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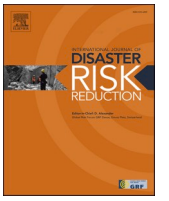

The engagement of informal volunteers in disaster management in Europe

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ABSTRACT

Informal volunteering is increasingly important in disaster management, but authorities remain cautious about collaborating with informal volunteers. Relatively little is known about the extent to which informal volunteers are integrated into European disaster management systems. We try to remedy this gap by examining Germany, Italy, Belgium, Hungary, Sweden, Norway, Finland, and Estonia, focusing on (1) the policies and institutional arrangements for integrating informal volunteers, (2) the methods and tools used for their engagement, and (3) the presumed benefits and challenges of involving volunteers in disaster management. 95 expert interviews combined with desk research and four online table-top exercises in 2019–2020 involving analysis of 11 disaster cases show that disaster management systems in these countries are taking modest steps toward opening traditional command-and-control structures to informal volunteers. In Sweden and Norway, where volunteering is more common, the engagement of informal volunteers is somewhat regulated, providing an opportunity to formally insure them. In Belgium and Italy, the engagement of informal volunteers is not encouraged, but formal volunteering is encouraged. In Germany, Hungary, Finland, and Estonia, it is done on an *ad hoc* basis. In most of the countries studied, campaigns to raise volunteers' awareness of support possibilities are backed up by practical training that focuses primarily on first aid. In all countries, except Germany, social media has been used by disaster management authorities to inform, guide, or register informal volunteers on an *ad hoc* basis. The studied cases indicate that disaster response is more efficient when procedures for informal volunteer engagement exist.

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1. Introduction

The availability and functionality of informal and formal social support structures is a key factor in mitigating social vulnerability to disasters [106]; [1]; [107]. Societies vary in their traditions of voluntary support provision and in the expected role of informal volunteers in times of disaster [2]. In most countries in the Global North, disaster management relies largely on a workforce of professionals and volunteers affiliated with official agencies, and disaster management systems employ a command-and-control model [3,4] viewing ordinary citizens as non-participants in disaster management operations [5,6]. That approach, however, can lead to an ineffective response especially in the case of new forms of emergencies [7], pointing to the need to integrate government-led interventions designed to protect human and natural environments with self-organising of individuals and communities [8]. Moreover, modes of volunteering are shifting from long-term commitments by a particular organisation to a short-term commitment to a specific issue or event [9]. Besides weakening organisational attachments [10], new communication technologies such as social media have changed the ways in which information is shared and structured in times of crisis, giving greater voice to citizens [11,12]. These changes mean that informal and self-organised volunteering are gaining greater importance in disaster management [13]; [96]; [14].

Self-organising, however, has its limits, since "the extent to which citizens are able to participate in disaster management depends largely on the formal institutional structures and arrangements" [3]. To engage informal volunteers, official responders should develop a capacity to identify them, establish goals and action plans that informal volunteers can follow, and provide training opportunities [15]. Thus far there are no comparative studies on how informal volunteers are involved in disaster management across Europe. In this study, we explore the engagement of informal volunteers in Germany, Italy, Belgium, Hungary, Sweden, Norway, Finland, and Estonia, to establish (1) what are the policies and institutional arrangements for engaging informal volunteers, (2) which methods and tools are used for engaging informal volunteers, and (3) what are the perceived benefits and challenges when engaging informal volunteers in disaster management. To answer these questions, we combined desk research with expert interviews and online table-top exercises in these countries between September 2019 and May 2020. We have selected European countries that differ markedly in volunteering practices[1] and in perceptions of the availability of social support in difficult life situations.[2] To capture volunteering dynamics 'in action', we studied 11 disaster cases occurring in these countries during the last decade.

Informal volunteerism has been defined as the efforts of people who work outside of formal disaster management arrangements to help others who are affected by a crisis either before, during or after the event [3]. In this article, we use 'informal volunteerism' as a broad umbrella term for self-organised volunteerism, including spontaneous, unaffiliated or emergent volunteering as well as informal social support networks that individual citizens may form to voluntarily provide help during emergencies.

In what follows, we first introduce the theoretical background and existing research on the involvement of informal volunteers in disaster management. Thereafter we describe our data and methods and present our findings. We conclude by discussing our results in the light of existing literature.

2. Theoretical background and previous research

Disaster or crisis volunteerism has been studied already since 1950s [17], but emphasis has been more on formal and less on informal volunteers [18]. However, recently informal volunteerism has gained more attention in disaster research (see Ref. [19]).

2.1. Informal volunteerism

Disasters stimulate spontaneous responses by individuals and voluntary groups from within and outside disaster-affected communities, as individuals and groups often become more unified, cohesive, and altruistic in such events [20]. Informal volunteers and self-organising groups can support authorities in building situational awareness and provide extra capacity when resources are scarce [21]. They have proven to be useful in many disaster cases (see Ref. [22]). However, disaster managers sometimes see informal volunteers as outsiders whose qualifications, skills, background, and capacity are unknown and whose credentials cannot be reliably verified [5,6]. Informal volunteering comes with significant coordination, integration, communication, logistical, and health and safety challenges for the volunteers and disaster management organisations [20,23,24]. Thus, disaster management authorities may be reluctant to integrate informal volunteers. Informal volunteers are involved more likely when possessing needed resources or competences, which they deliver at the right time [25].

Finding a right balance between self-organisation and official coordination of volunteering is complicated [24]. Lack of formal rules and procedures to guide community participation can create tension between 'official' and 'unofficial' responders [26]. Too much official control, however, may reduce the agility and adaptivity of volunteers' actions, reducing the role of informal volunteers to merely offering extra pairs of hands and stripping initiatives of their self-organising and emergent nature [21]. When disaster managers deter people from spontaneous helping, even if justified by specific hazards, it may ultimately have a negative effect, such as diminishing community resilience [27,28].

[1] According to the EU SILC study [16], among the selected countries, the lowest share of individuals engaged in voluntary activities is in Hungary with 7% and in Italy with 10%. A modest share of people are engaged as volunteers in Estonia and Belgium, 16% and 20% respectively. In Northern Europe, the rate of voluntary engagement is considerably higher ranging from 30% in Germany, 34% in Finland and 35% in Sweden to 48% in Norway.

[2] According to the EU SILC study [16], the share of people that claim to lack this support reaches up to 13% in Italy. This share is somewhat lower in Estonia (7%) and Belgium (8%); considerably lower (2–3%) in Hungary, Germany, Finland, Sweden, and Norway.

2.2. Policies for engaging informal volunteers

The effectiveness of the disaster response is dependent upon the timeliness and weight of the response [15]. When official responders cannot act, for whatever reason, informal volunteers can provide extra resources, especially because they are often the first ones to arrive and remain long after official services have left the scene [3]. However, informal volunteers must be managed effectively in their efforts. If not managed well, informal volunteers can hinder official responses because of their lack of training and preparation. Evidence shows that informal volunteering can be made more efficient and effective - being also beneficial for the overall response - through an established policy or plan that specifies their management practices [15]. Thus, informal volunteers "need a system that enables them to contribute skills and resources to the response and recovery from the disaster" [29]. The Australian government has adopted a national *Spontaneous Volunteer Strategy* [30] and a handbook on *Planning for Spontaneous Volunteers* [31] based on the lessons learned from several natural catastrophes. Guidelines about spontaneous/unaffiliated volunteer management have been published also in the United States and in the United Kingdom [32]. Most US emergency response plans include a volunteer reception centre protocol that guides how to link informal volunteers to existing organisations/volunteer groups [33]. Preparing ('pre-thinking') for the arrival of informal volunteers may not solve all the transaction problems mentioned above but is a major step towards anticipating and mitigating the problems.

Specifically, it has been suggested that non-profit organisations such as formal disaster relief organisations (e.g. the Red Cross) could operate as the intermediary between the emerging volunteers and other institutions responsible for disaster relief and provide training on (a) how to quickly recognise emergent volunteers' capacity and (b) when to 'use' volunteers and for which purposes/tasks. Emergent collaboration could be integrated into disaster exercises and in order to improve connectedness with volunteers, additional liaison officers could be installed [34].

2.3. Methods for engaging informal volunteers

Many disaster management authorities increasingly encourage individual citizens, private companies, and local communities to build self-preparedness and support networks ahead of emergencies to reduce potential disruptions, dislocations, or damages [35,36]. Official risk preparedness campaigns in some European countries emphasise self-preparedness, yet they rarely mention the need and possibility of voluntary support during disasters [1,37]. Moreover, social media is becoming an important source of information to better manage disasters, including the informal volunteer involvement [38].

To increase disaster preparedness, citizens can be advised how to help each other and how to, for example, pre-register as volunteers by using online platforms such as *Ready2Help,* established by the Red Cross in the Netherlands, and *Team Österreich* in Austria [39]; see also [40]. On these websites, citizen volunteers are asked register and can thereafter be contacted by the Red Cross via e-mail, SMS, or automated calls [39]. Existing networks and community activities can be employed to increase citizens' preparedness to offer help during disasters. For example, in Seattle, USA, existing community gardens are used as spaces to organise community emergency hubs to provide disaster information and preparedness training to the local community [41]. New networks and activities can be created focusing specifically on disaster issues. For example, the Neighbourhood Empowerment Network in San Francisco brings neighbours and stakeholders together to develop plans and actions for disaster preparedness and response (http://www.empowersf.org). Development of community response teams can increase social capital and thus resilience, too. There is some evidence, for instance, that having a community organisation focused on disasters within a neighbourhood leads to increased citizen preparedness and participation in disaster-related activities [42]. Neighbourhood association leaders may play a central role in coordinating disaster prevention activities on a regular basis and responding to disasters when they occur [43].

During disaster response, public authorities can communicate whether they welcome public involvement and appoint a dedicated point of contact for informal volunteers in the responsible organisation [15]. The registered informal volunteers can be instructed via direct messages on where, when, what for and with which resources they are called to join ([15]: 100). Volunteer reception centres and the use of mobile phones can provide spontaneous volunteers and official responders with accurate, timely information and guidance during a situation-driven and improvisational response [44]. Moreover, assigned and trained coordinators for spontaneous volunteers could assure feedback on their engagement, thereby smoothing processes and allowing for adaptation [15,24]. Research shows the importance of having training opportunities for informal volunteers, including safety and job specific training [15]. With clear opportunities for more effective and efficient volunteer organisation, the study at hand focuses on whether and to what extent countries engage in such practices.

3. Data and methods

We gathered data on the policies and methods for engaging informal volunteers in eight European countries via desk research, semi-structured expert interviews, and an online table-top exercise between September 2019 and May 2020. The desk research and interviews on the engagement of informal volunteers in disaster management in each country followed a study protocol jointly elaborated and agreed upon by the various study teams. The following terms guided the interviews, desk research and the later analysis:

- the policies and institutional arrangements (definitions of informal volunteers, addressing in regulations and crisis plans, allocation of tasks for engaging and managing them),
- practical methods and tools (ways of engaging and collaborating with informal volunteers, allocated financial, human and technical resources therefore),
- the perceived benefits and challenges of engagement of informal volunteers.

As an explorative study with an aim of broader thematic scoping, we rather stemmed from the informants' interpretations and reflections. E.g. under the practical methods and tools of engagement we did not limit the answer options regarding the training offered, activities of engaging local support networks or the use of social media. This approach provides a good basis for further quantitative/survey studies where these categories can be measured more precisely.

Additionally, to illustrate what national disaster management institutions have actually done to address disasters and what were the benefits and challenges of engaging informal volunteers analysis of eleven specific disaster cases were carried out. Selection of the cases was guided by the aim to cover a large variety of natural and man-made disasters that have ravaged the European countries over the past years. Disaster cases included drinking water contamination in Nousiainen, Finland in January 2017; a terrorist attack on government building in Oslo and at the island of Utøya killing 69 and injuring 110 people, Norway on 22 July 2011; in Sweden, a surge in immigration in 2015 and wildfire in 2018; in Belgium, gas explosion in Liege, and terrorist attack on Brussels airport and metro with hundreds injured on 22 March 2016; critical infrastructure failures due to a major storm in Southern Estonia in October 2019; flood disaster where 15 thousand people were evacuated in Germany in June 2013; in Hungary, toxic red sludge disaster in 2010 and snowstorm with vast traffic chaos in March 2013; and, the earthquake in L'Aquila with 309 casualties and thousands injured in Italy, in April 2009.

Desk research involved systematic collection and analysis of a variety of documents on disaster management in each country, including legal acts/regulatory documents, official policy documents, guidelines, reports produced by research institutions, and media articles. To complement the document analysis and to further verify the written information, 95 semi-structured expert interviews were carried out. Expert interviews are often the most effective way for obtaining information about decision makers and decision-making processes when the respondent is an expert in the topic at hand [45]. The interviewees included public officials working in national government departments and regional and local agencies tasked with disaster management. Involving both strategic and operative level managers from all countries allowed for a more comprehensive view on the policy approaches as well as practices of involving volunteers. They were identified on the basis of desk research and by applying the snowballing technique where informants guided researchers towards other relevant informants.

Drawing on the initial findings from interviews and document analysis [1,46], four table-top exercises were held in 2020 on the Howspace online platform with disaster management and communication experts in Estonia (8 participants), Finland (10), Germany (10) and Italy (17), to validate the findings on the engagement of informal volunteers (including benefits and challenges) and reflect on these in the light of the recent experiences with responding to the COVID-19 crisis. With contextualisation around the COVID-19 crisis, e.g., exercise participants were invited to imagine the key stakeholders in crisis communication, to create ideas for collaboration with informal volunteer networks and think about the role of digital volunteers and social media influencers as crisis related content producers. Most participants worked in the public sector, either in the field of rescue and crisis management or security/law enforcement, or represented a state level, regional or local disaster management authority. The others represented NPOs and NGOs, being their communication specialists or researchers or were developers of communication technology. Participants were able to partake in activities any time of day within a two-week period and visit the platform several times. In principle, this allowed them to open the discussion topic, and come back later and view the others' responses and comments. The exercise activities took approximately 45 min. Research team members shared the task of undertaking preliminary analyses of interviews and documents, with those in languages other than English being read and summarised by native speakers. We then used qualitative thematic content analysis (e.g., [108]) on the country reports to identify major commonalities and differences in approaches to spontaneous volunteer engagement. The collected, primarily qualitative, material offers a basis for identifying the similarities and differences in the ways in which spontaneous volunteers are involved in disaster management across Europe. We have aimed for a broad comparison between countries rather than an in-depth description of each; as such, our results reveal broad patterns across various countries rather than highly detailed specific situations.

Comparing different administrative systems and cultural contexts has limitations. To overcome the language barriers, we based our study on the findings and reports by experts in each country who were familiar with the context. It is also inevitable that the document analysis and interviews reflect the overall accessibility of information in each country. Nevertheless, the study provides a useful empirical snapshot of the definitions, rules, institutional arrangements, and practices of informal volunteer engagement in European disaster management systems.

4. Results

4.1. Policies for engaging informal volunteers

Here we explore the policies and institutional arrangements for engaging informal volunteers, including community members. First, we wanted to know about any formalised procedures for engaging informal volunteers and the roles they play in disaster management in each country.

In **Germany**, the engagement of informal volunteers is not regulated and there are no municipal and state agencies to comprehensively structure spontaneous help offers. The engagement and collaboration in different crisis stages works on an *ad hoc* basis as local municipalities and/or state agencies decide in each case if they want to collaborate with informal volunteers. As for the role of formalised volunteer groups in engaging the spontaneous volunteers, the key emergency organisations (e.g., German Red Cross, Johanniter-Unfall-Hilfe) were mentioned as the main contact points for informal volunteers during crisis. The German Red Cross has formulated guidelines to support their staff in dealing with informal volunteers [47] and is planning to develop a structure for engaging spontaneous volunteers [48], including an activity catalogue linking tasks which can and should be performed by volunteers with specific knowledge and skills [49].

In **Italy,** municipal, regional and the national level authorities involve civil protection volunteers who are responsible for supporting interventions in crisis [50]. However, only volunteers who have pre-joined the civil protection volunteer organisations and who have received special training are allowed to get involved in disaster preparedness or response activities. During the recent COVID-19 pandemic, more than 1000 citizens in a city of 200,000 inhabitants joined a volunteer project organised by more than 70 associations that aimed to recruit volunteers to support formal organisations [51].

In **Belgium,** as in Italy, informal, ad-hoc volunteers are not included in crisis response. Training and affiliation to a professional volunteer organisation is required from volunteers engaged with the Red Cross or the Federal Crisis Centre during a crisis (Red Cross Flanders, 12.2019). The Red Cross organises free trainings to anyone on first aid and other disaster responses. According to a representative of the Urgent Help Service Operations Cell (01.2020), there are no foreseeable options for integrating spontaneous volunteers as it is already difficult to organise professionals. However, after the extensive flood damage in July of 2021, a few French-speaking media outlets created 'Ensemble Solidaires', a website intended to keep the momentum of informal volunteering which occurred at the outset of the floods (this involved the establishment of aid distribution centres, aiding in evacuation efforts, distributing emergency supplies, cleaning flooded houses, etc.). The website seeks to facilitate the exchange of information between individuals who want to help and those who need it, posting answers to the frequently asked questions of victims as well as allowing a space for individuals to post offers of assistance [52]. This suggests that the infrastructure and the desire to help was always there in Belgium, but a disaster of this magnitude had not yet occurred to allow for the integration of informal volunteers in disaster management. However, the coordination of these informal volunteer organisations with formal disaster management actors has been criticised, since many of the informal aid distribution centres were told they had to shut down and there was a chaotic handover [53].

In **Hungary**, according to the Law of Disaster Management (234/2011 (XI.10), Chapter VIII), the involvement of volunteers is coordinated through the National Directorate General for Disaster Management (NDGDM) [54]. Volunteer organisations can only contribute to the disaster recovery if they are certified by the NDGDM. There is no official system for the involvement of spontaneous volunteers during a disaster. However, as in the cases above, citizens' increasing activeness as volunteers is driving more and more municipal volunteer rescue groups at the national and local levels. After the Red Sludge disaster in 2010 and experiences of uncoordinated (informal) support provision, the Civil Humanitarian Coordination Centre was established by the NDGDM in collaboration with the Hungarian Red Cross and other humanitarian organisations to coordinate *inter alia* the distribution of food, providing healthcare and shelter and reconstruction activities [55]. Later, cooperation extended to assistance with disaster management authorities and the municipalities in the region [56]. Nevertheless, there is still no formal arrangement specifying if and how spontaneous volunteers can engage [57].

In **Sweden**, the Swedish Civil Defence Association (SCF) and Swedish Red Cross, operating in conjunction with the Swedish Civil Contingencies Agency (MSB), are working on developing an informal volunteers' coordination mechanism. Until now, the engagement of informal volunteers has been roughly regulated in the form of so-called Voluntary Resource Groups (FRG) - an optional resource for municipalities' crisis management [58]; p.21) – which exist in about half of Sweden's 290 municipalities [59]. The FRG has the task to receive and organise informal volunteers in situations where a municipality judges that there is a need [100]. They are also responsible for signing contracts with the spontaneous volunteers so that they are insured before they contribute [60]. Based on experiences from wildfires in 2014 and 2018, the Voluntary Defence Organisation, another volunteers group, has asked for better regulation of the engagement of spontaneous volunteers [61]- The Swedish Civil Contingencies Agency asked the Swedish Red Cross in 2019 to take leadership over the coordination of informal volunteers [62].

In **Norway**, short-term contracts have been established for engaging informal volunteers to facilitate their participation in disaster response. For instance, when fighting forest fires, such contracts allow these volunteers to be eligible for occupational injury insurance and compensation for equipment used [63]. Otherwise, the engagement of informal volunteers is not formally regulated, but is influenced by a long-standing culture of volunteerism: the Norwegian Rescue Service is founded on a tradition of neighbours helping one another [64]. The Norwegian municipalities and/or state agencies are not obliged to involve informal volunteers into disaster management. However, municipalities' collaboration with members of local communities, or non-crisis-related NGOs, generally works well (County Governor of Oslo and Viken, 12.2019); [65].

In Finland, the role of volunteers is defined in the Rescue Act. A majority of volunteer action is organised by non-profit organisations that train and recruit volunteers. Both public authorities and NGO representatives see this responsibility as the natural way to organise and include informal volunteers [21]. The largest organiser of volunteer action is the Voluntary Rescue Service (Vapepa) - a network of 53 registered associations (including, for example, the Finnish Divers' Federation and Lifeboat Institution) that prepare a variety of trained volunteers for emergencies. Although the majority of Vapepa's volunteer action has been a response to authorities' requests, Vapepa has engaged also spontaneous volunteers and has established protocols for this. Spontaneous volunteers are seen as a supportive resource for the affiliated volunteers especially during large and acute disasters.

In Estonia, municipalities and/or state agencies are not obliged to involve informal volunteers in disaster management. As disaster management system is decentralised, every state institution engages and organises the collaboration with volunteers on an independent basis (South-Estonia Rescue Center, 11.2019). There are no formal procedures to enable this engagement. The Volunteer Reserve Rescue Team [66] is an NGO to support the Rescue Board in case of extensive natural and civilian disasters (e.g. forest fires, oil spills etc), and engages trained volunteers (see https://rpr.ee/english/). The first, more systematic, step in forming voluntary community support networks in municipalities includes, for instance, the creation of contact information database allowing municipalities and Rescue Board to communicate with disaster management local key persons and inhabitants (Alliance of Harju County Local Governments, 11.2019).

In sum, in Belgium and Italy, volunteer engagement in disaster management is more institutionalised and the qualification of professional skills or previous training is imperative**.** In Germany, Hungary and Estonia, there is no institutional arrangement to

Table 1
Methods for engaging informal volunteers in disaster management in eight European countries.

Country	Are there any official campaigns that encourage informal volunteering?	Is training provided to informal volunteers?		Are there any official activities to encourage local support networks?	Is social media used to engage informal volunteers?
		Content of training	Target group		
Germany	Yes, the BBK launched a campaign to foster volunteering in June 2021 (https://mit-dir-fuer-uns-alle.de/). The Federal Ministry of the Interior also runs campaigns to foster volunteering (https://www.bmi.bund.de/EN/topics/community-and-integration/socia-cohesion-volunteering/kampagne-ehrenamt-artikel.html). First moves by aid organisations such as the Red Cross to integrate spontaneous/ unaffiliated volunteers, e.g. via team structures. Population is encouraged to prepare for self-help in case of a disaster and to help their social environment [67].	First aid and safety courses, self-protection, needs of certain social groups (e.g. children, care givers, refugees) by Ministry of Interior with NGOs [67].	Anyone	No activities by state authorities or other relevant actors	Yes. Guidelines by BBK (a national authority) to enable local authorities to deal with unaffiliated volunteers via social media: e.g. social media benefits and necessary resources for maintaining, possibilities to involve unaffiliated volunteers to avoid parallel structures emerging; monitoring social media [47,68]. Example: During the floods in 2013 in Saxony citizens organised themselves via Facebook and Twitter to rescue their own houses or to help others affected by the floods [69]. In response, the local government in Dresden will create a social media platform that will facilitate citizen involvement during future flood emergencies [70]. Some online volunteer groups from floods have also been active during the Covid-19 pandemic [69]
Italy	No. But formal volunteering is strongly encouraged by *ad hoc* activities in local communities.	First aid by health emergency professionals	Secondary school students	No. Boosting such self-organisation through community support networks is considered dangerous.	No.
Belgium	Yes. Via the website Info-risques.be [101], people are advised to involve neighbours or vulnerable people to their own emergency plan.	Work with asylum seekers/migrants; elderly people (e.g. active listening); homeless populations or those who are poorly housed by Red Cross [71]	Formal volunteers	No activities beyond the inforisques.be website	No. But it has helped spontaneous volunteers to self-organise.
Hungary	Yes. Responsibility of Hungarian Red Cross; Complex Disaster Response exercises	First aid by Red Cross [72] Support vulnerable individuals e.g., elderly people, immigrants by Charity Service of the Order of Malta.	Anyone Anyone	Yes. Local voluntary rescue teams recruited by some municipalities to complement professional forces.	Yes, *ad hoc*. Example: In the Hungarian refugee crisis in 2015, Facebook was used to inform a network of approximately 30 people helping the refugees staying at Debrecen refugee camp. In 2013, during the snowstorm, the municipality and NDGD recruited volunteers for the M1 motorway for rescue work through Facebook [55].

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Table 1 (*continued*)

Country	Are there any official campaigns that encourage informal volunteering?	Is training provided to informal volunteers?		Are there any official activities to encourage local support networks?	Is social media used to engage informal volunteers?
		Content of training	Target group		
Sweden	Yes. Crisis preparedness booklet by [73]	First aid by Swedish Civil Defence Association [59]	Anyone, but funded only to the members of Voluntary Defence Organisations.	Yes. Formal local groups like municipal Voluntary Resource Groups or POSOM-groups and regional PKL-groups ('Psykologisk KatastrofLedning', psychological catastophy leadership; Katastroppsykologi.se, 2021). POSOM and PKL are volunteer-based expert formation.	Yes, *ad hoc*. Example: During migration crisis in 2015 Facebook groups (such as "Refugees Welcome" and "We who receive refugees at Stockholm Central") were useful tool in disseminating information and creating coordination among volunteers [74].
Norway	Yes. 72 h campaign encourages people to take care of themselves and siblings. Advice by municipalities, e.g. Oslo municipality, requests people to think about persons with impaired vision, hearing or mobility in their neighbourhood or community, about persons who do not understand Norwegian or English [75].	First aid by Ministry of Health and Care Services with NGOs [76, 77] Coping in the wilderness by various organisations [64]	Anyone Youth	No, except providing financial support to voluntary organisations, that would step in to perform some of the crisis response tasks	Yes, *ad hoc*. Example: Facebook (e.g. group (" [78]") was used to call for and provide information about the needs and necessities for the evacuees (clothes, accommodation, animal care) in the Gjerdrum-landslide crisis around New Year 2020/2021 [79].
Finland	Yes. 72 h home preparedness concept, comprises of recommendations for the households and a train-the-trainers system [102].	Urban crisis preparedness by Rescue Association Safety skills, anticipating hazardous situations by the National Rescue Association [109] and Regional rescue departments [110]	Anyone Care institutions, schools, migrant communities and persons with disabilities	Yes, social support networks are a part of national crisis planning [80], referring to the provision of psychological support. Primarily, the work of NGOs and faith-based organisations are affiliated to official rescue system. Guidance and a structured template to map individual support networks by National Rescue Association.[109].	Yes, *ad hoc*. National Rescue Association (SPEK) and Voluntary Rescue Service network (Vapepa) use all major social media platforms to advocate volunteer action and trainings for volunteers. Example: Recently, Vapepa has recruited volunteers to assist in coronavirus vaccinations [81]. For the emergency operations Vapepa has a specific mobile alarm system (OHTO), which sends automatic text messages to the registered volunteers in case of emergencies [105]
Estonia	Yes. Crisis preparedness guidelines [82] advises on how to prepare for a crisis together with the neighbours and community.	Community preparedness, by Rescue Board (South-Estonia Rescue Center, 11.2019). Course "Defend yourself and help others" by Rescue Board. Community preparedness by Defence League and the Estonian Women's Voluntary Defence Organisation.	Anyone School children Anyone	Yes. Short-term programs, e.g. mapping the local key persons and inhabitants to communicate with the Rescue Board during a crisis, or training their volunteers in preparing local communities for crisis (Alliance of Harju County Local Governments, 11.2019; South-Estonia Rescue Center, 11.2019).	No. There is no evidence that social media is used for engagement.

comprehensively structure spontaneous help offers. In Germany, Sweden, Hungary and Finland, formalised volunteer groups or organisations are the main contact points for informal volunteers during crisis, although the contact points and structures emerge and operate on an *ad hoc* basis. In Hungary, Finland and Sweden, clear requirements for the types of volunteers necessary have been stipulated and used to organise volunteers. In Sweden and Norway, the engagement of informal volunteers is the most institutionalised, including the use of short-term contracts allowing for insurance and reimbursements. In Estonia, there have been few experiences with engaging spontaneous volunteers and therefore no arrangements are in place.

4.2. Methods for engaging informal volunteers

As a second research question we explored the tools that are used for engaging informal volunteers in disaster management system. More specifically, we were interested in (1) the awareness-building campaigns to encourage informal volunteerism to offer support to other members of community, (2) the training offered to volunteers, (3) activities of engaging local support networks, and (4) the use of social media as a means for informing, registering and/or directing informal volunteers during a crisis.

4.2.1. Campaigns

We explored the public information campaigns established to encourage informal volunteer support to more vulnerable individuals in community or society. In all countries, except Italy, there are some campaigns encouraging informal volunteers to help during a disaster (Table 1). These can be in the form of crisis preparedness booklets, guides and dedicated websites. Citizens are encouraged to take special note of vulnerable individuals in their community while preparing for or during a disaster, for example, in the Estonian [82], Finnish [102], German [83], and Swedish [73] guides for public emergency preparedness. Such reminders, however, are often rather general without giving specific instructions on how to assist one another during a disaster.

4.2.2. Training

We also examined evidence of training opportunities on first aid skills, skills to cope and help in extreme conditions, or ways to support vulnerable individuals (e.g. the elderly, those with impairments). In some countries, awareness-raising campaigns on readiness to offer support are backed by practical trainings. Table 1 indicates that primarily voluntary organisations provide the trainings to increase preparedness in Estonia, Germany, Norway, Finland and Sweden (BBK, 2019; [84]. The training events are mainly focused on recognising health issues and providing first aid. Finland stands out with a varied palette of training events for citizens ranging from dealing with immigrants to preparedness of remote communities. We found evidence of training of informal volunteers to offer support to individuals in vulnerable situation in Hungary, Belgium, and Finland.

Table 2
Benefits and challenges in engaging informal volunteers during 11 disasters.

Case study	Benefits	Challenges
Floods in Saxony and surrounding areas in Germany, 2013	Volunteers contributed to filling sandbags, building sandbag installations, provided shuttle services, material for recovery or food for volunteers	Questioning of the established responsibilities of the professional agencies [47]. False or obsolete information emerged leading to an overflow of volunteers on "sites of deployment". Amateur sandbag installations were in a few incidences useless.
L'Aquila earthquake in Italy, 2009	In a recovery stage, volunteers created a self-built ecovillage (EcoVillaggio Autocostruito).	No challenges reported
Terrorist attacks in Brussels airport and metro stations in Belgium, 2016	Volunteers used the hashtag #ikwiihelpen on social media to offer temporary housing and transportation to those stranded by the bombings.	No challenges reported
Gas explosion in Liege, Belgium	People came forward with the intention of helping the victims	Informal volunteer profiles were completely inadequate (e.g. lack of skills for specific task)
Toxic red sludge disaster in Hungary, 2010	Brought damaged items (fixtures, furniture) out to the streets, clean up the mud from the gardens.	Volunteers worked without any coordination, e.g. cleaned up the toxic mud without any special protecting clothing. Collection of donations was uncoordinated some donated items could not be utilised, while there was a shortage of other things. Questioning of the established responsibilities of the professional agencies [85].
Severe winter weather and snowstorms in Hungary, March 2013	Volunteers provided warm food and drinks for those who were trapped in snow. Collection was coordinated via Facebook. Some also offered four-wheel drive vehicles, and shelters for whole families.	No challenges reported
Migration crisis in Sweden, 2015	Volunteers arrived at central stations and ferry terminals before government agencies could offer information to migrants at these sites.	Delayed official response, while informal volunteers helped already.
In Swedish wildfire in 2018	Volunteers provided food, water and accommodation for the emergency services personnel.	Problems with reimbursing the work of informal volunteers on equal grounds with formal volunteers.
Terrorist attacks in Oslo and at Utøya Island in Norway, 2011	Volunteers contributed to rescue efforts in both places, e.g. provided first aid in Oslo and picked up youth swimming from the Utøya Island.	Lack of oversight of who the informal volunteers were, difficulties in providing psychosocial support afterwards. Inadequate understanding of the risks in the hazard area.
Water contamination in Nousiainen in Finland, 2017-18	Residents of municipality informed about potential contamination via social media and kept each other updated. Voluntary rescue service volunteers went door-to-door and gave advice on water safety. Expert orienteers helped to locate the leak.	Authorities and the water service provider first denied the severity of crisis, but the volunteers' public awareness raising forced them to take action.
Extensive electricity and communication system's disruptions, Estonia 2019	Community members went to check if their neighbours were safe in remote areas. Volunteers provided a pop-up soup kitchen in Mooste parish [86].	Coordination of volunteer action is very difficult when electricity and telecommunication networks are disrupted.

4.2.3. Initiatives to build support networks

Beyond awareness raising activities, we explored activities to boost local social support networks by way of encouraging local community members to help one another. These activities may stem from state authorities, municipalities, or other relevant actors (e.g., NGOs or citizens). Overall, we found an active top-down approach to building social support networks in such countries as Finland, Hungary and Sweden in which support networks include trained citizens or locals with expert knowledge networking local actors and identifying potential sources of support (see Table 1). In Estonia, state programs and funding are allocated for the establishment of local social support networks.

4.2.4. Engaging via social media

Social media is increasingly used for voluntary self-organising during crises. However, the extent to which social media is being systematically employed by state or other actors involved in disaster management is not widely studied. Among the other tools of engaging informal volunteers, we explored if and how social media is used in informing, guiding and registering informal volunteers in crises. Overall, among the studied countries, German authorities have the most elaborated principles for dealing with informal volunteers via social media. The use of social media platforms for informing, guiding or registering informal volunteers has appeared in only *ad hoc* ways in Hungary, Sweden, Finland and Norway (Table 1). In Belgium, in the absence of means for official engagement of informal volunteers, social media provides a platform for self-organising citizens. In Italy, social media is used for the dissemination of information among citizens affected by a disaster, as well as for other citizens, and for formal volunteer personnel management. There is no evidence of social media engagements in Estonia.

4.3. Benefits and challenges in engaging informal volunteers

Thus far we have studied the current state-of-play regarding official efforts to engage informal volunteers during disasters, noting a substantial but uneven number of planning initiatives and communication instruments. Looking at such efforts in actual disasters offers another empirical angle. Below, we show that in some cases disaster management has greatly benefitted from the engagement of informal volunteers but also many challenges have occurred. The results of our case studies of the benefits and challenges in engaging informal volunteers during last decade are summarised in Table 2. Information about volunteers in our case studies come from country reports which are based on desk research, including previously published scientific articles, and expert interviews.

Table-top exercises on the most recent COVID-19 experiences demonstrated that spontaneous volunteering is considered a great resource but needs to be given a specific role as well as be well-coordinated, which further requires both adequate resources and experience (Finnish and Italian table-top exercises). Some of the preconditions for successful engagement has been a proper system for registration of informal volunteers, opportunities for *ad hoc* training, and protocols for coordinating personnel. We now unpack the above-mentioned benefits and challenges highlighted in actual disaster cases presented in Table 2 and table-top exercises.

4.3.1. Benefits

4.3.1.1. Providing relevant and accurate information horizontally. Stemming from the recent COVID-19 experiences, the Estonian table-top exercise participants saw spontaneous networks as helpful in drawing attention to the appropriate protective behaviour. The German table-top exercise participants saw that spontaneous networks can spread important messages through their easy access to individual community members, so that information is effectively and widely shared. Finnish table-top exercise participants emphasised that official disaster management actors could actively use the organisers of spontaneous volunteer action (as well as to those responsible for social media) to spread factual information. For example, such networks can reach out to the 'grassroots' and vulnerable individuals, collaboration with volunteers from NGOs such as sports associations, as well as actors who work with linguistic minorities or otherwise marginalised groups. The German participants emphasised that beyond communication, spontaneous networks can exert 'group pressure' and persuade others to act safely. German participants also added that digital volunteers can motivate more people to get involved in voluntary work.

Informal volunteers could prove important sources of local information. In Finland's Nousiainen water pollution case, local experiences and information exchange was important in the absence of official information. Informal risk awareness-raising, via social media and door-to-door canvassing, helped to keep residents updated and safe. Furthermore, thanks to those groups' perseverance, the suspicion of water contamination was taken more seriously in the community. One Italian respondent stated that the strength of spontaneous volunteering does not lie in having people to be placed in a well organised hierarchies, but rather in horizontal forms for flexibility and effectiveness. The respondent believed that temporary volunteers, as part of the affected communities, are a good source of information on possible needs and potential solutions.

After the floods in Germany, officials recognised the need to better monitor social media information/trends/mobilisation efforts [87,88]. COVID-19 experiences indicated that spontaneous volunteers can be valuable in monitoring social media discussions. As put by one Estonian participant in the table-top exercise, "each pair of eyes can be useful in spotting false information and reporting it to the web-police". The Italian table-top exercise participants emphasised that volunteer networks can help to identify early rumours that must be addressed and responded to. Informal volunteers were perceived also as resourceful creators of 'social support' both electronically and in person (Italian and Finnish table-top exercises). In Belgium, even though informal volunteers' engagement is not officially supported, the terrorist attacks at the Brussels airport and metro stations in 2016, demonstrated the great advantage of spontaneous volunteers in providing translation during the crisis (Urgent Help Service Operations Cell, 01.2020).

4.3.2. Challenges

Examples presented above were chosen as exemplary of prevailing trends or illustrative of the tendencies in the country case reports and interviews.

4.3.2.1. Incomplete overview of the sources of spontaneous help. In Norway's terrorist attacks in Oslo and at Utøya Island, authorities lacked oversight of who the informal volunteers were. After the floods in Germany, officials realised there was a strong need to better utilise the help provided by volunteers [87,88]. Similarly, in Sweden, the migration crisis in 2015 demonstrated that increased collaboration between authorities and volunteers is required to optimise the use of the resources available [74]. A prerequisite for better allocation is a better understanding of the potential resource the informal volunteers offer. The wildfire in 2018 pointed to the Swedish authorities' shortages of knowledge in the understanding of which spontaneous/emergent groups exist, how they can help, how to collaborate with them and how to organise it (Centre for Societal Security, 12.2019). At the Finnish table-top exercise related to COVID-19 experiences, it emerged that some spontaneous volunteer formations are very difficult to monitor and track. Neighbour support networks were brought out as an example of this: such "leaderless" networks can be difficult to collaborate with as they come into existence at the spur of the moment and in light of a specific need.

4.3.2.2. Safeguarding volunteers. In Norway, informal volunteers played an important role in the relief work after the Oslo and Utoya massacre in 2011, but volunteers had inadequate understanding of the risks in the hazard area and formal agents had a lack of oversight who was volunteering. This made it difficult to provide psychosocial support afterwards. The Health Directorate concluded that there is a need for municipalities to prepare more uniform plans for safeguarding such volunteers in the aftermath of crisis situations [89]. Also, during the COVID-19 related table-tops (Finnish, Italian), it was emphasised that spontaneous volunteers require support and guidelines to organise themselves so that they do not put themselves in danger. Such volunteers usually fall outside of the services provided for formal volunteer NGOs, such as defusing and debriefing activities for their pre-registered members.

4.3.2.3. Incompatible preparedness profiles and training of informal volunteers. During the gas explosion in Liege, Belgium, many informal volunteers arrived spontaneously with the intention of helping victims, but many of their skills and knowledge were inadequate for the task at hand. A lack of skills or training can lead to, at best, inadequate responses, and at worst, dangerous actions that can worsen a crisis situation. For example, in the German floods disaster in 2010, amateur sandbag installations turned out to be unstable and useless.

4.3.2.4. Unclear status of informal volunteers. The lack of differentiation between the formal and informal volunteers in state regulations and guidelines arises as a problem. For example, the issue of reimbursing the contributions of the informal volunteers appeared during the Swedish wildfire. According to a Swedish Red Cross representative (01.2020), initial tensions occurred between volunteers and state institutions during wildfires because of a government decision to give the same compensation to a volunteer who was making sandwiches or providing bedding as a part-time firefighter with six years of training.

4.3.2.5. Unclear role of digital volunteers in disaster management. Planning and foreseeing the role of digital volunteers in disaster management is important. Digital or virtual volunteering, which uses the internet as a channel for providing support and relief in disasters, is particularly useful in situations like pandemics when physical interactions need to be limited. However, guidelines and operational concepts for such activity are long overdue and should be developed as soon as possible.

4.3.2.6. Providing inaccurate information horizontally. Although informal volunteers may amplify accurate messages, they may also function as sources of information disorder by spreading (unintentionally) false information. For example, during the floods in Saxony and surrounding areas in Germany in 2013, false or obsolete information emerged, thereby leading to an overflow of volunteers on "sites of deployment". Thus, authorities and other agencies who are responsible of providing accurate information should collaborate closely with the volunteers. The potential of providing unreliable information and generating confusion and anger was particularly highlighted in case of digital volunteers. Agreeing on their role, in advance of a disaster, is highly important.

4.3.2.7. Lack of coordination. Uncoordinated action can create ambiguities and further mistrust amongst officials and volunteers in a disaster. This point was strongly put forth by Estonian participants in the table-top exercise. In the migration crisis in Sweden, since official responses were delayed, informal volunteers first helped the migrants without the coordination of authorities. In the toxic red sludge disaster in Hungary, volunteers worked without any coordination: they, for example, cleaned up the toxic mud without any special protecting clothing. The collection of donations was similarly uncoordinated, resulting in donated items that could not be utilised, while there was a shortage of other materials. In Estonia, in the case of the current COVID-19 crisis, official platforms directed volunteers to run errands (do shopping, walk dogs) for the self-isolated elderly. Yet, in some cases so-called 'volunteers' took advantage of people in need through blackmailing and extortion attempts, for example.

Communication and coordination protocols are needed for situations when normal communication channels become inaccessible. In Estonia, when there was massive electricity and communication system disruption in 2019, many locals said that lack of information was a main challenge [86,90]. The lack of information due to the power outage hindered locals from making plans on how to cope during such instances. Some of them said that the radio, instead of social media, should have been used for directly informing the locals [86]. People were told to call certain mobile numbers for certain needs and to inform their neighbours about that opportunity [91].

4.3.2.8. Lack of sense of authority and competence of official responders among the informal volunteers. After the floods in Germany, officials concluded that better communication with self-organised volunteers needs to be established to avoid misunderstandings – and even conflicts – stemming from the lack of sensed authority by official responders. As another example, during the Red Sludge disaster in Hungary in 2010, many volunteers worked on cleaning up the area and providing donations for the families in need. However, tension between local volunteers and the government were constant due to the officials poor understanding of the properties of the red sludge or not listening to the warnings of civil organisations [55]. To tackle these issues, a Civil Humanitarian Coordination Centre was subsequently established by NDGDM in collaboration of several humanitarian organisations like the Hungarian Red Cross and Hungarian Interchurch Aid.

5. Discussion and conclusions

Informal volunteering is gaining greater importance in disaster management [13]; [96]; [14]. In this article we examined (1) the policies and institutional arrangements for integrating informal volunteers, (2) the methods and tools for their engagement, and (3) the reported benefits and challenges of involving volunteers in disaster management in Germany, Italy, Belgium, Hungary, Sweden, Norway, Finland, and Estonia. To our knowledge there are no existing comparative studies on how informal volunteers are involved in disaster management across Europe, and we aimed to fill that empirical gap here.

Our study revealed that disaster management systems in these countries are taking modest steps towards opening their traditional command-and-control structures to participation by informal volunteers. Although informal volunteers can be most usefully engaged following established policies or plans that recognise and outline spontaneous volunteer management practices [15], only in Sweden and Norway, where volunteering is more common, is the engagement of informal volunteers somewhat regulated, providing an opportunity to formally insure them. Although spontaneous volunteering has taken place in several recent disaster cases in Belgium and Italy, formally speaking informal volunteering is not encouraged in those countries. However, in Italy, people interested in volunteering are encouraged to do so through formalised associations to grant them insurance and social security contributions. In Germany, Hungary, Finland, and Estonia, informal volunteer organisation is done on an *ad hoc* basis. Australia, United States and United Kingdom can be highlighted as examples where guidelines about informal volunteer management exist [32]. For more effective disaster management, improved coordination of informal volunteers is needed, even in non-complex disasters where non-complex tasks need to be fulfilled. The need for policies or plans specifying informal volunteers' management practices increases even more when complexity of disasters and/or tasks increases.

Regarding the tools for their engagement, in all countries, except Italy, crisis-preparedness campaigns encourage community members to be on the look-out for the needs of vulnerable individuals. In Italy, however, campaigns are organised by the affiliated volunteers themselves who seek new members for their formal-volunteer organisations. Several countries encourage active volunteering through formal and informal channels. In most of the countries studied here, crisis-preparedness campaigns are backed by practical training initiatives that primarily focus on first aid. Proactive policies aimed at building social support networks were present in Finland, as well as in Hungary and Sweden, in which support networks include trained citizens or locals with expert knowledge. In Estonia, such initiatives are growing. Internet and social media platforms can serve as a bridge between formal disaster management actors and informal volunteers [39]. During crisis, social media platforms hold the potential to simplify the gathering of information, the sharing of information, the collaboration as well as the management of problems [92]. In all countries, except Germany, social media has been used by disaster management authorities to inform, guide, or register informal volunteers on an *ad hoc* basis. The use of social media platforms to deal with spontaneous volunteers is well guided in Germany. More systematic use in other countries can be hindered by lack of training to effectively use social media [93], including the way in which social media platforms work, and a lack of knowledge about what kind of audiences can be reached on a given platform [94].

Our research helped to identify the potential benefits of involving informal volunteers in disaster management, including their use in the dissemination of relevant and accurate information horizontally and the provision of social support. However, there are clear challenges and risks, too. These include formal actors' incomplete overview of the spontaneous sources of help, the safeguarding of informal volunteers, the incompatible preparedness profiles and training of informal volunteers, the unclear status of informal volunteers, the uncertain role of digital volunteers in disaster management, the provision of inaccurate information horizontally, a general lack of coordination, and a lack of clarity and clear authority amongst officials and volunteers. These challenges have been only partly highlighted in the literature (e.g. Refs. [20,24], which tends to focus mainly on coordination, communication, and health and safety issues related to informal volunteers. However, there is evidence of successful strategies that can help to mitigate such problems. It has been found that, when informal volunteers should fulfil complex tasks, for instance, it is especially important to have a proper system for registering and triaging of informal volunteers to find out if a volunteer have the required competences and/or provide *ad hoc* training. When less complex tasks should be carried out in a disaster, roles for informal volunteers can be better pre-defined and prepared for. The experiences are promising and support the idea that "if the central and local government and other relief organisations incorporate management practices for the informal volunteers, their response is more beneficial in the long-term, financially, socially and psychologically" [95]. However, it remains an open question whether official bodies should engage informal volunteers in complex disasters to fulfil complex tasks. If volunteers have the required competences to fulfil specific tasks, and there is a plan in place how to engage them, the benefits of informal volunteerism outweigh the negatives.

As mentioned in the introduction, no authoritative comparisons amongst countries can be made given the complexity of variables that interact in crisis situations. For instance, in different countries, even the concept of informal volunteers may be understood slightly differently. Countries also vary in terms of what types of disasters are most common. Practices and insights regarding different types of disasters may not be easily comparable along the same analytical lines. And while country cases have been researched by analysts who reside in and are generally familiar with the disaster management systems in their respective countries, the extent to which particular socio-cultural, historical, and institutional contexts of each country case are understood by the particular analyst may vary. To all of this we should add that the comparison of qualitative data is necessarily interpretive without completely equivalent standards for comparing narrative answers. Nevertheless, we find our insights useful for ongoing academic and practitioner debates on the use of informal volunteers in European countries. We have aimed for a broad comparison of general patterns amongst countries, so our results should be seen as an indicator of trends and ongoing discussions in these countries.

There is a further need to explore the engagement and integration of informal volunteers in disaster management systems across the world. It is important to get better understanding on how informal volunteers' engagement differ by magnitude or phase of the disaster, but also about the reasons behind the country differences in informal volunteers' engagement. An important point of inquiry

would be on the national, structural features shaping the use of volunteers, such as legal restrictions, regulatory frameworks, and cultural expectations. Additionally, it would be useful to examine what strategic instruments official bodies use to plan for informal volunteering [111] including to what extent volunteer engagement is enabled versus controlled by official bodies. Last but not least, more data on volunteering trends in disasters in the Global South is urgently needed. We look forward to pushing these agendas forward in the future.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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