

University of Groningen

The role of local communities in a global risk landscape

Imperiale, Angelo Jonas

DOI:
[10.33612/diss.131472776](https://doi.org/10.33612/diss.131472776)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
Imperiale, A. J. (2020). *The role of local communities in a global risk landscape: Using Social Impact Assessment to understand, recognise, engage and empower community resilience in vulnerable regions*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen.
<https://doi.org/10.33612/diss.131472776>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



Chapter 5

(Key Priority 1, UNISDR, 2015)

“Understanding risk in all its dimensions”

We reflect on what can be learned about disaster risk reduction from the L'Aquila trial of scientists. The court case was initiated because of a controversial meeting on 31 March 2009 of the Major Risks Committee (MRC), held under the auspices of the Italian Department of Civil Protection. The purpose of the meeting was to consider (prior to the fatal earthquake of 6 April 2009) disaster risk in the L'Aquila area, which was being affected by an earthquake swarm since October 2008. We undertook a document analysis of trial materials, and a review of academic and mediacommentary about the trial. The legal process revealed that disaster governance was inadequate and not informed by the Disaster Risk Reduction paradigm or international guidelines. Risk assessment was carried out only in a techno-scientific manner, with little acknowledgement of the social issues influencing risks at the local community level. There was no inclusion of local knowledge or engagement of local people in transformative disaster risk reduction strategies. Most previous commentary on the trial is inadequate or misinformed. This paper is unique in that it considers the contents of the MRC meeting as well as all trial documents. It provides a comprehensive reflection on the implications of this case for disaster risk reduction and the resilience of peoples and places at risk. It highlights that a switch from civil protection to community empowerment is needed to achieve sustainable outcomes at the local level.

Reflections on the L'Aquila Trial and the social dimensions of disaster risk

Introduction

The 6 April 2009 earthquake in L'Aquila, Italy, drew the attention of scientists all over the world for various reasons. One was that the earthquake and its aftermath “triggered an unprecedented series of legal consequences” (Benessia and De Marchi, 2017, p.35). Over 200 legal inquiries were initiated, primarily relating to the collapse of public buildings or to the concrete buildings where most fatalities occurred (Alexander and Magni, 2010). Other court cases related to corruption and fraud in post disaster recovery and reconstruction (Lewis, 2011; Fidone, 2017). Various international reports (e.g. Sondergaard, 2013) and legal inquiries (DNA, 2016; Bindi, 2018) have revealed that there was Mafia infiltration as well as many other irregularities. However, what gained most international attention and has come to be known as ‘the L'Aquila Trial’ was the prosecution of 6 scientists and 1 government official. Initially accused of negligence, carelessness and malpractice, at the conclusion of a lengthy trial, they were initially found guilty of manslaughter, bodily harm and conspiracy, and were sentenced to 6 years prison and faced massive costs (Tribunale di L'Aquila, 2012). Following a successful Court of Appeal hearing, a counter appeal led to a hearing by the Supreme Court of Cassation (*Corte Suprema di Cassazione*) (SCC). The total legal process lasted more than 5 years, ending in November 2015 with the SCC decision that the 6 scientists were acquitted. The government official, however, was found guilty, and sentenced to 2 years jail.

Following public announcement of the indictments in June 2010, an unpleasant debate arose in the international scientific community (e.g. Nosengo, 2010; Hall, 2011; INGV, 2012; Cartlidge, 2012; Alexander, 2013; Alexander, 2014; Gabrielli and Di Bucci, 2015; Alexander, 2015). The debate was characterised by misleading information, a misunderstanding of the exact terms of the indictments and sentencing decisions, and a failure to appreciate the broader social and political context (Alexander, 2014; Yeo, 2014; Bretton et al., 2015). Broadly speaking, we concur with Stucchi et al. (2016, p.591) that for “varied reasons, among which certainly was the fact that all official documentation related to the L'Aquila trial was in Italian language, much of the international discussion was based on second hand sources and thus inevitably susceptible to be easily influenced by the spreading of imprecise information”. Many articles were published while the legal process was still underway (e.g. Nosengo, 2010; Hall, 2011; Nosengo, 2012; Cartlidge, 2012; Notaro, 2014; Alexander, 2014; Fioritto, 2014; Simoncini, 2014; Lauta, 2014; Scolobig et al., 2014; Bretton et al., 2015; Cocco et al., 2015), however only a few analyses have been published since the definitive sentence was issued on 20 November 2015 (e.g. Pietrucci, 2016; Ciccozzi, 2016; Stucchi et al., 2016; Benessia and De Marchi, 2017).

The L'Aquila trial and the meeting of the Italian Major Risks Committee (MRC), which was the reason for the trial, is not just a story of a trial of scientists or about how information was disseminated by the Italian Department of Civil Protection (DCP). It is a story that revealed multiple failures, especially a failure to implement disaster risk reduction (DRR) and to enhance resilience at the local community level. A social understanding of disaster means acknowledging that disasters result from socially-produced vulnerabilities and failures (Quarantelli, 1998; Perry and Quarantelli, 2005; Oliver-Smith et al., 2017). Disasters and related risks result from many factors, especially the social dimensions of an area, including people's hazard exposure, their vulnerabilities, and capacities to manage risks and be prepared. Risk is usually understood as the interplay between the (negative) consequences of a realized hazard and their likelihood (Coppola, 2015). The likelihood and consequence are directly influenced by the physical, social, economic and environmental vulnerabilities and by the resilience of a community (Coppola, 2015; Imperiale and Vanclay, 2016a).

The negative social impacts (i.e. consequences) of a realized hazard vary from disaster to disaster, and are unequally dispersed between regions of the world and within an affected region and local community (Cottrell and King, 2011; Coppola, 2015). While all residents are at some level of risk from the negative social impacts of a disaster, certain groups of people are more at risk. In the context of disaster, vulnerability is generally defined as “a measure of the propensity of an object, area, individual, group, community, country, or other entity to incur the consequences of a hazard” (Coppola, 2015, p.33). In social terms, vulnerability can be understood as the propensity of certain dimensions of local communities’ wellbeing (e.g. housing and infrastructures) to be affected by the (negative) social impacts of an external event or intervention (e.g. a realized hazard). While potentially all people can be vulnerable, some groups of people are more vulnerable than others. The extent of vulnerability influences the level of risk local communities have to cope with (i.e. the intensity of likely social impacts and their likelihood). The greater the vulnerability, the more people experience the risk.

The widespread recognition of this means that disasters are domains of potential injustice and do not provide dispensation to those who are guilty of professional neglect (Lauta, 2014). Rather than being blame games or witch hunts (e.g. Nosengo, 2010; Boschi, 2013; Clark, 2012; Yeo, 2014), disaster trials can be transformative opportunities (Benadusi and Revet, 2016). Reflections on trials following a disaster are opportunities to understand local disaster governance and recognise the drivers and constraints to social and institutional learning about DRR and resilience (Simoncini, 2014; Bretton et al., 2015).

The L’Aquila trial exposed the structure and functioning of the Italian civil protection system through which the Italian State organized disaster governance. It also revealed the specifics of the knowledge system through which the Italian disaster governance oriented its actions and the knowledge production processes concerning disaster risks. Adapting the definition of van Kerkhoff and Slezák (2016), we define a knowledge system in disaster governance as the network of actors who are connected by social relationships, both formal and informal, which dynamically combines knowing, doing and learning to bring about specific DRR actions at all levels of society.

The L’Aquila trial has been much commented on. Many papers were published while the legal process was underway (e.g. Alexander, 2010, 2013, 2014; Nosengo, 2010, 2012; Hall, 2011; Carlidge, 2012; Notaro, 2014; Fioritto, 2014; Simoncini, 2014; Lauta, 2014; Scolobig et al., 2014; Bretton et al., 2015), however only a few have been published since the definitive sentence in November 2015 (e.g. Ciccozzi, 2016; Pietrucci, 2016; Stucchi et al., 2016; Benessia and De Marchi, 2017). Nothing has been said about the discussion of the MRC meeting itself, or the way the Italian Civil Protection system, as exposed by the L’Aquila trial, perceives the role of science in DRR and organizes its knowledge system concerning disaster risk.

Since the UN declaration of the 1990s as the Decade of Natural Disaster Reduction, the *Yokohama Strategy and Plan of Action for a Safer World* (IDNDR, 1994), the *International Strategy for Disaster Reduction*, and the *Hyogo Framework for Action 2005-2015* (UNISDR, 2005), enhancing DRR has become understood as a strategy that should be fully interlinked with social and environmental development. Consequently, disaster management thinking has expanded from mitigating disaster impacts after disasters to also considering the reduction of social and environmental vulnerabilities and risks, and enhancing local community resilience. For more than three decades now, understanding disaster risk has meant understanding the vulnerabilities associated with the multiple dimensions of local people’s wellbeing and understanding the likely negative impacts disasters might create at the local level. Recognising the local knowledge and capacity to engage in mitigation and monitoring, and enhancing the resilience of local people so that they can reduce their vulnerabilities and better manage risk, became to be considered crucial to achieve DRR outcomes.

At the international level, enhancing DRR and community resilience came to be recognised as a sustainable development goal that should be pursued at all levels of society. As with every sustainable development goal, enhancing DRR requires a closer link between knowledge and action, which demands that scientific practices become more oriented towards the societal arenas in which sustainability problems, including disaster risks and impacts, are tackled (Cornell et al., 2013, Imperiale and Vanclay, 2016b). Understanding knowledge systems helps in visualising how science can support societies to address sustainability. Knowledge systems are “made up of agents, practices and institutions that organize the production, transfer and use of knowledge” (Cornell et al., 2013, p.61). The kind of knowledge required by the DRR paradigm is therefore a kind of transformative knowledge which should be produced within an open and participatory knowledge system able to engage local knowledge and capacities, co-design strategies addressed to locally reduce vulnerability and transform towards enhanced resilience of people and places at risk and a better disaster risk governance (Imperiale and Vanclay, 2016b).

There is yet to be a comprehensive reflection on the L’Aquila trial in terms of international policies and recommendations concerning enhancing disaster risk reduction (DRR) and community resilience as a sustainable development goal intended to enhance local people’s wellbeing. This is what we seek to do in this paper. Some of the key questions and issues we consider are: Was the MRC meeting case only a problem about how disaster risk was communicated to the public? Were the scientific contents emerged during the MRC meeting sufficient to understand the multidimensionality and the root causes of disaster risk at the local level and the likely negative impacts local people were overexposed to? Was the knowledge produced able to engage the local community and bring about positive sustainable transformation at the local level? Was the way through which the DCP organized its knowledge system concerning disaster risk adequate and coherent with the DRR paradigm and with the transformative approach suggested by the international literature in disaster studies?

Ten years after the 6 April 2009 earthquake, and 4 years after the SCC’s definitive sentence, we believe it is now time to make a sober analysis of the L’Aquila trial, especially in relation to the knowledge production through which disaster governance understands risks and the knowledge system through which it orients action towards DRR at all levels.

Methodology

This paper is part of a larger research project investigating the social dimensions surrounding the 2009 L’Aquila earthquake (Imperiale and Vanclay 2016a, 2016b). Its purpose is to reflect on the L’Aquila trial and consider what the trial reveals about Italian disaster management. This paper primarily draws on a document analysis of trial materials, which amounted to over 1,100 pages (Tribunale di L’Aquila, 2012; Corte di Appello dell’Aquila, 2014; Corte di Cassazione, 2016).

The research for this paper is part of a larger research project investigating the social dimensions surrounding the 2009 L’Aquila earthquake disaster (Imperiale and Vanclay 2016a, 2016b). The purpose of this specific paper is to reflect on the L’Aquila trial and consider what the trial reveals about the Italian disaster governance knowledge system. Our analysis of the trial provides insights concerning how disaster governance and its knowledge system are designed and organized in the top-down, emergency-centred approach of the Italian DCP. The data for this specific research, however, is primarily from a document analysis of the trial materials, which amounted to over 1,100 pages. In particular, the 169 page SCC sentence provided an effective synthesis of the initial trial and the appeal highlighting the main arguments used. We also considered all commentary in academic journals, the international, national and local media, and we did a rapid assessment of social media accounts of the trial. We also did an analysis of the various phone calls between officials, which were made available to the public by the newspaper, *La Repubblica*.

Finally, a small number of key informants who were significant identities in L'Aquila and/or the trial were interviewed specifically for this paper. It was not possible (or arguably appropriate) to interview the scientists on trial, their legal counsel, the prosecution, or any of the judges involved. We note that the lead author is an Italian national, who was present in L'Aquila on the night of the earthquake, and was based in the Abruzzo region for most of the time the legal process was taking place. The analysis of Italian documents and phone calls was done by the lead author in Italian. For this paper, key extracts were selected, being translated into English by the authors. In doing the translations, we attempted to convey the intended meaning rather than provide a strict literal translation. Nevertheless, we believe we have faithfully represented the statements in a way that maintains the integrity of what was intended, while at the same time enabling readers to fully understand the points being made.

Chronology of relevant events

October 2008 to March 2009	An earthquake swarm plagued the L'Aquila mountain area: October: 34 tremors (max 3.1); November: 30 tremors (max 2.0); December: 31 tremors (max 2.4); January: 88 tremors (max 2.7); February: 100 tremors (max 2.7); March: 115 tremors (max 4.1).
February-March 2009	The maverick scientist, Giuliani, was making predictions, informing the public, and attracting the attention of the national media. He was in contact with the L'Aquila Mayor, who frequently closed public schools.
March 2009	Body corporate meetings received requests for building inspections because of newly-emerging cracks. Some people requested to see civil protection plans.
12 March 2009	A phone call at 21.46 between Guido Bertolaso (DCP Chief) and Fabrizio Curcio (member of DCP) revealed official concern about Giuliani and his predictions.
30 March 2009 (morning)	The Abruzzo Region Civil Protection issues a press release saying that no more shocks are foreseen.
30 March 2009 (mid afternoon)	A 4.1 earthquake (at 15.38 local time) creates further concern. Students in a public student dormitory ask for technical inspection.
30 March 2009 (evening)	Bertolaso phones Stati (Abruzzo Region Councillor) instructing her to host a meeting of the Major Risks Committee in L'Aquila to show that the authorities were taking action.
30 March 2009 (evening)	DCP issues a press release announcing that an MRC meeting will be held in L'Aquila.
30 March 2009 (evening)	DCP sends a convening letter to some MRC members via fax. Some other scientists also invited.
31 March 2009 (afternoon)	(before the MRC meeting) De Bernardinis (Deputy DCP Chief) interviewed by a local TV station stating that rather than worry, better to drink a glass of Montepulciano D'Abruzzo wine.
31 March 2009 (evening)	The MRC meeting is held at the Abruzzo Region headquarters (18.30-19.30).
31 March 2009 (evening)	After the MRC meeting, De Bernardinis, Barberi (Deputy President of MRC), Stati and Cialente (L'Aquila Mayor) give a press conference.
31 March 2009 (late evening)	Barberi phones Bertolaso and briefs him about the meeting saying that the meeting went as instructed.
31 March 2009 (late evening)	Dolce (invited scientist) phones Bertolaso to inform him that the meeting went well and that they made the Abruzzo councillor (Stati) happy by saying that there were no tools for earthquake forecasting.
1 to 5 April 2009	A total of 76 earthquakes, the highest being magnitude 3.9.
2 April 2009	A 2 page draft minutes of the MRC meeting was circulated to the MRC members for comment. These draft minutes were later published on the website of <i>La Repubblica</i> .
6 April 2009 (early morning)	The fatal earthquake occurs at 3.32 am local time, killing 309 people.
6 April 2009 (afternoon)	The 5 page formal version of the minutes of the MRC meeting is finalised and signed by most of the people present at the meeting. It was not intended that these minutes would be made public, but they were released during the trial.
7 April 2009	Bertolaso phones Gianni Letta (State Secretary of the Presidency of the Council of Ministers, hereinafter Presidency) asking him to influence the way the national newspapers were reporting the MRC meeting to "ensure that polemics would calm down".
9 April 2009	Bertolaso convenes another MRC meeting in Rome ostensibly to assess the post-earthquake situation and the likelihood of another earthquake. However, before the meeting Bertolaso phoned Boschi (MRC member) instructing him to not reveal to the media the true reason for the meeting, with Boschi responding in a sycophantic way.
August 2009	Local lawyer, Antonio Valentini, files a suit at the local prosecutor's office.
3 June 2010	Local prosecutor, Alfredo Rossini, announces indictments against the 6 scientists and one civil servant.
25 May 2011	Investigating judge, Romano Gargarella, confirms the trial.
20 September 2011 to 16 October 2012	30 days of court hearings.
18 January 2012	<i>La Repubblica</i> publishes the 30 March phonecall between Bertolaso and Stati.
20 January 2012	After hearing the Bertolaso-Stati phonecall, Valentini files a suit at the local Prosecutor's office denouncing Bertolaso for manslaughter.
25 January 2012	During the L'Aquila trial, the judge announces indictments have been brought against Bertolaso.
22 October 2012	Judge Marco Billi finds the defendants guilty and sentences them to 6 years in jail. He also holds the State (in the form of the Presidency and the DCP) responsible for civil damages.
Within 30 days of the final decision	The 7 defendants, the Presidency, the DCP, the Attorney General and 7 citizens appeal the decision.
10 November 2014	The Court of Appeal acquits the 6 scientists but confirms the guilty verdict of the government official, De Bernardinis, but reducing his jail sentence to 2 years. The State was also found liable for damages.
Within 60 days after the Court of Appeal decision	Appeals against the Court of Appeal decision are made to the Italian Supreme Court of Cassation by several parties, including: (1) the Presidency; (2) the DCP; (3) the Attorney General; (4) De Bernardinis; (5) 44 persons (the families of victims) represented by 7 lawyers.
29 October 2015	Following a 3 year legal inquiry, Judge Guendalina Buccella announces the trial against Bertolaso would proceed.
20 November 2015	The Italian Supreme Court of Cassation confirms the decision of the Court of Appeal concerning the L'Aquila trial.
30 September 2016	Judge Giuseppe Grieco acquits Bertolaso on the basis of a lack of evidence.

Table 5.1: Chronology of events

Source: this paper, compiled from a wide range of documents, including the trial documents and news reports.

The social, political and seismological context

The 6 April 2009 earthquake was preceded by much seismic activity starting in October 2008. This activity increased in frequency and intensity, alarming residents, local administrators and the DCP. In March 2009 alone, over 100 tremors occurred in the vicinity of L'Aquila, with one on 30 March registering 4.1 on the Richter scale (Sentenza di I Grado, 2012). The local anxiety was arguably increased because of predictions being made by Giampaolo Giuliani, a somewhat unorthodox amateur seismologist, who considered that radon emissions could predict an imminent earthquake, something not yet accepted by orthodox science (Alexander, 2014; Stucchi et al., 2016). Due to this seismic 'swarm', many buildings began to crack. Prior to the fatal earthquake and the MRC meeting, public schools were often closed as a precaution. According to our interviewees, L'Aquila city and surrounding area were unprepared for any disaster and no civil protection plans existed. The L'Aquila hospital and other key public buildings were known to be vulnerable to seismic hazards, and many residential buildings were badly constructed. The poor state of buildings and the risks associated with this were known for at least 20 years (Boschi, 1995; Barberi et al., 2007). As a key informant reported, local awareness of the increasing vulnerability was evident in comments made at body corporate meetings by some residents about cracks appearing in buildings (many of which collapsed during the earthquake) and by their demands for building inspections and to see civil protection plans. During March, as a key informant reported, some local inhabitants tried to contact the Abruzzo Region Councillor responsible for local civil protection, Daniela Stati, to ask whether there were civil protection plans should there be a severe earthquake. The growing anxiety in the local population at the time of the MRC meeting was accompanied by an emerging awareness of increasing local vulnerabilities that characterised the local context and that amplified local community perceptions about their hazard exposure. A press release from the Abruzzo Region Civil Protection (ARCP) on the morning of 30 March 2009 stated that no more shocks were foreseen – paradoxically, there was a 4.1 earthquake that very afternoon. During the trial, the chief of the DCP, Guido Bertolaso, declared that this press release and the Giuliani predictions were the reasons for calling the MRC meeting on 31 March. After reading the press release, Bertolaso phoned Daniela Stati (Abruzzo Region Councillor responsible for civil protection and the ARCP) stating: "you must tell your staff not to write press releases that say other earthquakes will not happen, because this is bullshit and when talking about earthquakes these things must not be said" (Tribunale di L'Aquila, 2012, p.150). He went on:

"Listen, De Bernardinis, my deputy, will call you shortly. A meeting [of the MRC] about this earthquake swarm will be held in L'Aquila in order to shut up any imbecile, calm down any conjectures, worries etc. ... I will make them [the members of the MRC] come to L'Aquila to the Abruzzo region's headquarters, or to the local prefecture, you choose, I do not care, so that it will be more of a media move [strategy]. Understand? ... In this way, they, who are the best in earthquakes, will say: in a normal situation, they [the tremors] are phenomena that happen, and better that there be 100 tremors of 4 on the Richter scale rather than silence, because 100 earthquakes serve to release energy, and therefore there will never be the big one, the one that really hurts. ... Now, talk with De Bernardinis and decide where to hold this meeting tomorrow and make it known that there will be a meeting, and that this is not because we are afraid or worried, but because we want to reassure and calm people. Instead of us talking, we will let the best scientists in the field of seismology talk" (Tribunale di L'Aquila, 2012, p.152, author translation).

The meeting was scheduled for 18.30 on 31 March at the Abruzzo Region Headquarters in L'Aquila. It was convened by sending a faxed letter in the evening of 30 March to the MRC members. The letter stated that the discussion topic was "to carefully analyse the scientific and civil protection issues related to the seismic sequence occurring in L'Aquila Province over the last four months and which culminated in the 4.0 earthquake on 30 March 2009 at 15.38 local time" (Tribunale di L'Aquila, 2012, p.94). The DCP also issued a press release stating that an MRC meeting was convened for 31 March to provide information from the scientific community about the recent seismic activity and that there would be a press conference following the meeting.

The meeting of the Italian Major Risks Committee

The trial documents (Tribunale di L'Aquila, 2012, pp.99-103) indicate that the MRC meeting began at 18.30 and ended at 19.30. The 2-page draft minutes (dated 2 April 2009) and the 5-page formal minutes (dated 6 April 2009) were reproduced in the trial documents (Tribunale dell'Aquila, 2012). They indicate that 19 named people and a few unnamed people were present. Although there is no verbatim transcript or audio recording, because the trial primarily related to the conduct and content of this meeting, the discussion in that meeting was reasonably reconstructed through the trial process. Now, after the trial, there is little doubt or debate about the content of the meeting. According to the trial documents, handwritten notes about the meeting were taken by Lorella Salvatori, an employee of the DCP. She produced the draft minutes, which she distributed on 2 April. The final formal version of the minutes was only signed off by most attendees after the fatal earthquake, on 6 April 2009. Curiously, the formal minutes were also signed by Carlo Gizzi, the press officer for the Abruzzo Region, even though he was not named as being present. The people present at the meeting (with their role at the time) were:

The senior government official

1. Bernardo De Bernardinis, Deputy Technical Head, Department of Civil Protection;

Full members of the MRC:

2. Franco Barberi, MRC Deputy President, professor of volcanology at Roma Tre University;
3. Enzo Boschi, President of the Italian National Institute of Geophysics and Volcanology and professor of terrestrial physics at the University of Bologna;
4. Gian Michele Calvi, Director of the European Centre for Training and Research in Earthquake Engineering and professor of planning in seismic zones at the University of Pavia;
5. Claudio Eva, professor of terrestrial physics at the University of Genoa.

Other invited scientists:

6. Mauro Dolce, Director of the DCP Seismic Risk Office and professor of construction technology at the University of Naples Federico II;
7. Giulio Selvaggi, Director of the Italian National Centre for Earthquakes.

People present in a formal capacity:

8. Leone Altero, Technical Head of ARCP;
9. Gianluca Braga, L'Aquila Prefecture Office;
10. Massimo Cialente, Mayor of L'Aquila;
11. Attilio D'Annibale, DCP Communication Service;
12. Antonio Lucantoni, DCP Seismic Office;
13. Marinello Mastrogioseppe, ARCP;
14. Graziella Patrizi, L'Aquila Prefecture Office;
15. Rinaldo Pezzoli, L'Aquila Prefecture Office;
16. Roberto Riga, L'Aquila Councillor, responsible for civil protection;
17. Lorella Salvatori, DCP employee (produced the minutes);
18. Daniela Stati, Abruzzo Region Councillor in charge of civil protection;
19. Carlo Visca, ARCP.

People not named in the minutes, but can be deduced as being present because they signed the document, were mentioned in the trial, or were indicated by our sources as being present:

20. Christian Del Pinto, seismologist for the Molise Region Civil Protection;
21. Carlo Gizzi, press officer for the Abruzzo Region;
22. Two or three members of the local fire service.

Curiously, the President of the MRC, Giuseppe Zamberletti, was not present. No explanation was given for this, and there was little mention of him in the trial. The trial did not raise any issues relating to the integrity of the formal minutes, and one of our interviewees (who was present) indicated that the formal minutes were congruent with what transpired at the meeting. Drawing on the formal minutes and the court discussion, the general outline of the meeting can be reconstructed (see below).

Although Barberi was ostensibly the Chair, De Bernardinis opened the meeting, passed on the greetings of the DCP Chief (Bertalaso, who could not attend), and then introduced the people present. He quickly explained why the meeting was convened and invited the discussion to start. As evident in the minutes, there were two main topics of discussion: making an objective evaluation of the on-going seismic events, especially in relation to what could be forecasted; and providing advice concerning the increasing alarm in the local population.

Dolce spoke first. He gave an overview of the seismic activity and then stated that panic was being created because of unfounded rumours, by which he probably meant Giuliani, although there were reports of other people creating alarm. Leone Altero (representing ARCP) said that the local police special branch had identified these people. The minutes give no information about what was going to be done about this. Curiously, this was the only remark made by him or other ARCP officials during the whole meeting. Despite a stated purpose of the meeting being civil protection issues, Altero was not asked to provide any information concerning DRR strategies, civil protection plans or local preparedness, nor did he elaborate on this at any time. The focus only on the local police action revealed that the main concern for the ARCP and DCP was alarmism rather than DRR, and indicates unease by these agencies.

Discussion of the scientific risk assessment took the majority of the meeting. All scientists agreed that: it was not possible to predict earthquakes; given the earthquake swarm, it was unlikely the magnitude of the tremors would increase; and that, in their opinion, little damage had been caused as a result of the seismic activity to date.

Discussion of the second agenda item was initiated by Stati who thanked the scientists for their explanation (that a serious earthquake was unlikely), but noted that she and the mayor were in positions in which they must give political answers. She asked the scientists whether she and the mayor should pay attention to the people who were creating alarm. Barberi responded by saying there was someone who was forecasting earthquakes by measuring gas emissions, but in his view there was no measurement tool that could predict earthquakes and therefore the MRC should not waste its time discussing this topic because earthquake forecasting has no scientific basis. Barberi also said that the on-going earthquake swarm does not predict anything but reminds us that L'Aquila is in a seismic area and that sooner or later, a big event would occur. Then, he remarked that the only defence possible is for the DCP and Abruzzo Region to invest in strengthening buildings and better planning. Closing discussion on this topic, somewhat surprisingly, Mauro Dolce highlighted that future technical assessments of school buildings should pay more attention to the vulnerability of the non-supporting structures (e.g. chimneys, false ceilings, cornices, balconies, etc) rather than to the supporting structures (walls etc), which almost surely were not damaged by the earthquake swarm. Daniela Stati concluded the meeting by saying: "thank you for your statements which will allow me to reassure the public through the media we will meet at the press conference". The meeting closed at 19.30.

The press conference with national and regional press followed immediately in the same building, being attended by Stati, Cialente, De Bernardinis, and Barberi. It was organised by DCP staff member, Simona Bernacchi, together with the Abruzzo Region press officer, Carlo Gizzi. Rather than the information presented at the press conference, what was broadcast on local and national

media was an interview De Bernardinis had given to a local TV station earlier in the day, in which he said the earthquake swarm was normal, there was no danger, and the scientific community confirmed that the situation was favourable in that there was a continuous discharge of energy and that, rather than worry, it was better to drink a glass of Montepulciano D'Abruzzo wine (Corte di Appello dell'Aquila, 2014). The trial established that late in the evening of 30 March, Barberi and Dolce independently phoned Bertolaso to inform him how the meeting went, each saying that it "went as instructed" and that they made the Abruzzo councillor (Stati) happy by saying that there were no tools for earthquake forecasting (Tribunale di L'Aquila, 2012). This suggests that the meeting was a political stunt involving stooges rather than professional advice from independent scientists.

The earthquake, trial, appeal and final outcome

As is now well documented, at 3.32 in the morning of 6 April 2009, a devastating earthquake (Mw 6.3) struck L'Aquila, and 309 people died. In the hours and days before the fatal earthquake, there had been further tremors, which led to much concern. It appears that the reassuring message of the MRC meeting had permeated the local civil protection representatives. This was evident in the village of Paganica where, shortly after midnight on 6 April and after an unusually-large tremor, the local civil protection representatives decided to advise people by loudspeakers to calm down and return indoors (Alexander, 2010, 2014, 2015).

A local lawyer, Valentini, began acting on behalf of people seeking justice and/or to sue for damages. He began investigating the issues behind the earthquake. In late August 2009, Valentini filed a suit (*denuncia penale*) with the local prosecutor alleging that the DCP and MRC had failed in its duty to ensure adequate prevention and preparedness, noting that the inability to predict earthquakes did not mean that a serious earthquake would not occur and did not exempt the DCP and MRC from their duty of care. Following extensive investigations, on 3 June 2010 the local prosecutor, Alfredo Rossini, issued indictments against Barberi, Boschi, Calvi, De Bernardinis, Dolce, Eva and Selvaggi for negligence (*negligenza*), carelessness (*imprudenza*) and malpractice (*imperizia*) with respect to their public duty of precaution and prevention (Law 225 of 24 February 1992), and for violating their responsibilities regarding public communication by a public institution (Law 150 of 7 June 2000). On 25 May 2011, the investigating judge, Romano Gargarella, confirmed that the trial would proceed.

The trial formally commenced on 20 September 2011. On the first day of hearings, it was announced that additional legal actions had been initiated by the Municipality of L'Aquila and by 67 individuals (mostly in a class action), 53 of who were claiming damages from the State. The presiding judge, Marco Billi, announced that the court would hear all actions together, with the State (in the form of the Presidency and the DCP) being added to the list of defendants. Following a trial spanning 13 months (with 31 days of court hearings), on 22 October 2012 Judge Billi delivered a guilty verdict and sentenced the accused persons to 6 years in jail (Tribunale di L'Aquila, 2012). They were found guilty of multiple manslaughter (*omicidio colposo plurimo*), bodily harm (*lesioni colpose*) and conspiracy (*cooperazione colposa*). Billi stated that the accused had conducted an assessment of risks that was 'too approximate, generic and ineffective' and omitted relevant factors. This led to 'incomplete, inaccurate and contradictory information' that had an inappropriate reassuring effect on the behaviour of many people. In addition to finding the 7 defendants guilty, Judge Billi held them, together with the State, responsible for the court costs and compensation for loss of life or injury for the vast majority of claims.

The State and the 7 defendants appealed. Following a lengthy process, on 10 November 2014, the Court of Appeal announced it had overturned the conviction. It ruled that no blame should be assigned to the 6 scientists. The civil servant, De Bernardinis, however, was not absolved from

responsibility, but his sentence was reduced from 6 to 2 years jail and the financial liability was reduced to payment of legal costs, with no compensation to be paid for loss of life or injury.

De Bernardinis and the State were still not happy and appealed this decision. Conversely, the claimants were also dissatisfied, especially given the loss of compensation, and also appealed. These appeals meant the case had to be considered by the Supreme Court of Cassation. In its definitive decision of 20 November 2015, the SCC upheld the decision of the Court of Appeal. The 169 page decision statement (Corte di Cassazione, 2016) repeated key facts and articulated various high level principles, some of which are discussed below.

A critical aspect to understanding this story relates how jail sentences are served in Italy. Unlike other countries where a jail sentence must be served immediately irrespective of the length of the jail time sentenced, in Italy the serving of a jail term is postponed until a person has amassed at least 5 years of jail time. Thus, the two year jail sentence of De Bernardinis has no immediate implication. Furthermore, it should be noted that the Presidency of the Council of Ministers appointed De Bernardinis to be President of the Institute for Environmental Protection (ISPRA) in October 2010. ISPRA was then nominated the main public body responsible to control disaster rubble management in the L'Aquila area and in the Abruzzo region during the State of Emergency. As this was after the commencement of legal proceedings, some people interpreted this as the Italian State snubbing the trial. At no time was De Bernadinis suspended or asked to stand down from this position, and he completed his presidential position unchallenged.

Key issues in the legal process

The various phases of the legal process identified many issues and had differing interpretations of them. These related to the status of the meeting held in L'Aquila, the public duty the DCP and MRC had for precaution and prevention of disaster risks, the risk assessment conducted, and the communication implemented. A major difference of legal opinion emerged between the initial trial and the Court of Appeal, with the Court of Appeal's interpretation being endorsed by the SCC. In Table 1, we summarise these key points.

<i>First Trial</i> 22 October 2012	<i>Appeal Court</i> 10 November 2014
The meeting of 31 March 2009 was a proper meeting of the MRC and all participants were aware of its public role (due to the press release issued by the DCP). They shared with the DCP a duty of precaution and prevention, and of fairly informing the public.	The meeting was not an official MRC meeting since it was not convened through normal procedure and was iniquate. The meeting was closed to the public. There is no proof the scientists knew of the DCP press release or the intention to make a public statement. By being convened through emergency procedures, the scientists were only providing advice to the DCP.
The public duty of precaution and prevention required that the risk assessment be complete and adequate, and that there be proper assessment of all factors influencing disaster risk, including vulnerability and hazard exposure.	Even if it was an official MRC meeting, no regulation established what would comprise a proper risk assessment.
The risk assessment done by the MRC was inadequate because it did not consider the vulnerability of housing and the built environment, or hazard exposure in relation to population density and distribution.	The scientists provided a scientifically-correct analysis of the risks associated with the earthquake swarm. Assessment of vulnerability or hazard exposure was irrelevant for the intended purposes of the meeting.
The scientists were aware of the public role of the meeting. They should have ensured that all information provided to the public was adequate. They were expected to correct any misleading information that might have been provided by the DCP.	Only the DCP had responsibility in relation to information provided to the public. The DCP and De Bernardinis were negligent because they should have considered the influence institutional communication had on the public.

Table 5.2: Comparison of interpretations between the First Trial and the Appeal Court
Source: extracted from Tribunale di L’Aquila, 2012 and Corte di Appello dell’Aquila, 2014

A key issue relates to the status of the meeting held in L’Aquila. This was significant because of the obligations potentially imposed on the participants. The SCC determined that the MRC meeting was not a conventional meeting because it was convened using emergency procedures and was iniquate. It also considered that whether it was a formal meeting or not was irrelevant because the scientists were nevertheless required to fulfil their duty of providing “techno-scientific and proactive advisory activities pertaining to precaution and prevention” (Corte di Cassazione, 2016, p.131). However, the SCC ruled that the MRC and DCP have differing responsibilities. The only task the MRC scientists had was to provide techno-scientific advice, while responsibility for implementing precaution and prevention was up to the Presidency of the Council of Ministers operating through the DCP and the various local civil protection authorities. Because the duties of the MRC scientists were different to the obligations of the DCP, the scientists were exonerated, while the senior public servant (De Bernardinis) representing the DCP and the Presidency was guilty of inappropriate public communication. The SCC explicitly criticised De Bernardinis and the institutions for inappropriate public communication.

The first trial judge determined the scientists were culpable by arguing they were negligent because they should have observed the principles of precaution and prevention in the risk assessment. Conversely, the SCC ruled that, while the principles of precaution and prevention establish what the DCP and MRC should do (i.e. the duty of diligence), they do not establish how this should be done (i.e. the diligence due), therefore the scientists could not be held individually accountable. The SCC ruled there was no specific action the scientists had to follow, except to utilise the best available scientific knowledge. The SCC considered there was nothing the scientists could have done that would have reduced the risk of an earthquake occurring. The SCC determined that the scientists did utilise the best available scientific knowledge and that they adequately discussed what the earthquake swarm meant regarding whether or not it was a precursor to more severe earthquakes. Evidently, risk was understood in the legal process as likelihood of an earthquake, not the interplay between the hazard itself, hazard exposure, the extent of vulnerability and resilience, and likely negative social consequences. The SCC judgement revealed that the regulations governing Italian civil protection do not establish any particular measures that must be adopted to implement DRR other than “generic cautions that the institutional bodies have to adopt in general” (Corte di Cassazione, 2016, p.130). Furthermore, in current law on civil protection, there is no definition of disaster risk, nor a prescribed methodology to follow to analyse and assess disaster risk. Another issue concerned whether the scientific risk assessment should have considered the vulnerability of buildings and hazard exposure of local people. This was a key basis by which the original judge determined the risk assessment was inadequate and the scientists negligent. The Court of Appeal and SCC, however, said that the poor state of buildings was already known for at least 20 years by the people at the MRC meeting (Boschi, 1995; Barberi et al., 2007) and therefore was irrelevant in terms of whether it should have been explicitly discussed. This also reveals limited framing in how disaster risks were conceived.

The wider implications of the trial

The L’Aquila trial exposed many things, which are mostly too complicated to discuss in one short paper. Primarily, the trial revealed the narrowness of the techno-scientific approach towards disaster risk that was applied by the DCP and the members of the MRC, all of whom apparently had little understanding of the social dimensions of disaster risk. In asking the scientists to “carefully analyse the scientific and civil protection issues related to the seismic sequence occurring in L’Aquila Province” (Tribunale di L’Aquila, 2012, p.94), the DCP expected that there be a risk assessment only in terms of the likelihood of a strong earthquake in the short term. The focus of the risk assessment was not on local people’s wellbeing, their vulnerabilities, resilience, or transformative change processes, but strictly only on the hazard phenomenon. What the MRC scientists and DCP understood as ‘civil protection issues’ were actually matters of public control rather than DRR.

Such a limited perspective is odd, because at the time of the 2009 earthquake, the DRR paradigm had been well-established for over 15 years, and was embedded in international declarations such as the Yokohama Strategy (IDNDR, 1994) and the Hyogo Framework for Action (UNISDR, 2005) – and subsequently in the Sendai Framework (UNISDR, 2015). The DRR paradigm requires a proper risk assessment that considers the multiple dimensions of local people’s wellbeing. This means, for each dimension, understanding which assets are more vulnerable to the negative consequences of disasters, and which capacities local communities activate to manage risks and convert them into opportunities for development and enhanced resilience. Managing disaster risk demands transformative knowledge co-production processes that are capable of understanding, recognising, engaging and empowering the driving forces that reduce vulnerabilities and enhance local people’s wellbeing and resilience (Future Earth, 2014; Gall et al., 2014a; Imperiale and Vanclay, 2016b; Patterson et al., 2015).

The MRC discussion was seen as confidential advice to the DCP rather than being an opportunity for place-based transformative knowledge co-production. Had they been engaged, the local public health system, municipal services, professional associations, building firms, NGOs, and other formal and informal groups and individuals could have helped to better understand and identify local risks and vulnerabilities. Their potential role in contributing to prevention and preparedness, adding to knowledge concerning local disaster risk, and recognising the increasing vulnerability of buildings and local people's hazard exposure, should have been valued and utilised. Overall, the DCP knowledge system was impervious to public input and resistant to public use, and did not engage with the local driving forces of transformation. By having a closed knowledge system, the DCP failed to allow learning and transformation to take place. In the years preceding the earthquake, many reports about structural vulnerabilities in the L'Aquila area had been provided to key decision makers (DCP, the Abruzzo region and the local mayors). However, these reports were not shared with the broader public and there is no evidence that any action had been taken in response to any of them (Cocco et al., 2015; Stucchi et al., 2016).

Over-reliance on the techno-scientific approach demonstrates there is still a lack of understanding about how social vulnerability, risk and impacts are theoretically and practically related and about how science can contribute to enhancing local sustainable transformation (Future Earth, 2014; Patterson et al., 2015; Imperiale and Vanclay, 2016b). This lack of understanding of the social dimensions of disaster (Imperiale and Vanclay, 2016) results in disaster risks being narrowly defined in regulatory frameworks and in inadequate procedures for managing disaster risk, conducting proper risk assessments, and pursuing sustainable transformation. As other studies have also noticed (Simoncini, 2014; Scolobig et al., 2014), the L'Aquila trial shows that the relationship between policy and science within risk governance led by top-down emergency-centred civil protection agencies is still confused and does not contribute to transformative knowledge. The assessment and management of disaster risk should not be considered as separate, different and autonomous spheres, but rather as an integrated whole. How the management of disaster risk influences its assessment and viceversa should be part of a risk governance process with a shared public goal (i.e. enhancing DRR and community resilience).

Conclusion

It was not science that was on trial in L'Aquila, arguably it was patronage, political cronyism and the top-down, command-and-control system of disaster management. The trial was not about whether the fatal earthquake could have been predicted or not, it was about whether the relevant public bodies (the Major Risk Committee and the Department of Civil Protection) adequately fulfilled their duty of care by conducting a proper risk assessment and whether they adequately communicated with the public. The key issue in the trial related to the responsibilities and duties of scientists and the inadequacies of the MRC's risk assessment, especially the lack of consideration of local vulnerabilities and hazard exposure. Although the scientists were eventually exonerated by the Supreme Court of Cassation, this was only possible because of inadequacies in the Italian regulations about how risk is defined and how risk should be assessed and managed. In contrast, the State, DCP and government official (De Bernardinis) were found guilty of inadequate information dissemination. We consider that, despite the not guilty decision, the trial process suggests that some scientists at the MRC meeting displayed callousness and sycophancy, suggesting their complicity and/or naiveté in deceptive strategic action intended to suppress concern in the community, subdue alarmism, and demonstrate institutional action.

The academic debate about the trial focused mainly on issues such as earthquake forecasting, how uncertainty should be addressed, and how risks should be communicated. There was strong sympathy for the scientists, who were generally seen as being inappropriately accused. In our view, much of the academic analysis failed to consider the institutional, scientific and social

responsibilities to implement DRR at all levels. The technical perspective that framed most of this academic discussion failed to appreciate the social dimensions of disaster and disaster risk. In the academic and popular discussion, there was little reflection on the responsibilities of the public institutions or on the transformational role the DRR paradigm demands of science. Our analysis revealed multiple failures by all relevant institutions at all levels. At the theoretical level, there was an over-reliance on techno-scientific analysis, which failed to understand the social dimensions of disaster risks and failed to engage local communities in knowledge co-production and sustainable transformation. At the practical level, there was a lack of planning and an over-reliance on a top-down system of command-and-control that centralised responsibility and stifled local action. It was clear that the meeting of MRC scientists was only a political stunt intended to harness their status to make a statement that could be used by politicians to calm the public, and to legitimise the lack of institutional (and social) preparedness.

Ideally, the MRC should have taken sufficient time to conduct a proper risk assessment that would have appreciated the multiple dimensions of disaster risk, focussed on local people's wellbeing, their vulnerabilities, and resilience, and be a transformative change process that engaged all relevant local actors. Notwithstanding many reports highlighting vulnerabilities in the local built environment, the local authorities took no action, nor were any civil protection plans or emergency/evacuation plans shared with the public before the earthquake. This lack of preparedness was not considered a relevant matter to discuss in the MRC meeting. As our document analysis revealed, there is still a lack of understanding about how to conduct a proper disaster risk assessment and fully respect the duty of care concerning DRR.

While the trial established that the only responsibility the scientists had was to refer to the best available scientific knowledge, now, ten years after the L'Aquila disaster, it is high time to consider the questions: *Does the best available scientific knowledge concerning DRR only relate to seismological analysis of physical hazards?*; and *Should there be an interdisciplinary risk assessment protocol the MRC should follow to consider the multiple dimensions of disaster risk?* The political patronage system in Italy has led to elite capture and distortion in the allocation of funds, and to poor planning practice and culture. The regulations governing Italian civil protection do not establish any particular measures that must be adopted to implement DRR other than "generic cautions that the institutional bodies have to adopt in general". According to the legal framework underpinning Italian disaster governance and to the trial documents, responsibility for implementing DRR strategies is up to the Presidency of the Council of Ministers operating through the national DCP and the local civil protection authorities. Although the Italian State issues laws, provides recommendations, establishes building codes, and commissions technical reports and information campaigns, there is little in this system that protects against elite capture or ensures adequate implementation. Because of restrictions on funding for prevention, and a belief that DRR is a constraint to development, local political authorities are often unwilling and ill-prepared to implement DRR. Consequently, in L'Aquila there was a lack of prevention and preparedness.

Overall, what emerged from our analysis was that there was: a widespread lack of understanding in the DCP-MRC system of the interplay between social vulnerability, risk and impacts; a lack of definition of risk in all its dimensions and lack of procedure for proper disaster risk assessment and management in regulatory frameworks; a lack of awareness about the transformative role of science for DRR purposes; and a consequent lack of planning and monitoring of DRR strategies and of acknowledgement of the role local communities must have in planning. Despite the thorough analysis of DRR throughout the legal process (especially in the first trial), it was surprising there wasn't any reference to the international DRR and resilience paradigm (e.g. Yokohama Strategy, the Hyogo Framework for Action, and the concept of community resilience). This lack of awareness of the international discourse is odd and arguably reveals: a lack of influence by United Nations bodies; disconnection between national bureaucracies (at least in

Italy) and international thinking; the dominance of the command-and-control approach of the Italian DCP (and of civil protection systems in general); and resistance to transformative learning and approach, and to the innovations promoted by the sustainability thinking which advocate for transformative knowledge co-production processes addressed to enhance local people's capacities in understanding vulnerabilities and better managing risk at the local community level.

In the Italian political system, political leaders are shrewd masters of buck-passing and blame diversion to avoid responsibility for critical issues, while being adept at claiming credit for successes whether or not they are deserved. The L'Aquila trial revealed many instances of such behaviour. Arguably, there was an attempt made by some political leaders to shift responsibility for their lack of consideration of DRR issues to the scientists. When the trial started, the scientists provided a convenient scapegoat, although we are convinced that this was not the original motivation for the trial. When the trial ended, with the scientists being exonerated, the government official provided a further convenient scapegoat for institutional failure. The fact that he was subsequently given a high-level top job is suggestive. According to the current legal framework that rules the Italian disaster governance, reducing the vulnerabilities that existed in L'Aquila was not the task of the scientists who attended the MRC meeting, who only had the modest obligation to analyse the earthquake swarm and its implications for the likelihood of future earthquakes. Reducing the vulnerabilities is the task of the Italian civil protection authorities. Although the State issues laws, provides recommendations, establishes building codes, and commissions technical reports, there was nothing within this system that protects against elite capture or that ensures adequate implementation at the local level and social learning and transformation. As it is understood now, responsibility for implementing DRR strategies is up to the Presidency of the Council of Ministers operating through the national DCP and the various local civil protection authorities and a rigid chain of command. Because of restrictions on funding for prevention, and a belief that DRR is a constraint to development, local authorities are often not willing to implement DRR and/or are unsupported in this task.

Reflections on disaster trials are opportunities for learning and transformation. Our analysis of the L'Aquila trial gave rise to several suggestions. First, opening-up the knowledge system of disaster governance allows a broader social constituency to gain access and to have shared responsibility for knowing, doing and learning DRR. Second, DRR and resilience, like the other sustainable development goals, must not be seen only as the responsibility of the civil protection authorities or of a group of scientists convened in a meeting, it must be a shared goal creating a more collaborative, inclusive and sustainable disaster governance at all levels. Third, DRR and resilience require transformative knowledge and community place-based assessment capable of engaging with the local driving forces of transformation (Imperiale and Vanclay, 2016b). According to the international DRR and resilience paradigm, understanding disaster risk in all its dimensions means understanding that disaster risks are part of all societies. Disasters and disaster risks are not external forces from which society must be protected. Rather than protecting societies from risks, DRR requires effective transformational knowledge to empower societies to better manage risks and achieve social development. A radical shift from civil protection systems to community empowering systems is needed so that disasters (and disaster risks) are no longer seen as external forces from which societies must be protected, but as potential threats originating from the vulnerabilities of a society, which must be understood and reduced at the local level. These threats should be managed by understanding and reducing local vulnerabilities and risks, and by recognising, engaging and strengthening local people's assets and capacities in order to better design, implement and monitor participatory mitigation strategies, thus enabling the conversion of risks into opportunities for the enhancement of wellbeing and resilience at the local community level.

References

- Alexander, D.E. (2010), “The L'Aquila earthquake of 6 April 2009 and Italian Government policy on disaster response”, *Journal of Natural Resources Policy Research*, Vol. 2 No. 4, pp. 325-342.
- Alexander, D.E. (2013), “An evaluation of medium-term recovery processes after the 6 April 2009 earthquake in L'Aquila, Central Italy”, *Environmental Hazards*, Vol. 12 No. 1, pp. 60-73.
- Alexander, D.E. (2014), “Communicating earthquake risk to the public: the trial of the ‘L'Aquila Seven’”, *Natural Hazards*, Vol. 72 No. 2, pp. 1159-1173.
- Alexander, D.E. and Magni M. (2013), “Mortality in the L'Aquila (Central Italy) earthquake of 6 April 2009: A study on victimisation”, *PLOS Currents Disasters*, 2013 Jan 7. Edition 1. doi:10.1371/50585b8e6efd1.
- Arcuri, A. and Simoncini, M. (2015). Scientists and Legal Accountability: Lessons from the L'Aquila Case. EUI Working Paper LAW 2015/17. Available at http://cadmus.eui.eu/bitstream/handle/1814/35458/LAW_2015_17.pdf?sequence=1&isAllowed=y (accessed 30 July 2018)
- Barberi, G., Bertolaso G., Boschi, E. (2007), “Difendersi dai Terremoti: la prevenzione sismica in Italia”, in Barberi F. (eds), *Dall'emergenza alla ricostruzione*, Regione Umbria, 2007. Available at: http://speciali.espresso.repubblica.it/pdf/Difendersi_dai_terremoti.pdf (accessed 30 July, 2018)
- Benadusi, M. and Revet, S. (2016), “Disaster trials: a step forward”, *Archivio Antropologico Mediterraneo*, Vol. 18 No. 2, pp. 7-15.
- Benessia, A. and De Marchi, B. (2017), “When the earth shakes... and science with it: The management and communication of uncertainty in the L'Aquila earthquake”, *Futures*, Vol. 91, pp. 35-45.
- Bindi, R. (2018). Relazione Conclusiva, Commissione parlamentare di inchiesta sul fenomeno delle mafie e sulle altre associazioni criminali anche straniere. Available at: <http://www.avvisopubblico.it/home/wp-content/uploads/2018/02/XXIII-n.-38.pdf>
- Boschi, E., Gasperini P., Mulargia, F. (1995), “Forecasting where larger crustal earthquakes are likely to occur in Italy in the near future”, *Bulletin of the Seismological Society of America*, Vol. 85 No. 5, pp. 1475-1482,
- Boschi, E. (2013), “L'Aquila's aftershocks shake scientists”, *Science*, Vol. 341, No. 6153, pp. 1451-1451.
- Bretton, R., Gottsmann, J., Aspinall, W. and Christie, R. 2015. “Implications of legal scrutiny processes (including the L'Aquila trial and other recent court cases) for future volcanic risk governance”, *Journal of Applied Volcanology*, Vol. 4 No. 18, pp. 1-24.
- Cartlidge, E. (2012), “Aftershocks in the courtroom”, *Science*, 336 (12 October 2012), 184-188.
- Ciccozzi, A. (2016), “Forms of truth in the trial against the Commission for Major Risks: Anthropological notes”, *Archivio Antropologico Mediterraneo*, Vol. 18 No. 2, pp. 65-81.

- Clark, S. (2012), "From Galileo to the L'Aquila earthquake: Italian science on trial, The Guardian, 24 October, 2018", Available at: <http://currents.plos.org/disasters/article/dis-12-0009-mortality-in-the-laquila-central-italy-earthquake-of-6-april-2009/> (accessed 30 July 2018).
- Cocco, M., Cultrera, G., Amato, A., Braun, T., Cerase, A., Margheriti, L., ... and Meletti, C. (2015). The L'Aquila trial, *Geological Society, London, Special Publications*, 419(1), 43-55.
- Coppola, D.P. (2015). *Introduction to International Disaster Management* (3rd edn). Butterworth-Heinemann, Burlington MA.
- Cornell, S., Berkhout, F., Tuinstra, W., Tàbara, J., Jäger, J., Chabay, I., de Wit, B., Langlais, R., and Otto, I. (2013). Opening up knowledge systems for better responses to global environmental change, *Environmental Science & Policy*, 28, 60-70.
- Corte di Appello dell'Aquila (2014), *Sentenza nel processo penale a carico di Barberi Franco, De Bernadinis Bernardo, Boschi Enzo, Selvaggi Giulio, Calvi Gian Michele, Eva Claudio, Dolce Mauro*, Corte di Appello dell'Aquila, L'Aquila, Italy. Available at: <https://processoaquila.files.wordpress.com/2015/03/sentenza-appello-aq-1-1001.pdf> (accessed 30 July 2018).
- Corte di Cassazione (2016), *Sentenza sul ricorso proposto dal Procuratore Generale presso la Corte di Appello dell'Aquila et al.*, Corte Suprema di Cassazione, IV Sezione Penale. Available at: <http://www.giurisprudenzapenale.com/2016/04/01/terremoto-laquila-la-sentenza-della-cassazione-sulla/> (accessed 30 July 2018).
- Cottrell, A. and King, D. (2011). "Disasters and climate change", in Vanclay, F. and Esteves, A.M. (Eds), *New Directions in Social Impact Assessment: Conceptual and Methodological Advances*, Cheltenham: Edward Elgar, pp.154-170.
- DNA (Direzione Nazionale Antimafia e Antiterrorismo). (2017). Relazione annuale sulle attività svolte dal Procuratore Nazionale e dalla Direzione Nazionale antimafia e antiterrorismo nonché sulle dinamiche e strategie della criminalità organizzata di tipo Mafioso nel periodo 1 Luglio 2015-30 Giugno 2016, DNA. Available at: <http://www.avvisopubblico.it/home/wp-content/uploads/2017/06/RELAZIONE-DNA-1.7.2015-30.6.2016.pdf>
- Fidone, G. (2017). The Conflict against corruption and the pursuit of efficiency in public negotiation in Italy, *US-China Law Review*, 14(30), pp.30-45
- Fioritto, A. (2014), "Science, scientist and judges: Can judges try science?", *European Journal of Risk Regulation*, Vol. 5 No. 2, pp. 133-136.
- Future Earth. 2014. Strategic Research Agenda 2014: Priorities for a global sustainability research strategy. Paris, France: International Council for Science.
- Gabrielli, F. and Di Bucci, D. (2015). Comment on "Communicating earthquake risk to the public: the trial of the 'L'Aquila Seven'" by David E. Alexander, *Natural Hazards*, 75(1), 991-998.

- Gall, M., Cutter, S. and Nguyen, K. (2014), *Transformative Development and Disaster Risk Management*, IRDR AIRDR, Publication No. 4, Beijing: Integrated Research on Disaster Risk. Available at: <http://www.irdrinternational.org/wp-content/uploads/2015/01/AIRDR-Project-Report-No.-4-WEB-7MB.pdf> (accessed 30 July 2018).
- Hall, S. (2011), “Scientists on trial: At fault?”, *Nature News*, Vol. 477, No. 7364, pp. 264-269.
- Hasian, M., Paliewicz, N., Gehl, R. (2014). Earthquake Controversies, the L’Aquila trials, and the Argumentative Struggles for both Cultural and Scientific Power, *Canadian Journal of Communication*, 39,557-576
- Herovic, E., Sellnow, T. L., and Anthony, K. E. (2014). Risk communication as interacting arguments: viewing the L’Aquila earthquake disaster through the message convergence framework. *Argumentation and Advocacy*, 51(2), 73-86.
- Hewitt, K., and Mehta, M. (2012). Rethinking risk and disasters in mountain areas, *Journal of Alpine Research*, 100-1, Available at: <https://journals.openedition.org/rga/1653>
- IDNDR (International Decade for Natural Disaster Reduction). (1994), *Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation*, IDNDR World Conference on Natural Disaster Reduction, Yokohama, Japan, 1994. Available at: http://www.unisdr.org/files/8241_doc6841contenidol.pdf (accessed 30 July 2018).
- Imperiale, A.J. and Vanclay, F. (2016a), “Experiencing local community resilience in action: Learning from post-disaster communities”, *Journal of Rural Studies*, Vol. 47, pp. 204-219.
- Imperiale, A.J. and Vanclay, F. (2016b), “Using Social Impact Assessment to strengthen community resilience in sustainable rural development in mountain areas”, *Mountain Research and Development*, Vol. 36 No. 4, pp. 431-442.
- INGV (Istituto Nazionale di Geofisica e Vulcanologia). (2012). Il Processo a L’Aquila, available at: <http://www.ingv.it/ufficio-stampa/stampa-e-comunicazione/archivio-comunicati-stampa/comunicati-stampa-2012/processo-a-l-aquila/> (accessed 30 July 2018).
- Joffe, H., Rossetto, T., Bradley, C. and O'Connor, C. (2018). Stigma in science: the case of earthquake prediction, *Disasters*, 42(1), 81-100.
- Kelman I., Gaillard, J.C., Lewis, J., Mercer, J. (2016). Learning from the history of disaster vulnerability and resilience research and practice for climate change, *Natural Hazards*, 82(1), pp.129-143
- Lauta, K. (2014), “New fault lines? On responsibility and disasters”, *European Journal of Risk Regulation*, Vol. 5 No. 2, pp. 137-145.
- Lewis, J. (2011). Corruption: The hidden perpetrator of under-development and vulnerability to natural hazards and disasters, *JÀMBÁ: Journal of Disaster Risk Studies*, 3(2), pp.464-475
- Nosengo, N. (2010), “Italy puts seismology in the dock”, *Nature*, Vol. 465, No. 7301, pp. 992-992.

- Nosengo, N. (2012), “New twists in Italian Seismology Trial: Californian scientist testifies against defendants in quake manslaughter case”, *Nature*, 16 February 2012. Available at: <https://www.nature.com/news/new-twists-in-italian-seismology-trial-1.10049> (accessed 30 July 2018).
- Notaro, D. (2014), “Scientists and earthquake risk prediction: “Ordinary” liability in an extraordinary case?”, *European Journal of Risk Regulation*, Vol. 5 No. 2, pp. 159-167.
- Nuti C., and Vanzi, I. (1998). Assessment of Post-Earthquake availability of Hospital System and upgrading strategies, *Earthquake Engineering and Structural Dynamics*, 27, pp.1403-1423
- Oliver-Smith, A. (1996). Anthropological research on hazards and disasters, *Annual Review of Anthropology*, 25(1), 303-328.
- Oliver-Smith, A., Alcántara-Ayala, I., Burton, I. and Lavell, A. (2017), “The social construction of disaster risk: Seeking root causes”, *International Journal of Disaster Risk Reduction*, Vol. 22, pp. 469-474.
- Orsini, A. (2015). Terremoto: i 27 processi tra crolli, ricostruzione e infiltrazioni, *AbruzzoWeb*, Available at: <http://www.abruzzoweb.it/contenuti/punto-sulle-inchieste/566783-302/>
- Patterson J., Schulz K., Vervoort J., Adler C., Hurlbert M., van der Hel S, Shmidt A., Barau A., Obani P., Sethi M., Hissen N., Tebboth K., Anderton K., Börner S., Widerberg O. (2015), ““Transformations towards sustainability’: Emerging approaches, critical reflections, and a research agenda”. Earth System Governance, Working Paper No. 33. Lund, Sweden, and Amsterdam, Netherlands: Earth System Governance Project, July, 2015.
- Perry, R.W. and Quarantelli, E.L. (2005), *What is a Disaster?: New Answers to Old Questions*, Philadelphia: Xlibris Corporation.
- Pietrucci, P. (2016), “Voices from the seismic crater in the trial of The Major Risk Committee: a local counternarrative of ‘the L’Aquila Seven””, *Interface: A Journal on Social Movements*, Vol. 8 No. 2, pp. 261-285.
- Quarantelli, E.L. (Ed.). (1998), *What is a Disaster? Perspectives on the Question*. New York: Routledge.
- Scolobig, A., Mechler, R., Komendantova, N., Liu, W. and Patt, A. (2014), “The co-production of scientific advice and decision making under uncertainty: Lessons from the 2009 L’Aquila earthquake”, Italy. *Planet@risk*, Vol. 2 No. 2, 71-75.
- Simoncini, M. (2014), “When science meets responsibility: The Major Risks Commission and the L’Aquila Earthquake”, *European Journal of Risk Regulation*, Vol. 5 No. 2, pp. 146-158.
- Stucchi, M., Pinho, R. and Cocco, M. (2016), “After the L’Aquila Trial”, *Seismological Research Letters*, Vol. 87, pp. 591-596.
- Tierney, K. (2006). “Social inequality, hazards, and disasters”, in Daniels, R.J., Kettle, D.F. and Kunreuther, H. (Eds), *On Risk and Disaster: Lessons from Hurricane Katrina*, University of Pennsylvania Press, Philadelphia, PA, pp.109-128.

- Tierney, K. and Oliver-Smith, A. (2012). Social dimensions of disaster recovery. *International Journal of Mass Emergencies & Disasters*, 30(2), 123-146.
- Tribunale di L'Aquila (2012), *Sentenza nella causa penale contro Barberi Franco, De Bernadinis Bernardo, Boschi Enzo, Selvaggi Giulio, Calvi Gian Michele, Eva Claudio, Dolce Mauro*. Tribunale di L'Aquila, L'Aquila, Italy. Available at: <https://iononfaccioniente.files.wordpress.com/2013/01/sentenza-grandi-rischi-completa.pdf> (accessed 30 July 2018).
- UNISDR (United Nations International Strategy for Disaster Reduction). (2005), *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters*. Geneva: UNISDR. Available at: <http://www.unisdr.org/we/inform/publications/18197> (accessed 30 July 2018).
- UNISDR (United Nations International Strategy for Disaster Reduction). (2015), *Sendai Framework for Disaster Risk Reduction 2015–2030*. Geneva: UNISDR. Available at: <http://www.unisdr.org/we/coordinate/sendai-framework> (accessed 30 July 2018).
- van Kerkhoff, L. and Szlezák, N. (2016). The role of innovative global institutions in linking knowledge and action, *Proceedings of the National Academy of Sciences*, 113(17), 4603-4608.
- Vasilescu, L., Khan, H. and Khan, A. (2008). Disaster management cycle: a theoretical approach. *Journal of Management and Marketing*, 6(1), 43-50.
- Yeo, M. (2014), "Fault lines at the interface of science and policy: Interpretative responses to the trial of scientists in L'Aquila", *Earth-Science Reviews*, Vol. 139, pp. 406-419.

