijdrr.2020.101799.
102. Katsikopoulos P. Individual and community resilience in natural disaster risks and pandemics. Mind Soc 2020;20:113–18.
103. Vidović N, Cvetković VM, Beriša H. Optimising disaster resilience through advanced risk management and financial analysis of critical infrastructure in the Serbian defence industry. Int J Disaster Risk Manag 2024;6:183–200.
104. Jevtić M, Cvetković VM, Gačić J, Raonić Z. Factors of vulnerability and resilience of persons with disabilities during disasters: challenges and strategies for inclusive risk reduction. Int J Disaster Risk Manag 2025;7: 91–114.
105. Cvetković V. A predictive model of community disaster resilience based on social identity influences (MODERSI). Int J Disaster Risk Manag 2023;5:57–80106.
106. Ahmed S. Impacts of flooding disaster risk management policy for resilience building in pastoral and agro-pastoral community: the case of Dassenech, Southern Ethiopia. Int J Disaster Risk Manag 2025;7: 137–62.
107. Pradhan B, Kumar S, Nayak D. From vulnerability to resilience: a systematic review of Odisha's integrated approach to disaster risk reduction. Int J Disaster Risk Manage 2025;7:519–32.
108. Janković L, Cvetković VM, Gačić J, Renner R, Jakovljević V. Integrating psychosocial support into emergency and disaster management and public safety: the role of the Red Cross of Serbia. Int J Contemp Secur Stud 2025;1:99–124.
109. Hamza JM, Sunday JDK. Assessment on the level of awareness and adoption of cloud computing for disaster-resilient library management systems: a case study of Federal University of Education, Zaria. Int J Contemp Secur Stud 2025;1: 83–104.
110. Miletic S, Stojanović T. Risks and threats to critical infrastructure with reference to trends in the protection of critical infrastructure in the Republic of Serbia. Int J Contemp Secur Stud 2025;1:203–14.