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ORIGINAL PAPER

Volunteer-based disaster response during the 2023 Kahramanmaraş earthquakes: a SWOT analysis

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Abstract
This exploratory, qualitative case study investigates the volunteer response to the 2023 Kahramanmaraş earthquakes through a SWOT analysis, focusing on the perspectives of both volunteers and coordinators. It includes in-depth interviews and field observations involving a purposeful sample ($n=21$) of participants actively engaged in volunteer coordination activities. This focused approach provides deep, contextual insights into the structured response, rather than a generalisable overview of all volunteer activities. Based on observations and interviews, the study identifies significant strengths, weaknesses, opportunities, and threats in volunteer management. MAXQDA Analytics Pro 2024 was employed to analyse data. The findings suggest various strengths, including organizability, a large number of volunteers, extensive communication, a spirit of solidarity, and representation of different professional groups. However, participants reported significant weaknesses, including a lack of training, inadequate coordination, continuity issues, and challenges in disaster area security and logistics. Participants identified essential opportunities to enhance volunteer mobilisation, particularly in relation to the young population, NGO collaborations, training opportunities, and new technologies. Nevertheless, persistent threats included uncontrolled volunteering, cultural conflicts, malicious actors, and inadequate management. Based on these results, the study proposes four strategic recommendations to strengthen voluntary disaster response systems in Türkiye and similar contexts, maximising resilience and preparedness towards possible catastrophes.

Keywords Disaster · Earthquake · Volunteerism · Coordination · SWOT

1 Introduction

Natural catastrophes are especially dangerous to communities, and they not only cause physical destruction but also deep psychological, social, and economic trauma (Çınaroğlu et al. 2024). Of all of them, earthquakes are particularly destructive because they occur

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without warning and have extensive repercussions (Özdemir and Mızrak 2023). While these disasters lead to significant adverse results for the affected society, they also test the actions of states (Şahin et al. 2018). While the state apparatus is crucial in disaster response, catastrophic disasters often involve the active participation of civil society, primarily through voluntary actions. Within this context, the 2023 Kahramanmaraş earthquakes highlighted the critical role of volunteers in emergency response efforts. The dual seismic events affected 11 provinces, resulting in over 50,000 fatalities and disrupting the lives of millions (EM-DAT 2023). According to the Turkish Disaster Response Plan, the emergency was declared at Level 4, triggering nationwide mobilisation and international aid requests. Volunteers, regardless of formal training, became essential actors in the immediate response phase. Their widespread involvement offered a compelling case study in disaster volunteer management and coordination under crisis conditions (Sert et al. 2024; Boztilki and Barış 2024). Understanding the institutional structures that underpin volunteer engagement is, therefore, essential to contextualising the role volunteers played in these events.

1.1 Disaster volunteering in Türkiye

Effective disaster planning and readiness are essential in minimising losses and ensuring coordinated response operations (Şahin et al. 2018). Disaster volunteers play a crucial role in these operations, making significant contributions to society through solidarity and collaboration, without expecting material reciprocation (DEMA 2024a).

In Türkiye, the institutional framework of disaster volunteerism is shaped by the collaboration of state-initiated efforts and non-profit organisations, with the ultimate objective of delivering timely aid to victimised communities during times of disaster (Aydemir 2021). The Marmara Earthquake of August 17, 1999, marked a critical turning point in the evolution of the institutional framework, exposing catastrophic failures in disaster management and creating an immediate need to redesign institutional roles and centralise coordination mechanisms (Tosun 2021). Responding to this need, the Disaster and Emergency Management Presidency (DEMA) was established in 2009, consolidating national disaster-related institutions under a unified authority to coordinate and govern emergency response activities (DEMA 2024b).

DEMA collaborates with municipalities and NGOs to ensure effective mobilisation of volunteers during crises through systematic training and ongoing support (DEMA 2024a). Before the February 6, 2023 earthquakes, DEMA and its partner volunteer organisations—the Turkish Red Crescent, the Humanitarian Relief Foundation (IHH), and the Search and Rescue Association (AKUT)—had approximately 600,000 volunteers in total. Following the earthquakes, a total of 1.5 million volunteers were reported (Anadolu Agency 2024).

In addition to civilian volunteer structures, military involvement constitutes a distinctive feature of Türkiye's disaster management framework. The Turkish Armed Forces are directly involved in emergency response and recovery, particularly in providing logistical support and delivering essential services during disasters (İlhan 2013).

Overall, disaster volunteerism in Türkiye operates within a multi-actor, coordinated system that involves government agencies, nongovernmental organisations, and community-based organisations in delivering effective disaster response and recovery interventions.

1.2 2023 disaster volunteering in Kahramanmaraş earthquakes

On Monday, February 6, 2023, two powerful earthquakes struck Türkiye, with a magnitude 7.8 quake centred in Pazarcık and a 7.5 magnitude quake centred in Elbistan, both located in Kahramanmaraş Province. These devastating earthquakes affected a vast region, resulting in the loss of 50,399 lives (Presidency of the Republic of Türkiye Strategy Development Directorate 2023). During the course of the following 45 days, seismological agencies recorded more than 24,000 aftershocks, which significantly hampered disaster management and volunteer activities in the region (Fig. 1). Despite ongoing security risks posed by aftershocks, volunteers played a key role in relief efforts to meet short-term demands by conducting search and rescue operations and providing shelter, food, and healthcare services.

Foreign teams, NGOs, municipal fire brigades, ministry-attached search and rescue teams, police forces, and the Disaster and Emergency Management Agency (DEMA) conducted search and rescue operations. DEMA mobilised 35,250 search and rescue personnel (DEMA 2023). A total of 271,060 personnel were deployed in the field, comprising 9908 spontaneous volunteers and 8000 registered DEMA volunteers. Following the disaster, applications to DEMA's volunteer scheme increased by 110,041, bringing the total number of registered volunteers to 719,000 (Anadolu Agency 2023).

The disaster, of unparalleled magnitude, required international aid, resulting in one of the largest foreign disaster responses in INSARAG history (INSARAG 2023a). Responding to DEMA's appeal for assistance, international authorities mobilised an estimated 5000 foreign search-and-rescue teams and 49 INSARAG-classified teams from 90 countries into affected areas. A total of 35,409 volunteers participated in field operations, and 11,320 search and rescue personnel were deployed on the first few days. The coordination between local and international teams made one of the world's largest rescue efforts possible.

The Kahramanmaraş 2023 earthquakes highlighted the limitations of state institutions, such as DEMA, demonstrating the need for increased resources, specifically volunteer human power (Usta et al. 2023). Spontaneously assembled groups and volunteer associations rapidly filled fundamental gaps in search and rescue, the distribution of humanitarian

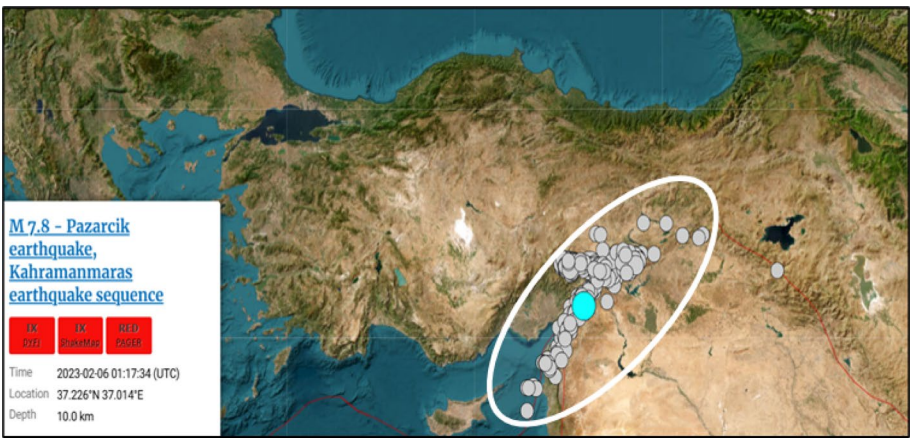

Fig. 1 Kahramanmaraş earthquakes area (USGS 2024)

aid, and psychological and medical support (Sert et al. 2024). The speedy and mass-scale mobilisation constituted a severe stress test for Türkiye's disaster volunteerism system.

A review of volunteer research in Türkiye reveals a high rate of volunteering in relation to disasters, consistent with global trends. These volunteers primarily focus on crisis intervention, search and rescue, humanitarian relief, and emergency sheltering (Öksüz et al. 2021). However, managing the unprecedented situations arising in disasters is highly complex (Demirbilek 2023). Even though solidarity is typical in society under such emergencies, who becomes responsible enough to come voluntarily—breaking their routine living—remains insufficiently addressed (McLennan et al. 2016).

Carvalho et al. (2024) found that volunteers are driven by knowledge, personal values, empathy, altruism, and the extent to which they feel prepared. Jaime et al. (2023) noted that volunteers' competencies and knowledge significantly impact their performance and satisfaction. Ghodsi et al. (2022) also enumerated prior disaster response experience and training as the main predictors of volunteer resilience. However, Whittaker et al. (2015) stipulated that cultural assumptions and legal requirements generally inhibit increased volunteer participation.

In Türkiye, Erkal and Değerliyurt (2009) identified the absence of disaster preparation, particularly risk management and adaptation policies. Similarly, INSARAG (2023a) also reported that coordination, logistics, and search and rescue were the most significant shortcomings in the Kahramanmaraş earthquakes. Inefficient logistics and inadequate equipment hindered the effectiveness of operations, while the lack of structured planning further contributed to overall inefficiency. The report noted greater flexibility and diversification in training for teams and volunteers to accommodate changing disaster scenarios.

This exploratory, qualitative case study examines the volunteer response to the 2023 Kahramanmaraş earthquakes through a SWOT analysis, drawing on in-depth interviews and field observations with a purposeful sample of volunteers and coordination organisations. This focused approach is intended to provide deep, contextual insights into structured volunteer responses, rather than a generalisable overview of all volunteer activities. The primary aim is to establish strategic knowledge for improving the coordination of volunteers in large-scale disaster scenarios. To achieve this broader objective, this paper focuses on the following specific objectives:

1. To classify and explain the internal and external drivers—i.e., strengths, weaknesses, opportunities, and threats—that frame volunteer involvement in disaster relief, observed and experienced by disaster coordinators and volunteers.
2. To synthesise these SWOT elements into practical strategic elements through cross-comparison of internal capacities with external realities and thereby enable the development of adaptive and resilient volunteer management strategies.
3. To help develop a context-based volunteer management framework that can enhance disaster preparedness and response planning in Türkiye, as well as provide insights for other disaster-risk areas around the world.

2 Methodology

2.1 Study design

The current exploratory, qualitative case study applied the SWOT analysis method, i.e., Strengths, Weaknesses, Opportunities, and Threats (David and David 2017). The SWOT approach enables both qualitative and quantitative measurement, focusing on four key dimensions, and offers a structured framework for quantifying the condition of a system or organisation and generating strategic insights (Uçar and Doğru 2005). One of the primary advantages of SWOT analysis is its simplicity and flexibility, which is why it has been widely utilised in business and academic circles since its development in the 1960s (Ghazinoory et al. 2011). However, this very simplicity also represents a limitation, as the framework's reductive nature can risk oversimplifying dynamic and multifaceted realities.

SWOT analysis is particularly valuable in strategic decision-making. Following the study, the analysis categorises each factor through a cross-tabulation matrix that combines internal and external factors: strength–opportunity, strength–threat, weakness–opportunity, and weakness–threat. Each of these combinations offers different crucial strategies based on the combination of circumstances and challenges (Ansoff 1980). By examining internal performance (strengths and weaknesses) and external environmental factors (opportunities and threats), the SWOT model presents a balanced view that enables a comprehensive assessment of current realities and potential future possibilities. It is a flexible and powerful tool with uses across individuals, groups, organisations, or even policy or programmatic efforts (David and David 2017).

Reporting of this research conformed to two globally recognised qualitative research guidelines: the Consolidated Criteria for Reporting Qualitative Research (COREQ) of Tong et al. (2007) and the Standards for Reporting Qualitative Research (SRQR) of O'Brien et al. (2014). The COREQ checklist explicitly ensures greater transparency and completeness of reporting in qualitative interviews and focus groups. It guides researchers in clearly documenting aspects related to the research team, study context, methods, data generation, analysis, and interpretation, thereby increasing the validity and replicability of the study (Tong et al. 2007). In addition, the arrangement of the research questions, data analysis, findings, and conclusion was informed by the phenomenological analysis process advocated by Moustakas (1994), hence increasing the methodological rigour of the study.

2.2 Study sample

We formed the research sample using purposive sampling, a non-probability sampling method commonly applied in qualitative research (Creswell 2007). The participants were individuals from public agencies, nongovernmental organisations, and disaster volunteers actively participating in volunteer coordination efforts in earthquake-stricken provinces of the 2023 Kahramanmaraş earthquakes. Before starting data collection, we contacted major organisations responsible for volunteer coordination to obtain official permission for interviews.

We interviewed 21 participants from nine provinces in Türkiye and stopped data collection once they reached data saturation. Table 1 presents the descriptive features of the participants. Although qualitative studies do not have strict rules regarding sample size, Namey

Table 1 Descriptive characteristics of the participants

Participant	Age	Gender	Role	Institution	City	Level of education	Term of office (Year)
P1	38	Male	Disaster Volunteer	DEMA	Balıkesir	Undergraduate	12
P2	41	Male	Disaster Volunteer	IHH Humanitarian Relief Foundation	İstanbul	Undergraduate	15
P3	32	Male	Disaster Volunteer	Ministry of National Education	Bursa	Undergraduate	9
P4	45	Female	Disaster Volunteer	Higher Education Institution	Gaziantep	Doctorate	17
P5	45	Male	Disaster Volunteer	Directorate of Religious Affairs	Ankara	Associate Degree	16
P6	51	Male	Volunteer Coordinator	General Directorate of Security	Ankara	Master's Degree	20
P7	35	Male	Disaster Volunteer	Turkish Armed Forces	Balıkesir	Undergraduate	13
P8	53	Male	Volunteer Coordinator	Hak Humanitarian Aid Association	Kahramanmaraş	Undergraduate	22
P9	35	Female	Disaster Volunteer	DEMA	Kahramanmaraş	Undergraduate	12
P10	43	Female	Volunteer Coordinator	Ministry of National Education	Osmaniye	Undergraduate	18
P11	48	Female	Volunteer Coordinator	DEMA	Elâzığ	Undergraduate	21
P12	44	Male	Volunteer Coordinator	DEMA	Hatay	Undergraduate	20
P13	47	Female	Volunteer Coordinator	DEMA	İstanbul	Undergraduate	16
P14	44	Male	General Coordinator	Turkish Red Crescent	Elâzığ	Doctorate	23
P15	32	Female	General Coordinator	GEA Search and Rescue	İstanbul	Doctorate	8
P16	37	Male	Disaster Volunteer	Republic of Türkiye Ministry of Health	Ankara	Undergraduate	15
P17	35	Female	Disaster Volunteer	Republic of Türkiye Ministry of Health	Ankara	Undergraduate	9

Table 1 (continued)

Participant	Age	Gender	Role	Institution	City	Level of education	Term of office (Year)
P18	32	Male	Volunteer Coordinator	National Medical Rescue Team	Balıkesir	Associate Degree	12
P19	40	Male	Volunteer Coordinator	National Medical Rescue Team	Balıkesir	Undergraduate	16
P20	30	Female	Volunteer Coordinator	Hak Humanitarian Aid Association	Kahramanmaraş	Undergraduate	8
P21	33	Female	Volunteer Coordinator	Turkish Red Crescent	Hatay	Undergraduate	12

et al. (2007) point out that researchers achieve sample adequacy when they obtain thematic saturation in in-depth interviews.

No participants dropped out or withdrew from interviews. The sample consisted of Turkish citizens who had served as disaster volunteers or coordinators for a period of at least five years and were actively engaged in disaster response activities at the time of the study. Spontaneous volunteers, who have no formal connection or previous experience, were not included in the sample.

Among the 21 participants, nine were female and twelve were male. The mean professional experience was 14.95 ± 4.50 years, ranging from 8 to 23 years, indicating a highly experienced sample. The ages of the participants varied between 30 and 53 years, with a mean age of 40.1 years.

Regarding educational level, 15 participants held a bachelor's degree, three had completed a doctoral degree, one had a master's degree, and two had associate degrees. The participants were nine disaster volunteers and twelve disaster volunteer coordination officials.

2.3 Data collection

The researchers developed a semi-structured, in-depth interview guide, based on a comprehensive review of the literature, and employed it to conduct this study. Two qualitative research method experts vetted and approved the guide to ensure the appropriateness and candour of the interview questions. The pilot test was subsequently conducted with two participants, resulting in minor revisions to enhance question clarity and logical sequencing. Based on pilot interview feedback, where some responses were brief, the researchers incorporated additional follow-up questions into the guide to obtain more comprehensive and detailed responses (Creswell 2007).

The final interview guide included seven sociodemographic questions, four open-ended questions aligned with the SWOT dimensions (strengths, weaknesses, opportunities, and threats), and an additional question inviting participants to comment on areas for improvement. The main questions were:

- What are the strengths of disaster volunteer management?
- What are the weaknesses of disaster volunteer management?
- What are the opportunities for disaster volunteer management?
- What are the threats to disaster volunteer management?

To gain deeper insights into participants' responses, the researchers used follow-up questions such as "Can you explain?", "Why do you think that?" and "Could you give an example?". The interviews were scheduled at mutually agreed-upon times to accommodate both researchers and participants. For the avoidance of potential interpersonal bias, no prior personal or professional relationship existed between the researchers and participants. The researchers conducted the interviews in February and June 2024, primarily in the provinces most affected by the February 6, 2023, Kahramanmaraş earthquakes—Kahramanmaraş, Hatay, and Osmaniye—and in the hardest-hit districts, such as İslâhiye, Nurdağı, and Kırıkhan. The researchers conducted seventeen in-person interviews at worksites, providing a comfortable and contextually appropriate environment for participants, and held the final four interviews via Zoom due to geographical distance and logistical constraints. All interviews lasted between 20 and 40 min.

Aside from the interviews, two researchers conducted field observations at sampled disaster volunteer coordination centres to examine volunteer operations organisation, inter-agency coordination, and volunteer management.

The researchers used field notes from the observations to corroborate and contextualise the interview data. Two researchers, qualified in qualitative research and disaster management, conducted all interviews. The presence of both researchers in every session facilitated cross-monitoring, enhancing consistency and credibility in the data. The respondents—typically well-educated individuals with experience in research environments—provided responses that demonstrated critical reflection. The researchers carefully avoided biases that could arise from their professional experience in the field or participants' official status. To prevent such biases, they conducted the interviews using neutral, non-directive wording and open-ended questions (Briggs 1986). Qualitative research and disaster response training, as well as the team's experience, ensured methodological rigour and ethical sensitivity throughout data collection. The interviewers conducted each session with sensitivity to the emotional situation in post-disaster settings, demonstrating a consideration for participants' potential personal and professional distress resulting from the earthquakes.

2.4 Data analysis

The researchers employed a SWOT analysis grounded in qualitative content analysis and conducted data gathering and analysis concurrently to enable iterative engagement with the data. With participants' informed consent, they tape-recorded all interviews and transcribed them verbatim. They reviewed the transcripts multiple times to ensure a comprehensive understanding of the data and to identify emergent patterns.

Using MAXQDA Analytics Pro 2024, the researchers extracted inductive initial codes directly from participants' narratives without relying on a predetermined coding framework. Two researchers independently coded the transcripts, compared their coding outcomes, and resolved discrepancies through consensus discussions to enhance the credibility and trustworthiness of the analysis.

The researchers repeatedly compared and calibrated codes clustered them into broader categories and identified recurring thematic patterns. They subsequently mapped these emergent themes onto the four SWOT dimensions: strengths (internal positive conditions), weaknesses (internal negative conditions), opportunities (external empowering conditions), and threats (external constraining conditions). This scaffolding enabled the development of an integrated analytical framework, providing meaning to the findings.

Representative quotations were selected to illustrate each theme and to demonstrate the diversity of participant perspectives. To further support the analytical process, we used Xmind AI to create visual mind maps, which enabled us to visually represent the relationships among codes and their positions within the SWOT categories.

2.5 Reliability

Lincoln and Guba (1985) proposed four broad criteria to establish trustworthiness for qualitative inquiry: credibility, transferability, dependability, and confirmability. To enhance reliability, the researchers contrasted the findings with the existing literature. They stopped data collection when thematic saturation emerged, as indicated by the recurrence of themes. The researchers dedicated substantial time to engaging with participants to earn their trust and gain a deeper understanding of their experiences. At the conclusion of each interview, they briefly recapitulated key points to resolve any misunderstandings.

To facilitate the transferability of the findings, the researchers provided a detailed description of the research environment and participant demographics. They further enhanced the methodological rigour by applying the COREQ checklist (Tong et al. 2007). Consistency and transparency in data collection, analysis, and interpretation are essential in qualitative research. To address validity, the researcher employed confirmatory strategies by asking participants explanatory questions, such as "Do you mean this?" during interviews, and by summarising findings after interviews for participants to validate (Yıldırım and Şimşek 2016). They systematically incorporated verification questions and conducted one-on-one interviews to maintain data integrity. The researchers computed inter-rater reliability Miles and Huberman's (1994) formula: (Agreement/(Agreement + Disagreement) × 100, which yielded a reliability rate of 97.5%. As Miles and Huberman (1994) pointed out, a reliability rate above 70% is considered acceptable. These results provide a solid internal consistency, supporting the validity and precision of the findings. To further enhance credibility, the researchers included direct quotations from participants to validate their interpretations.

2.6 Ethics

Kocaeli University Social and Humanities Ethics Committee granted ethical approval with decision number 3 at its session dated April 27, 2023, and numbered 2023/05. All participants provided informed verbal consent, and the researchers maintained confidentiality throughout the study. To protect participants' privacy, the researchers ensured anonymity by assigning pseudonyms such as P1, P2, and so forth. They stored all data confidentially on a password-protected flash drive, which only the research team could access. After completing data analysis and transcription, the researchers permanently deleted all audio recordings to safeguard confidentiality.

3 Findings

The thematic analysis revealed four primary themes—Strengths, Weaknesses, Opportunities, and Threats (see Fig. 2). These themes collectively illuminate the multifaceted nature of volunteerism in disaster response in Türkiye, highlighting both its potential and its challenges.

3.1 Strengths

Theme 1: Strengths comprised five sub-themes: Organizability, Large Number of Volunteers, Extensive Communication, Spirit of Solidarity, and Representation of Different Professional Groups.

Organizability: The majority of the participants stated the rapid mobilisation of volunteers as the primary benefit. Participants also reported that volunteers exemplify rapid self-mobilisation and timely crisis response, which enables a fast response to disasters. This capacity is profoundly rooted in the high degree of compassion and readiness in Turkish society. For example, one participant remarked, "Our society is kind. We are ready to act quickly, so it is easy for volunteers to organise" (P1). Another shared, "We can come together at the end of the day because we are an emotional society" (P14). Such observations underscore the critical role of social motivation and organisational capacity among volunteers, identifying cultural influences such as collective empathy and social bonding as vital in enabling fast response. These findings align with social capital theories, which state that highly trusting and solidaristic communities are better placed to mobilise resources during crises. Yet, this potential can also prove to be a source of vulnerability if emotional reactions dominate rational planning—a consideration arising after the strengths theme.

Large number of volunteers: Türkiye's large population and well-established societal norms of mutual support provide a substantial pool of potential volunteers. The participants noted that many people are eager to volunteer, which results in a higher overall capacity for disaster response. One of the volunteers mentioned, "We have a high spirit of solidarity; everyone is very willing and eager to help" (P11) and went so far as to mention that there was surprise among some, who were resentful at not being asked to assist. This surplus

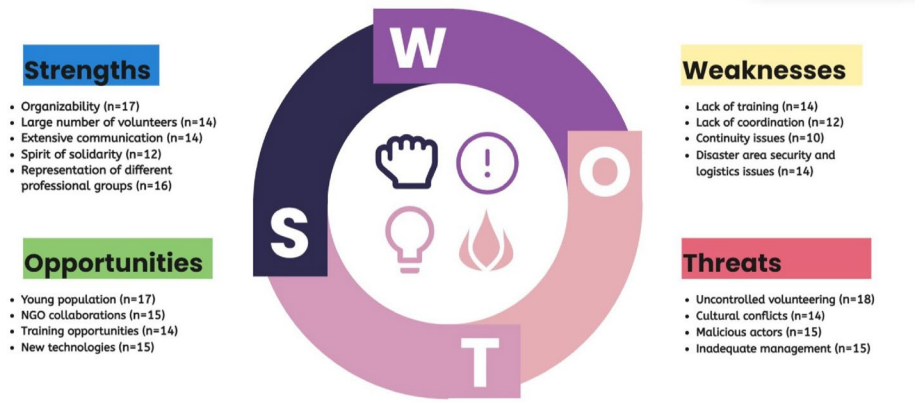

Fig. 2 Mind map of the themes and sub-themes ($n=21$)

of volunteers presents disaster relief crews with a large pool of human resources during disasters. As yet another respondent echoed, "Everyone is very willing and enthusiastic to help" (P11). This demonstrates a quantitatively robust human resource pool but raises questions about the quality and coordination of this workforce. Though a greater willingness to volunteer is clearly an asset, if poorly planned, the large pool of volunteers may complicate logistical coordination and resource allocation.

Extensive communication: Structured organisations possess enormous communication systems through which immediate and efficient transfer of information is possible. Such networks are utilised by organisations such as DEMA and Turkish Red Crescent to facilitate coordination among command centres, volunteers, and other actors. As one participant explained, "You can easily see who can be a volunteer in the system. For example, if there is a need for psychologists, volunteers can be easily contacted via the system" (P13). Such an infrastructure of technology is essential for operational effectiveness in mobilising and deploying staff based on particular skills. Sustaining these communication systems requires institutionalising volunteer administration. Nonetheless, the quality and timeliness of data largely determine success, and neglecting regular updates and training can undermine this process.

Spirit of solidarity: The volunteer culture strongly cultivates solidarity and altruism. All participants emphasised that Turkish society's solidarity inspires individuals to volunteer selflessly. One of the interviewees described it as "a sense of being a whole and a spirit of solidarity" (P2), while another said, "People are compassionate and merciful; we are a society with a high sense of empathy" (P15). Moreover, other volunteers also have altruistic motives alone: "Since it is being done solely for spiritual gratification without any expectation of financial reward, it is not viewed as a job and leads to more commitment than required" (P3). This internal altruism is a significant factor that drives volunteer commitment, even in demanding circumstances. However, it may also lead volunteers to prioritise emotional fulfilment over professional ethics, potentially resulting in problems regarding accountability and consistency.

Representation of different professional groups: The volunteer labour force comprises individuals with diverse professional backgrounds, contributing a range of skills to disaster response efforts. The observers noted that the presence of professionals in fields like medicine, engineering, and logistics supports more inclusive and diverse relief operations. As the observer commented, "Numerically strong, with volunteers from various professional backgrounds" (P10). Such heterogeneity enhances problem-solving ability at various phases of disaster response, thereby enabling effective and specialised interventions. It serves as a versatile tool that enhances both the depth and quality of aid delivery. However, the fusion of these varied skills into an efficient delivery requires elaborate coordination frameworks.

3.2 Weaknesses

Theme 2: Weaknesses comprised four sub-themes: Lack of Training, Lack of Coordination, Continuity Issues, and Disaster Area Security and Logistics Issues.

Lack of training: The lack of formal disaster-response training limits the majority of volunteers' effectiveness in the field. Consistent with this, participants reported that the lack of experience results in errors and inefficiencies. As one put it, "We are very lacking in preparation, both in training and management plans during disasters" (P18). Another

underscored, "There is a lack of proper education and insufficient preparedness for events" (P5). This gap between volunteer enthusiasm and technical proficiency reveals a pressing necessity for procedural capacity building. Without standardised training programs, volunteers could unwittingly contribute to increased risks or hinder operational efficiency. The absence of uniform training programs indicates broader structural weaknesses in disaster preparedness systems and underscores the need for institutionalising education and certification procedures.

Lack of coordination: Volunteer administration is affected by fragmentation and unclear coordination. The data indicate that many relief organisations and ad hoc groups tend to act with minimal synchronisation, leading to bottlenecks and inefficiencies. As one participant explained, "We face significant coordination deficiencies—there's a lack of coordination at every level and across all service groups." (P15). This respondent also noted that emotionally driven participation and out-of-the-ordinary volunteer participation make coordination even more complicated. Another reported, "We are always very short in planning and preparation. Though we gather at the time of disaster, sustained engagement declines over time." (P14). These reflections reveal that coordination problems run deep within organisational cultures and emergency management systems. The involvement of numerous actors without clear leadership or a joint command structure results in operational inefficiencies and resource wastage. While emotional motivation is a powerful driver of volunteerism, it may inadvertently undermine systematic planning and long-term engagement.

Continuity issues: Maintaining long-term volunteer involvement is a significant challenge. Participants perceived that their initial enthusiasm diminishes over time. One of the interviewees found it concerning that there is no continuity, as they put it, "There is no continuity in volunteerism. Volunteers can easily give up, making their commitment fragile" (P2). Another participant noted, "Volunteerism is mostly temporary and uncoordinated. Emotional attachment is strong, but long-term commitment is poor" (P15). This is one of the trends, a conflict between sporadic volunteer mobilisation and the need for a stable, proficient labour force. The instability of volunteer commitment puts both capacity building and knowledge retention, essential to disaster management resilience, at risk. In the absence of structural support and formal recognition, retaining volunteers in the long term remains a persistent challenge.

Disaster area security and logistics issues: Disaster zones present significant safety and logistical challenges. According to interviewees, inadequate screening of volunteers raises security concerns, while insufficient logistical support at disaster sites further exacerbates operational difficulties. As a participant hinted, "Volunteers should arrive at the disaster site self-sufficient; otherwise, they risk becoming an additional burden." (P11). Another one spoke of, "If there is no good leadership, expressions of dissatisfaction emerge, such as 'We didn't come to clean rubble,' which may negatively affect the perceived legitimacy of volunteer efforts" (P6). These are the challenges of managing volunteers in risk-prone and demanding environments. Poor screening and logistics planning add risk for volunteers and affected communities, while leadership failure increases frustration and conflict, potentially undermining the credibility and effectiveness of volunteer efforts.

3.3 Opportunities

Theme 3: Opportunities comprised four sub-themes: Young Population, NGO Collaborations, Training Opportunities, and New Technologies.

Young population: Türkiye has a predominantly young population, with the majority of its youth being keen on volunteering. Interviewees attributed youth participation in disaster relief a vital role, noting the dynamism and flexibility that young volunteers can bring to emergency response. As one participant highlighted, "Our nation has a high concentration of young population and… a resilient and participatory community spirit" (P21). Another concluded, "They want to help, but need to be guided" (P5). This demographic advantage is a valuable asset in human capital that, when properly developed, can significantly enhance disaster response capacity. However, the reported need for regulation also suggests that without formally established mentorship and training programs, stakeholders may fail to attain this capacity.

NGO collaborations: Constructing effective collaboration among volunteer groups, NGOs, and government agencies requires identifying specific opportunities for joint action. Participants emphasised the importance of raising institutional awareness and increasing readiness to facilitate volunteerism. As one volunteer put it, "Institutions are sensitive to this issue. NGO organisations need to be supported by volunteers and official institutions" (P5). A deepened partnership can yield significant cooperative benefits by sharing resources, expertise, and networks. This integrated volunteer management corresponds to cooperative governance models, stressing cooperation between many sectors.

Training opportunities: Several participants suggested increasing formal training for volunteers. Through training workshops, practice drills, and certification programs, volunteers can acquire essential skills and build confidence before a disaster. One interviewee pressed this argument particularly hard: "They want to help, but they need to be guided" (P5). This location for training to enhance the effectiveness of volunteers is a reference to the central area where intervention is required. Formal training programs not only improve technical proficiency but also contribute to volunteer retention and overall security.

New technologies: New communication and coordination technologies provide new opportunities for enhancing volunteer management. Participants reported that these technologies enable rapid mobilisation and effective information sharing. As a volunteer once said, "With advances in technology, we have the capacity to call as many volunteers as we wish at any time" (P13). The use of such technologies would transform the mobilisation of volunteers by increasing speed, coverage, and accuracy. Their full potential, however, depends on ensuring access to digital literacy, investing in infrastructure, and addressing issues related to data privacy.

3.4 Threats

Theme 4: Threats comprised four sub-themes: Uncontrolled Volunteering, Cultural Conflicts, Malicious Actors, and Inadequate Management.

Uncontrolled volunteering: Participants regarded unrestricted volunteer entry into stricken areas as a substantial operational risk. Uncoordinated movement could lead to confusion and overload on the available limited means. A participant explicated, "Sending a common message to all volunteers at the same time generates operational ambiguity, and

more people than necessary receive the message" (P2). This lack of vetting and deployment systems poses an operational risk that leads to inefficiency and potential safety hazards. It highlights the tension between maintaining an open volunteer intake and requiring a highly organised, formalised management structure.

Cultural conflicts: Language, cultural, and geographical disparities could hinder collaboration among volunteers. An interviewee demonstrated, "Cultural differences make volunteering difficult. Volunteers from cultures and geographies far from the earthquake epicentre make field operations challenging" (P11). These kinds of cultural and geographical variations would result in team fragmentation and communication chaos, jeopardising general coordination. Similarly, this threat requires culturally sensitive training and local liaison involvement in addressing these kinds of disparities.

Malicious actors: The exploitation of disasters by individuals or groups for personal gain is a significant threat. One participant criticised those who "exploit disaster contexts for personal benefit" and condemned agencies that prioritise self-promotion over providing genuine support (P14). These practices undermine trust in volunteerism, may demoralise genuine volunteers, and divert essential resources. Such an issue poses significant ethical and governance issues in responding comprehensively to volunteer mobilisation.

Inadequate management: Poor leadership and misinformation severely undermine volunteer activity. An interviewee reported that "unqualified or disinterested officials" and a lack of communication by authorities may discourage volunteers (P6). Poor management worsens fragmentation and lowers the morale of volunteers, jeopardising the sustainability of volunteer programs. It is a symptom of institutional disaster management systemic vulnerabilities and signals the critical importance of good, dedicated leadership.

To enhance the qualitative depth with descriptive quantitative support, the researchers also examined the distribution of themes across the 21 interviews. Within the Strengths domain, 17 participants emphasised the sub-theme of organizability, reflecting a common perception of strong mobilisation potential. Representation of different professional groups ($n=16$), extensive communication ($n=14$), a large number of volunteers ($n=14$), and a strong spirit of solidarity ($n=12$) also emerged as salient strengths, reflecting a perception of diversity and grassroots capacity within volunteer-based disaster response. In the Weaknesses category, insufficient training ($n=14$) and problems related to security and logistics in the field ($n=14$) were frequently reported, followed by a lack of coordination among stakeholders ($n=12$) and challenges related to the sustainability and continuity of volunteerism ($n=10$). Under Opportunities, the youthful demographic profile of the population stood out significantly ($n=17$), alongside collaborative potential with NGOs ($n=15$), emerging technological infrastructures ($n=15$), and capacity-building through training ($n=14$). Finally, among the Threats, the issue of unregulated and uncontrolled volunteer influx was most frequently expressed ($n=18$), followed by concerns regarding malicious actors exploiting volunteer frameworks ($n=15$), inadequate governance mechanisms ($n=15$), and potential intercultural or intergroup tensions ($n=14$). These counts provide empirical evidence of the perceived distribution and relative salience of SWOT dimensions across participant narratives, serving to triangulate and substantiate the qualitative themes within the broader analytical framework of the study.

Table 2 SWOT analysis of disaster volunteer management through cross table

		Opportunities (O)		Threats (T)
Strengths (S)	SO strategies	Combine the energy of the young population with strong volunteer organizability to establish rapid response and disaster training teams.	ST strategies	Combine the energy of the young population with strong volunteer organizability to establish rapid response and disaster training teams.
		Leverage the representation of various professional groups to form specialized units through NGO collaborations.		Mobilize skilled professionals and solidarity-driven networks to compensate for inadequate official management in disaster zones.
		Further enhance the use of communication technologies for targeted and skill-based mobilization.		
Weaknesses (W)	WO strategies	Address the lack of training through expanded access to preparedness programs, workshops, and certification initiatives led by NGOs and government partnerships.	WT strategies	Reduce coordination and logistics problems by creating a centralized volunteer database and enforcing certification before deployment.
		Improve volunteer continuity by developing digital platforms that provide feedback, recognition, and long-term engagement incentives.		Mitigate cultural conflicts and weak leadership by implementing locally embedded coordinators and culturally sensitive volunteer training programs.

3.5 SWOT analysis of disaster volunteer management through cross-table

The matrix created through the SWOT analysis provides a strategic context for converting inner capabilities and external environments into productive plans for disaster volunteering in Türkiye (Table 2). The SO strategies highlight how previous strengths can be leveraged with opportunities—such as a young population and technological advances—to enhance the rate, magnitude, and skill of disaster response activities.

ST strategies illustrate how organisations can leverage robust communication systems and a well-defined organisational culture to counter significant threats, such as uncontrolled volunteer surges and ineffective leadership. Likewise, professional volunteers and institutionalised frameworks help safeguard against harmful forces and the spread of misinformation.

WO strategies recognise how current weaknesses, including training and continuity gaps, can be addressed by leveraging new opportunities. Investing in education programs and utilising digital platforms can help bridge the gap between volunteer intent and effective operational capability.

Finally, WT approaches emphasise the importance of defence approaches—such as certification mechanisms, centralised volunteer registries, and improved local coordination units—to prevent the negative impacts arising from mismanagement and field-level risks.

4 Discussion

This study provides a comprehensive analysis of volunteer-driven disaster response in the 2023 Kahramanmaraş earthquakes through a SWOT analytical framework. Participants emphasised the urgent need for institutional intervention to enhance the competence and resilience of Türkiye's disaster management system, particularly in integrating volunteers into emergency response operations.

To address these gaps, we categorised strategic recommendations into four objectives derived from the SWOT analysis. These strategies provide national and international actors with a roadmap to establish volunteer-based disaster response systems. They aim to build a robust, adaptable, and efficient framework that ensures both security and scalability.

Importantly, these findings directly engage not only with Türkiye's national disaster management frameworks—particularly the Türkiye Disaster Response Plan (TAMP) and the Türkiye Disaster Risk Reduction Plan (TARAP)—but also with internationally recognised disaster governance models. While TAMP outlines formal institutional responsibilities, interviewees perceived that it lacked structured mechanisms for managing both spontaneous and long-term volunteers (TAMP 2022). This gap was particularly evident during the February 2023 earthquakes, when large numbers of volunteers participated in the response without a centralised coordination mechanism. TARAP, in turn, outlines 17 strategic goals and 56 high-level actions related to preparedness and risk governance but does not explicitly include any targets addressing volunteer management or civil society engagement (TARAP 2022), highlighting a critical omission in inclusive disaster governance. The results of this study help fill that void by presenting strategic, volunteer-specific actions aligned with both national goals and international standards.

Equally important is the study's contribution to the international discourse on disaster governance. The strategic recommendations align with the Sendai Framework for Disaster Risk Reduction (UNDRR 2015), particularly Priority 4, which emphasises enhancing disaster preparedness and "building back better" in recovery. Furthermore, international frameworks such as the US Federal Emergency Management Agency (FEMA), the UK's Civil Contingencies Act (Cabinet Office 2004), and guidance from the United Nations Volunteers (UNV), the International Federation of Red Cross and Red Crescent Societies (IFRC), and the Core Humanitarian Standard (CHS) all incorporate structured volunteer roles into formal emergency planning. Additionally, mechanisms such as the European Union Civil Protection Mechanism and the EU Aid Volunteers program facilitate the transnational coordination of professional volunteers during disasters (European Commission 2024). These frameworks may provide operational models for integrating civil society and the voluntary sectors in a manner that Türkiye's current legislation does not.

At the same time, it is necessary to recognise the limitations of applying a SWOT framework in this context. By its nature, SWOT organises complex realities into four categories, which may lead to a specific reduction of the nuanced dynamics of disaster volunteering. Some themes exhibited overlapping or even contradictory aspects. For instance, interviewees described the large number of volunteers both as a strength, providing substantial human resources, and as a threat, due to the challenges posed by uncontrolled participation. Likewise, training emerged both as an opportunity, through existing NGO initiatives and new technologies, and as a weakness, given current gaps in preparedness. These findings reflect participants' views, but they may not fully capture the actual structures or general patterns.

Acknowledging this limitation suggests that future studies should use qualitative or mixed method approaches to validate and extend these insights.

4.1 Strategic objective 1: enhance volunteer training and capacity

Our analysis indicates that training is vital in creating cultural sensitivity, competency, and preparedness among volunteers (Kotluk and Koçakaya 2018). It is therefore suggested that systematic training programs be formulated and initiated in collaboration with universities, NGOs, and public institutions. Despite the availability of some programs within Türkiye, such as those of the Disaster and Emergency Management Academy (DEMA 2024c) and Turkish Red Crescent (2024), field observations during recent disasters suggested that these programs remain limited in scope, consistency, and applicability to actual contexts (Usta et al. 2023).

According to interviewees, training sessions should be designed to equip volunteers with the information and skills necessary for all aspects of disaster management, including preparation, response, and recovery. Participants particularly emphasised the need for essential modules on first aid, search and rescue techniques, psychosocial care, logistics coordination, and communication planning. They also perceived that regular awareness drives and activation campaigns throughout the year would increase public involvement and preparedness. Several participants suggested that nationally significant dates, such as August 17 and February 6, marking major earthquakes in Türkiye, should extend beyond commemorative events to serve as platforms for public education and regular training.

Internationally, there are well-established institutions like the UK's Emergency Planning College (2024), Germany's Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (Federal Office of Civil Protection and Disaster Assistance 2024), and the US's Emergency Management Institute (2024), which could serve as model institutions in disaster preparedness and education. These institutions offer excellent training programs, applied research, and ample resources on disaster risk reduction, emergency preparedness, response, and recovery. Their evidence-based, cross-sectoral approaches have strengthened disaster preparedness in their contexts.

Türkiye could enhance the effectiveness of its disaster training systems by adopting the frameworks, tools, and best practices of these institutions. This may involve launching multi-dimensional training programs, including online learning environments, regional training facilities, workshops led by experts, and interactive study materials. To maintain effectiveness and sustainability, stakeholders should continuously update training materials and periodically monitor participants' performance after program completion.

Expanding training capacity requires developing digital modules and establishing regional hubs to reach volunteers in underserved or hard-to-reach areas. However, field observations during the 2023 Kahramanmaraş earthquakes revealed persistent structural barriers in expanding these training opportunities to rural and provincial volunteer sectors. Participants reported that limited internet connectivity, lack of regional training infrastructure, and insufficient integration of local NGOs into national-level programs reduced the scalability of digital learning platforms. Volunteers from rural areas were also perceived to have lower baseline access to disaster preparedness resources and fewer opportunities for sustained skill development, resulting in uneven readiness levels across regions. Addressing these gaps, according to participants, could require targeted investments in rural broadband

access, mobile training units, and the inclusion of provincial civil society organisations in curriculum design to ensure cultural and contextual relevance. Meanwhile, participants recommended embedding disaster awareness into day-to-day public life through visible awareness materials in social spaces—such as public transportation, community centres, and electronic public noticeboards—and by incorporating preparedness messages into broader cultural practices.

Such capacity-building efforts are also consistent with Priority 4 of the Sendai Framework for Disaster Risk Reduction (UNDRR 2015), which highlights the importance of "building back better" through enhanced preparedness and training. Additionally, the IFRC emphasises modular, community-based training as a crucial component of sustainable volunteer engagement in disasters (IFRC 2025).

4.2 Strategic objective 2: strengthening the coordination and communication network

A centralised coordination centre led by DEMA might be beneficial to consolidate all the volunteer organisations under one integrated system. This centre could be responsible for planning, coordinating, and monitoring volunteer operations, as well as providing the infrastructure for rapid and effective mobilisation in times of emergencies.

An assessment of Türkiye's voluntary organisations indicates that, apart from search and rescue, they are primarily focused on different post-disaster humanitarian roles. Organisations are not typically task-oriented, but they often work in exceptional situations that require broad social involvement (Sarı and Özer 2024). In contrast, countries like the UK (2024), Germany (2024a), Australia (2024a), and Canada (2024a) have grouped volunteer organisations into umbrella organisations. While others are independent NGOs, the majority of them are affiliated with ministries, such as the Ministry of Social Services. These countries incorporate volunteer management as a national function and allocate state funds to administer it.

Nowadays, Türkiye appears to lack such a centralised umbrella structure. Instead, most NGOs are separate or work under other ministries—such as the Ministry of Interior and the Ministry of Family and Social Services—or local governments, which form an uncoordinated and fragmented system. According to interviewees, volunteer management needs to be prioritised at the national level, placing all volunteer work under a single, cohesive structure to facilitate structured, efficient, and scalable development.

Advanced communications technology—such as centralised databases, cell phone applications, and combined software platforms—may make this a possibility. A centralised volunteer database should be capable of recording registration details, educational background, and past task performance, thereby facilitating improved coordination between NGOs and public agencies and preventing unauthorised or potentially harmful activities in the field. However, participants reported that these centralised digital coordination tools are often underutilised or inaccessible in rural and provincial areas. Volunteer groups in these regions usually rely on local messaging applications or informal verbal communication channels rather than national-level coordination platforms. Interviewees further perceived that the lack of standardised digital literacy training and the inconsistent adoption of national coordination platforms limited the real-time integration of rural volunteers into large-scale disaster response operations. In particular, in remote villages far from administrative centres,

it is of critical importance to establish and strengthen communication systems—such as radios—that eliminate dependence on the internet or mobile networks to ensure uninterrupted contact with village headmen during potential emergencies. Interviewees suggested that such devices could enable continuous information flow during disasters, facilitate the rapid mobilisation of local volunteers, and enhance operational coordination. They also recommended testing these communication systems not only during disaster situations but also in normal times through regular drills, which would improve local actors' proficiency in using the equipment and increase the operational validity of emergency plans. Bridging this gap will require technological adaptations—such as offline-capable mobile applications—and policy mechanisms that mandate the integration of rural volunteer networks into national systems by provincial disaster coordination centres.

Volunteer mobilisation is increasingly needed in a broad range of circumstances beyond disaster (Orloff 2021). Establishing a well-institutionalised and regulated volunteer management system—founded on strategic planning and frequent monitoring—would significantly enhance Türkiye's national and international capacities. By enhancing transparency, accountability, and structural participation, such a system would harness volunteerism as a sustainable and scalable support mechanism to supplement public resources effectively. This strategic alignment is also supported by the Sendai Framework's Priority 2, which emphasises strengthening disaster risk governance to manage disaster risk at all levels, including through multi-stakeholder coordination. Moreover, the IFRC and UNV guidelines emphasise that volunteer management systems should be integrated into national disaster governance plans to ensure long-term functionality and inclusivity (IFRC 2025; UNV 2025).

When considering the applicability of these strategies within Türkiye, several practical constraints emerge. Centralising volunteer coordination under DEMA may face bureaucratic resistance, inter-agency coordination challenges, and potential conflicts with local governance structures (Unlu et al. 2010). Resource limitations, uneven regional infrastructure (Hermansson 2016), and variability in digital literacy among volunteers pose additional barriers. Governance challenges are particularly pronounced in Türkiye's centralized yet regionally diverse institutional context, where tensions between national authorities and local municipalities—often influenced by political affiliations—could impede unified coordination (Bellini and Sauter 2025).

To enhance the likelihood of successful adoption, we recommend a phased or adaptive approach to pilot centralised coordination before national rollout. Continuous feedback loops, stakeholder consultations, and iterative adjustments would allow policies to be tailored to the diverse local contexts of Türkiye, balancing national standardisation with provincial autonomy.

4.3 Strategic objective 3: ensuring volunteer retention and loyalty

For long-term volunteer retention, occasional recognition and rewarding their efforts are critical. Recognition boosts motivation while instilling a sense of value and affiliation among the volunteers. Social events and networking functions enable volunteers to engage with each other, promoting bonding and resilience (Holwitt et al. 2017). Certification courses that advance volunteers' professional skills, with additional modest incentives such as gift packages, can also enhance sustained participation (Orloff 2021).

According to interviewees, volunteer retention should be actively encouraged through structured programs that include certification, appreciation ceremonies, and frequent engagement activities. Participants suggested that institutionalisation of regular meetings, reorientation training, and feedback forums guarantees continuity of active involvement and fosters a spirit of ongoing improvement. This can be realised through concerted efforts by NGOs, the private sector, and government departments. Committed platforms for volunteer recognition and appreciation can structure and expand these initiatives.

Today, Türkiye celebrates International Volunteer Day on December 5 with minimal social media coverage. This differs from countries such as the United States, the United Kingdom, Australia (2024b), and Canada (2024b), which all observe an annual National Volunteer Week, with a particular emphasis on disaster volunteers through awards and public recognition (Pointsoflight 2024; Volunteering Australia 2024). Germany similarly bestows its top national honours, such as the Federal Order of Merit, on individuals who have made notable contributions to disasters and crises (Verdienstorden der Bundesrepublik Deutschland 2024). These systems institutionalise volunteer motivation and recognition in ways Türkiye could emulate. Moreover, this emphasis aligns with the IFRC's Volunteer Policy and the Sendai Framework's Priority 2, which encourages the strengthening of disaster risk governance through inclusive practices and stakeholder engagement.

Learning from these models, Türkiye could establish a National Disaster Volunteers Day with public rites, excellence awards in service, and memorials for heroism. Sharing volunteering tales and accomplishments through mainstream and social media would generate awareness and further enhance the public's appreciation of disaster volunteerism. These steps would not only consolidate the loyalty of current volunteers but would also promote increased participation in disaster readiness and response in society.

4.4 Strategic objective 4: improving safety and logistics for disaster areas

Volunteer safety and well-established logistical support systems are also essential to effective disaster response. Comprehensive safety training prepares volunteers to handle potential dangers in the field, reduces risks, and improves confidence in operations (Kilpatrick et al. 2010). Effective logistics management also requires ample pre-disaster planning and pre-positioning of equipment and supplies as needed.

To operate safely, volunteers should undergo identity verification and credibility checks, ensuring that only authorised personnel are engaged in field operations (Volunteer Centre Western Isles 2024). Effective security procedures and logistics systems should be put in place ahead of emergencies to provide clear guidance during response operations (ICRC 2024). Countries such as Germany (2024b), the United States (2024), and the United Kingdom (2024) have set good examples in this matter, with efficient and secure processes for deploying volunteers. These international practices align with the CHS on Quality and Accountability and the Sendai Framework's Priority 4, which emphasises safe, efficient, and accountable humanitarian responses. Türkiye can enhance its response to disasters by localising and adapting these tried-and-tested international models.

Diversified and sustainable funding sources are also required to fund logistical activities. Securing global grants, donor funding, and public-private partnerships can provide the funds necessary for purchasing and maintaining the needed equipment. Open budgeting, rigorous financial reporting, and thorough documentation of logistics activities can increase

accountability and public confidence. Not only will these habits enhance operational efficiency, but they will also strengthen stakeholder confidence and promote the long-term sustainability of volunteer-based disaster response efforts.

4.5 Implications for policy and practice

The findings of this study emphasise the importance of Türkiye institutionalising volunteer-based disaster management through strategic, sustainable, and collaborative multi-stakeholder efforts. Participants suggested that volunteerism should be formally declared a national priority and made an intrinsic component of the country's disaster risk reduction and emergency response systems. Creating a centralised volunteer coordination system led by DEMA is essential to consolidate the existing fragmented structures, allowing for real-time task assignment, holistic data management, and continuous performance tracking. Nevertheless, the establishment of such a centralised system requires careful consideration of potential bureaucratic resistance, inter-agency coordination challenges, and the need to maintain local autonomy in volunteer mobilisation. A phased implementation approach, starting with pilot programs in select provinces, may prove more politically feasible and enable gradual institutional adaptation.

Additionally, Türkiye could leverage its existing TARAP and TAMP frameworks to incorporate these proposed volunteer management components. By integrating volunteer mobilisation strategies into Provincial Disaster Risk Reduction Plans under TARAP, local and national resilience can be significantly strengthened. Legal and policy updates that define the roles, responsibilities, and rights of volunteers would also help align Türkiye with global standards.

To enhance preparedness and operational effectiveness, government agencies, NGOs, and universities can collectively design competency-based standardised training programs. These programs would be most effective if they were widely accessible through web portals and regional training facilities, with content continuously updated to reflect the evolving needs of the field. Dates of national significance—August 17 and February 6—could serve as opportunities for training exercises and mass awareness campaigns, embedding disaster preparedness into the collective memory.

According to interviewees, organisations can maintain volunteer motivation through ongoing recognition strategies, incentives, and career development opportunities. Certification programs, national volunteer days, and media campaigns that promote volunteer efforts can reinforce motivation and consolidate public support. Participants also emphasised that legal frameworks, insurance provisions, and pre-positioned supply chains enable safer and more effective volunteer deployment in disaster zones. For example, FEMA's Community Emergency Response Teams (CERT) program provides a legal and operational framework for structured volunteer training, while the UK's Civil Contingencies Act mandates that local authorities coordinate voluntary sector engagement during emergencies (FEMA 2025; Cabinet Office 2004). Such mechanisms demonstrate how legal codification enhances coordination and sustainability in volunteer-based disaster response.

Finally, aligning with international disaster governance models, such as FEMA in the United States and the Civil Contingencies Act in the UK, could provide Türkiye with adaptable blueprints to enhance the institutional design of its own volunteer integration strategies. These examples demonstrate how policymakers and organisations can formalise

volunteerism into scalable, legally supported system models that Türkiye can adapt within its national plans. Yet, their successful application requires a careful process of contextualisation, whereby lessons learned abroad are recalibrated through consultation with Turkish stakeholders, pilot testing, and incremental legal reforms. They should be regarded as flexible reference points, to be selectively adapted and localised in ways that align with Türkiye's governance culture and disaster management priorities. Strengthening these frameworks would not only improve coordination between governmental agencies and civil society actors but also ensure that volunteer capacities are mobilised swiftly and effectively during crises. Over time, integrating these strategies can foster a culture of preparedness in which communities actively engage, training programs continue regularly, and volunteer networks function as a permanent pillar of national resilience.

In conclusion, the findings of this study not only support but also operationalise the core objectives of TARAP, TAMP, and the Sendai Framework. Furthermore, they offer concrete strategic pathways for institutionalising volunteer participation in disaster risk governance in Türkiye and countries with similar characteristics.

4.6 Limitations

This study offers rich qualitative insights into the dynamics of volunteerism during the 2023 Kahramanmaraş earthquakes, utilising a SWOT-based analysis framework. However, we acknowledge several limitations to contextualise the scope and boundaries of the study's findings.

First, we collected data from a purposive sample of 21 volunteers and observers engaged in disaster response activities. While this approach enables a deep exploration of experiential narratives, it inherently limits the generalizability of findings beyond the studied group. The perspectives presented here may not fully reflect the broader diversity of volunteers operating across different Turkish regions or other types of disasters.

Second, the study heavily relies on self-reported data collected in the immediate aftermath of the earthquakes. Participants' responses may have been shaped by emotional intensity, post-disaster cognitive framing, or memory biases. Given the small qualitative sample size, these self-reported accounts are also more susceptible to overrepresentation of particularly salient or emotionally charged experiences, potentially introducing response bias that could amplify specific themes while underrepresenting others.

Third, the SWOT framework, while helpful in synthesising diverse themes, abstracts complex real-world experiences into discrete analytical categories. As a result, interactions between categories (e.g., how solidarity can both enhance organizability and hinder coordination) are not always fully explored. This analytical simplification limits the extent to which these findings can inform predictive models or detailed operational planning.

Fourth, the study focuses on the Turkish sociocultural and institutional environment, which shapes its contextual boundaries. Key strengths, such as emotional mobilisation and cultural empathy, may not apply to volunteer settings in other countries or to different types of disasters within Türkiye. Therefore, although the findings provide valuable insights into volunteerism during an extraordinary seismic emergency, researchers should avoid generalising them to all disaster types, regions, or volunteer models.

Finally, the cross-sectional nature of the research limits its ability to assess long-term trends in volunteer engagement, capacity retention, or training outcomes. Future studies

should adopt longitudinal or mixed method designs to determine how the initial findings evolve over time and in relation to structural reform in disaster volunteer management.

5 Conclusion

This exploratory, qualitative case study indicates that volunteers play a vital role in enhancing the speed, scale, and effectiveness of disaster response, as observed during the 2023 Kahramanmaraş earthquakes. Participants' accounts indicate that volunteers can serve not only as essential human resources in emergencies but also as crucial connectors between affected communities and formal response systems, reportedly addressing operational and service delivery deficiencies, as well as communication and operational capacity gaps.

Through a SWOT analysis grounded in firsthand accounts, this study reveals key areas for improvement within Türkiye's volunteer management system—particularly in training, coordination, retention, and safety. The strategic recommendations presented offer practical and scalable solutions that can be applied not only to Türkiye but also to other countries seeking to build resilient, community-centred disaster response frameworks. However, researchers should interpret these insights cautiously, given the study's exploratory nature and the limitations of the sample.

By addressing these structural and operational challenges, Türkiye could potentially develop a more resilient and adaptive disaster management model that fully integrates and empowers its volunteer workforce. Notably, the findings emphasise that volunteers might be seen not solely as reactive participants but as fundamental actors in disaster preparedness, mitigation, and recovery efforts. Participants reported that, with training and coordination, volunteers can become powerful agents of community resilience.

Realising these potential demands requires sustained investment in policy reforms, interagency collaboration, and the development of both human and technological infrastructure. Such efforts should be continuous and adaptable to accommodate changing risk environments, demographic shifts, and emerging global best practices. Based on our findings, we recommend integrating volunteers into disaster governance as a strategic imperative. Continued research, innovation, and institutional commitment will be critical to ensuring volunteerism remains a structured, empowered, and effective cornerstone of disaster resilience in Türkiye and beyond.

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Declarations

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