Special Issue Future of Smart Cities

FUORI LUOGO

Rivista di Sociologia
del Territorio, Turismo, Tecnologia

Guest Editors
Monica Bernardi
Luca Bottini

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Sommario

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Rocco Scolozzi[1]

"If it happens again I'm leaving": suggestions for risk communication from a field study of communities in Basilicata, Italy[2]

1. Introduction

The processes of depopulation, with their causes, consequences, and transformations, roughly follow similar patterns (Rao, 2012). Communities develop, expand and maintain themselves through successive transformations or decline on the basis of mainly endogenous processes (Forrester, 1982). In many cases, a disastrous natural event, often accelerated by poor maintenance or overexploitation of ecosystems or local resources, can contribute to the abandonment of a territory, more rarely the single event, however dramatic, alone determines the decline of a community. "Where the population is strong, it is able to resist even disaster, trying, as far as possible, to remain stubbornly settled in its places of origin" (translation from Scamardi, 2020, p. 30).

A community is resilient when it proves capable of handling and adapting to a shock, such as an adverse natural events (e.g. earthquake, landslide, debris flow), particularly to the extent that its members are interconnected and work together to be able to

- sustain critical systems (health, communications, accessibility, economic activities) even under stress;
- increase self-sufficiency in the case of limited or temporarily interrupted external resources;
- learn from experience to improve resilience as a community, speeding up recovery, adapting to environmental, social and economic changes, without losing community identity[3].

Such capacities at the community level are sustained over time by a number of variables, such as: widespread perception of risks, reciprocity and trust between citizens and between citizens and institutions, available resources (human and material), and the collective preparation and application of effective behaviour. Other examples of social variables identified as important for the resilience of social-ecological systems include: vision, leadership and trust (Folke, 2003); the ability to monitor and respond to environmental feedback (Folke, 2003); development of social networks (Folke, 2003; Lebel et al, 2006); sharing of various sources of information and knowledge through these networks (Berkes & Turner, 2006; Folke, 2003); governance, which includes participation, representation, deliberation, accountability, empowerment, social justice (Lebel et al., 2006) and, finally, the existence of collaborative and social learning "arenas" (Pahl-Wostl et al., 2013; Reed et al., 2010). Community resilience can be considered an ecological, technical and social, local and political process (understood as the concertation of operational frameworks and visions).

According to Cyrulnik, cultivating resilience implies helping individuals to recognise and develop their skills and resources to deal with a traumatic event, as well as influencing the local culture. This can be pursued by involving the family, community, and health, educational, political and economic systems, in a positive reorganisation that values differences in all their forms, and which are indispensable for the overall improvement of society (Cyrulnik & Malaguti, 2005). Accordingly, it becomes imperative to systematically examine the vulnerabilities of individuals, communities, and the socio-economic systems they are integrated into, alongside assessing the resilience of technological systems.
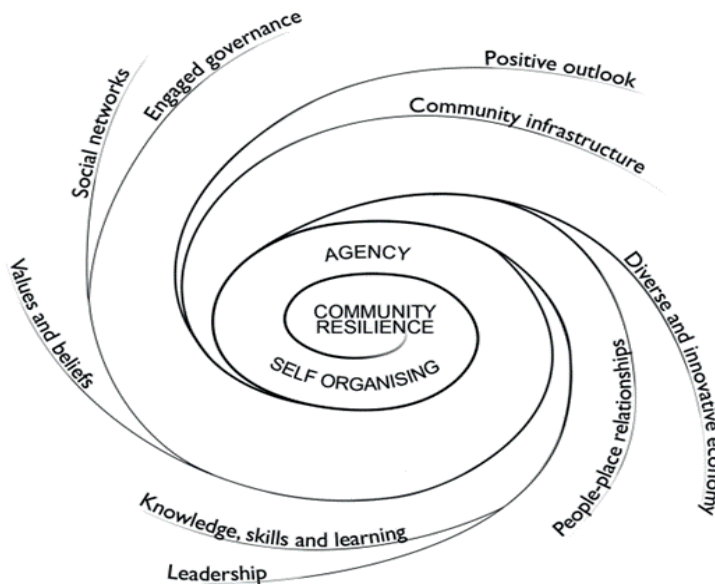
Figure 1 Community resilience as an interaction of individuals, community and administrative processes (from Berkes & Ross, 2013).

1.1. Risk communication as dialogic process

Risk communication plays a crucial role in shock preparation, i.e. before the event. On the other hand, we live in a "risk society" (an original term *Risikogesellschaft* proposed by the sociologist Ulrich Beck[4]) where access to information is considered a right of citizenship and where the ability to deal with threats to which we are exposed may depend on the cooperation of the community. From this emerges the importance of trust between citizens and institutions: without trust, any risk communication loses effectiveness, with potentially negative effects on the security of that community.

Given the importance of risk communication entire fields of applied research have emerged recently such as "risk communication" and "risk analysis", which have matured since the 1980s and in which certain principles have been defined and consolidated that should be part of the cultural heritage of public administration. These recent developments offer alternatives the "deficit model" of risk communication, widespread since the 1970s, in which it is assumed that controversies about risks (e.g. on the actual hazard, on technical analyses) are attributable to the "cultural deficit" of the public, which, supposed ignorant of science, is incapable of protecting itself from dangers or of correctly understanding risks. According to this model, an appropriate provision of information (or effective education) would be sufficient to change behaviour and choices. In this paradigm, experts are the bearers of objective and unquestionable knowledge, because this knowledge is quantified with mathematical approaches, while the public is a passive and homogeneous recipient subject (Sturloni, 2018).

The sociocultural theory of risk (or *Cultural Theory*), proposed by anthropologist Mary Douglas (Douglas, 1992), replaced the deficit model, proposing to overcome the rigid determinism of technical and engineering approaches by considering the importance of culture (or rather cultures) in understanding how communities shape social responses to hazards. In this model, risk acceptance and risk decisions depend on a process of social negotiation, codified and shared through local culture (Steg & Sievers, 2000).

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4   Wimmer, J., & Quandt, T. (2007). Living in the risk society-An interview with Ulrich Beck. *Journalism Studies,* 7(2), 336-347. https://doi.org/10.1080/14616700600645461.

More recently, the social *amplification* theory *(social amplification of risk framework* or SARF) has been proposed. This is an interdisciplinary approach that aims to understand and explain in greater depth the reasons why certain types of risky events, although evaluated by experts as unimportant or extremely geographically circumscribed, become extremely meaningful for society, while other types of events, evaluated as serious by the same experts, attract not only little concern but also little attention from the media and the public (Kasperson et al., 1988).

The term "risk communication" implies a dialogic relationship between active and interdependent actors and differs from the simple distribution of information. Only a dialogue, continuous over time, can *"contribute to the building of that relationship of trust and collaboration between citizens, experts and institutions that is considered indispensable for a shared management of risks of natural or anthropic origin. Specifically, risk communication has the primary task of facilitating the sharing of information necessary to favour conscious choices to protect individual and collective safety"* (Sturloni, 2018, p. 56). In the context of hydrogeological risk, communication has been recognised as having the capacity to raise awareness, affect behaviour and ultimately improve the responsiveness of communities to reduce damage and save lives (Charriere et al., 2012).

Effective communication is based on two factors: the functionality of the message and the quality of the relationship between the interlocutors. Information alone, understood as the distribution of information to abstract recipients, risks losing the necessary relationship with the recipient, and thus risks being ignored. In this paradigm, the public, the recipient of risk communication, is recognised as an active player and as a possible *partner* in risk management.

In peacetime, public participation in risk management is necessary for its effectiveness, especially where decisions have to be made in situations of uncertainty and where technical knowledge is insufficient to indicate an unambiguous solution. The impossibility of acquiring perfect knowledge and total control of risks and the resulting uncertainty "places democracy at the heart of decision-making" (Ungaro, 2004, p. 105).

In an emergency, public trust in institutions is essential; people are at their best when they can face a difficult situation together. However, the situation becomes more complicated if they begin to perceive that they are being manipulated or deceived, and if they feel that things are not being told to them as they are. This is precisely the situation in which attitudes of panic or denial are most likely to arise, leading people to ignore any instruction or develop paranoid assumptions (World Health Organization, 2013).

From the above, it emerges that planning risk communication processes and prioritising interventions effectively are crucial, including:
· knowing the profile of the recipients to whom the communication is addressed
· defining the objectives to be achieved
· choosing the most appropriate messages
· identifying the most suitable communication channels to reach the target audience.

Regard the profile of recipients, this study explored some representative communities of small municipalities in the inland areas of Basilicata (and southern Italy in general), characterised by a much higher rating on the old-age index than the national population, and affected by landslides and earthquakes, lack of services, mobility difficulties and depopulation phenomena. With regard to objectives and channels, it is crucial to distinguish between strategies and the timing of the expected effects to avoid creating unrealistic expectations or for commitment to fall away time. In particular, we distinguish three categories of objectives (or situations) with different corresponding strategies:
· prevention: motivating people exposed to a known risk to change their behaviour, here it is relevant to offer available alternatives;
· emergency: making people aware of an imminent risk in order to encourage responsible self-protection behaviour to safeguard their own safety and that of their loved ones, here training in appropriate reactions is crucial;
· dispute management (pre- and post-event): facilitating discussions between the parties on

the nature of the hazard, damage management, and anticipatory risk governance, where it is essential to replace the decide-announce-defend (DAD) model with a share-open-negotiate (SON) model.

These elements constituted the theoretical context for the applied research questions, defined around the objective of providing operational indications (rather than sociological and theoretical knowledge) for risk communication in support of community resilience, such as: identifying how the members of the fragile communities studied perceive and are informed about natural hazards, the levels of reciprocity and trust in institutions, and the relevant differences between communities in terms of knowledge, trust, exposure and preparedness.

2. Methodology

Based on these premises, a questionnaire including 16 questions (see Appendix) was designed, tested and applied in a survey to collect qualitative information on different variables and to compare different social groups. In this regard, the gender, age group, educational qualification and municipality of residence were asked. In addition, the respondents were asked to describe themselves (question Q1) through one of the following five occupation categories:
· Administrator or civil servant
· Professional with local business activities
· Member of local association or group
· Student or teacher
· Citizen (not falling under the above cases)

The purpose of this description was not obtain an exact sociological classification but an exploratory attempt to ascertain whether groups that relate in necessarily different ways to natural hazards show indications of different knowledge, perceptions and attitudes. Any differences can be translated into "customised" indications suitable for each type of interlocutor. Questions Q2 and Q3 were used to check for differences in the number of people in the settlements during the day, distinguishing weekdays from public holidays and six time slots (00-06:00, 06:00-08:00, 08:00-12:00, 12:00-16:00, 16:00-20:00, 20:00-00:00). These differences may be important for estimating the number of people exposed at different times (Lutoff et al., 2016).

Questions Q4 and Q5 aim to obtain information on commuting, related travel times and means of transport used, and on motivations and travel times for other trips. Motivations and travel times constitute crucial information for the design or management of the local road network in the case of emergencies, but also for warning systems (Ryan, 2018).

Questions Q6 to Q10 concern knowledge and perceptions of risks and their consequences. In particular, these questions aim to assess possible differences in the perceived importance of an event, the estimated probability of its occurrence, the imagined impact on the local economy and the possible contribution to emigration. taking inspiration from a previous study (Wagner, 2007).

This information is relevant for imagining evolutionary scenarios of the community based on the risks as currently perceived and the "demand" or perceived need for local interventions aimed at reducing these risks that could mitigate demographic decline (Franceschinis et al., 2021).

Question Q11 investigates opinions on actions considered effective in improving community preparedness for disaster events. Similarly, questions Q12 and Q13 investigate preparedness (knowledge and actions) but at an individual level. The purpose of question Q14 is to distinguish between citizens with and without rescue experience and to be able to check for differences in how they respond to the other questions.

Questions Q15 and Q16 are derived from a previous study (LIFE FRANCA project[5]) and concern

5   https://www.lifefranca.eu/it/.

social ties within communities and individual trust in institutions. For Q15, values around 4 means that the community is made up of people who are likely to be alone or without support in the event of a disaster, the opposite of a cohesive community and therefore not very resilient. For Q16, values around 4 mean that the respondent does not fully trust the mayor (representative of public institutions) with possible different interpretations of the situation; in the event of a disaster, this could be an impediment to coordinated and effective management of the emergency.

2.1. The study area: the selected municipalities

The study area comprises four small municipalities in the province of Potenza (Albano di Lucania, Campomaggiore, Castelmezzano, Pietrapertosa), which have similar population size. Their characteristics are summarised in Table 1.

Table 1 Main demographic indicators of the four communities and at national level (source ISTAT)

Indicator (data as at 01.01.2021)	Albano di L.	Campomaggiore	Castelmezzano	Pietrapertosa	Italy	Basilicata
Average age (years)	46.4	49	51.3	50.1	45.9	46.5
Mortality index	11.7	13	14.6	14.8	12.5	12.2
Replacement index	167.9	152.4	225	191.7	138.1	146.5
Women in %	48.8%	50.9%	51.3 %	52.4 %	51.3 %	50.8
Population	1369	746	744	945	59,236,213	545,120

It is interesting that all four municipalities have a higher average age and a greater replacement index (ratio between the number of 60-64 year old people and 15-19 year old ones) compared to the Italian average. Increasingly older communities with fewer young people could face a number of problems in the coming years regarding the management of natural disasters, perhaps not yet visible today.

2.2.   Sampling and the sample

Sampling followed the so-called 'opportunity approach', inviting mayors, some local associations and residents involved in other MITIGO project activities to disseminate the questionnaire to their fellow citizens, seeking maximum heterogeneity. As they are small communities, this collaboration made it possible to collect a fairly diverse sample with overall statistical significance. The sum of the number of inhabitants in the four municipalities at the age considered relevant for the questionnaire (i.e. excluding people under 14 or over 75) is 2866. Therefore, according to Slovins' formula, the sample (167 questionnaires) allows a statistical margin of error in terms of a confidence interval of 7%. This is equivalent to saying that if 47% of respondents in the sample answered "yes" o a certain question, the percentage of people who would answer "yes" in a survey of the entire population would be between 40% and 54%. This approximation is considered acceptable, considering the qualitative nature of the questions and the processes (social and individual) that are being explored.
In addition to descriptive statistics, the assessment of any statistical differences between the groups was carried out using the χ^2 Test for contingency tables or non-parametric ANOVA (with tests such as Kruskall-Wallis).

3. Results

3.1. People at home on weekdays and holidays (Q2, Q3)

As is expected, given commuting patterns, the questionnaires show a substantial difference between holidays and weekdays in the number of people at home. In the morning (time 08:00-12:00) the difference exceeds 100%, in the afternoon it is limited to around 50%.

It is interesting to note the statistically significant difference (ANOVA, $p<0.001$) between the municipalities for public holidays and for almost all times. This information concerns the dynamics of the exposure of the local population and could help to calibrate and differentiate communications in the event of a disaster or alert, considering the time, whether a working day or holiday, and the specific community.
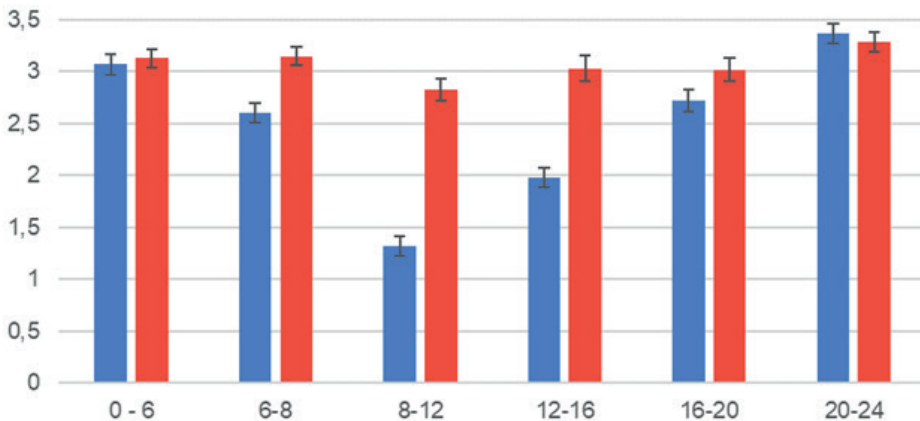
Figure 2 Number of people generally at home at different times, on holidays (red) and working days (blue).

3.2. Commuting characteristics (Q4 and Q5)

Most residents appear to commute (54%) by private cars (60% of respondents). Most of their commuting trips take less than 60 minutes and are for work or study reasons, followed by other reasons such as shopping, health services and leisure.

The commuting rate varies significantly between categories of occupation and between municipalities (ANOVA, with $p < .001$), while occupation category (Q1) and age significantly differentiate between public and private transport use.

3.3. Perception of risks (Q6, Q7)

All the respondents consider natural hazards to be a real danger for their locality, almost all agree that these could jeopardise their activities and that the frequency of disaster events will increase in the coming years. About two thirds of the sample believe that structural interventions can reduce these risks and at the same time they believe that the population in general has few tools and little awareness to deal with them.

Most of the people interviewed consider it certain or at least probable that an earthquake, landslide, fire or interruption of utilities will occur in the next 10 years; but it is interesting that 20% do not consider the occurrence of an earthquake to be probable, despite the fact that all four municipalities fall within seismic zone type 2 (medium-high risk). A singular aspect is that the expected probability of an earthquake varies significantly between municipalities (considered

less likely by residents of Pietrapertosa than those of Albano). On the other hand, more than 20% of respondents do not consider the risk of wildfires to be important, despite the fact that in every municipality there are areas at high risk and affected by wildfires in the last 15 years.
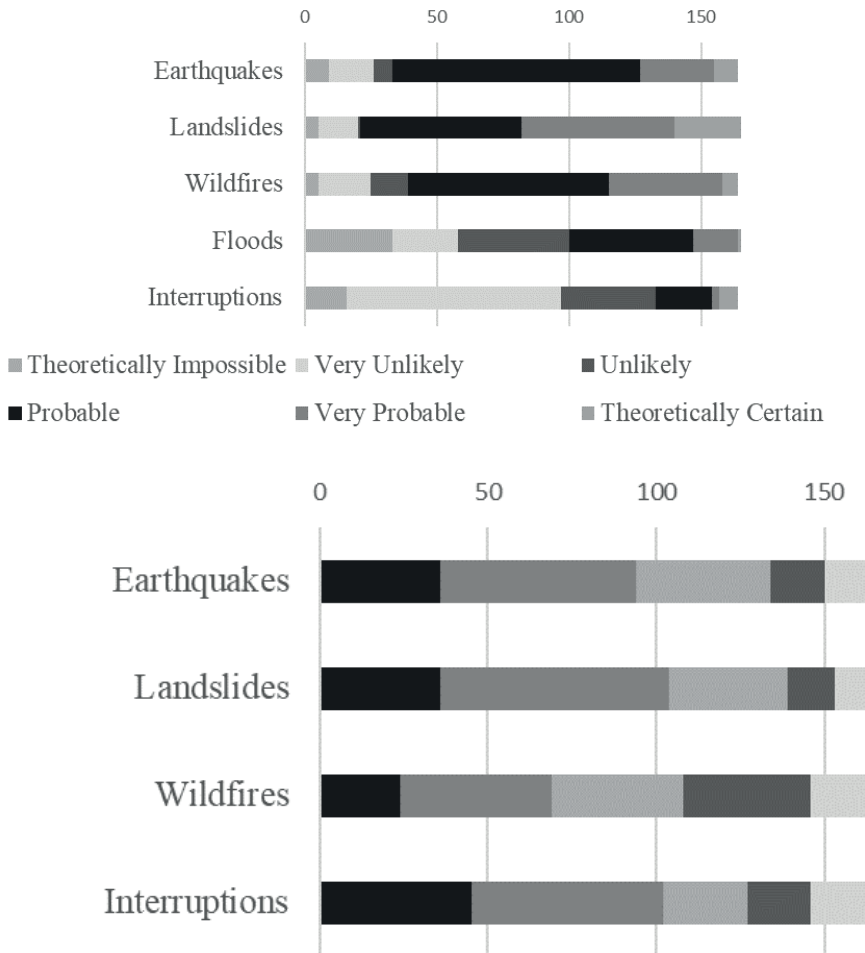
Figure 3 Probability estimates of disaster events and related perceived relevance as a reason for leaving the locality/emigrating, moving home and relocating/leaving a business..

In comparing the groups, it is interesting to note the different responses from those who are rescue volunteers (or have had rescue experience) and those who say they have no experience, to the statement "the population generally has few tools and little awareness for dealing with natural hazards" (Q6.5): it is more common for those who provide rescue or have had rescue experience to consider the population to be less prepared than other groups.

3.4. Expected consequences on the community of disaster events (Q8, Q9, Q10)

According to the sample, events such as earthquakes, landslides and disruptions of utilities could have an impact on the community in terms of less willingness to stay and live and work in the locality. In the event of a disaster, the immediate consequences would mainly concern the disruption to the road network and services, with damage to businesses and property. Of the

various consequences of a disaster event in the long term, the contribution to emigration seems the most feared.

3.5. Disaster preparedness (Q11, Q12, Q13, Q14)

Regarding which actions could improve the community's response and preparedness for disaster events (among those listed) no important differences emerge; among the most selected are mapping risks, and carrying out new works, while the least selected are training for public administrators and technicians and for companies and professionals.

Concerning self-preparedness in the event of an earthquake, interestingly almost 20% of respondents would not know what to do, while 26% feel confident in their abilities because they keep themselves informed.
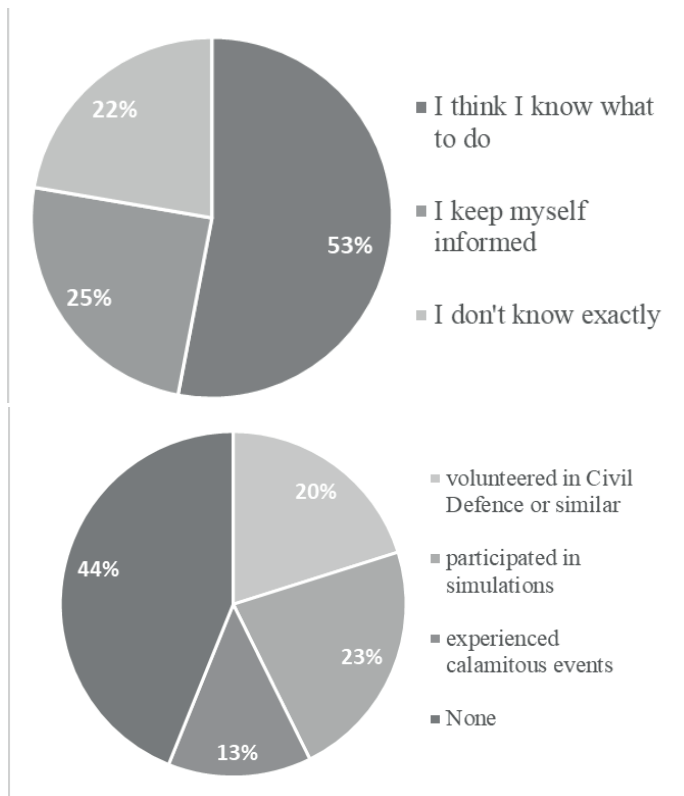
Figure 4 Distribution of answers to the questions "Would you know what to do personally during an earthquake?"(left), and "Do you have any experience of events, rescue or simulations?" (right).

At the community level, more than 40% of the respondents have no experience of disaster or rescue events, at the same time one fifth of them are or have been rescue volunteers or have participated in simulations. In this respect, an interesting gender difference emerges: women are more frequently rescue volunteers than men.

3.6. Ease of shelter and readiness for evacuation (Q15, Q16)

If evacuation to escape danger was necessary tonight, only 30% of respondents would have no difficulty in finding temporary accommodation (e.g. from relatives, neighbours, etc.), while 40% would have considerable difficulties.

If the mayor gave a warning to evacuate the locality, 36% would be willing to leave their homes immediately, while just over a third would only do so after assessing the situation for themselves.
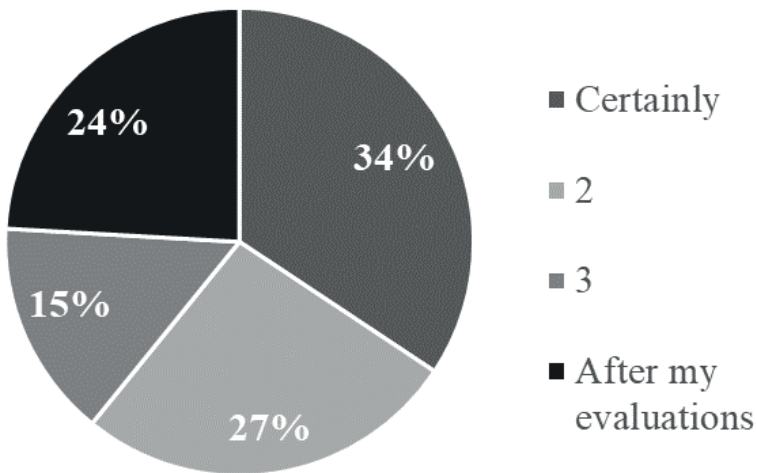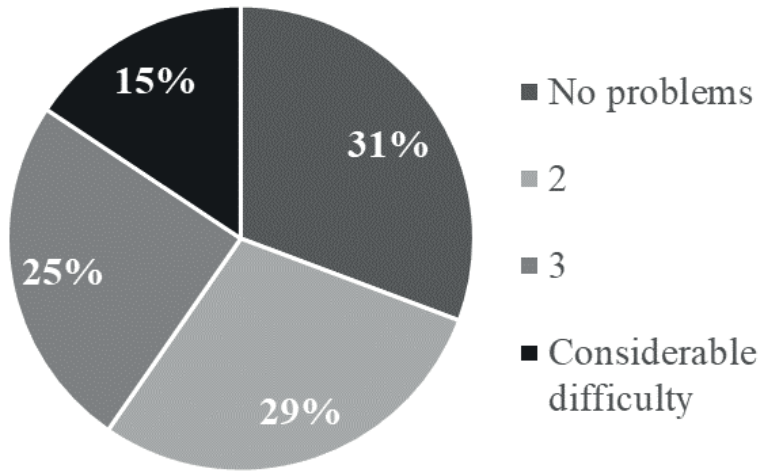
Figure 5 Possible difficulty in finding shelter (left) and readiness to evacuate in an emergency (right).

In the answers on willingness to evacuate, a significant difference emerges between the four municipalities, in particular, in Castelmezzano, citizens seem significantly more likely to follow the mayor's instructions than in Campomaggiore.

Table 2 Statistical analysis of response differences between the groups by municipality, age group, gender, literacy, occupation category, rescue experience; only significant ones are reported (P < 0.05 or < 0.001 if marked with *).

	Municipality	Age group	Gender	Literacy	Occupation Category (Q1)	Rescue Experience (Q14)

Q2	Q2.1, Q2.2, Q2.4, Q2.5, Q2.6					
Q3	Q3.1, Q3.2*, Q3.3, Q3.4, Q3.5, Q3.6					
Q4	Q4a*, Q4c	Q4c*			Q4a*, Q4c*	
Q5	Q5.1	Q5.3, Q5.4	Q5.3	Q5.2	Q5.4	
Q6						Q6.5*
Q7	Q7.1*, Q7.4*			Q7.5		
Q8	Q8.1*,Q8.3*			Q8.3		
Q9	Q9.1, Q9.2, Q94, Q9.5		Q9.3			
Q10						
Q11				Q11.5		
Q12				0.016		
Q13	Q13.1,Q13.2, Q13.4					
Q14	0.034		<0.001	0.025		
Q15						
Q16	0.021	0.019		0.036		
Q17	<0.001					0.059

4. Discussion: suggestions for risk communication from literature field study

Floods, earthquakes, and landslides, or more simply migrating to more convenient locations with easy access to services, activities and work, are the common reasons given for the sudden or gradual depopulation of many inland towns in Southern Italy; however beyond any single event, the endogenous processes and the characteristics of the community are what make it possible to withstand shocks and recover, perhaps evolving and learning from the experience.

From the literature review and the research we collected information of general interest and some practical implications, especially useful for setting up risk communication projects in the areas studied of Basilicata and in general in the inland areas of southern Italy and the Italian Apennines. Furthermore, the areas of Basilicata explored in this study could be a laboratory for the anticipation of what could happen in other "fragile commiunities", characterised by the disappearance of social cohesion and ageing populations, sometimes aggravated by the instability of ecosystems (e.g. due to increased drought or extreme weather events).

The overall long-term aim of any risk communication is to increase and sustain over time of community resilience, understood as the competence of the community to operate in critical systems (e.g. water, mobility, facilities) even under stress, increase its self-sufficiency, learn from experience to adapt to environmental and social change, and accelerate recovery times. These competencies depend on risk perception, reciprocity between citizens and trust in institutions, as well as on available resources (human and technological) and the collective preparation and application of effective behaviours. These can be only developed iteratively, by successive approximations through experiences or simulations, over a long period of time.

Therefore, each risk communication programme should be directed at one specific area of risk management at a time, such as *prevention, emergency,* or *recovery management*, in order to focus the available resources and attention on specific aspects and to facilitate understanding of the message. In addition to a specific scope, each communication project should make explicit the expected change, whether *cognitive*, *behavioural*, or *values,* in the target audience (e.g. young or elderly people, private or public organisations).

In practice, the risk communication team should ask themselves what they want the recipient to know, do or value as important (or unacceptable) regarding specific aspects of risk. On the basis of thin information, it will be easier to define realistic indicators of success and expectations based on the time required for each type of change. On the other hand, the expected change should refer to the status quo of the specific community (not of a general, geographically vague "public"). Therefore, it is essential to collect data regarding the current or most widespread

knowledge, behaviour and values in the community of interest.

Concerning targets, communication methods should be inspired by a dialogue between specific actors, considering their capability to cope with or react to an event, and communities, considering their dynamics, in terms of commuting rates and means of travel. This dialogue should consist of a two-way exchange of information, building relationship based on trust. Information alone, understood as the distribution of information to abstract recipients, risks losing the necessary relationship with the recipient, and thus runs the risk of being ignored; without dialogue (or feedback), it is not even possible to assess the effectiveness of a communication (e.g. assess what has reached the recipients, or what changes it has promoted in their behaviour).

Recognising risk communication as dialogue means trying to understand the target audience (their knowledge, values and interests) and the relationships between the different social actors involved in risk management (between synergies or collaborations and possible conflicts). This dialogue should promote an anticipatory approach oriented to *strategic conversations* (Arnkill, 2019; Ratcliffe, 2002) between the different actors, in multi-centred contexts, not only exchanging information but also producing new knowledge about risk (no longer the monopoly of experts and technical institutions). In other words, it is a matter of conceiving risk communication in terms of sharing, exchange, confrontation and participation.

In this regard, it may be useful to consider some of the principles for building resilience of socio-ecological systems in risk management and communication (Boyd et al., 2015; Gallopín, 2006; Lebel et al., 2006). Strategies to increase the diversity and redundancy of resources and foster a polycentric approach to the management of local systems and connectivity could limit the negative and long-term consequences of natural disasters. Municipal contingency plans could be inspired by these principles (in part they already are) in a more systematic way and in synergy with public transport and road network management plans, which, being defined by different actors and in different locations, today hardly align with each other and with the locality.

The questionnaire tested in this study proved to be a useful source of information regarding these elements, obviously not exhaustive and limited in the level of complexity explored.

With regard to the profile of the recipients, this study explored a number of communities representative of the inland areas of Basilicata (and of southern Italy in general), characterised by an old-age index that is much higher than the national one, by landslides and earthquakes, lack of services, mobility difficulties and depopulation phenomena. From the questionnaire, whose sample approximately represents the four communities investigated (confidence interval of ±7%), some specific points emerged regarding the above-mentioned issues.

The segmentation of target audiences and tailoring communication for different social groups (students, professionals, administrators, citizens, members of local associations) is useful to calibrate the communication project or the intervention with respect to the needs, expectations and capacities of each group. Targeting communication to specific groups can allow resources and strategies to be focused more effectively and efficiently, avoiding unproductive dispersion and over-exposure to generic information (which may have the opposite effect to that desired, such as saturation or disinterest). For example, one group may particularly benefit from better information on the location of risk areas (e.g. digital maps on smartphones), while another may be more interested in more information on mitigating impacts on their activities (e.g. things to do before, during and after an event), at different levels (e.g. individual, neighbourhood, municipality level).

Risk communication in the context of emergencies (alert) should take into account the daily dynamics in the number of inhabitants actually at home: the number of people present at home can vary considerably between working days and holidays (a difference of more than 100% in the morning and about 50% in the afternoon has been noted), and these differences can vary among municipalities. The fact that on working days, more than half of population commutes or leaves their municipality on a regular basis indicates that it might also be relevant to set up communication channels. For example, instant messages on mobile phones could be directed to

people at home and in offices, alerts on commercial radios could better reach commuters driving their cars or bus drivers. These information channels could help calibrate and differentiate risk communications depending on the time of day, working day or holiday, and specific community.

Perceptions of risk may differ from reality; for example in subjective probability estimates, one fifth of respondents consider the possibility of wildfires or earthquakes to range from unlikely to theoretically impossible, despite the fact that their territories are medium-high risk areas for earthquakes and high risk areas for wildfires. This points to a gap that needs to be filled and monitored and suggests developing specific information campaigns based on updated risk maps and tools to verify any gaps between perception and reality and their possible changes over time. With regard to self-preparation in the event of a disaster, it is interesting that almost 20% of respondents would not know what to do in the event of an earthquake, while only 26% keep themselves informed. This highlights the importance of information and training on the effective practices in an emergency. The latter can only be achieved through frequent repetition, bearing in mind that in the event of a disaster, especially if associated with strong emotions, the activation of suitable reactions is only possible if the correct reactions are learnt to the point of being 'automatic'.

In this regard, the positive impact of volunteer rescue work in the community may be very relevant (20% of the respondents were interested); among people with rescue experience the sense of self-efficacy and the demand for training increases. This suggests that one leverage point for increasing effectiveness in risk communication is to continuously invest in local associations and facilitate their active participation in defining communication programmes and projects, valuing their contribution and creating opportunities and a 'sense of usefulness' (a key motivation in associations). With regard to voluntary work, the greater participation of women was noted; this merits further research and systematic support for local volunteering associations.

Again with regard to self-preparedness, it is relevant to note that 40% would have considerable difficulties in finding temporary accommodation in the event of an emergency. This difficulty can be associated with age (significant differences were shown in related responses). A high percentage of elderly people combined with a high percentage of lonely people substantially decreases the resilience of a community: as the average age and loneliness increase in a community, individual resources, including both physical and cognitive abilities, and social resources inevitably decrease. These weaknesses can be compensated by nurturing neighbourhood relations and by tailoring services or resources co-created by the same community. This suggests that the design of risk communication and management should also include the definition and maintenance of spaces and relationships to cultivate reciprocity at the community level. Focus groups, for example, in the form of anticipatory dialogues, developed in the field of social services (Arnkil, 2019), could be effective in this regard.

Regarding to people's trust in institutions, only 36% would be willing to leave their homes immediately in the event of a mayor's order to evacuate the area. This is equivalent to imagining that in the event of a fire, less than 4 out of 10 fire extinguishers would work immediately, and highlights the importance of the social dimension in risk management, in particular the relationship between citizens and the municipal administration. Obviously, there are many aspects concerning this relationship that are not addressed within the question on the readiness to evacuate; at the very least, the questionnaire's data suggests that this issue should be explored in greater depth in subsequent surveys. For this purpose, focus groups made up of different social groups, including administrators, could offer useful elements.

Due to the rapidity of technological, social and environmental changes "risk assessments are always limited by the questions one can think of to ask" (Martineau 2003, p. 92). The questionnaire made it possible not only to find some answers to predefined research questions but also to ask new ones. Assuming that a "good question is a half-answer", we report some of these questions with the aim of focusing new directions for action-research:

· ageing theme: how can risk management and risk communication methods be adapted to

be effective in increasingly ageing communities? In particular, what changes in needs, values, behaviour and agency should be considered?

· community identity and technological innovations: how can a synergy between the human aspects (human capital, social capital) of community resilience and technological or structural innovations (e.g. new mobility, new media, new infrastructures) be sustained over time, avoiding creating "accidental adversaries" by adopting technologies e.g. with unequal accessibility?

· multiple generations: how can participation workshops promote social cohesion between generations with a view to collaborative and anticipatory civil protection?

· knowledge and perception: what are the most relevant gaps between perceived and current (known) risks in each community and how can they be bridged?

Answers to these largely unexplored questions could provide useful references to further improve and define inclusive and anticipatory risk management strategies, supporting community resilience over time.

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Table 1. Questionnaire questions and possible answers.

Q1. Which category do you most belong to or recognise yourself in?	Q1.1 Administrator or public official Q1.2 Professional with local business activities Q1.3 Member of local association or group Q1.4 Student or teacher Q1.5 Citizen
Q2. On a normal working day: how many people are present in the flat at the following time slot? (Options: from 0 to 7 or more)	Q2.1 00:00 - 6:00 Q2.2 6:00 - 8:00 Q2.3 8:00 - 12:00 Q2.4 12:00 - 16:00 Q2.5 16:00 - 20:00 Q2.6 20:00 - 24:00
Q3. On a holiday day: how many people are present in the flat at the following times? (as above)	As above Q3.1-2-3-4-5-6
Q4a. During the day, where do you spend most of your day? (2 options)	Q4a.1 At home, or in the village Q4a.1 Outside the municipality of residence (e.g. commuting for study or work)
Q4b. In case you are commuting, how long are you generally travelling (adding round trip)?	Q4b.1<30 minutes Q4b.2 30 to 60 minutes Q4b.3 60 to 90 minutes Q4b.4 90 to 120 minutes Q4b.5 over 120 minutes
Q4c In the case of commuting, it moves with: (2 options)	Q4c.1 private vehicle Q4c.1 public transport
Q5. Apart from work, the most frequent trips outside their municipality of residence are for:	Q5.1 purchasing Q5.2 public services (bank, post office, ...) Q5.3 medical services (hospital, doctor, ...) Q5.4. recreation (sport, cultural event, ...)
Q5b. On average, how long are you travelling (adding round trip)?	Q5b.1 <30 minutes Q5b.2 30 to 60 minutes Q5b.3 60 to 90 minutes Q5b.4 90 to 120 minutes Q5b.5 over 120 minutes

Q6. How much do you agree with the following statements? (One answer for each statement) (5 options: from "Totally agree" to "Not at all agree", plus "I don't know")	Q6.1 Earthquakes and hydrogeological instability (e.g. landslides, debris flows) are a real risk for my territory Q6.2 Earthquakes and hydrogeological instability can put my business at risk Q6.3 Natural damaging events will become more frequent Q6.4 Risks are minimised by structural interventions (e.g. embankments, protections, reinforcements) Q6.5 The population generally has few tools and little awareness to deal with risks Q6.6 In general, earthquakes and hydrogeological instability do not pose a relevant threat to me or my business
Q7. In your opinion, what is the probability of the following events in your municipality in the next 10 years: (6 options: from "Theoretically Impossible" to "Theoretically Certain")	Q7.1 Earthquakes Q7.2 Landslides Q7.3 Forest fires Q7.4 Floods Q7.5 Road interruptions
Q8. What impact do you think they could have on the community in terms of willingness to stay and maintain residence and activities or leave: (5 options: Low importance | Some importance | quite relevant | extremely relevant | I don't know)	Q8.1 Earthquakes Q8.2 Landslides Q8.3 Forest fires Q8.4 Floods Q8.5 Road interruptions
Q9. In your opinion, considering the most recent calamitous events in your municipality, what were the main consequences in the immediate release? (5 options: Very much in agreement | Somewhat agree | Little agreement | Not at all agree | I don't know)	Q9.1 Damage to persons Q9.2 Damage to property (e.g. houses, buildings, warehouses) Q9.3 Damage to economic activities Q9.4 Temporary interruption of drinking water, electricity or other services Q9.5 Temporary traffic interruption
Q10. In your opinion, considering the most recent calamitous events in your municipality, what could be their consequences in the long term? (5 options: Very much in agreement | Somewhat agree | Little agreement | Not at all agree | I don't know)	Q10.1 Displacement of economic activities Q10.2 Interruption or displacement of public services Q10.3 Business closure (company bankruptcy) Q10.4 Psychological fears and traumas Q10.5 Contribution to emigration
Q11. In your opinion, what actions could improve community response and preparation to calamitous events (e.g. earthquakes, landslides)? (5 options: Very much in agreement | Somewhat agree | Little agreement | Not at all agree | I don't know)	Q11.1 Mapping natural hazards on the territory Q11.2 New protection or consolidation works Q11.3 Create or renew emergency plans Q11.4 Training for administrators and technicians Q11.5 Training for local companies and professionals Q11.6 Training for citizens, associations, schools
Q12. Would you know what to do personally during an earthquake?	Q12.1 I don't know exactly Q12.2 I think I know what to do, I informed myself Q12.3 Yes, I also keep myself informed through Civil Protection campaigns
Q13. Of the things you should do at home before an earthquake, what would you and your family or housemates improve on most? (only one answer)	Q13.1 Place heavy objects in low shelves and use furniture doors with a catch so that objects do not fall out during the shock Q13.2 Learning where and how to close gas, water and general electric taps Q13.3 Keep a first-aid kit, torch, battery-powered radio in the house, making sure everyone knows where they are Q13.4 Identify safe places in the home where to take shelter during the shock Q13.5 Find out if the municipality's emergency plan exists and what it provides for Q13.6 None of these
Q14. Do you have any rescue or simulation experience?	Q14.1 I am (or have been) a volunteer in Civil Defence, Red Cross or similar organisations Q14.2 I participated in simulations of catastrophic events (excluding simple evacuation tests) Q14.3 I have experienced calamitous events in which rescue personnel and means were involved Q14.4 None of these
Q15. If you had to evacuate tonight due to danger, how easily would you find temporary accommodation (e.g. with relatives, neighbours, etc.)?	*No difficulty* 1 | 2 | 3 | 4 *Considerable difficulty*
Q16. If a warning came from the mayor to evacuate the area and leave your home, would you do so immediately?	*Certainly, the mayor has the responsibility and adequate information* 1 | 2 | 3 | 4 *After making my own evaluations with my knowledge*