

ISSN 2421-4442

# S T S

ICUREZZA TERRORISMO SOCIETÀ

Security Terrorism Society

INTERNATIONAL JOURNAL - Italian Team for Security, Terroristic Issues & Managing Emergencies



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# SICUREZZA, TERRORISMO E SOCIETÀ

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INTERNATIONAL JOURNAL  
Italian Team for Security,  
Terroristic Issues & Managing Emergencies

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ISSUE 1/2019

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Milano 2019

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EDUCATT - UNIVERSITÀ CATTOLICA DEL SACRO CUORE

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SICUREZZA, TERRORISMO E SOCIETÀ  
INTERNATIONAL JOURNAL – Italian Team for Security, Terroristic Issues & Managing Emergencies

ISSUE 1 – 9/2019

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Associato all'AIE – Associazione Italiana Editori

ISSN: 2421-4442

ISSN DIGITALE: 2533-0659

ISBN: 978-88-9335-464-6

copertina: progetto grafico Studio Editoriale EDUCatt

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# Collaborative Networks for Disaster Risk Reduction: the Role of Risk Communication and Disaster Education

## Exploring the non-structural activities employed by the Italian Civil Protection in reducing seismic risks in the Abruzzo Region

ROBERTA SCASSA

### Nota Autore

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### Abstract

I disastri naturali presentano attualmente diverse e complesse sfide per la società che vanno oltre le capacità di una singola organizzazione e che quindi richiedono l'operato congiunto di più attori nel quadro della riduzione dei rischi derivati da disastri ambientali. Ricerca precedente in questo ambito sottolinea la complessità di tali problemi ed enfatizza la necessità di una collaborazione proattiva e preventiva tra diverse organizzazioni su diversi livelli di governance.

Una delle migliori soluzioni a questo drammatico problema è stata riscontrata nello sviluppo di networks di riduzione dei rischi derivati da disastri ambientali dove conoscenze, informazioni e competenze possono essere scambiate tra diversi esperti operanti in campi attinenti alla riduzione dei rischi ambientali. Con l'approvazione del Sendai Framework for Disaster Risk Reduction (SFDRR) nel 2015, la necessità di ridurre tali rischi tramite prevenzione, comunicazione del rischio ed educazione ambientale si è tramutata in una eco sempre più incalzante e risonante a livello globale. Questo articolo si propone l'obiettivo di investigare le relazioni che intercorrono fra vari attori operanti nel campo della riduzione del rischio sismico nella regione Abruzzo, in centro Italia. Tramite interviste con esperti della Protezione Civile Abruzzo e con collaboratori degli stessi, la ricerca si snoda su alcuni punti principali: meccanismi adottati dalla Protezione Civile Abruzzese durante tempi di pace per aumentare la consapevolezza della società riguardo il rischio sismico. Ricerca precedente in questo ambito si è largamente concentrata sull'analisi del grado collaborazione di determinati attori (inclusa la Protezione Civile Abruzzese), durante un'emergenza o una crisi. Al contrario questo studio si propone di analizzare le così dette attività non strutturali di prevenzione messe in atto dalla Protezione Civile Abruzzo in tempi di regolarità. La comunicazione del rischio e l'educazione ambien-

tale sono considerati fattori cruciali delle attività non strutturali volti ad aumentare la consapevolezza della società nel suo complesso riguardo i rischi sismici che potrebbero riscontrarsi in regione. Questi elementi sono anche determinanti per il successo di un progresso nel campo della riduzione dei rischi derivati dai disastri ambientali. Interessanti spunti forniti da esperti nel campo e consigli su come la comunicazione del rischio dovrebbe articolarsi nell'immediato futuro sono riportati dall'autore.

## Abstract

Natural disasters present several complex societal challenges beyond the jurisdiction and capacities of single actors. Prior research in the broader field of Disaster Risk Reduction (DRR) emphasises how the complexity of these problems requires that diverse organisations collaborate across multiple scales and levels, and adopt proactive behaviours. One of the best solutions to respond to these complexities is found in the establishment of inter-organisational networks collaboration where knowledge and information about disasters can be exchanged. Moreover, with the approval of the 2015 Sendai Framework for Disaster Risk Reduction (SF-DRR) the necessity of reducing disasters through prevention activities and knowledge sharing among multi-stakeholders collaborations has been recognized on the international level. This paper investigates inter-organisational relationships in the DRR field through the analysis of a specific network in the Abruzzo Region, in Central Italy. Drawing from semi-structured interviews with the actors involved in the Abruzzo Civil Protection network, the research allows to examine the inter-organisational collaboration and behaviours beyond emergency times. In particular, the paper focuses on examining the prevention mechanisms adopted to raise the awareness of the society about seismic risks. Studies often analyse the level of collaboration during an emergency or a crisis, trying to examine the efficiency of collaboration and coordination when responding to a disaster. Yet, studies rarely look into the relationships among actors proactively involved in DRR on the sub-national level before a disaster occurs. This paper analyses the non-structural prevention activities employed by the Abruzzo Civil Protection. The results are discussed with relevant academic literature, and show how knowledge sharing together with disaster education and risk communication are crucial ingredients for the success of risk informed and proactive multi-stakeholder collaborations in the field of DRR. Interesting insights from experts in the field are given, and recommendations for articulating future risk communication strategies are expressed by the author.

## Keywords

Disaster Risk Reduction, Prevention, Risk Communication, Environmental Education, Network Analysis.

## 1. Introduction

The term disaster can be easily misunderstood due to it is often used in an inappropriate way. It is striking that when disasters happen, the media and public opinion refer to the event as “natural disaster” thus emphasising its *naturalness* (Wisner et al., 2003). According to the UNISDR, there is no such a thing as ‘natural’ disaster since a natural hazard itself does not cause a disaster but it only becomes a disaster when measures to mitigate its impacts are lacking (UNISDR, 2014).

UNISDR describes disasters as a result of the combination of several factors: ‘the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences’ (UNISDR, 2017)<sup>1</sup>. Disasters are in fact currently conceived as determined not only by the magnitude of the losses they provoke (i.e. damages), but also by socio-political measures that are in place or are lacking in a certain geographical area. Over the past decades international frameworks such as the UN International Decade for Natural Disaster, the Yokohama Conference (1994) and the World Conference on Disaster Risk Reduction (WCDR) in 2004, the Hyogo Framework for action (2005-2015) and the recently approved Sendai Framework for Disaster Risk Reduction (2015) have contributed to change the definition and understanding of DRR (UNISDR, 2014). These changes happened since it was acknowledged the complexity behind disasters. Consequently, it was emphasised the necessity of adopting more decentralised forms of governance and prevention measures to better cope with disasters (*Ibid*).

In the past 20-25 years (Twigg, 2015; Shaw et al., 2016), disaster risk management experienced a shift from pure hazard response to preparedness approaches (Shaw et al., 2016). It was also subjected to a decentralisation process where collaboration between actors from different sectors, and across multiple levels of governance, became crucial in order to respond to disasters (Twigg, 2015). In particular, with the recent establishment of the 2015 Sendai Framework for Disaster Risk Reduction (SFDRR), approved at the Third World Conference on Disaster Risk Reduction, held from 14 to 18 March 2015 in Sendai, Miyagi, Japan<sup>2</sup>, DRR was explicitly described as complex issue requiring a holistic and multidisciplinary approach (UNISDR, 2014). According to both Weichselgartner et al. (2015) and Twigg (2015), multidisciplinary knowledge sharing is pivotal in the DRR domain. In fact, practi-

<sup>1</sup> For specific definitions of DRR terminologies such as vulnerability, exposure and coping capacity see UNISDR official website at <https://www.unisdr.org/we/inform/terminology>

<sup>2</sup> For more information about SFDRR see <https://www.unisdr.org/we/inform/publications/43291>

tioners of DRR need specific knowledge in order to make informed decisions and sound policy arrangements (Weichselgartner et al., 2015). Accordingly, the SFDRR guideline principle (g<sup>3</sup>) states:

Disaster risk reduction requires a multi-hazard approach and inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as on the easily accessible, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge.

Kapucu (2006) argues that inter-organisational networks collaborations are the best solution to overcome these complexities and interdependence among actors. In fact, networks can be considered as collective knowledge and information source (Gulati and Gargiulo, 1999) allowing knowledge to be exchanged.

The SFDRR first priority for action that is “understanding risk” emphasises that in order to better cope with risks, the disaster community has to be fully aware of the risks it could face. In particular, within this priority, principles (l) and (m)<sup>4</sup> consider awareness-raising to be achieved through disaster education and risk communication activities at all levels of governance. Indeed, alongside the increasing importance of multi-stakeholder approaches, the process of knowledge sharing and communication of the information exchanged gained much more consideration in the DRR domain.

In this context, the paper builds on previous research (see Roberta Scassa 2018) that analysed the complexities behind inter-organisational collaborations in the Abruzzo Region, Central Italy. In particular, as also Barbara Lucini mentions (2014), considering that the Civil Protection is the organisation in charge of prevention activities in Italy, it is relevant for this study to focus on this specific organisation. Indeed, previous research in this context (see Roberta Scassa 2018) investigated the Abruzzo Civil Protection (ACP) and its relationships with other actors in the field of DRR.

As a part of a larger study, this paper specifically focuses on the knowledge sharing and risk communication mechanisms employed by the Abruzzo Civil Protection in order to raise the awareness of the society at large, eventually leading to reducing seismic risks.

<sup>3</sup> UNISDR. (2015). Sendai Framework For Disaster Risk Reduction (2015-2030), p. 13, UNISDR/GE/2015-ICLUX EN5000 1st edition available at <https://www.unisdr.org/we/inform/publications/43291>

<sup>4</sup> UNISDR. 2015. Sendai Framework For Disaster Risk Reduction (2015-2030), pp. 14-16, UNISDR/GE/2015-ICLUX EN5000 1st edition available at <https://www.unisdr.org/we/inform/publications/43291>

Indeed, taking the Abruzzo Civil Protection as the case study, the paper asks the following questions:

RQ1: Which are the key factors enhancing the process of knowledge sharing among actors in the ACP network?

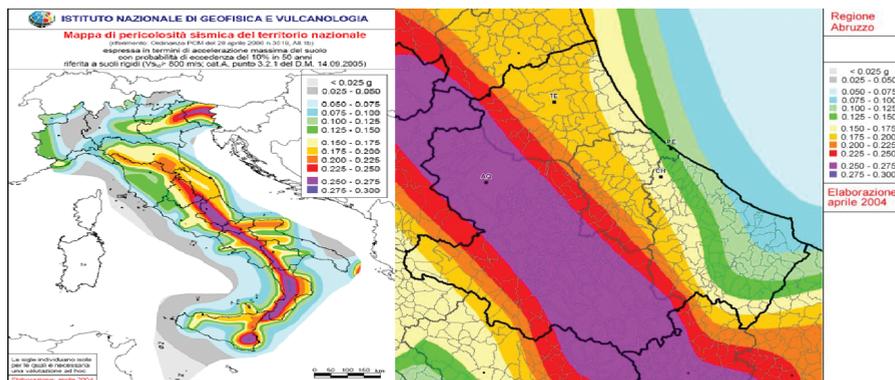
Sub-questions:

- a) Is disaster risk reduction information flow enabled beyond emergency times, and to what extent?
- b) Which are the information and knowledge sharing mechanisms employed to raise the awareness of the disaster community?

## 2. Methodology

The research is designed on a case study, that is the Abruzzo Civil Protection (ACP) in the Abruzzo Region, Central Italy. In particular, this case study is focused on the risk communication and knowledge sharing processes implemented in the Abruzzo region. The case study is chosen since it is particularly relevant given the high seismic risks that the Abruzzo region faces, and the central role and the responsibilities that the ACP has in this context.

Figure 1<sup>5</sup> e Figure 2<sup>6</sup>



The seismic hazard maps in Fig.1 and Fig.2 show the extreme vulnerability of the Abruzzo region that is coloured in fuchsia namely representing the second to last highest value in terms of vulnerability.

This paper utilises a combination of methods for data collection and analysis. Discussions on multi-stakeholder collaboration, risk communication and knowledge sharing in the DRR domain were sourced from acade-

<sup>5</sup> Italian Seismic Hazard Map (2004), source: INGV (<http://zonesismiche.mi.ingv.it>)

<sup>6</sup> Abruzzo Seismic Hazard Map (2004), source: INGV (<http://zonesismiche.mi.ingv.it>)

mic literature as well as from reports published by organisations with experience in disaster risk reduction and in particular risk communication. The author conducted Internet searches using “multi-stakeholder collaboration or multi-stakeholder knowledge sharing”, “collaborative networks for disaster risk reduction”, “disaster risk reduction” and “risk communication or disaster communication”.

Qualitative semi-structured interviews were conducted with 13 key informants working in the Abruzzo Civil Protection and in other organisations collaborating directly with the former.

In this regard, by employing a snowball sampling as a methodological strategy, the author was able to identify relevant respondents (i.e. members of other organisations) directly linked to the ACP that is the primary focus of the research.

Here, snowball sampling was adopted as a methodological starting point in order to engage with an egocentric network approach, and thus gathering ego-network data. An egocentric network approach is essentially a research design that consist of a set of target actors sampled from the population that provide data about the members of their network (Perry et al., 2018). The egocentric approach identifies a set of individuals sampled from the population and their social environment allowing to analyse the data by focusing on the ego, that is the “focal actor” (i.e. ACP) and on the relationships with its alters (i.e. partners of the ACP). Therefore, by employing a snowball sampling and an egocentric approach as research methods, together with semi-structured interviews, the author was able to gather egocentric data suitable to be examined through network analysis. First of all, adopting an egocentric approach means that the author had the first interview with a key informant that in turn provided the names of other relevant interviewees, what has been called name generator (Perry et al., 2018). More specifically, the first interview was carried out with an expert that is in charge of implementing and coordinating the prevention activities in the ACP, and then with the newly revealed key informants.

The author carried out 8 face-to-face interviews, 3 Skype interviews and finally 2 interviews via phone, overall ending up with 13 interviews. The interviews were conducted between May 2018 and June 2018 focusing on collecting information about:

- 1) Inter-organisational knowledge sharing
- 2) Risk communication and awareness-raising

When interviewing, as also suggested by Noack et al. (2013), data suitable for qualitative network analysis (i.e. audio data of the interview conversation) was gathered. The collected egocentric data was examined through network analysis that explores the relationships among social entities, and the cha-

racteristics and implications of these relations (Wasserman et al., 1994). Specifically, the network analysis was conducted by examining the data collected with semi-structured interviews, and by visualising these data in a network map through a network visualisation software.

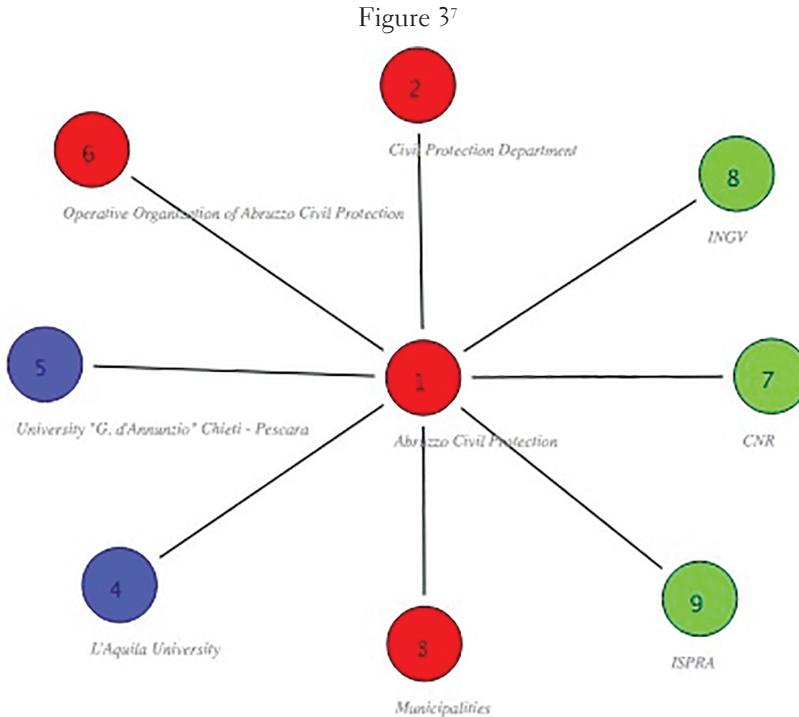
Through this software called SocNetV 2.4 (Kalamaras, 2018), the author drew the network of inter-organisational relationships between the ACP and other organisations, and thus visualised the collected egocentric data. SocNetV 2.4 (*Ibid*) allowed to visualise the network through coloured and numbered circles called *nodes* (organisations) and connected to other circles through lines called *edges* or *ties*.

Indeed, certain interview's responses together with the network map helped to identify network practices such as in particular risk communication strategies, knowledge sharing mechanisms, presence/absence of ties among the actors in the network, size of the network and the directions of the information flow in the ACP network.

In this regard, it was also possible to investigate whether in the ACP network there is room for novel information based on the presence/absence of ties among the actors. According to Burt (1992), when actors are not directly connected, it is more likely to have non-redundant information. Overall analysing the network structure of the ACP contributed to individuate the role and scope of the organisations, the type of relationship that they have with one another when exists, how frequently they interact, communicate and exchange information with each other, which kind of information they exchange and to whom the information is distributed. However, this is a descriptive network analysis entailing that no quantitative analysis of the network data was conducted.

### 3. Analysis

#### 3.1 The Abruzzo Civil Protection Network: inter-organisational collaboration and knowledge sharing



By using SocNetV 2.4<sup>8</sup>, the network structure of the ACP during the prevention phase of disasters, in particular concerning the reduction of seismic risks, was developed.

In Fig.3, the ACP represents the ego (central actor) and all the other nodes are its alters which are the actors it engages with for carrying out prevention activities. As mentioned by the ego, it is possible to identify the actors embedded in the network during “times of peace” (in Italian “tempi di pace”), in contrast to the emergency times. Looking at Fig.3, the network is made up of 9 nodes (actors) and 8 ties or edges (relationships between the ego and the alters).

Ego (node 1) is located at the centre and has ties to everyone else in the network, meaning that there is no other actor between the ego and the alters.

<sup>7</sup>Abruzzo Civil Protection Network Structure, Roberta Scassa in Beyond the Emergency: Multi-stakeholder approach in Disaster Risk Reduction- Exploring social network collaborations of the Italian Civil Protection in reducing seismic risks in the Abruzzo Region, 2018

<sup>8</sup>Kalamaras D. (2018). Social Network Visualizer (SocNetV) available at: <http://socnetv.org>

Nodes are differentiated by numbers and colours: the former identifies the actors in the network, while the latter expresses actors' role and function. In the table below (Fig.4), actors are categorized based on their respective numbers and colours facilitating the analysis of Fig.3. A brief description of the actors is also provided.

Figure 4<sup>9</sup>

<i>Nodes' Numbers</i>	<i>Nodes' Colours</i>	<i>Description</i>
1. Abruzzo Civil Protection (ACP)	Red	Governance Institution – Regional level
2. Civil Protection Department (CPD)	Red	Governance Institution – National Level
3. Abruzzo Municipalities	Red	Governance Institution – local level (communication activity)
4. University of L'Aquila	Blue	Academia - seismic engineering
5. University "G. d'Annunzio" Chieti-Pescara	Blue	Academia - Geology
6. Operative Organization of Abruzzo Civil Protection	Red	Governance Institution – Emergency Body
7. Italian National Research Council (CNR)	Green	Research Institute - seismic engineering
8. National Institute of Geo- physics and Volcanology (INGV)	Green	Research Institute - Geology
9. Italian Institute for Environmental Protection and Research (ISPRA)	Green	Research Institute - Geology

The actors in the ACP network (see Fig.3) find DRR a complex problem requiring a multi-stakeholder approach.

<sup>9</sup> *Actors' identification in the Abruzzo Civil Protection network*, Roberta Scassa in *Beyond the Emergency: Multi-stakeholder approach in Disaster Risk Reduction- Exploring social network collaborations of the Italian Civil Protection in reducing seismic risks in the Abruzzo Region*, 2018

In particular, it emerged that it would be preferable not to be in need of such an approach, but it would be impossible to reduce the uncertainties and disruptive consequences of seismic risks without inter-organizational collaborations.

The resulted ego-network is based on 8 main collaborations (Fig. 3), where the ACP represents the focal actor in the network. These collaborations are mainly established through mutual agreements (in Italian “*Convenzioni*”) between the ego and its alters. In the network, not all the alters happen to have relationships with each other meaning that some actors have refer to the ACP in order to have certain kind of information.

These relationships are developed and maintained due to they allow to share knowledge necessary to provide scientific progress in the DRR scenario. In other words, in order to reduce seismic risks the actors of the ACP network declared to be in need of diverse information from different expertise fields and organisations. In the resulted egocentric network, there are three types of activities that can be distinguished when collaborations are established among the actors in the network: basic research, applied research and collaboration and coordination of administrative activities. The first type of activity concerns the research institutes and the universities that alone contribute to deepen the knowledge about DRR as well as to the advancement of the research in fields of their specific expertise areas. The second type of activity is the one involving the ACP, research institutes and universities. In fact, through mutual agreements the ACP requires the technical and scientific support of advanced research institutions. Within these dynamics, the ACP organises technical boards (in Italian “*Tavoli Tecnici*”) where it requires the presence of the research institutes and universities for the study and planning of prevention activities. Furthermore, the research institutes and universities are obliged to offer their help to the governance institutions (whatever the level of governance is) as mandated by their charters. In other words, if their support is requested, they must intervene as regulated by law. These types of collaborations are therefore institutionalised. In this network, the ego (node 1) and some of its alters (i.e. node 4, node 5, node 6, node 7, node 8 and node 9) collaborate to apply relevant research findings to concrete and specific projects. The projects are based on guidelines and objectives previously issued by the CPD on the national level and thus showing the implementation of the subsidiary principle typical of the Italian governance system.

The third type of collaboration mainly concerns the activity of the National Government, CPD, ACP, Operative Organization of the ACP and the Municipalities that is characterised by governance, policy implementation and data exchange processes.

### 3.2 Knowledge Sharing: The role of Communication

By investigating the process of knowledge sharing and more broadly the prevention activities put in place during times of peace in the ACP network, it emerged that risk communication and disaster education represent crucial mechanisms that significantly contribute in strengthening preventive attitudes and measures towards seismic risks. However, although the respondents mention that with the relatively recent establishment of the technical boards it was possible to carry out important prevention projects, such as for instance the *Seismic Micro-zoning* (in Italian “Microzonazione Sismica”, MZS<sup>10</sup>), and the *Limit Condition in the Emergency* (in Italian “Condizione Limite per l'emergenza”, CLE<sup>11</sup>), there are still many obstacles in achieving smooth knowledge sharing, risk communication and disaster education processes.

First of all, the information flows more during emergency times since it is both more urgent and more requested in this phase. Moreover, most of these activities and projects contain information about the emergency (e.g. the content of the information is more related to the emergency, recovery and reconstruction phases) rather than the actual prevention of seismic risks.

Interestingly, actors recognised that the number of prevention activities increased only recently, specifically after L'Aquila earthquake struck in 2009. They furthermore acknowledged that the prevention activities put in place at the time (i.e. before L'Aquila earthquake) were scarce and not appropriate.

Secondly, respondents strongly emphasised their “mission” to meaningfully inform other actors relevant in the DRR community, in particular the citizenry. The organisations of the ACP network further explain the importance to communicate and involve the citizens in order to provide them with the tools and necessary information to cope with all kinds of risks. For example, the Italian Civil Protection has organised and is currently engaging with the awareness-raising campaign “I do not risk” (in Italian “Io non rischio”<sup>12</sup>) that is literally aimed at enhancing the involvement and understanding of the citizenry for matters concerning the reduction of seismic risks.

In this regard, the mechanisms allowing raising the awareness of the disaster community at large are several and are mainly related to disaster education and risk communication. Yet, on the one hand respondents highlighted

<sup>10</sup> The MZS studies started in 2011 and have the main objective of gathering data about the changes and alterations influencing the earthquakes in the upper part of the soil, identifying stable and unstable zones and thus producing meaningful information to be applied in disaster risk reduction planning, <https://protezionecivile.regione.abruzzo.it>

<sup>11</sup> The CLE project was launched in 2012 and identifies the fundamental physical structures for the management of the emergency (e.g. emergency areas, strategic emergency buildings etc.), <https://protezionecivile.regione.abruzzo.it>

<sup>12</sup> For more information about “I do not risk” campaign see <http://iononrischio.protezionecivile.it>

the necessity of these strategies, on the other hand they also acknowledged the difficulties to achieve the above tasks, revealing some of the impediments to carry out activities that could enhance others' understanding of seismic risks. Interestingly, one key informant clearly recognizes the limits of current hazard maps to be accessible to, and easily readable by a large audience with different cultural and professional backgrounds.

Indeed, alongside the importance of strengthening others' understanding and awareness of risks through communication it emerges the difficulty to achieve these objectives.

In order for communication to be efficient, respondents mention that it has to be clear, with simple vocabulary, engaging, interactive, and often visualised through pictures and videos. In fact, key informants made clear that in order to understand what is being communicated, also among disaster practitioners, shared language and simple vocabulary are necessary factors facilitating the process of communication itself.

Direct communications strategies via phone calls or face-to-face are preferred when having to interact with each other and share information. In fact, it is also mentioned how the recent establishment of the technical boards (i.e. face-to-face meetings) positively contributed to the process of knowledge sharing, by both shortening language distances and by enhancing the understanding of the problems at stake.

Yet, respondents find face-to-face communication and in general direct communication hard to be put in place in larger groups of people given the extremely wide audience of DRR: actors range from disaster practitioners to children in schools. In fact, in the actors of the ACP network strongly recognised the necessity of communicating differently to meet the standards of a target audience.

In this regard, key informants mention the use of Internet and social media as methods to reach other people in every phase of the disaster cycle (i.e. from emergency to prevention) and thus raise the awareness of the society at large. The use of new applications is indeed a significantly powerful tool to let the information flow reach other parts of the society. Yet, respondents recognised that not all the citizens have access to Internet thus other strategies have to be employed.

Overall, respondents emphasised that besides being informed through good communication strategies, people have to be educated about DRR.

In this context, teachers and students are claimed to play an increasingly important role. Universities and schools are the public institutions where the communication and educational processes have to start in the first place, and be achieved through continuous, interactive and fun activities. Moreover, extra-curricula activities, such as for example one-day experts conferences,

are considered insufficient to educate the society about DRR. In contrast, it was emphasised the importance of integrating DRR as an official subject in schools, yet an objective still to be implemented.

As mentioned, when about to inform and communicate seismic risks to a larger audience gathering a diverse array of attendants with completely heterogeneous backgrounds, and thus also a different understanding of the matter at stake, the respondents find other communication strategies to be more appropriate (i.e. use of Internet and social media).

## 4. Emerging Issues and Discussion

### 4.1 Disaster Prevention: Risk Communication and Disaster Education

The respondents of the ACP network acknowledged that Italy was influenced by drastic cultural and political changes regarding DRR in the past 60 years: the Italian Civil Protection experienced a conceptual and practical shift that is from pure response to prevention and mitigation. Yet, it was also emphasised that Abruzzo experienced a real change in 2009, just after the devastating earthquake in L'Aquila town. The catastrophic consequences of the event brought the Civil Protection System to rethink about the civil protection activities in place at the time, revealing the necessity to implement other prevention strategies aimed at avoiding to experience again what happened in L'Aquila. In this regard, the ACP reflects the perspective of disasters' "window of opportunity" for change adopted by Birkmann et al. (2010) in which it is emphasised that disasters can bring changes in socio-ecological systems. Changes and lessons learned could create an alteration (e.g. social, political) of the pre-disaster conditions that could eventually lead to substantial changes of the impacts on people's lives (*Ibid*). Interestingly, the interviewees pointed out that prevention activities were adopted just after L'Aquila earthquake as also demonstrated by the establishment of the technical boards two years after the event, as well as by the MZS and CLE that were launched respectively in 2011 and 2012. Yet, as highlighted by the respondents these are fundamental changes that still lack a 360 degrees approach towards preparedness to natural hazards, since they mainly relate to structural mitigation activities rather than non-structural activities such as for example risk communication.

Specifically, actors of the ACP network find face-to-face communication or via phone far more efficient to share knowledge since, compared to other methods, it avoids misunderstandings and it allows evaluating immediately the knowledge transferred. According to Koskinen et al. (2003), face-to-face interaction is the best method to exchange knowledge since "it allows immediate feedbacks so that understanding can be checked and interpretation

corrected". Meherabian (1971) emphasises how face-to-face interaction contributes to avoid misinterpretation of meanings and what is communicated. Moreover, the respondents of the ACP highlight how shared vocabulary and shared language contribute to let the information flow go smoothly as also theorised by Nahapiet et al. (1998). Access to other actors and thus information and resources is limited when language and codes are different (*Ibid*). The actors of the ACP network emphasised that having some notions and understanding of one another's disciplines considerably enhances the process of exchange allowing to better understand the knowledge transferred. Here, respondents reflect the cognitive proximity approach in which similar knowledge bases among the actors allow for evaluating novel knowledge, and for integrating this new information into internal knowledge (Boschma et al., 2014). In the ACP network not only shared language and codes are important factors allowing actors to understand each other and the knowledge transferred, but also the forms of communication to exchange the information and the degree of similarity of the knowledge bases are relevant. Yet, different knowledge sharing and communication strategies have to be employed considering the large audience characterising the DRR community.

In the ACP network, respondents find certain non-structural measures for raising the awareness of the society at large considerably relevant to reduce disasters, and identify mechanisms constraining and incentivising the implementation of these measures. The SFDRR first priority for action that is "understanding risk" emphasises that in order to better cope with risks, the disaster community has to be fully aware of the risks it could face. In particular, within this priority, principles (l) and (m<sup>13</sup>) consider awareness-raising to be achieved through disaster education and risk communication activities at all levels of governance. These principles reflect the opinions as well as the awareness-raising mechanisms employed in the ACP network that are essentially risk communication and disaster education. In the network, risk communication and disaster education are implemented through tools such as awareness-raising campaigns (e.g. I do not risk campaign), conferences, specific brochures, the use of social media and Internet, together with trainings and one-day presentations in schools. By adopting the risk communication rules and strategies listed by Lundgren et al. (2009), it is possible to find many similarities with the methods adopted by the actors of the ACP network. First of all, the respondents as well as Lundgren et al. (2009) emphasise that in order to meaningfully inform the public, one has to know the audience that

<sup>13</sup> UNISDR. 2015. Sendai Framework For Disaster Risk Reduction (2015-2030), pp. 14-16, UNISDR/GE/2015-ICLUX EN5000 1<sup>st</sup> edition available at <https://www.unisdr.org/we/inform/publications/43291>

will receive the message, thus allowing to understand which risk communication methods is best to adopt in that specific context. When having to communicate with the citizenry, respondents find that the messages should be clear and without highly scientific explanations. In fact, as highlighted by the respondents, it is not possible to communicate a message to children in the same way as one would do with adults.

According to both the actors of the ACP network and Lundgren et al. (2009), the complexities behind the risks have to be communicated through a clear and simplified language in order to allow the audience to comprehend these complexities. The choice of the strategy to communicate the message is as much important (*Ibid*).

The respondents of the ACP network suggests that the message should be sent very often, visualised through videos and pictures, and sometimes using technology-assisted communication.

According to Lundgren et al. (2009), there are some basic tools that range from information materials, visual representation of risk, face-to-face communication etc. Lundgren et al. (2009), recommend combining multiple risk communication strategies in order to satisfy the needs of the audience as much as possible. This expedient was acknowledged and employed in the ACP network as well.

Respondents for instance experienced the importance of interaction and games when informing students, and the usefulness of brochures rather than web-centred messages when informing people who rarely use Internet (e.g. elderly people). Interestingly, it is emphasised that the all the mechanisms currently employed, such as one-day-experts' presentations, campaigns, trainings and brochures are not enough articulated and not continuously enabled in order to break trough the citizenry and catch its attention.

It also emerged that DRR communication and education are long-term processes or as Rajib Shaw (2014) put it, "lifelong processes", where the citizenry has to be able to gain skills to mitigate the impacts of disasters. In this regard, the respondents recognise that effective risk communication is time and cost consuming, requiring specialised personnel and adequate resources (e.g. funding, staff, equipment, time) that are often employed for risk assessment and management as also noticed by Lundgren et al. (2009).

## 5. Conclusions

UNISDR frameworks as well as many researchers in the DRR domain consider multi-stakeholder approaches crucial mechanisms to be employed in order to allow every actor of the disaster community to share knowledge about DRR. It is also stressed that the success of these collaborations should

empower disaster practitioners to adopt sound and informed risk reduction policy arrangements, eventually leading to better cope with all kinds of risks. In particular, DRR experts emphasise the importance of risk communication and disaster education as fundamental mechanisms to raise the awareness of the disaster community about the risks it could face.

Through the attempt to examine inter-organisational relationships in the Civil Protection network in the Abruzzo Region, Central Italy, findings provide answers to the research questions and give interesting insights for the above considerations. By employing an egocentric network analysis it is possible to show that the ACP results embedded in a local network where 8 main collaborations are established with actors having specific characteristics of interest (i.e. highly scientific knowledge and resources), possibly excluding the integration of actors that not possess these requirements, and revealing for instance the absence of NGOs and private actors within the network.

Furthermore, knowledge sharing is found to be a complex process where the use of shared language, simple vocabulary, face-to-face interactions facilitate not only the process itself, but also actors' capacity to understand the information shared. Yet, although the current international push towards a proactive management of DRR through prevention and mitigation measures, the information flow in the ACP network is still both more stimulated after a disaster struck, and more requested during emergency times. The content of the information shared is also more concerned about phases of the disaster cycle, such as recovery and emergency. Interestingly, risk communication and disaster education represent incredibly important mechanisms to raise the awareness of the society at large about DRR, yet they are still failing to achieve this objective due to the following reasons:

<i>Communication</i>	<i>Disaster Education</i>
– Not continuous	– Not continuous
– Not easily understandable	– Often not fun and interactive
– Lack of specialised personnel	– Absence of DRR as intra-curricula subject
– Lack of resources	– Lack of attention

Indeed, in relation to the attempt to examine multi-stakeholder collaborations at the local level, specifically in the ACP network, results suggest that knowledge sharing together with disaster education and risk communication are crucial ingredients for the success of a risk informed society and for proactive multi-stakeholder collaborations in the field of DRR.

Results also suggest that although the importance of these mechanisms is widely recognised among the actors in the ACP network as well as in the SFDRR, there are still many obstacles impeding the implementation of these

activities on the local level. The actors of the ACP network, despite the recent efforts in adopting more proactive measures and behaviours, result interlocked in a local network where the knowledge is shared among a restricted number of organisations, and the information flow often fails to reach other actors relevant in the disaster community (i.e. citizenry, private actors and NGOs).

The kind of communication currently adopted results also inappropriate: disaster practitioners of the ACP network clearly explain that most of the aspects required for an efficient communication strategy are not met on the local level.

This in fact reveals a gap in what is perceived to be an adequate disaster education and risk communication strategy, and in what is actually implemented in the Abruzzo region. These contradictions show indeed an overall impediment to bring a substantial change towards a risk informed society.

Given the importance represented by communication and awareness-raising, yet considering the absence of a proper communication organisation in the ACP network (except for L'Aquila Municipality), the author argues that future UNISDR frameworks could shed some light on the role and responsibilities of disaster communication experts eventually creating and consolidating new professional profiles in this field, and incentivising their involvement in DRR networks.

Moreover, UNISDR frameworks could give more insights on how to carry out communication and disaster education activities in order to facilitate the job of risk communication experts and DRR teachers in efficiently managing their tasks.

In general, UNISDR frameworks and disaster practitioners could altogether try for instance to incentivise the implementation of policies establishing the adoption DRR as intra-curricula subject, and encourage investments in risk communication through for example the use of apps and social media. That being said and given the wide acknowledgement of certain risk communication strategies, actors in the ACP network should try to push stronger towards the implementation of non-structural activities and collaborate more often in trying to find innovative and up with the times solutions. In this regard, besides the usual brochures and campaigns, it is particularly recommended to further invest in Internet, social media e new applications that can be considered to be efficient tools likely to play an increasingly important role in the current risk communication scenario. This is surely not a simple task but it requires the collaboration of a diverse range of actors with a different expertise that can think and act aiming at making risk communication one of the pillars of disaster risk reduction.

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Questo volume è stato stampato  
nel mese di giugno 2019  
su materiali e con tecnologie ecocompatibili  
presso la LITOGRAFIA SOLARI  
Peschiera Borromeo (MI)

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e-mail: editoriale.dsu@educatt.it (produzione) - librario.dsu@educatt.it (distribuzione)  
redazione: redazione@itstime.it  
web: www.sicurezzaerrorismosocieta.it  
ISBN: 978-88-9335-464-6

Euro 20,00



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