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Survey results on preparedness, coordination, and lived experience of first responders in Germany and Romania 2021

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Abstract

Pluvial and riverine floods affected many areas worldwide in 2021. To better prepare for future disasters, understanding the areas of emergency and the need for disaster management improvement is necessary. This study analyzes the results of several online surveys amongst professionals and voluntary helpers active in the 2021 flood operations in Germany and Romania. The main findings from 2,333 respondents are about perceptions of motivational aspects and problems experienced in flood operations. Satisfaction with several aspects is lower in Germany, especially provision of information and coordination. Coordination and cooperation with the population are the main problematic areas in Romania. Infrastructure disruptions are a problem in Romania, especially in terms of wastewater disposal, and in Germany in terms of roads and transportation to the affected areas. Preparedness of the population and cooperation challenges are reported for Romania, but less so in Germany. The differences revealed by the survey between Germany and Romania lie not only in the magnitude of the hazard event but also in the organizational structure of disaster response.

Zusammenfassung

Im Jahr 2021 waren viele Gebiete weltweit von Überschwemmungen und Flussüberschwemmungen betroffen. Um sich besser auf künftige Katastrophen vorbereiten zu können, ist ein besseres Verständnis der Verbesserungsmöglichkeiten des Notfall- und Katastrophenmanagements erforderlich. Diese Studie analysiert die Ergebnisse mehrerer Online-Befragungen unter professionellen und freiwilligen Helfern, die bei den Hochwassereinsätzen 2021 in Deutschland und Rumänien aktiv waren. Die wichtigsten Ergebnisse aus 2333 Antworten sind Wahrnehmungen von motivierenden Aspekten, aber auch von Problemen, die bei den Hochwassereinsätzen aufgetreten sind. Die Zufriedenheit mit einer Reihe von Aspekten ist in Deutschland im Vergleich geringer, insbesondere mit der Informationsbereitstellung, aber auch mit der Koordination. Koordination und Kooperation mit der Bevölkerung sind ein Hauptproblem in Rumänien. Unterbrechungen der Infrastruktur sind in Rumänien ein Problem, vor allem in Bezug auf die Abwasserentsorgung, und in Deutschland in Bezug auf die Straßen und

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den Transport zu den betroffenen Gebieten. Zusammenfassend lässt sich sagen, dass die Unterschiede zwischen Deutschland und Rumänien nicht nur im Ausmaß des Gefahrenereignisses, sondern vor allem in der Organisationsstruktur der Katastrophenabwehr liegen.

Keywords risk perception, flood risk management, awareness, risk governance, disaster risk reduction

1. Introduction

Europe was affected by heavy rain and related pluvial floods in 2021. Over 220 deaths were recorded in Europe of which Germany was affected by over 190 deaths (*Yang* et al. 2021; *Illarena* et al. 2022; *CRED* and *UCLouvain* 2023). While the floods in Germany were regarded as unprecedented and caused the highest number of casualties since the 1962 coastal floods, in neighboring countries, the casualties and damages were much smaller. Romania experienced one casualty in one event in the summer of 2021, with over 200 people evacuating (*Davies* 2021b; c). Other countries worldwide also experienced floods in 2021, such as China and Pakistan (*Lang* et al. 2022). Different flooding events across Pakistan caused a total death toll of 187 during the Monsoon season of 2021 (*Davies* 2021a). A concurrent hazard affected almost every country in 2021: COVID-19 pandemic. Affected people and rescue teams had to consider this risk while coping with the floods, too.

Floods and related losses and damages are a shared experience globally, just like the pandemic. There is a lot of research on flood preparedness, disaster management, and lessons learned in general in both Germany (*Kreibich* et al. 2005; *Thieken* et al. 2016; *Kuhlicke* et al. 2020; *Merz* et al. 2021) and Romania (*Reti* et al. 2014; *Zaharia* and *Ioana-Toroimac* 2018; *Popa* et al. 2019; *Negm* et al. 2020).

But while first responders are on the front line of responding to floods, their experiences, motivations, and insights into problems during the flood operations have not been commonly addressed by scientific studies yet. Studies covering risk perception include perspectives of first responders and other people (*Plapp* and *Werner* 2006) or analyze the motivational aspects of volunteers (*Holwitt* et al. 2017). We found few studies on the satisfaction and motivations of first responders regarding flood operations worldwide, which justifies our study. However, first responders and emergency management are crucial in disaster events and provide the affected a 'critical infrastructure service' (*Boin* and *McConnell* 2007). Therefore, it is very important to know how to maintain their motivation.

This paper analyzes the motivation and experiences of challenges of first responders through an online survey carried out in many countries worldwide. Significant responses are analyzed in this paper from Germany and Romania, with different operational structures in disaster management. The findings can help to direct future disaster risk management and operational teams to better prepare for and cope with the floods when lessons learned from such surveys are taken up by flood disaster risk research and governance.

1.1 Country selection and comparison

Germany and Romania are comparable in size and mix of topography between mountainous and lowland areas. Both countries are situated in Europe and are surrounded by several neighboring countries. They also have several river basins and access to the sea, so they share cross-boundary flood-prone areas. The comparable climate enables flood exposure through different seasons (*Table 1*). The population in Germany is much higher, but both countries have a diverse composition of ethnic groups, with one national group and language predominating. The age structure is comparable with an aging population, with a higher range of females reaching the highest age, although the overall median age is slightly higher in Germany. Urban population, with almost 78% of the total population, is higher in Germany than in Romania, with about 55%.

Table 1 Country facts in comparison. Test source: verbatim from the CIA World Fact Book, as of 10 April 2023 (CIA 2023); Map Data sources: BKG 2023; EEA 2023; HOT OSM 2023; Open Street Map contributors 2023

	Germany	Romania
Map and area		
	Border countries and lengths (9): Austria 801 km; Belgium 133 km; Czechia 704 km; Denmark 140 km; France 418 km; Luxembourg 128 km; Netherlands 575 km; Poland 447 km; Switzerland 348 km **Land:** 348,672 sq km **Water:** 8,350 sq km	**Border countries and lengths (5)**: Bulgaria 605 km; Hungary 424 km; Moldova 683 km; Serbia 531 km; Ukraine 601 km **Land:** 229,891 sq km **Water:** 8,500 sq km
Climate	Temperate and marine; cool, cloudy, wet winters and summers; occasional warm mountain (foehn) wind	Temperate and marine; cool, cloudy, wet winters and summers; occasional warm mountain (foehn) wind
Terrain	Lowlands in north, uplands in center, Bavarian Alps in south	Central Transylvanian Basin is separated from the Moldavian Plateau on the east by the Eastern Carpathian Mountains and separated from the Wallachian Plain on the south by the Transylvanian Alps
Major rivers	Danube river source (shared with Austria, Slovakia, Czechia, Hungary, Croatia, Serbia, Bulgaria, Ukraine, Moldova, and Romania) - 2,888 km; Elbe river mouth (shared with Czechia) - 1,252 km; Rhine (shared with Switzerland, France, and Netherlands) - 1,233 km	Danube river mouth (shared with Germany, Austria, Slovakia, Czechia, Hungary, Croatia, Serbia, Bulgaria, Moldova, and Ukraine) - 2,888 km
Major watersheds	Atlantic Ocean drainage: Rhine-Maas (198,735 sq km), (*Black Sea*) Danube (795,656 sq km)	Atlantic Ocean drainage: (*Black Sea*) Danube (795,656 sq km)
Population	84,220,184 (2023 est.)	18,326,327 (2023 est.)
Ethnic groups	German 86.3%, Turkish 1.8%, Polish 1%, Syrian 1%, Romanian 1%, other/stateless/ unspecified 8.9% (2020 est.)	Romanian 83.4%, Hungarian 6.1%, Romani 3.1%, Ukrainian 0.3%, German 0.2%, other 0.7%, unspecified 6.1% (2011 est.)
Age structure	Total: 47.8 years Male: 46.5 years Female: 49.1 years (2020 est.)	Total: 42.5 years Male: 41 years Female: 44 years (2020 est.)
Urban population	77.8% of total population (2023)	54.7% of total population (2023)

Both countries were selected because they have extensive experience with flood disasters (*Tables 2* and *3*). The absolute death tolls have been higher in Romania, whereas in Germany, there have been only two events in recent history with 20 or more deaths recorded. In Romania, these events have been mainly summer floods; in Germany, it is a seasonal mix of devastating flood events.

It is of interest to compare these countries since both have similar climates and topography, but the floods of 2021 in Germany have created unexpected death tolls and international awareness. As reported by the EM-DAT data base (*CRED* and *UCLouvain* 2023), Romania also had severe flood damages in 2021, but only one casualty as compared to the over 190 deaths in Germany.

Originally, it was planned to make a cross-country comparison with many other affected countries in Europe, and even include samples of countries located outside Europe affected by similar flood events in 2021. However, neither the responses from neighboring countries in Europe, nor from other countries, were sufficient to analyze them in comparison to the ones obtained from Germany and Romania. Therefore, this study focuses on Germany and Romania. We selected the two most recent flood events in Germany and Romania to get clear reflections on the perceptions of first responders.

Table 2 Top 10 flood disasters in Germany. Source: EM-DAT CRED (CRED and UCLouvain 2023), as of 10 April 2023, with own additions in italics

Disaster Subtype	River Basin or Location	Start Year	Start Month	Total Deaths	Total Affected	Total Damages, Adjusted ('000 US$)
Flash and riverine flood	Ahr, Volme, Dhünn, Moselle, Inde, Kyll, Jagst rivers	2021	7	197	1000	43201120
Riverine flood	*Elbe, Danube*	2002	8	27	330108	18873085
Riverine flood	*Isar, Amper, Ammer, Wertac*h, *Lech, Iller, Inn, Danube*	1999	5	7	100000	755465
Flash and riverine flood	*Inn*	2016	5	7		2438717
Riverine flood	Mosel, Saar, Rhine, Neckar, Aisch, Nahe	1993	12	5	100000	1215526
Riverine flood	Rhin, Moselle	2011	1	4		
Riverine flood	Danube, Elbe, Neckar, Mosel, Rhine	2013	5	4	6350	16205764
Flash flood	*Ore mountain, Saxony*	2010	8	3		
Riverine flood		1994	4	2		382046
Riverine flood	Danube	2005	8	1		329682

Table 3 Top 10 flood disasters Romania, and the 2021 event for comparison. Source: EM-DAT CRED (CRED and UCLouvain 2023), as of 10 April 2023

Disaster Subtype	River Basin or Location	Start Year	Start Month	Total Deaths	Total Affected	Total Damages, Adjusted ('000 US$)
Riverine flood	Danube	1926		1000	238755	
Riverine flood	Someş-Tisa, Mureş, Siret	1970	5	215	15000	3768897
Riverine flood	Siret	1991	7	108	1000000	107442
Riverine flood	Mureş, Olt and Argeş-Vedea	1975	7	60	2000	271900
Riverine flood	Olt, Argeş-Vedea, Buzău-Ialomiţa, Siret	2005	8	33	12000	469047
Riverine flood	Danube, Mureş	1998	6	31	600	269300
Riverine flood	Danube, Someş-Tisa	2006	6	30	12237	
Riverine flood	Danube, Prut, Siret	2010	6	26	14669	1491661
Riverine flood	Siret, Trotus	2005	7	24	122320	1198842
Riverine flood	Crişuri	1997	7	20		200553
Flash and riverine flood	Vişeu, Iza, Zăbala, Putna, Milcov, Buzău, Bistriţa (Almaj), Siret, Prut, Rm. Sărat, Caşin, Tâenave, Crişuri, Arieş, Olt, Cerna, Argeş, Ialomiţa, some of the Danube tributaries in the west and rivers from the Tulcea and Constanta counties, in the southeast	2021	6	1	100	

1.2 Assumptions guiding the survey questions

In Germany, the floods in 2021 were perceived by the public not only as an unprecedented disaster in magnitude but also as a failure of the emergency response (*Cornwall* 2021; *Kühne* et al. 2021). We selected people directly involved in the emergency response. This was based on the assumption that they knew best what had happened and which problems had occurred. To balance the study, we also assumed that ideas for improvements exist or emerge from the operation. We assumed that the comparison of Germany with Romania helps to understand general motivation and satisfaction aspects but also helps to unravel specific challenges and problems as well as areas for improvement in flood disaster management.

Since provision of information and problems in the warning chains were discussed as main challenges in the media (*Mathiesen* et al. 2021), and recorded in the pretest and group discussions, we added specific questions about it to the survey. The inclusion of volunteers and cooperation between volunteers with official relief organizations is a major discussion topic in Germany's flood risk management (*Holwitt* et al. 2017; *Zettl* et al. 2017; *Hälterlein* et al. 2018), but also internationally (*Rice* and *Fallon* 2011). The importance of integrating all actors, including flood volunteers, is also addressed for Romania (*Vinke-de Kruijf* et al. 2015; *Comănescu* and *Nedelea* 2016), so we have assumed it is an important additional question for the survey.

Apart from organizational aspects of coordination and information, technical aspects of infrastructure failures have also gained importance in research and have been reported to be a major problem for flood relief work (*Berariu* et al. 2015). We have therefore added a specific survey question about this.

Finally we assumed it is helpful to analyze first responders' perceived preparations, skills, and worries, since they can influence their operations (*Form* and *Nosow* 1958; *Barton* 1969).

These aspects are emphasized in literature to be influential in how first responders carry out their tasks, which includes – but is not limited to – achieved skills in trainings (*Fahey* et al. 2002), psychological factors (*Hofinger* et al. 2014) or worries (*Cowlishaw* et al. 2010; *Van der Auwera* et al. 2012).

2. Method

An online survey was designed to capture first responders active in the flood operations or afterward. The online survey method was selected due to the main advantage of accessing people from different roles and responsibilities while enabling anonymity. Flood management is a sensitive topic, especially when critique is involved. Moreover, legal proceedings were ongoing in Germany. Thus, it was important to observe anonymity and enable a low threshold for participation. Other known advantages of online surveys include people participating from different regional locations and observing social dependencies of organizations or social coerciveness, or self-disclosure and privacy concerns (*Taddicken* 2014). Online surveying saves time and cost for the participants (*Latkovikj* and *Popovska* 2019), which is important when addressing emergency management personnel busy with emergency tasks in their daily work. The known limitation of online surveys is availability biases related to age (*Nimrod* 2014). This was checked during the analysis and it was found that elderly staff members could also participate. Another disadvantage is that the regional sample distribution and the exact identity of persons cannot be controlled (*Latkovikj* and *Popovska* 2019). However, since emergency personnel engaged in large-scale disasters also come from faraway regions, it was not considered a major problem. Still, online samples, even when controlled for duplications, will continue to have those certain limitations.

The online format was designed and tested to take around ten minutes to adjust it to the practitioners' limited time. Also, considering the ongoing COVID-19 pandemic during the survey phase, this was a suitable method for field investigations. The survey questions were informed by discussions and workshops with 74 first responders and researchers who reported their experiences from the 2021 flood operations (*Fekete* 2021). The practitioners suggested the survey questions, and they were tested by an international team of 60 pre-testers who were professionals in their field, be it from academia or practice. In addition, some survey questions were taken from a previous survey on the same topic after floods in Germany in 2013 to also enable a longitudinal comparison (*Baumgartner* et al. 2017). The anonymous survey consisted of 20 topic questions, including selection, multiple option questions, and open questions, and eleven additional questions on the respondents' background.

In Germany, the survey ran for three weeks from September 1 to 21, 2021 on the online platform soscisurvey, and in Romania, it ran from November 1 to 30, 2021. The survey was offered in four languages: English, French, German, and Romanian. More responses were retrieved from Germany (GER, N=1738) than from Romania (ROM, N=595). The varying sample size was due to several factors. Germany had seen one of the most extreme flash floods in decades. This, in connection with good personal contact with students and networks, helped to gather the sample size. There was a much lower extent regarding damage and effects in Romania; one life was lost, and two hundred needed evacuation. Yet again, personal contact with operational forces was very good. The Department for Emergency Situations in Romania's military structure facilitated this survey's distribution along a hierarchical order. In Romania, no volunteer system as in Germany exists, so it was more difficult to raise interest amongst professional organizations or reach out to volunteers.

In the data preparation phase, pretests were deselected. Interviews with missing values (less than four questions answered) were discarded: n=833 for Germany (survey response rate 67%) and n=416 for Romania (survey response rate 58%). The percentages of responses were calculated on the remaining interviews: n=1,738 for Germany, n=595 for Romania, n=2,333 in total. Statistical tests using Chi-square were conducted using R, and only results at a significance level of 0.05 were reported. Qualitative responses in the form of sentences or short statements were retrieved from open-ended questions as well. These were used in this study to descriptively verify and confirm the results.

3. Results

The results are organized as follows. First, the top problems reported by the respondents are analyzed for Germany and Romania. The resulting selection guides for further discussion of the phenomena and for a more in-depth analysis of the most relevant issues. The figures show the order of reply items according to the total number of responses per item for both countries.

3.1 Problems reported – overall

Many problems were experienced by the survey respondents, ranging from missing information to COVID-19 (*Fig. 1*).

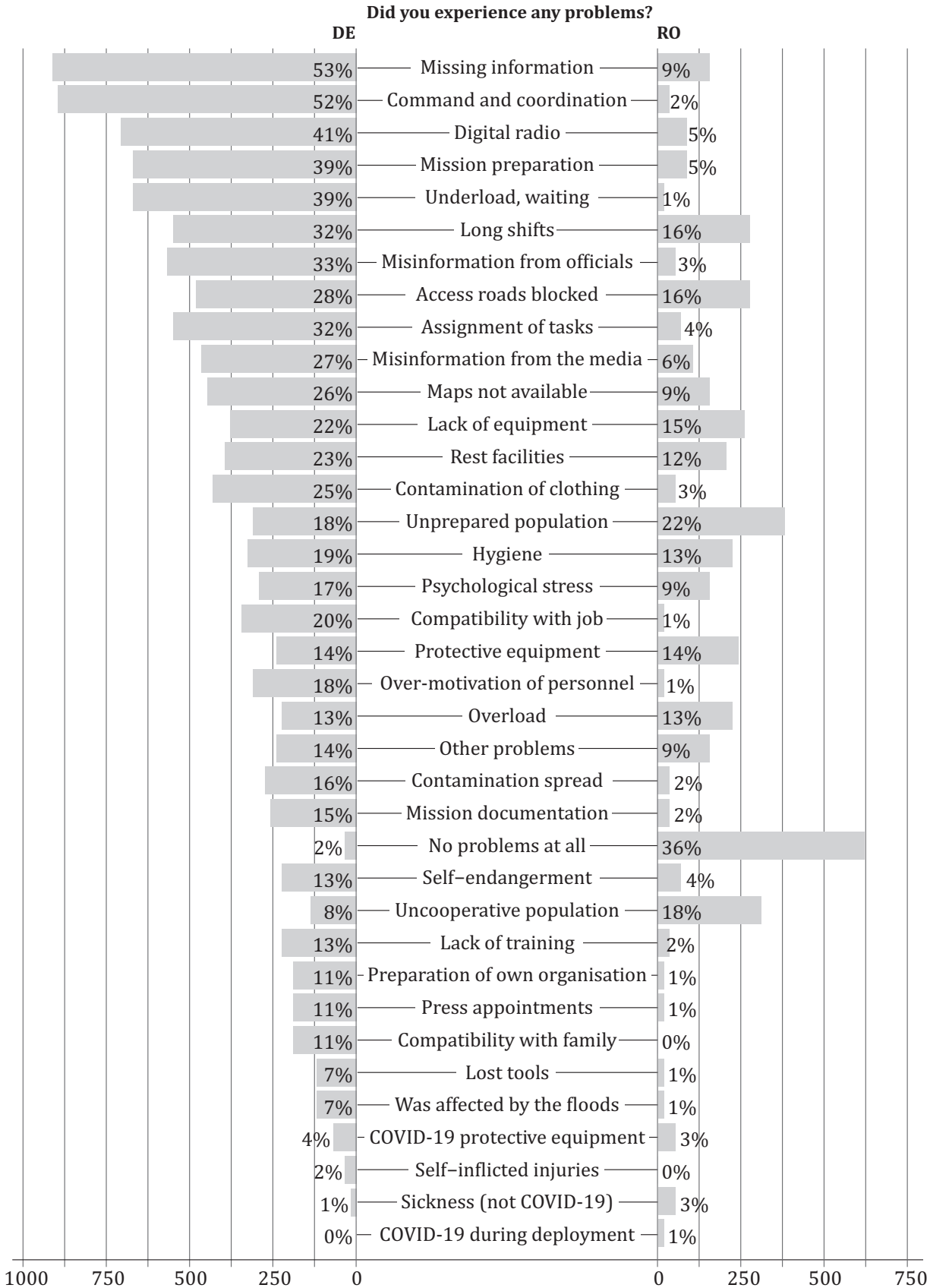

Fig. 1 Problems reported by the survey participants, multiple answers (DE n=1,738; RO n=595). Source: own elaboration

The results where problems occurred differed quite significantly between Germany and Romania. German participants listed information, coordination, digital radio, documentation and evaluation, and underload as the top five problems mentioned. The participants from Romania had different problems. While 'no problem' was the main aspect in Romania, unprepared and uncooperative communities were a major concern. Next came infrastructure in terms of access roads that were blocked. Waiting to be replaced and long shifts were also a problem in the Romanian survey responses. This point is related to the responses in Germany on underload or long breaks, in which responders had to wait for coordination.

3.2 Problems in detail: information and coordination

Shedding more light on the problems experienced in depth, areas of improvement are expressed (*Fig. 2*).

The results show that German and Romanian respondents regarded equipment as the most important factor (DE n=939, RO n=250). In the German group, it is followed by improvements in command and control (n=1020), and coordination (n=990). In the Romanian group, improvements in communication (n=118) and sharing experience (n=120) and non-specified improvements (n=120) are mentioned in second place.

Fig. 2 Areas of improvement, multiple answers (DE n=1,738; RO n=595). Source: own elaboration

More aspects can be identified to match the top five problems mentioned. For example, the Romanian group regards information about the population (N=112) as an important area for improvement. This may be related to an unprepared population.

Information and communication are generally reported in the survey responses. Additional survey questions investigated how the provision of information was perceived before the deployment had started, and during the operation (*Fig. 3*).

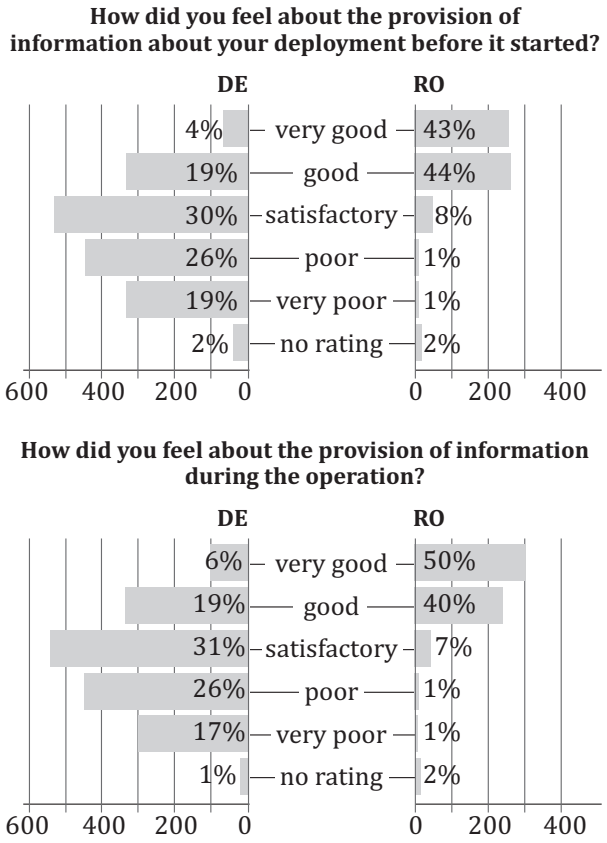

Fig. 3 *Information provision before and during the flood operation (DE n=1,738; RO n=595). Source: own elaboration*

Overall, compared to German respondents, the provision of information was better received in Romania. The picture is very similar to provision of information before and during the operation. However, information provided during the operation was slightly better in the Romanian sample.

Overall, the cooperation between the volunteers was rated quite positively overall, as can be seen from the responses to the next question (*Fig. 4*). Cooperation between volunteers was rated even better in Germany as compared to Romania.

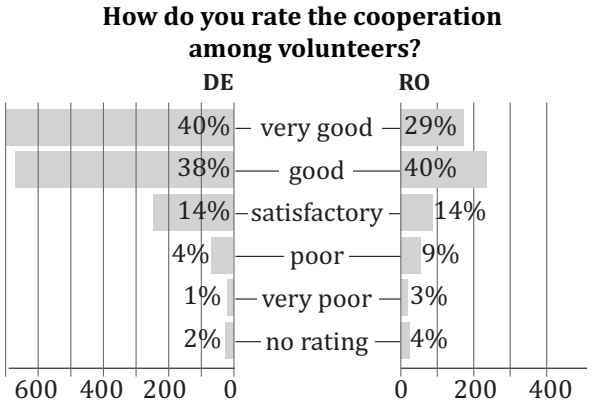

Fig. 4 *Cooperation among the volunteers (DE n=1,738; RO n=595). Source: own elaboration*

3.3 Problems: infrastructure

Infrastructure is a backbone for emergency management operations in general. Breakdowns of roads and electricity or water supply are common natural hazards. The survey results on infrastructure impacts revealed that traffic routes, communication, and radio were top problems in Germany (*Fig. 5*).

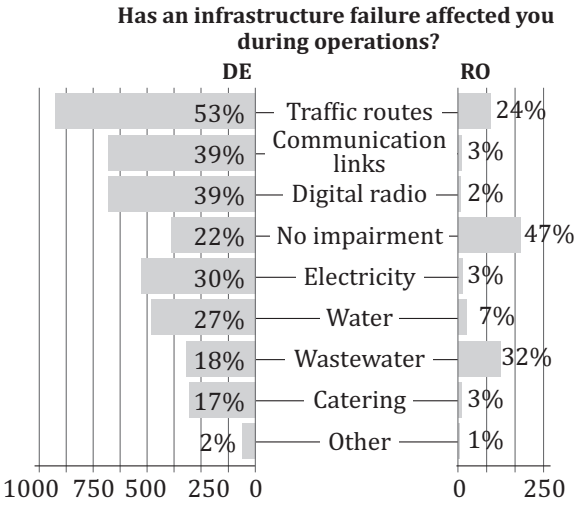

Fig. 5 *Infrastructure failure, multiple answers (DE n=1,738; RO n=595). Source: own elaboration*

Electricity, water, and wastewater are additional problems, followed by catering or providing food supplies. Apart from no problems reported in Romania by the majority respondents, traffic routes and wastewater were the most serious problems reported by other respondents.

3.4 First responders' self-perception and profiles

The survey participants were asked to rate their preparation themselves to better estimate personal impressions of satisfaction. The results show that although this is perceived as positive by most respondents, overall less positive answers were given for the German group (*Fig. 6*). The general satisfaction is much higher for the Romanian group.

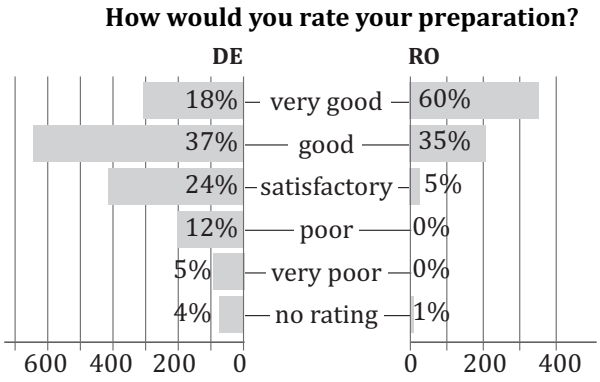

Fig. 6 Preparation (DE n=1,738; RO n=595). Source: own elaboration

The respondents were worried when called on a mission where children were involved, followed by aggressive reactions by the population (*Fig. 7*). These were the top two problems in Germany, followed by "no difference" and "the elderly". In Romania, the greatest worry is children, then "no worries", then "the elderly".

4. Discussion

The discussion part focuses on the interpretation of the results and relates them to the existing literature.

4.1 Identification of problems and improvements

Lessons learned studies about flood risk management in Germany in the past two decades repeatedly reported shortcomings in coordination and communication (*DKKV* 2003; *Petrow* et al. 2006*; DKKV* 2015*)*, also for 2021 (*DKKV* 2021). Governmental lessons learned studies in Germany had confirmed such problems (*Broemme* 2022a; b; *Ministerium des Innern des Landes Nordrhein-Westfalen* 2022; *Rheinland-Pfalz. Die Landesregierung* 2022), which is consistent with our results regarding the question of problems from the perspective of first-responders.

In Romania, the survey reported unprepared and uncooperative communities as major problems. We assume that this is due to the lack of raising awareness programs at the local level. The impoverished and unprepared population often behaves passively during disasters, which is due to an external locus of control. Such communities have high expectations of administrative support, but the trust in officials is severely damaged (*Armaș* et al. 2017).

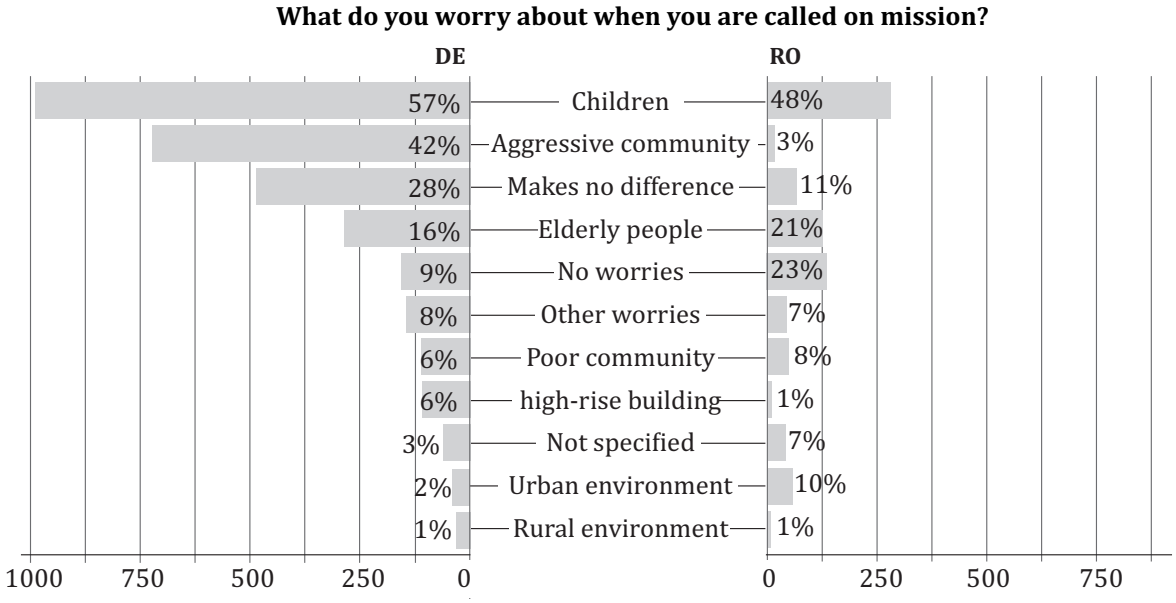

Fig. 7 Worries when called on a mission, multiple answers (DE n=1,738; RO n=595). Source: own elaboration

4.2 Information and communication

Problems with digital radio, text messaging and warning, and other organizational information and communication problems also were acknowledged in lessons learned studies in Germany after the floods of 2021 (*Broemme* 2022b; *Ministerium des Innern des Landes Nordrhein-Westfalen* 2022). Our survey results underline this finding but provide more detail in differentiating the information provided before and during the operation. The information could be improved in the preparation phase, which is somewhat more visible in the Romanian sample. The scientific literature is rich in studies supporting more general information, specifically early warning, and the Sendai Framework (*United Nations* 2015). Fewer studies warn about information overload or misinformation that can also hinder first responders' actions (*Yang* et al. 2009). A recognized problem is the top-down mass communication of preparedness measures, which does not reach everyone (*Goersch* 2014). But a communication problem is also related to bottom-up distributed responsibilities in the sense that citizens are required by law to prepare for themselves. However, there is a tension in the perception of who should be responsible; the government or the people (*Snel* et al. 2022).

4.3 Integration of volunteers and cooperation

Unfortunately, the small sample size for this question in our survey limits a thorough investigation of the role of volunteerism in Romania. In the German sample, some worked as first responders and also as volunteers. Reasons for this were identified during the group discussion preceding the survey, which showed a high level of willingness to help but also a certain frustration about waiting times.

Especially in Germany, the integration of people as volunteers is a topic already observed and analyzed with controversial perceptions about their role and integration by the established incident command structures and organizations (*Holwitt* et al. 2017; *Hälterlein* et al. 2018). Internationally, it has been long acknowledged that integrating the affected people on-site is important as they are the first in line to respond and often take the brunt of all relief and emergency efforts (*Form* and *Nosow* 1958; *Barton* 1969). Inter- and intrapersonal challenges are documented in these studies. Against this background, our study confirms that the general cooperation between volunteers and official organizations with regard to the event analyzed is overall perceived as positive. However, more research is needed for long-term structural changes and better integration.

4.4 Infrastructure failure

Infrastructure breakdowns and losses are typical patterns in disasters. However, under the focus of critical infrastructure, this thematic area has gained increased visibility in international frameworks. In the Sendai Framework (*United Nations* 2015), an explicit monitoring process includes death tolls, affected people, and damaged infrastructure. Interpretation of the results of our survey shows that in Germany, due to the magnitude of the disaster, most bridges and some highways were destroyed, as well as the broadcasting infrastructure. Traffic routes were also a problem in Romania, but as a systemic problem that was only highlighted by disaster events. Wastewater or water discharge, a typical pattern for flash floods, was mentioned in Romania. The results also show that communication and coordination problems in Germany are, at least in some parts, related to infrastructure breakdown, which technically impaired communication and coordination. However, as reported above, the problems in governance are also to be considered.

4.5 Preparedness and worries of first-responders

The studies involving first responders highlight the importance of analyzing risk perception and find a correlation with higher education leading to lower perception of problems (*Prati* et al. 2013). However, *Prati* et al. (2013) found that results between (European) countries differ significantly and argued for more research, which our study addresses. Preparedness and cooperation are also related to personal psychological aspects, and floods can impair mental health (*Masson* et al. 2019). It is therefore important to analyze the mental health, stress, and concerns of first responders and volunteers. Our survey results show that overall, the respondents have a positive perception about their preparedness, which may reflect their training and familiarity with emergencies given their roles and profiles. Despite such positive preparedness perception, there are many concerns or worries. It is interesting that children and the elderly are more prevalent in the Romanian sample, but

that an aggressive community is something the German respondents express much more. This could be explained by politically motivated groups trying to persuade people to join their protest or skepticism against COVID-19 preparations or related government measures. Hindrance concerning this background, and in rare cases, also criminal acts were reported in Germany (*BR* 2021). But people dissatisfied with a perceived lack of help by official organizations could also be a reason (*Fekete* and *Sandholz* 2021).

5. Conclusion

This study analyzed survey results from 2021 on preparedness, coordination, and lived experience of first responders in Germany and compared it with findings of the same survey in Romania. In Romania, the main problems listed by the survey respondents were related to an unprepared or uncooperative population/community and that access roads were blocked. In Germany, it was lack of information, problems of command, and coordination in the field and digital radio. The differences seem to be related to different magnitudes and, therefore impacts, but also to structural problems in Germany, which warrant further investigations and monitoring.

Further relations that still need to be tested are differences in attitude towards rescuers according to residents' coping type and preparedness education. Moreover, the relationship between vulnerable groups concerning their trust in authorities and their behavior toward rescuers must be further analyzed. Differences in the capacities of rescue organizations need to be analyzed in comparison to different regions and countries. The data itself does not allow us to deduce whether such a result found in our study would be consistent across multiple events. Follow-up studies with the same questions need to be conducted, and more international comparisons and analyses of first responders and volunteers and longitudinal studies are necessary. The studies themselves will not improve flood risk management structures. But authorities also need documented evidence of persisting structural and non-structural problems to justify actions and continuation or transformation.

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