# Heritage and Catastrophe:
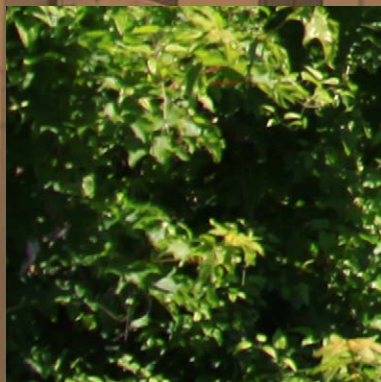
Prevention, Emergency, Restoration and Transformation
in 2009 L'Aquila Earthquake

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# Heritage and Catastrophe:

## Prevention, Emergency, Restoration and Transformation in 2009 L'Aquila Earthquake

# Preface

At 3:32 on April 6th, 2009, after a four-month swarm, a massive earthquake struck a part of Abruzzo and the entire city of L'Aquila. A city of over 72,000 inhabitants, the fourth university city of Italy and the second city of Italy for the number of historic buildings. The earthquake, considering the people around the basin and students from other cities, led to more than 140,000 displaced. The emergency was dramatic. For the first time the epicenter was destroying a region capital, the heart of political and administrative life.

On April 7, 2009, by order of the Mayor, all of the built heritage of the city was declared unfit for use, which means that all the inhabitants were considered homeless. The setting up of the tent cities was immediate. By a subsequent order, on April 9th, 2009, the Mayor imposed a ban on access to the historic center of the city and to 49 historic centers of the villages struck by the earthquake. Immediate was also the shoring, to secure the building and the localization of emergency construction projects that have resulted in 19 new urban centers, with 185 buildings, 1176 temporary housing units and 33 school buildings for temporary use.

After the management commissioner of the reconstruction, the City of L'Aquila adopted a "Timetable" for the reconstruction, which laid down the dates of the rebirth of L'Aquila and the surrounding area. We rolled up our sleeves, and after the initial difficulties we immediately started repairing thousands of houses that had been partially damaged, quickly allowing the return home to about 45,000 people. We have almost finished the reconstruction of collapsed or irremediably damaged houses in the suburbs and we have started the restoration of the great historical and architectural heritage of historic centers.

The new town of L'Aquila was, however, thought of as an important "smart" dimension that will have a key role in the national scene. The "smart" approach to reconstruction has given permission to launching a prolific path for the creation of a vision of an avant-garde city, sustainable and projected on future societal challenges. The City of L'Aquila, has also set the reconstruction of underground- services with choices that use the latest technology in the industry. In a few years, the City will be totally wired by optical fiber and every home in the historic center will be connected Wi-Fi.

With the certainty of funding from the government, according to the time schedule of the reconstruction, we can say today that in 2019 the City will be finally rebuilt. Therefore, I invite you to visit again L'Aquila city and tell the world of a small Italian community, torn apart by an earthquake that was able to take back their city and their lives.

Of this I am proud.

**Dott. Massimo Cialente**
*Mayor of L'Aquila*

# Acknowledgements

Sant'Angelo, who showed us the work done by the team of Catania, led by Prof.ssa Caterina Carocci.

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**Territorial Office of Homogeneous Area of Barisciano.** Arch. Anna Scudero, architect in charge for the adoption of the reconstruction plan of Fossa, who presented the technical side of the reconstruction work done at Fossa and in other villages in the Homogeneous Area.

**The People of L'Aquila.** Who not only patiently responded our interviews, polls, questions, etc., but were always happy to see our interest and encouraged us in our work.

**Town of Fossa.** Mr. Antonio Gentile, Mayor, who showed us the old village and shared with us his plans for the reconstruction both material and economic.

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**Viviamo L'Aquila Association (viviamolaq. blogspot.it).** Arch. Alba Fagnani, Fabio Troiani, Tullio Perinetti, Andrea Ciammetti and Federico Massidda, who led us through a site visit to the Parcobaleno project, to L'Aquila city center and presented the interesting work that the Association is carrying on, answering to a significant set of questions about reconstruction, building procedures, communities involvement and psychology of disasters.

**Urban Management Students and Advisers on the Study Trip**
*Photo: Florencia Carvajal S.*

# Table of Contents

# List of Abbreviations

| | |
|---|---|
| CASE | Complessi Antisismici Sostenibili Ecocompatibili |
| | *– Ant-seismic Sustainable and Eco-compatible Complex* |
| CVO´s | Civil Organizations |
| DCP | Dipartimento della Protezione Civile – *Department of Civil Protection* |
| ECPR | European Consortium for Political Research |
| EIMS | Earthquake Information Management System |
| ENEA | Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile |
| | *– Italian National Agency for New Technologies, Energy and Sustainable Economic Development* |
| EU | European Union |
| EUCENTRE | European Centre for Training and Research in Earthquake Engineering |
| EVA | Eco Villaggio Autocostruito – *Self-constructed Eco Village* |
| GDP | Gross Domestic Product |
| GIS | Geographic Information System |
| GSSI | Gran Sasso Science Institute |
| HFA | Hyogo Framework for Action |
| HRC | High Risk Commission |
| INGV | Istituto Nazionale di Geofisica e Vulcanologia |
| | *– National Institute of Geophysics and Vulcanology* |
| JER | Japanese Earthquake Reinsurance |
| MAP | Moduli Abitativi Provvisori – *Temporary Habitation Module* |
| NEC | National Earthquake Center |
| NTC | Norme Tecniche per le Costruzioni – *Technical Building Norm* |
| OECD | Organization for Economic Co-operation and Development |
| UNISDR | United Nations Office for Disaster Risk Reduction |
| USRA | Ufficio Speciale per la Ricostruzione dell'Aquila |
| | *– Special Office for the Reconstruction of l'Aquila* |
| USRC | Ufficio Speciale per la Ricostruzione dei Comuni del Cratere dell'Aquila |
| | *– Special Office for the Reconstruction of l'Aquila Basin* |

*Right Page*
**Collapsed Building and
Subsequent Demolition
in the Basin of L'Aquila**
*Photo: Federico Rota*

# Introduction

**Renato D'Alençon Castrillón, M.Arch.**
**Federico Rota, M.Sc.**
*Editors*

On April 6th, 2009, a major earthquake hit the center region of Italy. The main shock occurred at 3:32 local time (1:32 UTC), and was rated 5.8 on the Richter scale and 6.3 on the moment magnitude scale, with the epicenter near L'Aquila, the capital of Abruzzo. L'Aquila and several villages in the surrounding suffered most damage. The earthquake killed at least 287 people, injured 1,000, left 40,000 homeless and damaged or destroyed 10,000 buildings in the L'Aquila area (U.S.G.S. 2014) and is the biggest ever to have affected a heritage city.

L'Aquila is particularly sensitive to earthquakes, as it sits on the bed of an ancient lake basin, and thus its soil structure is particularly poor in the event of an earthquake. While hard rock shakes with the same frequency and amplitude as seismic waves, the unconsolidated sediments of an ancient lake bed can amplify the shaking or lose their consistency and flow, almost like a liquid. This characteristic marks the history of L'Aquila, which has records of being struck by earthquakes as early as 1315 and will continue to be in the future.

Italy frequently experiences earthquakes, even if they are usually not very deadly as in other regions of the world. The last major earthquake was the 5.9-magnitude 2002 Molise earthquake which killed 30 people and was the deadliest quake in 20 years. Several policies and procedures for facing the emergency and the medium/long period reconstruction have been tested and applied during the last century, leading to two main strategy lines: endogenous "in situ" practices that aim to accurately restore what was before, where it was; exogenous policies that adopt mechanism of centralism, forced modernization of the territories and re-localization of wide portions of population in new urban settlements (Rota 2013, see Map 1).

*Left Page*
**Building Leftovers in**
**the Basin of L'Aquila**
*Photo: Federico Rota*

In Italy and elsewhere, the occurrence of an earthquake triggers a characteristic process of emergency relief, damage management and reconstruction. Immediately after the catastrophe the focus is to put on emergency responses: restoring infrastructure and communications, providing emergency shelter and recovering normality as soon as possible. While the emergency phase is (or should be) temporary, the process of reconstruction represent the opportunity to rethink about a territorial system and it should be thought to last, since it affects the future of the population. The process of reconstruction to be conducted after the management of the emergency

takes several years, if not decades, and is bound to be partial, with little support and burdened with a number of problems concealed in the process, many of which receive little or no attention.

One of these problematic edges is the loss of a valuable built heritage, which occurs widely, yet almost unnoticed behind the chaos of fast demolition during the first days and of practical reconstruction priorities of the months and years to come. Monuments such as historic buildings, churches, pieces of art and other built stock suffer severe damage, and even if some of the most notorious are repaired, many of



Year
Magnitude
Area (km)
Population
Population in tent camp
Deaths
Buildings hit

**Map 1:**
**Most Important Seismic**
**Events in Italy during**
**the 20th Century**
*Source: Rota 2013*
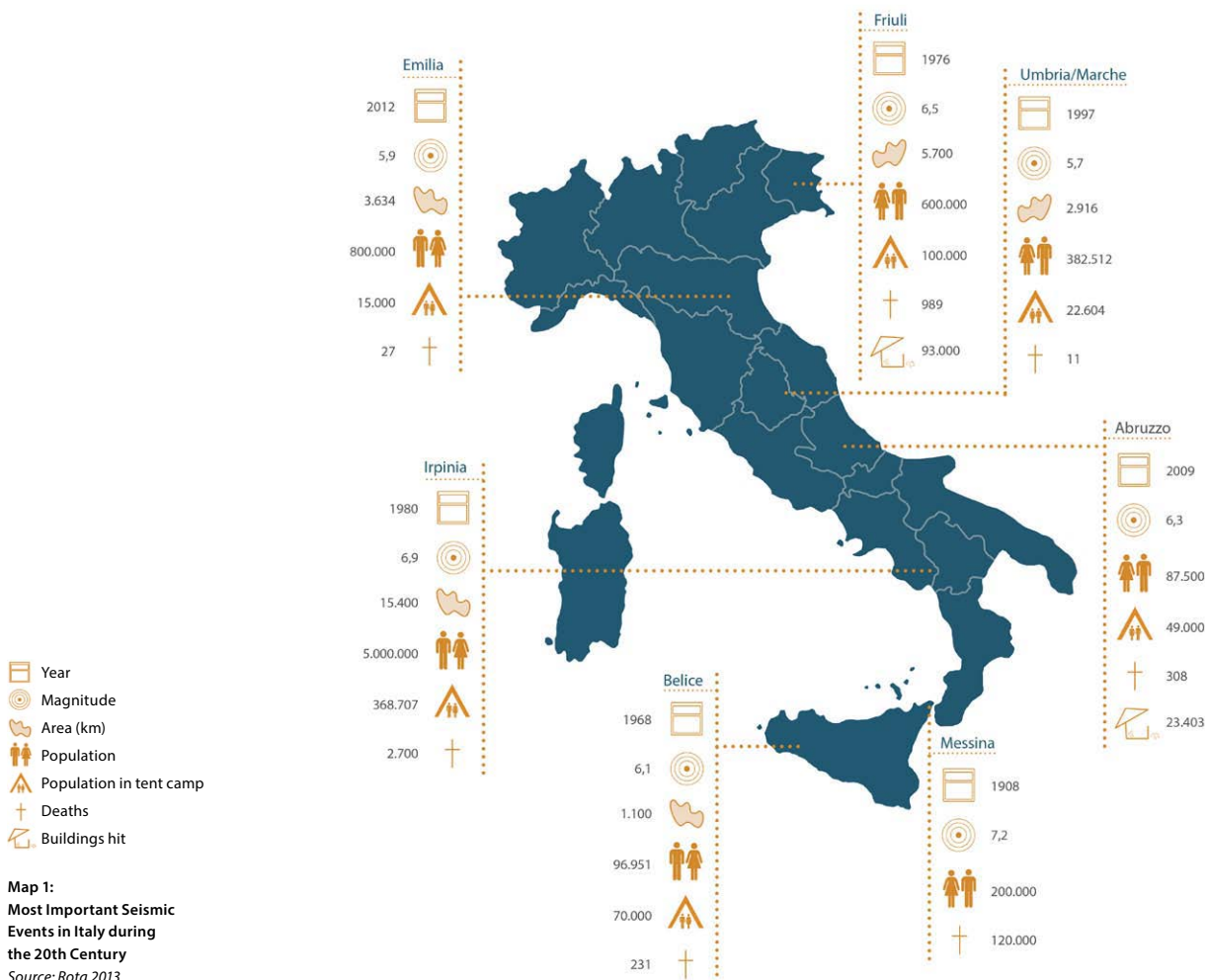
them are lost with the earthquake destruction and subsequent demolitions or are impossible to recover. Furthermore, the destruction of valuable domestic, non-monumental heritage is almost completely neglected. The most representative of these is the traditional architecture of small towns, which suffer extensive destruction even if designated as protected areas and receive little attention and investment.

Facing destruction and the need to rebuild, several questions arise: how to recover the assets damaged or lost in the buildings and houses collapsed, the cultural heritage embodied in the built stock and the traditional construction techniques? What policies need to be adopted or formulated to strengthen territories affected by natural disasters? How are these policies implemented in practice? How to involve the public authorities, the population and the technicians in order to improve the resilience of both communities and built environment? Or is it otherwise necessary to develop ad-hoc tools that allow the inclusion of architectural heritage criteria in post-catastrophe conservation, restoration and/or reconstruction of small towns and villages with a heritage value? How are planning tools relevant towards a wider regional intervention?



**Figure 1:**
**Photographic Survey of MAP Modules and CASE Complexes**
Temporary Habitation Modules (Modulo Abitativo Provvisorio, MAP), Followed by the Anti-Seismic Sustainable and Eco-Compatible Complexes (Complessi Antisismici Sostenibili Ecocompatibili, CASE)
*Photos: Federico Rota*

15

## Problem scope

Catastrophes management and reconstruction of built heritage after natural disasters have in recent time exceeded the technical dimension of building techniques and financing to include social, cultural and environmental elements, thus turning into a complex, multidimensional challenge. While the actions of reconstruction attempt a response to the immediate need for housing through construction methods of rapid implementation, several other issues arise in dealing with damaged built heritage assets such as the appropriateness of restoration and reconstruction of urban fabric and buildings, its social acceptance, its cultural pertinence and its comprehensive sustainability.

The aim of the work presented in this volume is to define the currency of management strategies and procedures after a catastrophic event, in particular earthquakes, which need to be able to cope with the growing cultural, historical, economic and environmental complexities such situations pose.

## Case of study: The L'Aquila earthquake 2009

The focus during the period after the L'Aquila earthquake was addressed to the management of the humanitarian and housing emergency, as well as the rehabilitation of the infrastructures. The rebuilding process began in the months following, starting with securing of collapsing structures and the construction of the Temporary Habitation Modules (Modulo Abitativo Provvisorio, MAP), followed by the Ant-seismic Sustainable and Eco-compatible Complexes (Complessi Antisismici Sostenibili Ecocompatibili, CASE) projects, which seem to have addressed the issue from the mere quantity point of view, with serious problems. On the one hand, a wide relocation of large segments of the population was made, to new apartments in residential complexes often far away from their original villages, work and family networks; on the other hand there was a huge neglect of the possibilities of reuse of existing built heritage, not just as a direct result of the earthquake, but also due to of the decision-making procedures leading to the construction of new houses, temporary and permanent (Figure 1).

The reconstruction processes triggered by the earthquake issues accelerated an already on-going process of depopulation that the L'Aquila region (except for the town itself), due to the lack of working opportunities for the youngest generation in such a rural environment. To understand these urban and material transformations, our research work must consider a deep understanding of the social, demographic and economic complexity of context (Map 3).

## Built heritage protection in Italy

Heritage loss can be mainly distinguished in two categories: the first consists of monuments, historic buildings, churches and other important buildings under heritage protection, while the second relates to the traditional, non-monumental architecture that characterizes most of the residential buildings in the historical centers in the basin affected by the earthquake. The buildings in which people lived for generations have an exceptional heritage value embedded in the use of local materials, in the traditional building techniques, in the building typologies and in the urban structure that define the collective memory they represent (Map 2).

The idea of Heritage is understood today as a complex issue with a wide range of meanings, far exceeding the built heritage, extended to the more inclusive concept of cultural heritage. Under this idea are included as belonging to heritage things such as biodiversity, folklore, audiovisual heritage, etc., further expanded through a series of other agreements and international definitions. Since 1980 more than 50 charters and other agreements have been announced directed to the recognition and preservation of heritage in various specific fields, greatly expanding the scope of the original idea (Getty Conservation Institute 2010) . To illustrate this development, it will suffice to mention the most recent ones, such as the Convention on Biological Diversity (2000), the European Landscape Convention (2000), and the Convention for the Safeguarding of Intangible Cultural Heritage (2003). UNESCO itself now recognizes a broader concept, which reflects mainly the above, the "cultural diversity", from the UNESCO Universal Declaration on Cultural Diversity

............ Confine comunale
───── Autostrada
───── Superstrada
───── Strada regionale
───── Strada statale
───── Strada provinciale
───── Strada comunale

**Map 2:**
**L'Aquila City and Territory. The Basin and its Settlements, Road Network and Demography**
*Source: Rota 2013*

Barete
633
284
661
1.901
1861  2010

Pizzoli
3.047
1.208
1033
4.871
1861  2010

Arischia (AQ)
1.299
538
291

L'AQUILA
43.575
16.631
3.444
43.575
1861  2010

Camarda (AQ)
512
214
131

Scoppito
2.757
977
402
2.757
1861  2010

Coppito (AQ)
3.059
1.023
215

Preturo (AQ)
797
291
72

Paganica (AQ)
5.024
1.766
312

Barisciano
1.798
715
505
4.555
1861  2010

Poggio Picenze
1.011
357
145
1.400
1861  2010

Bazzano (AQ)
841
313
81

Roio Piano (AQ)
520
218
72

Poggio di Roio (AQ)
733
283
5

Pianola (AQ)
1.372
472
62

Sant'Eusanio Forconense
443
178
92

Bagno (AQ)
609
247
71

Fossa
661
276
145
1.610
1861  2010

Tornimparte
2.958
1.134
540
3.905
1861  2010

Sassa (AQ)
607
208
69

Lucoli
944
454
2.667
4.248
1861  2010

Ocre
1.020
394
208
1.572
1861  2010

Rocca di Cambio
447
251
1.059
1.225
1861  2010

Villa Sant' Angelo
431
170
293
1.027
1861  2010

San Demetrio Ne' Vestini
1.605
613
283
3.518
1861  2010

Fagnano Alto
446
224
181
2.380
1861  2010

Termine · Sant'Eusanio · San Sabino Basanello · Santi · Seora · Casaline · Menzano · Cavallari · Bivio Pizzoli · Pozza San Marco · Colle di Preturo · Cese · Preturo · San Vittorino · Villa Mazzo · Boccanello · Arischia · Collebrincioni · Aragno · Filetto · Pescomaggiore · Fetogna · Villa · San Martino · Barisciano · Poggio Picenze · San Gregorio · Onna · Palombara · Bazzano · Esperità · Monticchio · Malepaco · Pianola · San Cipriano · Colle di Roio · Roio Piano · Poggio di Roio · Nucleo industriale Pile · Genzano · Pagliare · Palombaia di Sassa · Sassa · Sant'Andrea · Collefracido · Cominio · Bagno · San Raniero · Civita di Bagno · San Benedetto · Valle Cavalletto D'Ocre · Fossa · Cerro · Casentino · Sant'Eusanio Forconense · Poggio Picenze · San Demetrio Ne'Vestini · Castelnuovo · Ripa · Villa Sant' Angelo · Tussillo · Fontavignone · Stiffe · Vallecupa · Castello · Opi · Corbellino · Campana · Colle · Frascara · Pediciciano · San Panfilo D'Ocre · San Felice D'Ocre · San Martino D'Ocre · Carri · Casamaina · Rocca di Cambio · Scoppito · Cave · Vallinsù · Forcelletta · San Bartolomeo · Casale · Madonna della Strada · Collebato · d'Appolloni · Rocca Santo Stefano · Colle di Sassa · Forcelle · Colle Martino · Colle Rascone · Palombara · Collemare San Martino · Foci · Pilè La Costa · Molino Solomeno · Colle Ferdinandesco · San Nicola · Colle Santa Maria · Colle Sant'Elio · Pianello · Villagrande · Riaggia · Piaggia · S. Croce · Peschiolo · Prata · Collebrincioni · Spogna-spognetta · Vado Lucoli · Lucoli alto · Prato Lonaro I · Prato Lonaro II · Bivio di Scoppito · Sassa Scalo · Colle di Lucoli · Casavecchia · San Menna · San Francisco · Piaggia · Bivio Pizzoli

0 - 25 %

25 - 50 %

50 - 75 %

75 - 100 %

Tent camp

**Map 3:**
**L'Aquila City and Territory. The**
**Basin After the Earthquake:**
**Damage and Tent-Settlements**
*Source: Rota 2013*

(2001) which established a commitment to "the fruitful diversity of cultures (…) taking into account the risks associated with widening ethnic homogenization and universalization" (UNESCO 2014).

In Italy, the definition of cultural heritage or 'beni culturali' as established by the Italian law, includes architectural monuments, museums, libraries and archives (the Ministry for Cultural Heritage has been created by combining the former General Direction of Antiquities and Fine Arts with the State Archives). The funding of this sector still represents the most significant single item within the total sum of money allocated for cultural initiatives (Culturelink Network 2014).

Cultural and natural heritage legislation is applied on national, regional and local level. In general, the national institutions are responsible but local authorities may protect areas and buildings through urban planning legislation. Recent Code on cultural heritage and landscape is aimed at protecting historical areas and buildings, as in the Natural Heritage Act, Law for Environmental Protection Assessment.

Planning instruments recognize World Heritage sites regarding specific zoning and building development compatibility by:

– Specific Landscape Plans and Natural Parks Plan
– Management plans are compulsory for new sites
– Think-tank within the Ministry for Heritage and Cultural Activities has been appointed for guidance in management plans
– Natural sites are required by the law to have a medium and long-term plan

Italy has a solid tradition of protection of cultural Heritage, as recognized by UNESCO World Heritage Conservation Fund (UNESCO 2005). The same report recognizes as weaknesses the lack of effective control and permission system, which should be reviewed regarding territorial transformations, linked to tourism development and larger landscape structures. Other main issues are guidelines for improved management plans and increased local involvement; increasing coordination between landscape conservation and agricultural politics.

In spite of this appraisal, for the case of the earthquake of 2009, the effectiveness of the Italian built heritage protection system is not clear, and furthermore, a very clear split appears between the reconstruction policies and the heritage conservation of affected areas.

Several villages in the valley along Strada Statale 17 just outside L'Aquila suffered the greatest damage while, medieval mountain hill towns lying high above the valley suffered little damage. Onna was reported to be mostly leveled with 38 deaths among the 350 residents. The villages of Villa Sant'Angelo and San Pio delle Camere were badly damaged. Fatalities were reported in Poggio Picenze, Tornimparte, Fossa, Totani, San Gregorio and San Pio delle Camere (Figure 2).

While most of L'Aquila's historical structures suffered damage, it was not only the historic buildings but also many of its modern buildings that suffered the greatest damage, as in the case of the collapse of the dormitory of the University of L'Aquila. Even some buildings that were believed to be "earthquake-proof" were damaged. L'Aquila Hospital's new wing, which opened in 2000 and was thought capable of resisting almost any earthquake suffered extensive damage and had to be closed (Figure 3).

## This publication

This publication is a compilation of the work of 26 graduate students of the Urban Management Program of TU Berlin, with backgrounds in the fields of architecture, urban design, civil engineering, sociology, international relations, administration, city and regional planning, environmental sciences. The diversity of their trainings and perspectives contributed a rich palette of tools and skills, reflected in the results here presented.

The general objective of the Field Study was to develop an elaborated field research of the problematic described above, identifying a specific problem to be discussed, formulating an adequate research question and supporting it based on a first-hand a documentation to be conducted during the field

trip. This should conclude in an article, summarizing the argument and the discussion in a structured, correctly documented and properly written whole.

The expected result of the work was the identification of research topics in the field of catastrophes management and reconstruction after catastrophes in contexts of heritage value, both urban centers and buildings, and the articulation of these topics in new shared research proposals, which should lead the collection of relevant data necessary to document the research questions in the field. The work involved a comprehensive and accurate documentation on the basis of literature review, archive work and field research. The teams researched on the relevant conditioning and comfort methods in each case, by field documentation and literature research in manuals, maps and other documents.

Four lines of work have been identified as relevant for the work facing catastrophes in historic cities or heritage areas: a) preparedness and emergency responses, b) resilience and disaster risk reduction, c) reclamation and reconstruction, and d) population in action.

### a) Preparedness and emergency responses
After a major catastrophe occurs, the focus is put on emergency responses: restoring infrastructure and communications, providing emergency shelter and recovering operational normality as soon as possible. The process of reconstruction to be conducted after the management of the emergency takes several years, if not decades, and is bound to be partial, with little support and burdened with a number of problems concealed in the process, such as the loss of a valuable built heritage, which occurs widely, yet almost unnoticed behind the chaos of fast demolition during the first phase and of practical reconstruction priorities of the months and years to come. Facing the destruction and the urgent need to rebuild, the question arises of how to recover not only the material but also the cultural assets damaged or lost in the buildings and houses collapsed.

One of the objectives of the work in this first part was the identification and study of the potentials for innovating in post-disaster emergency strategies and waste management techniques in order to include subsequent reconstruction as one of its criteria, thus adding value to the process and turning it into a potential platform for reconstruction.

### b) Resilience and disaster risk reduction
In the disaster management perspective, resilience represents the capacity of a community, a territory or a built environment to react while and after facing

**Figure 2:**
**Photographic Survey of the Villages in the Near of l'Aquila in 2012: Paganica and Onna**
*Photos: Federico Rota*

a disaster event. While most of natural disasters can't be predicted and controlled, there are tools that can be provided and considered during the urban planning to improve the resilience of those environments; this could positively affect both the emergency and the reconstruction phases, fastening and strengthening the capacity to react.

What lessons can be thus learned from the case of L'Aquila regarding the resilience of urban environments? What are the specific procedures and processes characteristic of heritage areas? How can these be improved and adapted? In the second part of the volume, the articles dealt with such questions, trying to put them in a broader perspective that makes the learnings from this particular case relevant in a broader perspective. The hypoth-

esis implied is that such an increased value can be attained by considering the value of damaged or destroyed heritage directly after the catastrophes for an effective consideration in the restoration and reconstruction phases.

## c) Reclamation and reconstruction
After a disastrous event a large amount of building demolition debris needs to be disposed of before any reconstruction is possible. Because of the emergency management priorities, this is not done immediately, but instead demolition materials are first accumulated and taken to a landfill only after several months, causing considerable difficulties while facing the emergency phase and the screening activities. In this period, an opportunity arises for working with these materials for reconstruction by



**Figure 3:**
**Photographic Survey of the**
**City of l'Aquila in 2012**
*Photos: Federico Rota*

21

selectively recycling them or reclaiming them before recycling. In the particular case of destroyed heritage constructions a potential arises for recovering also some of the cultural meaning embodied in the materials.

The third part of the volume confronts with the concrete, material issues of recovery and reconstruction of the built stock. While the reuse of buildings, of reclaimed materials and traditional building systems are technically feasible, the case of L'Aquila shows a peculiar detachment of the potential heritage, closed and policed for years while reconstruction took place elsewhere. Related issues are stressed, such as political will and user acceptability when strongly bound values such as community or family history are not associated to their use.

### d) Population in action
The dramatic changes in the productive structures and the spatial distribution of the productive activities, especially in Europe, has led in the last decades to a scenario where former industrial plots, conveniently located in central areas, are abandoned and remain undefined, expecting a new use or a redevelopment. Citizen awareness regarding the collec-

tive decisions about the city grows increasingly as conflicts of interest and alternative developments are evident in many cities. Awareness and better information are consequently leading to a proliferation of organizations that demand a voice in these developments.

Political engagement has made a foothold in these concrete, relatively small but politically laden causes, and activist tactics have gained a space for them in the public arena, forcing the traditional administration and political structures to negotiate with these organizations on new grounds, and often influencing substantially the decision-making.

The case of a post-catastrophe is indeed, not exempt of these changing practices, increasingly growing to be a standard basis for administration and the population. However, the exceptional administration status granted to specific organizations to deal with the emergency, reframes the general model and obliges to new questions: how is the population informed involved during the emergency and reconstruction? What are the possibilities to actually influence the decisions in this context? Do ad-hoc modes of organization or public action emerge?

*Right Page*
**Collapsed Building in**
**the City of L'Aquila**
*Photo: Federico Rota*

# Part I: Preparedness and Emergency Responses

# 1 Political Influence on Communication Management: Communication Management Prior to the Time of the Earthquake in L'Aquila 2009

**Authors**
Ana Laura Alcántara Castillo
Florencia Carvajal S.
Daniela Roque Montes

**Abstract**
The value of tremors as an indicator of required action depends on the competence of the receiver of this information to evaluate the tremors as possible threat notices or not. The handling of information is independent of prior knowledge of the topic, making advice by experts a necessity. This led to the creation of the High Risk Commission which gathered to discuss the significance of the tremors from early March, 2009. Later, a trial took place in which the people of L'Aquila raised objections to the performance of the members of the High Risk Commission This paper aims to analyze how the political power underestimated information in disaster prevention; it summarizes findings from in-site research of the way communication scenarios arose before the major earthquake of April 6 2009. Evidence from literature reveals divergences in establishing a clear diagnosis of how evidence of a possible earthquake should be announced. Our results suggest the existence of diverse communication arrangements for an amended risk overview for the public. Anticipating an earthquake with accuracy demands constant field data collection of a high scientific level. Nonetheless this does not guarantee a proper understanding of the outcome data that would lead to better disaster mitigation strategies. Decision making depends on the accuracy of the source, whether we are dealing with experts or politicians, and thus we suggest the analysis of several actors' interests for future research.

*Last Pages*
**Scaffolding at the Entrance**
**of Villa Sant'Angelo**
*Photo: Jesús Salcedo Villanueva*

*Left Page*
**Scaffolding in**
**Downtown L'Aquila**
*Photo: Florencia Carvajal S.*

## 1.1 The scenario prior the incident

The Abruzzo earthquake swarms at the end of March 2009 caused political, scientific and social controversy. Earthquakes cannot be predicted. However, preventive measures can be taken to avoid some percentage of their negative consequences. Due to political resolutions, the measures taken in this case were to exhort the inhabitants of the city of L'Aquila to remain calm, while they were assured that things would return to normal once the energy from the swarms was released completely.

The seismic activity that precedes an earthquake should be handled with caution by the entities in charge of disaster management in order to provide an accurate solution in case of a real earthquake. In addition, other factors or stakeholders with no political or scientific background can influence the population and put pressure on the different government entities, turning the event into a political issue instead of raising awareness.

Knowing which actors are involved in the decision making process when a natural disaster occurs makes it possible to identify the responsibility of each of them. The stakeholder analysis in this particular case will give a clear overview of how the decision making can be affected by personal points of view and the power of some of these. The stakeholders´ various levels of power, their limitations and the links between them are significant in the preparedness stage and in the response to and management

of a disaster. The stakeholders' actions in the period between 30 March until the earthquake will clarify the consequences of decision making based on power and the omission of information by some in the preparedness phase.

## 1.2 The L'Aquila status quo

Current knowledge of the pre-earthquake situation is still vague and this is significant for future assignment of responsibilities during emergency procedures. In order to avoid pre-established knowledge of the structural functions of the actors´ roles this paper aims to bring together different authors with their different perspectives to reach a broader overview of the networking and sharing of information.

Our literature sources derive mostly from the media. After the earthquake numerous articles about the pre-disaster mishandling appeared. Articles appeared in Time and The Guardian as well as other important newspapers, some with clear statements defending specific actors, others with a more objective view.

Some criticized the handling of the situation citing the High Risk Commission as the body responsible for the earthquake's negative impact on the city. Several others disputed the innocence of the scientists, claiming that even when it is impossible to predict an earthquake, they have responsibilities. As Shore explains:

"… it is the scientists' obligation to persist in forcing the proper telling of their story, to insist that they be correctly quoted and to vigorously hound – and correct – those who distort their message." (Shore 2012, p.5)

Even when they cannot predict, they can work with the odds and give the best advice to the citizens and the administrative heads. On the other hand, Nosengo says it is quite difficult to draw a line separating responsibilities:

"Where do the responsibilities of scientific advisors end and where do those of politicians start?



**Figure 4:**
**Current State**
**Government Building**
*Photo: Florencia Carvajal S.*

Who is responsible for the task of translating the uncertainty of science into effective communication to the public?" (Nosengo 2012)

However, even when the line is not clearly defined, it is clear in this case that the scientists should have played a more participative role defending their statements. As author Mazzotti states:

"Earthquake experts must communicate public risk more effectively to avoid a repetition of the Italian media fiasco that a year ago culminated in jail terms for the academics involved" (Mazzotti 2013).

Other journalists have put forward the opinion of experts around the world who defended the position of the scientists. As yet, it seems unclear what was on trial: a scientific mistake or a mishandling of information.

"The case has alarmed many in the scientific community, who feel science itself has been put on trial. Some scientists have warned that the case might set a damaging precedent, deterring experts from sharing their knowledge with the public for fear of being targeted in lawsuits, the BBC's Alan Johnston in Rome reports. (Greenemeier 2013)

Yet others do not offer an opinion as to whether or not a mistake was made. Some authors simply believe that, even if a mistake was made, the prosecution of the scientists will not bring any good in the future. Stuart Clark writes:

"This verdict cannot bring back the hundreds lost in L'Aquila. It can only doom more to die as Italian scientists turn their back on the study of earthquakes." (Clark 2012)

Clark claims that the issue is not about predicting at all, but rather about a poor communication process.

"The question is: was this trial about science or communication? While the media are filled with stories about science being on trial, claiming

that the scientists have been convicted of failing to predict the earthquake, New Scientist points out that the conviction was actually for errors in communication. " (Clark 2012)

A study of the opinions of several different authors allows a broader perspective of the situation. Guilt and innocence in this case are not as black and white as some authors implied. Most have focused only on the scientific issues; only a few have widened their research to include communication issues.

## 1.3    How to handle estimations?

Seismology cannot predict earthquakes; however, swarms constitute facts that should not be underestimated. There is a very high level of uncertainty in natural disasters prevention and consequently people's safety has to be prioritized. Decisions made are inevitably based on either overestimations or underestimations of facts.

We look forward to discovering how the responsibility network worked, what influence power had over the decisions made and how information was distributed. The impression is that the network did not function appropriately or as expected and that information was distorted by the authority of some actors. This investigation will show the extent to which the political sphere took stronger action where the scientific probably should have.

It is therefore necessary to profile the actors involved and describe the repercussions of their arrangements in order to recognize how the response to the L'Aquila earthquake was handled. In what tier did the power of specific actors influence the diffusion of information in the L'Aquila earthquake?

The network did not function properly; rumors, conflicts and vested interests always deplete the efficiency and efficacy of information flow. The absence of a  hierarchy of sources leads to limitations in the management of a response. Certain procedures determine the provider of information's level and establish a capacity to overcome other misleading and potentially dangerous sources of information.

13 earthquakes in March

3.8

3.3

23:57

**30**

INGV

"No damages"

2.5

8:04

4.0

15:38

3.5

15:43

21:05 - 21:32

3.1

5 earthquakes

**31**

G. BERTOLASO

Schools closed
Primary school
De Amicis

Civil Protection created
High Risk Commission

National Institute of
Nuclear Physics of Gran
Sasso collaborator blamed
for false alarm
"I am limited to provide
data I do not believe I am
causing panic among the
inhabitants". (Perfetto 2009)

march

april

G. GIULIANI

B. BERNARDINIS

13:14

2.8

179 quakes in the province

G. BERTOLASO

D. STATI + INGV + GIANLUCA BRAGA

Sulmona &
L 'Aquila's
mayors
informed

Civil Pro L'Aquila
Impossible to predict
an earthquake

**1**

2.0

11:46

NATIONAL GOVERNMENT

Local
authorities
state of
emergency

"People have to learn to live
with the condition of the soil
and remain an aware status,
without an anxious status:
those are the lessons that
have to be learn since the
last earthquakes".

(Perfetto 2009)

"As civil protection, we are
working side by side with the
mayors and the inhabitants.
The scientific community
confirms there is no danger,
since energy has been released,
the situation is positive."

"We can calm the inhabitants about the rumors
an idiot has spread about a stronger earthquake"

**2.4** 13:11

**6.3** 3:32

**4.3** 3:47

**4.8** 23:15

8 aftershocks during the day

2      3      6

Sulmona mayor
Fabio Federico
reports
G. Giuliani

M.CIALENTE

EXPERTS

emergency plan created

energy is decreasing in intensity

Schools reopen

meeting points established
1. Piazza Palazzo
2. Piazza Duomo
3. L'Area del Castelo

6:55 C. PROTECTION encourages awareness

7:13 C. PROTECTION

7:22 G. BERTOLASO

7:33 10000 buildings damaged

8:15 C. PROTECTION 16 dead - 30 missing

8:34 S. BERLUSCONI state of emergency

9:25 G. SELVAGGI

9:35 hospital collapsed

10:24 Via Rossi 4 story dorm collapsed

26 cities affected

Ona & Paganica reduced to debris

150 victims, thousands displaced

Panic alert by
G. Giuliani

"I am only a doctor and I will always attach to the scientific evidence and what is informed by the official entities of Civil Protection."
(Parisse 2009)

"It is not possible to predict an earthquake of that magnitude."

"So far there has been many recurrence between 2,5 and 3 degrees."

(Boi et al. 2009)

"Worst tragedy of the milieu, I am ready to declare the state of national emergency."
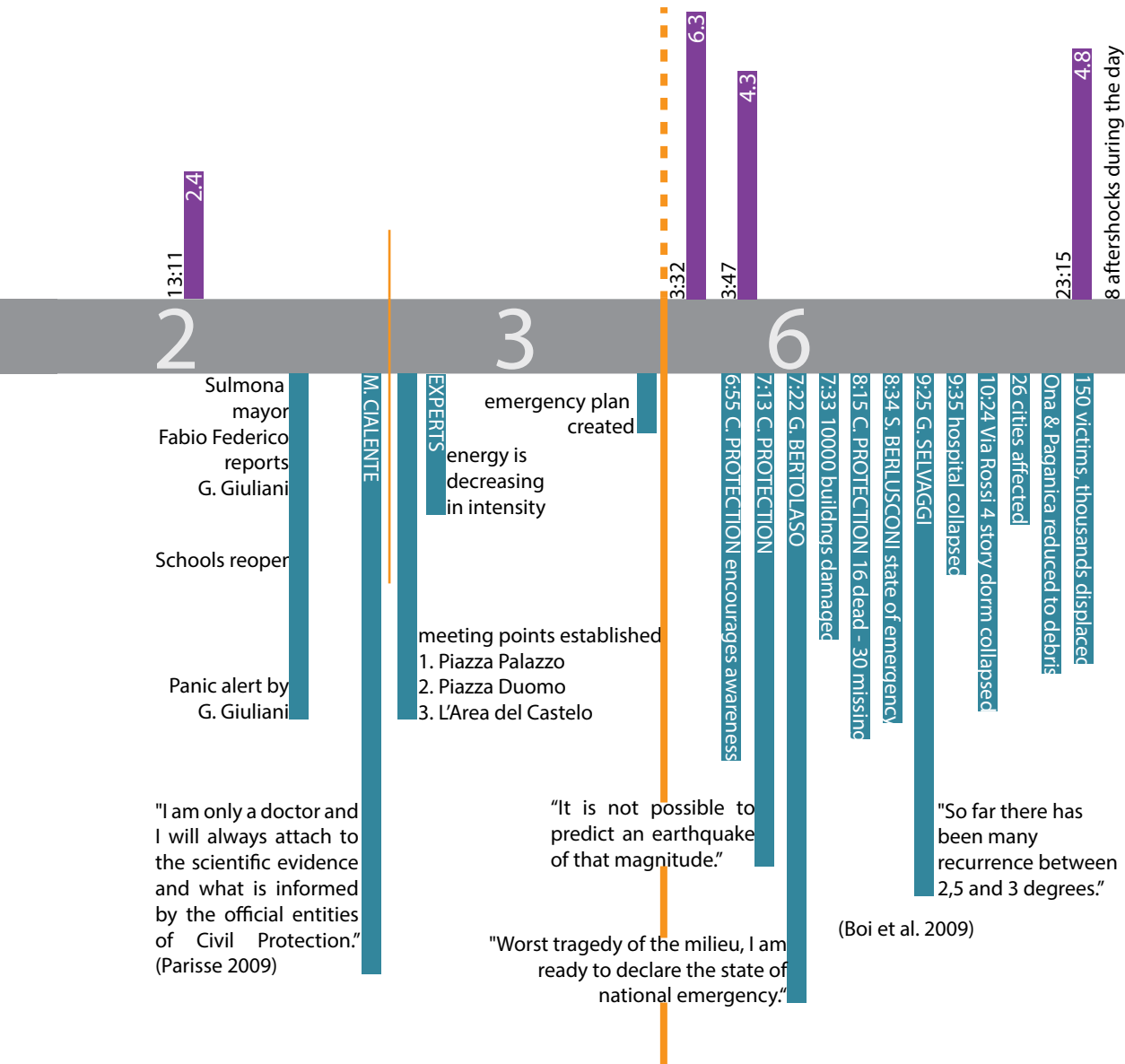
Earthquake scale

**Figure 5:**
**Timeline of the Events,**
**Quakes and Reactions**
*Source: Authors*

## 1.4 Time-action relationship techniques

It is beneficial to consider the different perspectives of the actors involved. In order to achieve this, we conducted several interviews during a visit to L'Aquila. In order to tackle the political aspect interviews were conducted with Pierluigi Biondi PhD, mayor of Villa Saint Angelo, and Dr Massimo Cialente, mayor of L'Aquila, capital city of the Abruzzo province.

In addition, the most valuable interview for this research was with Christian Del Pinto PhD, a seismologist who at the time of the earthquake worked for the Civil Protection in the locality of Molise. He attended as a listener the meeting organized by the High Risk Commission on 31st March, 2009. Later on, he was a vital witness in the trial of the members of the High Risk Commission.

## 1.5 Sequence of resources

In order to comprehend the interaction of the actors involved in the pre-disaster management it is necessary to understand the internal organization of the institutions involved and their relationships.

The High Risk Commission (HRC) meetings take part every two months. The aim is to bring together technical actors such as the Department of Civil Protection and scientific actors such as the National Institute of Geophysics and Vulcanology (INGV) and the European Centre for Training and Research in Earthquake Engineering (EUCENTRE). The Commission is composed of 21 members: the chairman and the vice-chairman; the chairman of the National Research Council (CNR); the chairman of the National Institute of Geophysics and Volcanology; the chairman of the School of Specialization and Environmental Research (ISPRA); and experts in seismic risk, hydrogeological and hydraulic risk, volcanic risk, industrial chemical nuclear risk, environmental and health risk and experts in the field of civil defense.

The Department of Civil Protection (DCP) is one of the most powerful government agencies in Italy. It was established in 1982 with the purpose of managing
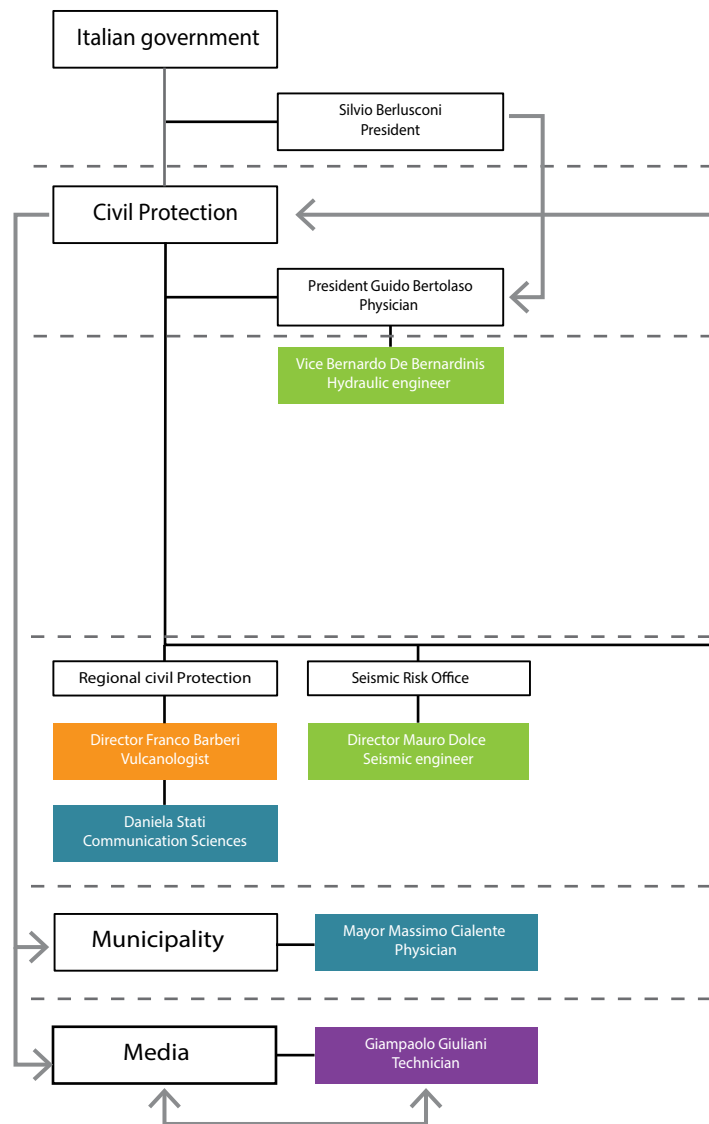
**Figure 6:**
**Mayor of L'Aquila**
**Massimo Cialente**
*Photo: Jesús Salcedo Villanueva*

**Figure 7:**
**Seismologist Christian**
**Del Pinto**
*Photo: Florencia Carvajal S.*



Italian government

Silvio Berlusconi
President

Civil Protection

President Guido Bertolaso
Physician

Vice Bernardo De Bernardinis
Hydraulic engineer

Regional civil Protection

Seismic Risk Office

Director Franco Barberi
Vulcanologist

Director Mauro Dolce
Seismic engineer

Daniela Stati
Communication Sciences

Municipality

Mayor Massimo Cialente
Physician

Media

Giampaolo Giuliani
Technician

disasters and events to protect lives. The DCP intervenes with security measures such as inspections, supervision and prevention in order to stop natural hazards developing into disasters. In the beginning, the system was centralized, but did not work properly. A reform process was begun at national level to give a more important role to the entities at regional and local level. This is why the DCP now consists of a central head in Rome and several regional centers. Since 2001 the head of the department at national level has been Dr Guido Bertolaso, with hydraulic engineer Bernardo de Bernardinis as vice-president since 2008.  The vulcanologist Franco Barberi is the

head of the DCP at regional level in Abruzzo and also the director of the High Risk Commission.

One of the sub-departments of the DCP is the Office of Seismic and Volcanic Risk, which is in charge of analyzing and developing policies and methodologies for the prevention and management of earthquake disaster and volcanic activity. This department has a technical and scientific focus. By December 2006 the civil engineer Mauro Dolce was the director of this division. His focus area was the evaluation of buildings' vulnerability to earthquakes in the prevention   phase as well as the construction of shelters
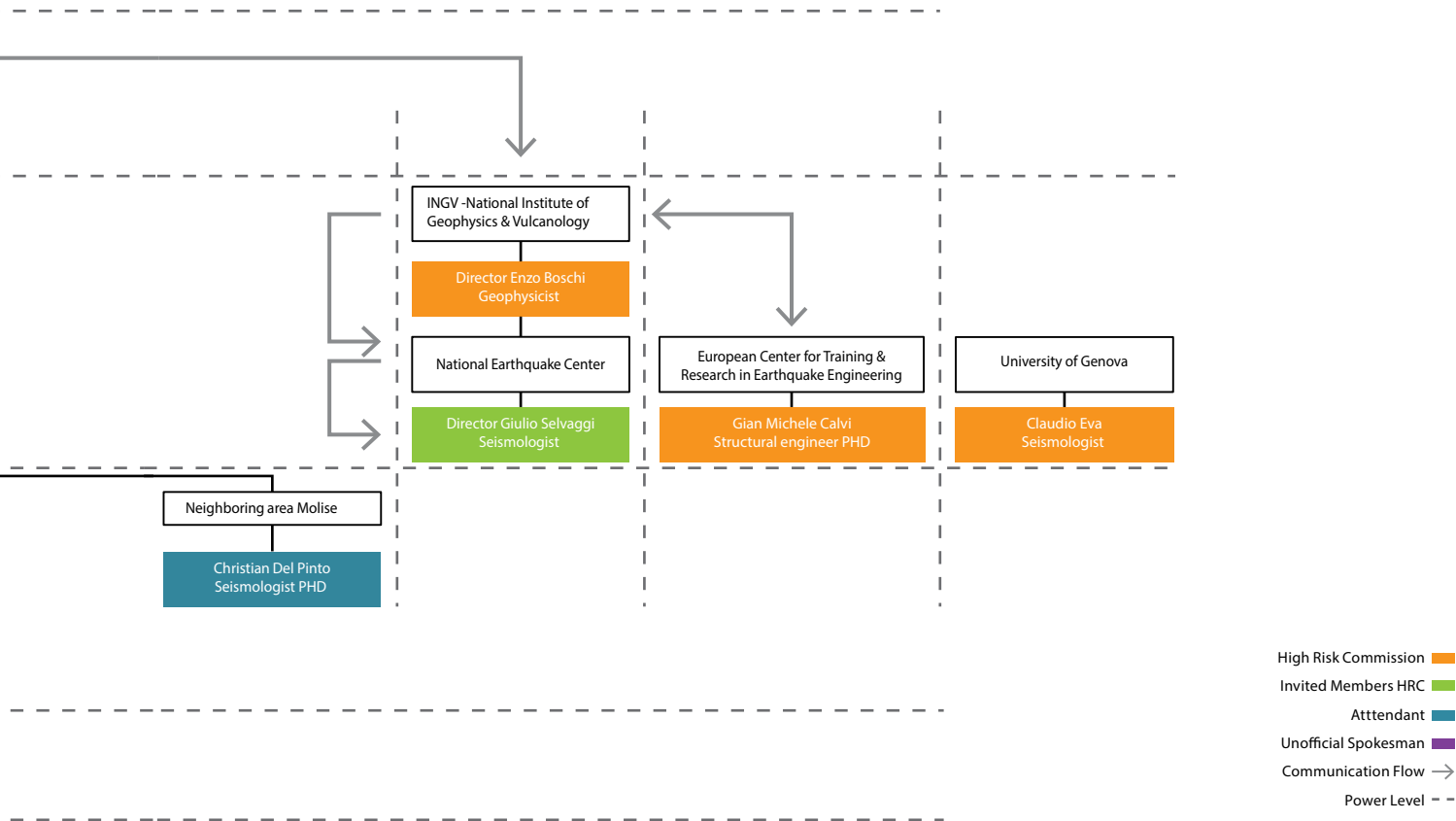


**Figure 8:**
**Drafted Actors Organization**
**Chart of Entities**
**Responsible for Deciding**
*Source: Authors*

after an earthquake. He was in charge of coordinating with all the investigation centers such as: INGV, ReLUIS (The Laboratories University Network of seismic engineering) and EUCENTRE.

The best asset that the Office of Seismic and Volcanic Risk has is its relationship with INGV. The main functions of the INGV are monitoring all geophysics activities and developing research papers. The Ministry of University and Research, Civil Protection and several universities are linked to INGV for advice and joint investigations. The institute has a national level hierarchy with its main office in Rome and others in Milano and Bologna. The director of INGV since 1999 has been the geophysicist Enzo Boschi, who was the former director of the National Institute of Geophysics before it merged with three other institutions to become INGV.

Within INGV is the National Earthquake Center (NEC). The NEC has the specific task of monitoring all seismic activity in Italy. In 2007 the director was the seismologist Giulio Selvaggi.

EUCENTRE is a focused research center and monitors seismic risk. It was founded by the DCP, INGV and the University of Pavia. In 2003 the Doctor Michele Calvi (Structural Engineer) was the president of EUCENTRE.

Due to the multiple swarms that occurred in March 2009 a High Risk Commission meeting was convened on March 31. During such meetings other assistants such as directors or presidents of institutions involved in the field, or external experts in the field of civil protection, can participate without the right to vote.

Claudio Eva is one of the members of HRC. He is a seismologic and physics professor at the University of Genova. Mayor Massimo Cialente attended, representing the city of L'Aquila.

Giampaolo Giuliani is a technician whose most recent work included research into the relationship between the concentrations of radon in the soil and earthquakes. He previously worked at the National Laboratory of Great Sasso. He started to alert the population about the possibility of an earthquake. He also tried to contact Civil Protection and to establish communication with Mayor Massimo Cialente.
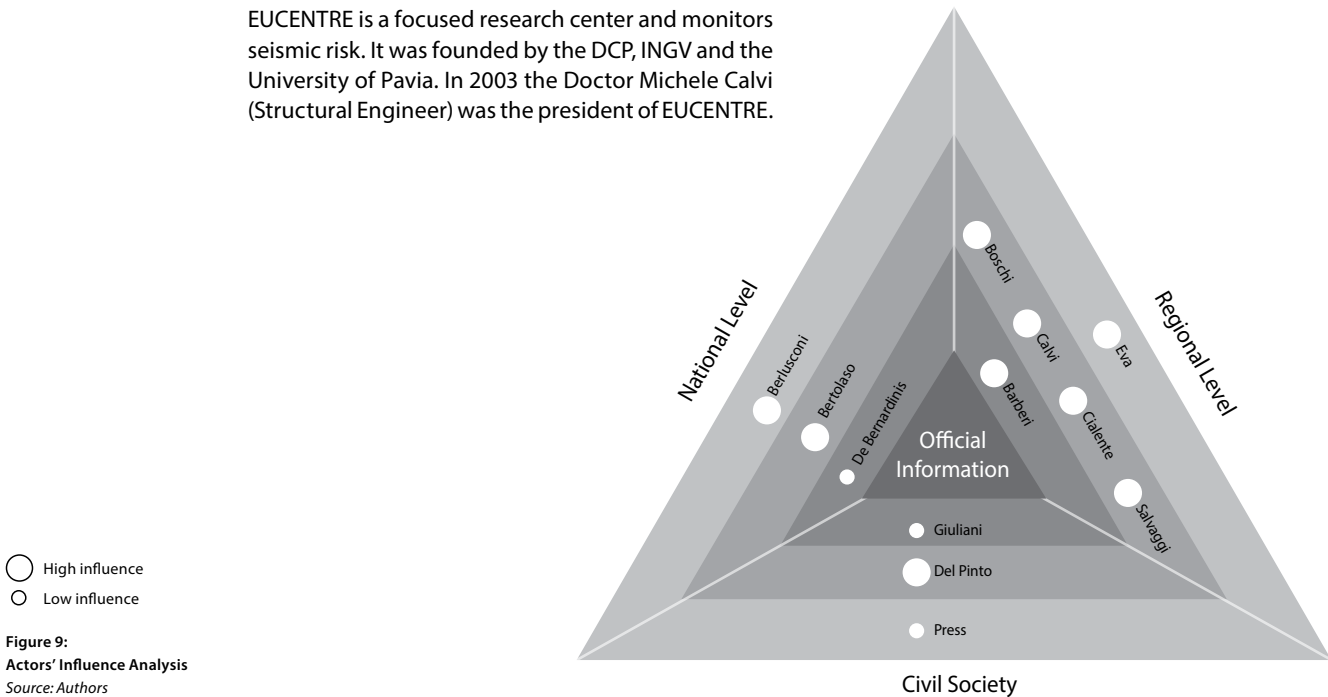
○ High influence

○ Low influence

**Figure 9:**
**Actors' Influence Analysis**
*Source: Authors*



Figure 9: Actors' Influence Analysis

As a result of the panic created among the citizens of L'Aquila by Giuliani, some actors decided to take measures to calm the inhabitants. How they managed the situation and the consequences are described below.

### Phone call

On March 30th 2009 Guido Bertolaso had a phone conversation with Daniela Stati, and because Bertolaso was being investigated for other crimes at the time, the phone call was recorded. In it Bertolaso expressed his irritation with Giampaolo Giuliani for alarming the population about an imminent earthquake. He informed Stati about the HRC meeting convened by him. In his most shocking statement he informed Stati that after the meeting DCP vice-president Bernardinis would announce that the swarms were a positive sign, indicating the release of energy. He aimed to gather the best experts in the field to support that claim.

### Meeting

On March 31st at 18:00 hours a meeting of the HRC was held in L'Aquila with the actors mentioned above. Their discussion lasted about an hour. The most active actors were Barberi, Boschi and Selvaggi, with Bernardinis acting as moderator. Christian del Pinto informed us that the meeting was mainly about Giampaolo Giuliani. Not much was said about scientific opinions regarding the previous earthquakes in Abruzzo. It could be said that it was a media show to discredit Giuliani.

### Press conference

During the press conference held after the meeting with HRC Bernardinis told the media that the scientists had assured him of a positive scenario for Abruzzo. The swarms were helping to release energy and he recommended drinking a bottle of Montepulciano.

### Trial

The press conference held by Bernardinis could be said to have influenced the preparedness of the population to cope with an earthquake. Fortunately, the earthquake happened during the early hours of the morning, so many lives were saved though many others were lost. Family members of some of the deceased, led by Vincenzo Vittorini, decided that their loss was not only due to the earthquake and proceeded to sue HRC. In September 2011 the trial of Bernardinis, Barberi, Boschi, Calvi, Dolce, Eva and Selvaggi for manslaughter began. The prosecution's case was based on the testimonies of the relatives and friends of the victims. They argued that the victims had changed their minds about how to react to an earthquake. The inhabitants of L'Aquila had been trained by their parents to act
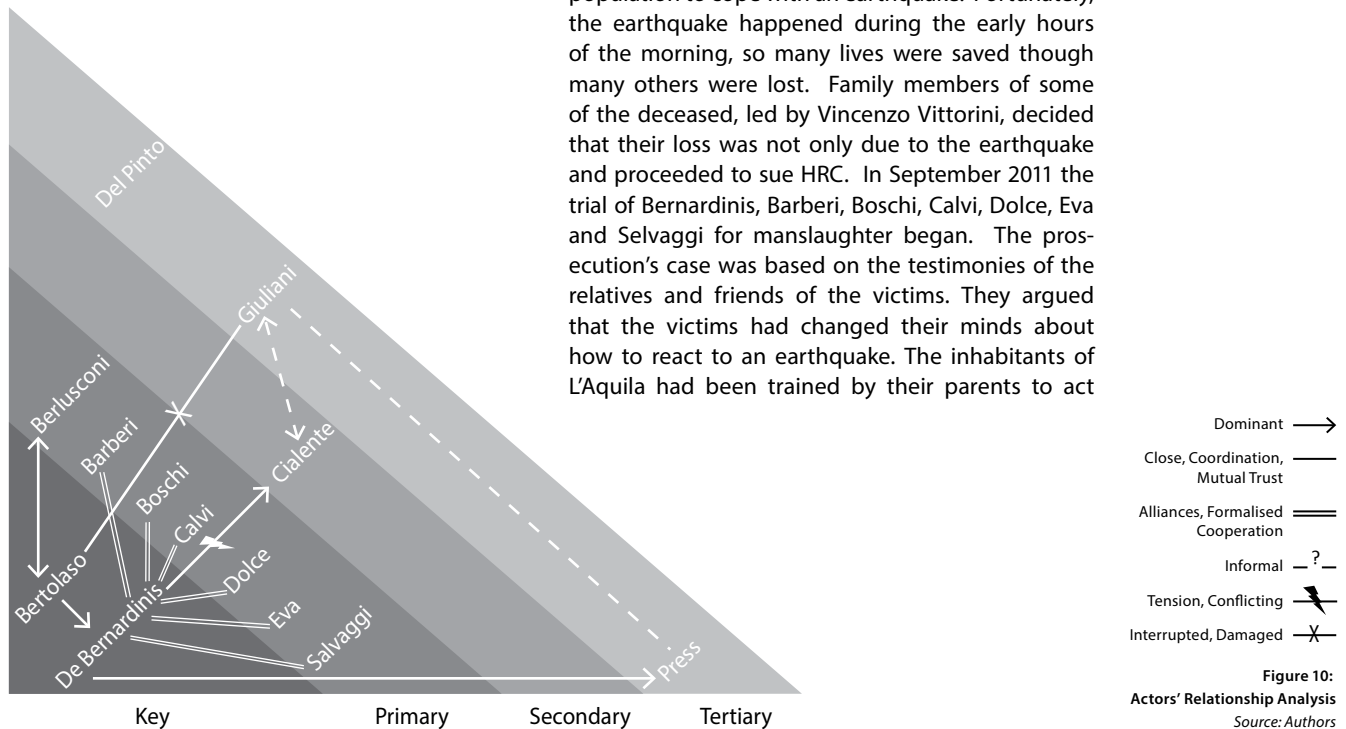


Dominant ⟶

Close, Coordination, Mutual Trust ⸻

Alliances, Formalised Cooperation ⹀

Informal —?—

Tension, Conflicting

Interrupted, Damaged —✕—

**Figure 10:**
**Actors' Relationship Analysis**
*Source: Authors*

whenever seismic activity occurred, but the press conference held by Bernardinis in which he claimed that the swarms were a positive sign indicating the release of energy generated an enormous impact on people´s behavior, said the prosecutor. The shocking statement of Bernardinis inviting the population to relax and drink wine was probably the pillar of the whole trial. Trust in the experts proved to be deadly, according to the relatives. Members and assistants from the HRC, such as Barberi and Boschi, were prosecuted due to their support during the meeting for the declaration that Bernardinis later gave. Structural engineer Calvi had given assurances that buildings in the Abruzzo region would not be seriously affected in future earthquakes. The other three defendants, not members of the HRC, are being prosecuted because they had expertise in the subject and assisted at the meeting. Boschi's lawyer said that "it has not been said that the earthquake would not happen or that it would happen." (Cartlidge 2012)

This declaration was quickly invalidated by the accusation that during the meeting only banal and self–contradictory statements were made. The background to Boschi's statement is some research he had carried out in which he estimated the probability of a bigger earthquake after swarms. He claimed that the probability was very low but that a gap remained for the possibility that it might happen. Afterwards, in the meeting, he declared: "The seismic swarm provided no signal of an impending major earthquake." Selvaggi supported that statement three weeks earlier in a statement to the press, saying: "A swarm, of whatever kind or whatever duration, is never and I underline never a precursor of a larger seismic event." Minutes before the meeting Franco Barberi also supported this claim.

The trial attacked the way the HRC denied the possibility of an earthquake. In October 2012 the defendants were found guilty and are at present on appeal. It is clear that this was not a lineal sequence of events. The trial highlighted the role of the different interests of the actors involved, such as the need to defend their public image or their being intimidated by the power of others. The various relationships within the group provided support and caused the

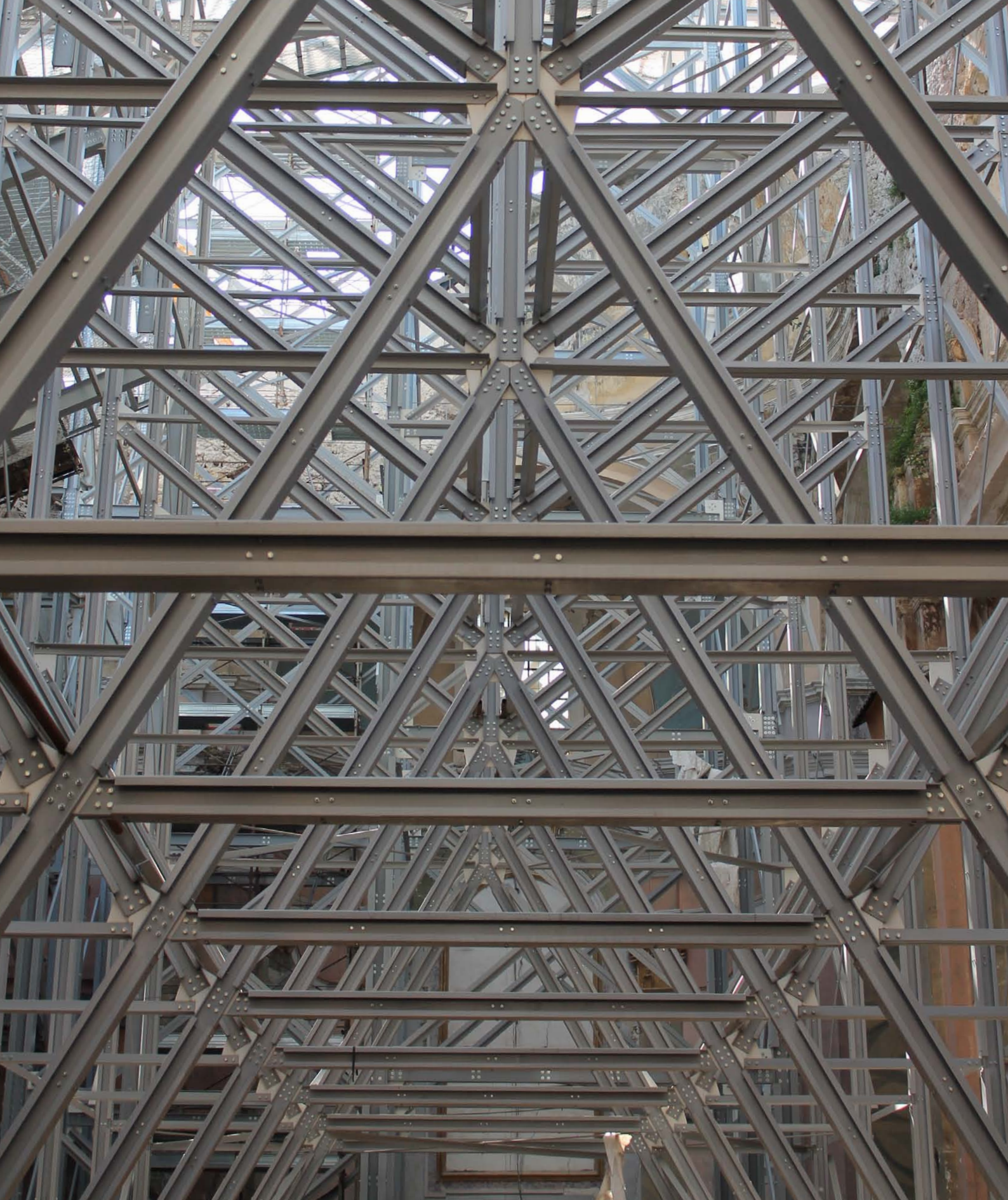distortion of information. Still under discussion is whether the trial came to the right conclusion.

## 1.6 The courage to act

The management of information concerning the events prior to the earthquake of L´Aquila has revealed serious shortcomings. Mishandled information led to an unfortunate outcome with at least 300 people killed and the most of the city destroyed. Civilian safety in any emergency should be a priority and must be properly managed to prevent casualties. We perform an in-depth analysis of this case and propose it as a learning tool for better management in the event of future natural disasters.

Although earthquakes are impossible to predict in magnitude and location, swarms are definitely a sign of an occurrence on a tectonic level. The initial strategic pronouncements after the appearance of the first swarms bred conflict among certain sectors and as a consequence many lives were lost. The inhabitants of the province of L´Aquila had relied on the flawed information provided by the government through the media. It should be noted, however, that the outcome of the disaster could never have been completely predicted.

Since the tragedy a general malaise has affected the relationship between the civil protection and the municipality of the people of L'Aquila. The reasons that led to the underestimation or misunderstanding of the scientific facts provided by the swarms remain unclear. After five years of living with the consequences of the earthquake it is simpler to just believe in the general mainstream statement which does not consider the possibility that the swarms might not have triggered a major earthquake. Had this been the case, the actions taken by the liable actors would have been more appropriate. This particular case could then have been considered an exception to traditional strategies.

The real problem is not the communication problems between the leaders and the people but that in the face of possible risk, concern for safety failed to prevail over political conflicts.

*Right Page*
**Scaffolding in the Church of Santa Maria Paganica, L'Aquila**
*Photo: Florencia Carvajal S.*

## 2 Local Management in Emergency Disaster Response: Factors That Led to Local Lack of Preparedness

**Authors**
Marina Moscoso Teixeira Mendonça
Jesús Salcedo Villanueva
Siqi Wang

**Abstract**
The following article discusses the performance of the L'Aquila municipality with regard to the earthquake of 2009, with the emphasis on the management of the emergency response by the Department of Civil Protection (DCP). The emergency phase, which officially lasted two years, is studied as the main situation, and 6 factors that affected the local disaster management are discussed: (1) centrally characterized management of DCP, (2) the L'Aquila event management procedures, (3) badly defined roles and responsibilities of the institutional structure, (4) politicization of decision making, (5) lack of local capacities and resources, (6) institutional fragmentation. The article also suggests possible improvements in strategic areas for the future management of local disaster.

## 2.1 Introduction

More than five years have passed since an earthquake struck L'Aquila in 2009, and a number of sound reports have been drawn up to review the situation from the point of view of institutions dealing with disaster management. One of the main reports is the OECD "Reviews of Risk Management Policies Italy 2010 - Review of the Italian National Civil Protection System", a significant assessment of Italian national policies on disaster management. This report praises the structure of the DCP, and also produces a set of recommendations for the improvement and development of the institution.

The central control in disaster management coordination is positively evaluated (OECD 2010), but the role and responsibilities of the local authorities in the L'Aquila earthquake of 2009 are not discussed in this report, which offers an opening for the problems this article attempts to expose.

## 2.2 Literature review

The HYOGO Framework for Action (HFA), an international framework established by the UNISDR[1] to build the resilience of nations and communities to disasters, analyzes the Italian disaster management performance in an official report (Dipartimento della Protezione Civile 2011). The report mentions the demand of capacity building and the availability of resources to be implemented at every level of disaster risk reduction strategy, emphasizing the importance of the capacity building at a local level.

Other authors have studied the performance of the institutions at different scales and have also produced a set of recommendations or critical areas in which the institutions could improve substantially. For instance, Stanganelli (2008) discusses the integration of policies from international frameworks, the multi-sectorial Italian institutions and their fragmentation before the L'Aquila earthquake, as well as the politicization of the event. Likewise, D. E. Alexander (2010b) makes an analysis of the situation

and indicates dimensions in which the management of big events could be substantially improved.

Furthermore, Özerdem and Rufini (2013) pose the question of lessons learnt from previous experiences. Their article talks about the distribution of power and the competences of institutions during the emergency response. The DCP's focus on disaster response as opposed to preparedness is criticized and the problems that the institutions and actors involved faced during the emergency are discussed.

The aforementioned articles open up the discussion of whether or not the DCP was prepared to handle such an emergency, as they touch upon the lacks and merits of the national and local authorities during the emergency response phase. The official reports argue more positively for the institution whereas the scientific articles are more critical of the organizational structure and its performance.

The present article attempts a more substantial discussion of a point which is missing in the literature review: the performance of local management in response to the 2009 earthquake and their handling of the emergency and the return to normal living conditions. The findings are grounded in the field research and interviews carried out with local authorities which the authors conducted in May 2014 in the city of L'Aquila and the surrounding villages struck by the earthquake.

## 2.3 Local authorities sidelined

Within the Italian framework, in the case of an emergency of the magnitude of an earthquake the presence of the national forces is required. Nevertheless, it is crucial to include the support of local management in the conduct of the emergency response due to their legitimate knowledge of local structures. However, the emergency response of the 2009 L'Aquila earthquake was entirely conducted by the DCP, which was in charge of all activities during the more than two years that the emergency phase lasted.[2]

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1   The United Nations Office for Disaster Risk Reduction – http://www.unisdr.org

2   The emergency phase lasted from April 6th 2009 until August 2011 (Longhini 2013).

The main examples that characterize the reduced local disaster management are (i) the presence of the national army, (ii) the unilateral intervention of the DCP, (iii) the key decision to close down the historical city centre, (iv) the decision to use the CASE and MAP housing strategy, among others. These findings were mainly made during the interviews carried out with local authorities and civil associations in the course of the fieldwork.

This situation points to the fact that the municipality played a minor role in the efforts, indicating that it was overrun by the central government in the management of the event (Alexander 2010b). This had a problematic impact on the mid and long-term regeneration process.

This article claims that local capacity building and decentralization should be the backbone of good disaster management. In the light of the attributions and responsibilities of the local authorities in the case of disaster response, it is valid to investigate what factors led to this disarticulation of authority and divergence from the policy framework.

Consequently, this discussion raises the following question: what were the factors that resulted in the absence of local authorities in the management of the disaster response?

This article explains then, that the following factors contributed to the weakening of the participation of local authorities: centralism in management, procedures, roles and responsibilities, politicization, local capacities and resources, and fragmentation.

## 2.4 Factors that influenced the local management of the emergency

Our findings are originated in the observation of the procedures taken in the field, discussed in the literature and in the interviews conducted by the authors. The following are examples of how the municipality was sidelined: the centralized management of the disaster by the DCP, whose head was appointed commissioner; the length of the emergency phase, which made it difficult for local officials to integrate

local structures of management; the lack of a local emergency plan and implementation capacity; the poor structural quality of the building stock and a clear lack of enforcement capacity in terms of disaster preparedness; and most importantly the lack of resources and disaster response capacity.
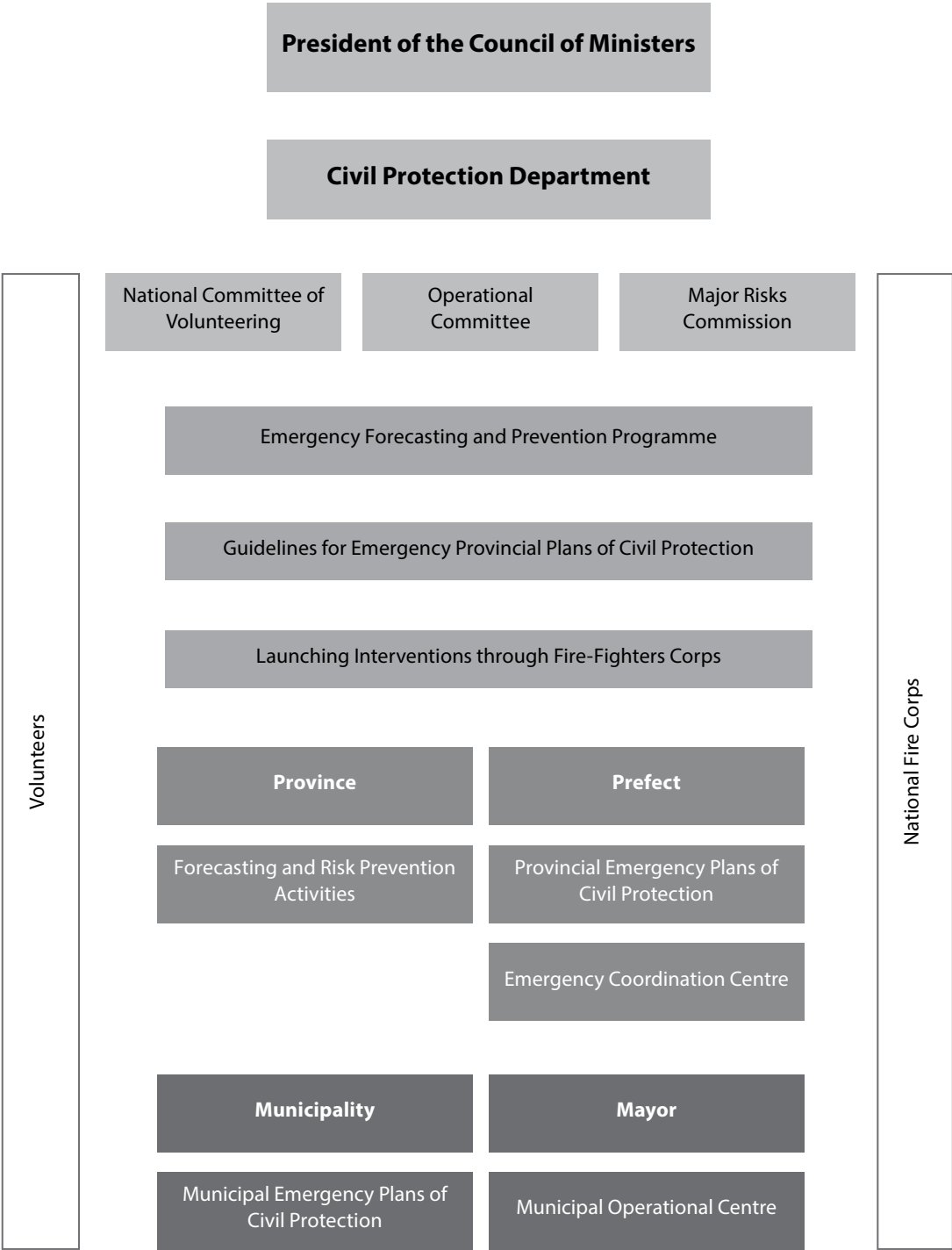
Considering this scenario, the main objective of this research was to find out which factors influenced the local lack of preparedness and the reasons why there was this sidelining of duties and consequently a problematic mid and long-term regeneration process.

**Legal framework of civil protection
– the centralism of the DCP**
The National Civil Protection System is Italy's institutional form of protecting human life, as well as economic and cultural assets in any kind of disaster. Civil protection is defined as a system of joint competence with vertical (from the local level of government to the national), and horizontal (between public institutions, associations and private actors) structures (OECD 2010). Figure 11 illustrates the cross level structure of the DCP.

Since the act of 1998[3] decentralizing Italian politics, the civil protection structures of Italy have gained a bottom-up arrangement. Depending on the characteristics and magnitude of the disaster, operational responsibility in emergency response and decision making lies initially with the local authorities. Responsibility is governed by the principle of subsidiarity in case the capacities are insufficient. This means that it scales up from the municipality to the province, then to the region and lastly to the central government. In the case of major disasters the intervention of the central government is needed. It is the responsibility of the Prime Minister to decide whether to declare a state of emergency and what resources are needed. The Prime Minister delegates authority to the head of the DCP for the coordination of all activities and over the public and private organizations involved in the emergency response.

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3   The law - L. 31.3.1998 n. 122 established changes in the administrative competences among national, regional and local levels, introducing government decentralization (OECD 2010).

**President of the Council of Ministers**

**Civil Protection Department**

Volunteers

National Committee of Volunteering

Operational Committee

Major Risks Commission

Emergency Forecasting and Prevention Programme

Guidelines for Emergency Provincial Plans of Civil Protection

Launching Interventions through Fire-Fighters Corps

**Province**

Forecasting and Risk Prevention Activities

**Prefect**

Provincial Emergency Plans of Civil Protection

Emergency Coordination Centre

**Municipality**

Municipal Emergency Plans of Civil Protection

**Mayor**

Municipal Operational Centre

National Fire Corps

National Level
Regional Level
Provincial Level
Municipal Level

**Figure 11:**
**Structure of the DCP**
*Source: Authors*

In the Italian framework of civil protection, it is possible to identify a paradox between centralism and decentralization. On the one hand, unified central control in a disaster situation gives rise to a rapid and efficient response; on the other hand, in the mid-term the lack of local input lends an authoritarian and locally disconnected characteristic to the emergency coordination and a problematic regeneration process.

The effects of centralizing power on the procedures and decision-making process of emergency management can be perceived in the lack of investment in local capacity. By not allowing the local authorities to participate in the response, centralized control has over time weakened local capacities and, in this way, undermined the development of local emergency strategies.

Local politicians interviewed in L'Aquila in June 2014 recognized the lack of competences and resources at the disposal of their administrations during the emergency phase and acknowledged that investment in preparedness and emergency strategies is not a priority because of, among other factors, the persistent lack of own resources and political will (Cialente 2014; Biondi 2014).

**Procedures in the disaster management**
As stated above, the magnitude of the disaster called for a national response. The high number of the population affected and displaced the damage to the building stock and the lack of capacity of the local authorities made central intervention necessary.

A few hours after the big shock a state of national emergency was declared, and the national civil protection stepped in. The DCP, through its nominated special commissioner[4], was in charge of the emergency response until December 2010, when the regional level government was delegated the coordination of the reconstruction phase.

The emergency response conducted by the DCP is regarded by the OECD (2010) as positive and strong.

The relief operations were conducted with efficiency and rapidity. Nevertheless, many authors (Özerdem & Rufini 2013; Alexander 2010b) indicate that the local authorities were sidelined in the L'Aquila 2009 earthquake response, giving the response a different tone.

These authors point to the fact that the mayors were given restricted powers and roles and the reconstruction policy was performed unilaterally by the DCP. The anomaly is that the policy framework in Italy is in fact characteristically decentralized, meaning that the local authorities were actually in a better position to deal with the situation, to establish priorities and guidelines and play a major role (Özerdem & Rufini 2013).

To illustrate the sidelining of authority, the mayor of L'Aquila only had the power to decide on the location of the sites of the C.A.S.E. housing project, but not on their design. This means that no local knowledge regarding the adequacy of the project to meet the needs of its population was taken into account. According to the mayor of L'Aquila, Massimo Cialente (2014), he had to fight to influence the project, organizing the new housing in nineteen smaller sites instead of in one big center.

During a fieldwork interview officials from the department of reconstruction (Ufficio Speciale per la Ricostruzione dei Comuni del Cratere, USRC) alleged that the changes imposed in the coordination of the emergency led to greater difficulties in the reconstruction process (Agnelli 2014). The coordination changes were accompanied by changes in the rules and procedures for reconstruction, making the process more complicated.

Moreover, D. E. Alexander (2010b) argues that the management of the emergency was a success only because of overwhelming national action. He claims that the taking over of functions did not improve resilience or self-sufficiency at the local level.

In conclusion, the procedures were actually performed by authorities external to the municipality. This was a function of the institutional

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4    Guido Bertolaso – the Head of the DCP (Longhini 2013)

centrality of civil protection in Italy formerly discussed and opens up the problematic of acting according to the framework.

### Roles and responsibilities

As the OECD (2010) reports, the structure of the DCP and the principle of subsidiarity are viewed positively. The HFA framework (National Civil Protection Department 2009; National Civil Protection Department 2011) also praises the organizational structure by indicating positive factors about procedures that are already in place and that are helpful for the exchange of information. This is essential for the transference of responsibilities that occurs in the different phases. In other words, the communication responsibility between the different levels is clear as far as knowing who is in charge of what in a crisis scenario.

Nonetheless, different authors comment that some roles and responsibilities are not clear enough, and it is also possible to find some related structural problems when analyzing the OECD report on the DCP. This report points out that even though financial and organizational resources cannot be entirely devolved to local institutions, the strategic choices for development for the region and their policy instruments must be chosen by local institutions. This shows that there is a weak point in the roles and responsibilities of the local management because, as described earlier, they had no say in the decision-making process. Likewise, it can be said that the participation of the civil society and the private sector could lead to a clarification of roles in disaster management.

In addition to the unclear responsibilities of the different sectors of the DCP, there is the fact that the DCP was established as a ministry without portfolio under the Ministry of the Interior (OECD 2010). A commissar was appointed head of the DCP and as D. E. Alexander (2010b) claims, his role has never been fully institutionalized.

It is also important to mention that the DCP was in fact a ministry in 2000 but was quickly transformed into a department of state, with nominal depen-

dence on the Ministry of the Interior but directly responsible to the Prime Minister as head of the National Cabinet. This change in structure is the main reason why the responsibilities of the DCP became so wide-ranging and why its decisions carry so much weight.

On the local level, the main findings in the field show that the mayors of the cities visited had either unclear responsibilities or few resources for the management of the emergency (Cialente 2014). It is also interesting to point out that ever since the 225/192 DCP law, the intention has been that the regions should build better capacities towards disaster management and the provinces should actively participate in national disaster prevention programs.

An important finding of the fieldwork showed that even though twenty years have passed, the local institutions still lack improved capacities (Cialente 2014). As a result, institutionalization of responsibilities at all levels is still necessary; only then will local management be able to exercise its reach and scope. This would also make a clear how much a local administration can achieve when a major crisis occurs and thus make the need for improved capacities more evident.

### Politicization of the event

The decision making process during the emergency of L'Aquila 2009 was characterized by administrative instruments which made politicians' decisions easier and faster to make. These were very important because of the upcoming elections and the possibility of obtaining votes through the measures taken to assist the affected population (Özerdem & Rufini 2013).

One of the instruments available was the ordinance. As D. E. Alexander (2010b) claims, ordinances were widely used during the emergency phase to bypass parliamentary scrutiny as well as bureaucratic procedures that would have slowed the process. This produced good results in some aspects of the emergency response but also brought about consequences related to corruption. Both D. E. Alexander

(2010b) and Özerdem and Rufini (2013) mention that some of the decisions made during the crisis were tangential to corruption, such as the agreement of the C.A.S.E. project and the tycoon managerial expertise of the Berlusconi administration with relation to housing and urban renewal.

One has to take into account the amount of economic resources that started to flow into the region for reconstruction projects, and the rapid rate at which they were deployed, in order to understand the politicians' interest in being actively involved in the reconstruction. Even though corruption can be difficult to prove, mediatisation is most definitely not. All the new projects built were mediatised to present the politicians as the heroes of the crisis, showing promises kept and new opportunities up ahead. Silvio Berlusconi alone visited the earthquake site no fewer than twenty-three times with televised statements for the homeless each time (Özerdem & Rufini 2013).

The diversity of parties ruling the stricken region further accentuated the politicization. The municipality was led by the Democratic Party and the region by the Centre Right linked to Berlusconi's administration. The former and the central government shared control of all decisions regarding the reconstruction. The head of the central DCP, Guido Bertolaso, was appointed Special Commissioner with extraordinary powers to take any action to assist the needy and later the region's president took over the task of Special Commissioner for Reconstruction (Di Camillo et al. 2014).

Another key finding is the lack of citizen participation in the decision making process. The general opinion of civil associations interviewed in the fieldwork reveals that there was very little citizen involvement in the emergency . Even though the local authorities were better equipped to make decisions for their own towns, they were overruled by decisions made centrally and in a top-down way, making it even more difficult for citizens to have a say in the process. The exception was that the local mayors were allowed to decide the geographical location of the C.A.S.E. projects.

The politicization of the process may have produced some minor benefits in the management of the process. Namely, that decisions could be taken quickly in a bureaucracy-free environment. But it resulted in the weakening of local institutions regarding disaster management and further undermined the existing knowledge and expertise of the locals by ignoring the need for the integration of the civil society in such an important crisis.

**Local capacities and resources**
Since the management structure of the Italian framework for disaster reduction is bottom-up, the regions are required to invest in the structure of civil protection intervention and promote capacity building of local organizations. "Each region is entitled to legislate independently on a number of issues, and particularly on the issues of land management and risk reduction" (UNISDR 2008, p.13).

In practice, however, at the local level it is "challenging to keep as a high priority when short-term profits dominate decision-making" (Kelman 2008, p.1). Besides this, the lack of resources makes capacity building more difficult. Taking the emergency plan as an example, it is stated in the HFA that there should be emergency plans and regular emergency training. But according to the mayor of Villa Sant'Angelo (Biondi 2014), the local emergency plan was not up to date. In some schools, there were not even escape routes. Even in some government offices, emergency plans were non-existent (Biondi 2014). A major consequence of this was the lack of backup of all official municipal data, which led to the late response from the authorities during the emergency. Even to this day there are no resources to update the emergency plans.

Besides the lack of resources, the lack of research on the vulnerability of the population, building stock, heritage, and environment at local level also indicates a weak local disaster management. Risk communications can be evaluated as good, but there is no local awareness of how to manage these communication tools. In other words, people do not necessarily know that such tools related to risk communication exist, or how to use them properly.
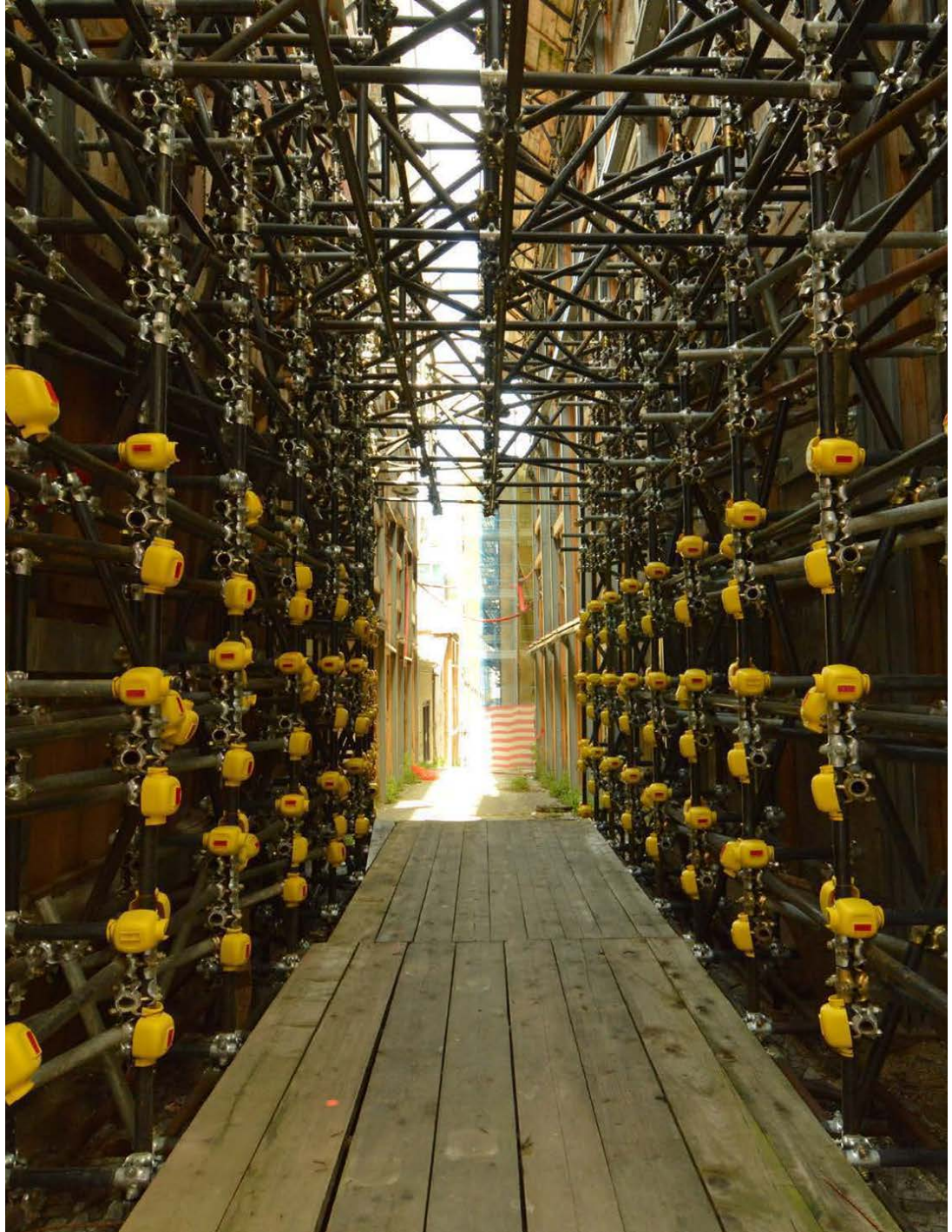
**Figure 12:**
**A View Through the**
**Scaffolding**
*Photo: Jesús Salcedo Villanueva*

The upgrading of institutional capacities through the allocation of a budget for local government would be an effective way of improving local disaster response and decentralizing civil protection efforts. Disaster management requires an integrated system of emergency response where the very centre is the local response and not the national one (National Civil Protection Department 2009; National Civil Protection Department 2011).

**Fragmentation**

Fragmentation among institutions was also responsible for the poor local disaster management. The OECD report (2010) assessed that the Italian DCP is well structured. It has a complex internal institutional framework and external cooperation mechanism that are set up to deal with different varieties of emergency situation with functional cooperation with other departments. However, Stanganelli (2008) claims that even though the DCP has an integration of policies and a multi-sectorial structure, in reality it is fragmented.

The DCP, ruled as it is by the subsidiarity principle, still needs to have clarity of communication and participation at all levels, including in a major crisis like the one in L'Aquila. The fragmentation mentioned here is related to the assumption of control by the national DCP and the lack of decision-making and communication by the municipal authorities (Cialente 2014) and is responsible for the consequences related to the long-term regeneration process.

This fragmentation problem not only occurs in L'Aquila between the municipal and central levels, but also on a national scale and horizontally between the DCP and other departments. For example, in the 2002 Molise earthquake, a collapsed school caused the death of 27 pupils ("Earthquake Shakes Southern Italy", 2013). As a result of the severe damage, Italy raised awareness to assess risks in educational buildings. This strategy was performed on the assessed schools by different departments each with a different focus. There was a lack of coordination between the strategy and the allocation of funds. This fragmentation resulted in the funding being stopped

and thus the school buildings were not retrofitted when the L'Aquila earthquake struck. An interview with the national DCP (Goretti 2014) revealed that between 4,000-5,000 schools around Italy have been assessed and enhanced. This number represents only ten percent[5] of state-owned schools (European Agency for Special Needs and Inclusive Education 2014).

On the one hand, this illustrates the will for institutions to improve towards disaster risk reduction and, on the other hand, the obstacles impeding this reduction from being achieved.

## 2.5   Conclusion: Lessons to learn

One of the main findings, also criticized by Özerdem and Rufini (2013), is that the DCP only focuses on the response and not on preparedness. The buildings are not well maintained to resist earthquakes and there is no enforcement of prevention policies. The civil associations that were interviewed in the fieldwork also mentioned the lack of a "prepared culture" (Fagnani 2014).

The OECD also criticizes the lack of preparedness; it claims that emergency plans are not up to date, or implemented at a local level. HFA also mentions that regular training should take place, though some experts claim that the HFA recommendations are considered to be low (Fagnani 2014). Emergency training in schools happens only once a year, which is not enough to change the culture.

The second finding is that the lessons learnt remain local; there is no procedure in place to spread them across the country. During the field interviews, some associations expressed the opinion that the L'Aquila earthquake is a special case (reference with notes), based on the frequency with which the region experiences major earthquakes and on the fragility of the heritage buildings in the city centre. This illustrates the lack of a preparedness culture as a major flaw in most institutions.

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5   The number of state-run schools in Italy is 42,000, according to the European Agency for Special Needs and Inclusive Education, https://www.european-agency.org/country-information/italy/general-information

Moreover, D. E. Alexander (2010b) pointed out that when disasters struck a lot of money flowed into the relief plans, yet the fieldwork showed that for all levels of governance one of the main barriers to investment in preparedness is the lack of financial resources. The lesson to draw is that funds should be allocated before emergencies occur and that these funds should be invested in heightening preparedness and awareness. The lack of awareness in turn, leaves no interest for private investment in disaster risk reduction. To sum up, local management in the L'Aquila earthquake did not function well, and the causes of this are many and complex: the monopolization of control by the central government and the politicization of the decision making process, among others. But it is certain that key areas in which institutions need to invest are local capacity building and resource accessibility for future disasters.

*Left Page*
**Destroyed House in**
**the Village of Onna**
*Photo: Federico Rota*

# 3 Self-Preparedness for Natural Hazard: How Prepared? Delivery Failure of "The Handbook of Civil Protection in Families"

**Author**
Maged Elgendy

**Abstract**
One of the significant channels of the Civil Protection Department is the publication ''The Civil Protection Handbook for Families'' or in Italian ''Protezione Civile in Famiglia''. It was published in 2005 by the presidency of the Council of Ministers of Italy Department of Civil Protection – Rome, in cooperation with the Regione Autonoma Valle d'Aosta, Presidenza della Regione. There are some claims that there is no prevention culture in Italy. In the case of the earthquake in L'Aquila, this handbook should have saved lives. In order to measure the success of this handbook, it is important to measure the quality of the book and the quality of its delivery to the citizens for whom it was intended. This research paper is principally concerned with how far the delivery of this handbook was successful before and after the disaster in L'Aquila, Italy 2009. Questionnaires were given to citizens of L'Aquila during our fieldwork. This paper elaborates and analyzes the data collected during our field trip. The results of this analysis lead to a conclusion which answers the question regarding the delivery accomplishment of ''The Handbook of Civil Protection in Families'' to the citizens of L'Aquila.

## 3.1 Introduction

When a disaster occurs, many people may not only lose their homes, but also friends or family members. It is the responsibility of good governance to provide them with alternative shelter. However, nobody can compensate for the permanent emotional tragedy when we lose a person we love.

In the long term, the loss of emotional stability by a large number of people has a negative impact on the economy and social life at national level. Consequently, disaster responses at the political level should be equipped to intervene constructively not only during or after the disaster, but also before.

The Civil Protection Department in Italy is concerned with the management of disasters. The framework of this department includes cooperation with many institutions and departments. Such as: Ministry of the Interior, Ministry of Foreign Affairs, Ministry of Education, Ministry of Agriculture and Forestry Policies, Ministry of Infrastructure and Transport, Ministry of Economy and Finance, Ministry of Cultural Heritage and Activities, as well as the army, navy, air force, police and some other departments (Di Camillo et al. 2014, p.16).

In Italy - a member of the European Union – people are aware of the danger of an earthquake striking at any time. Over the last decade, many buildings and small villages (especially very old constructions) have been destroyed in earthquakes. In the wake of these earthquakes, both Italian and EU regulations regarding natural hazard preparations have provided funds and authority to the concerned institutions  in order for them to develop their disaster response capability.

## 3.2 Monitoring the existing situation

According to the Hyogo Framework for Action (HFA) in Europe, essential 8, states: ''How much do civil society organization and citizens participate in the restoration, protection and sustainable management or ecosystem service''. This shows how impor-

tant it is to enhance not only the top-down method of Italian politicians, but also the bottom-up level.

''On an operational level, the Civil Protection Department issues guidelines, aimed at regions, provinces and municipalities, to prepare and implement prediction and prevention programmers in relation to various risk scenarios. It also promotes information activities for national scenarios, in collaboration with other institutions and associations, as well as training and research activities regarding the prediction and prevention of natural and manmade risks''. (Dipartimento della Protezione Civile n.d.)

It is obvious that the provision of information is one of the most important tools in making sure that people are aware of the issue. In addition, having an informed citizenry will facilitate all kinds of interactions instigated by the Civil Protection Department in order to achieve their goals. The informing and spreading of awareness could be achieved through many channels: schools, civil society organizations, even multimedia.

If we take a look at the HFA priority for action 3, it states that knowledge, innovation and education should be used to build a culture of safety and resilience at all levels [C1, 3, 2]. Was this applied in Italy? The results of the ECPR Joint Sessions of Workshops Mainz, 11th - 16th March 2013 (Loghini 2013) are a trigger to research in this area.

As mentioned before, the Civil Protection Department consists of a huge team that includes large technical and administrative institutions. The department is not a mechanical tool to be employed at times of disaster. The Civil Protection is moving away from being just a "rescue machine" which operates only after a disaster and is turning into a system for forecasting, preventing and monitoring the territory against risks that may occur (Dipartimento della Protezione Civile n.d.).

The Civil Protection Department is aware of the relevance of well-informed citizens. It is clear to them that the trust and confidence of citizens is key to the

success of their aim. This is one of reasons that Civil Protection Department released ''The Handbook of Civil Protection in Families''

''In order to be efficient, this system must, first of all, gain the confidence of the citizens, who are active players in the civil protection. The hand-book entitled "The Civil Protection for Families" describes with simple concepts and numerous illustrations the risks present on Italian terri-tory, suggesting to the reader the approach to be taken in front of small or large emergencies. Knowing the risks, knowing how to get informa-tion, being organized within the family, knowing how to ask for help, emergency and disability are the five key issues of the guidebook, a prac-tical and effective way to build your own "Family Plan of Civil Protection". The booklet, distributed free of charge, may be acquired in the necessary quantities at: comunicazione@protezionecivile. it. Shipping charges are paid by the applicant'' (Dipartimento della Protezione Civile n.d.).

One effective channel for delivering the informa-tion is the creation of a handbook that explains to people the various aspects of disaster risk and prevention. The Civil Protection Department already has such a handbook, namely ''The Handbook of Civil Protection in Families''. This means that money and effort have been spent to create such a product. This channeling of financial resources was necessarily supported by a political decision.

As a result of the D.L. 343 of 2001, the Italian Civil Protection Department started to deal also with so-called "big events" 4. As for provision 5:

''(…) the President of the Council of Ministers or the appointed Interior Minister determines the civil protection policies, has the power of issuing decrees for civil protection, promotes and coordinates the activities of the central and local administrations of State, regions, provinces, municipalities, national and local authorities and any other institution and public and private organization within national borders, that are

aimed at protecting the integrity of life, property, settlements and environment from harm or risk of damage from natural disasters, catastrophes and other big events which result in serious risk''. (Dipartimento della Protezione Civile 2001).

In another words, the Civil Protection Department in Italy is allowed to manage huge amounts of money. The Civil Protection Department is a large organization that works in cooperation with almost all the executive institutions in Italy. They have funding and facilities as well as manpower. The Civil Protection Department has many channels for deliv-ering information to the public. It also plans on all levels (before, during and after a disaster) to reduce disaster causalities.

''The Handbook of Civil Protection in Families'' can be found on the website of the Civil Protection Department in both Italian and English. This means that the project is an important and also official channel of information delivery. The hand-book includes information about different natural hazards, including earthquakes, such as: definition, how the earthquake comes about and, most impor-tantly, instructions of what the individual should do before, during and after the earthquake in order to avoid the risk.
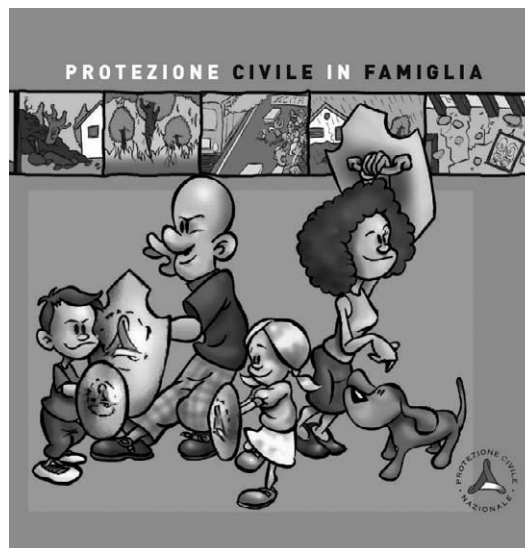
It is important to know what became of this great effort. The handbook was created for a purpose and it seems like it is easy to come by a copy. But in order to get the handbook, the citizen must first know about the handbook. Quite simply, the citizen must be informed. The citizen must be told that such a handbook exists and that he or she can acquire a copy if they do such and such. Secondly, the citizen must be motivated to acquire the handbook. He or she must be aware of the importance of the instructions inside. In other words, the citizen must be aware of the danger.

### 3.3    Realizing the danger

It is obvious that some people were not aware of the extent of the dangers of such an earthquake. Anna Loghini referred in her article to some interviews. One person said that they were used to earthquakes as a part of daily life, to the extent that people normally made jokes about those who were scared during earthquakes. (Loghini 2013, p7).

It is sometimes true that citizens are used to danger. At the same time, they are aware of the danger. Joking about the current situation doesn't mean that the citizens didn't realize that their lives might be at risk. The majority of people who hadn't read ''The Handbook of Civil Protection in Families'' nevertheless applied some of the procedures presented in the handbook. These people knew the importance of individual responsibility in times of hazard and that they must do something. The responsibility of the Civil Protection Department is to make sure that people are aware of any safety procedures that might save their lives. This is supposed to be the aim of such a handout.

The government will never be able to compensate for individual emotional loss. However, the government can reduce the number of casualties that result from a natural hazard by improving preparedness at all levels. A strong and stable building may save some lives. Individual preparedness will also decrease the number of losses. Therefore, the government should help individuals do everything possible in order to protect themselves and, most importantly, the authorities should spare no effort in making sure that each individual knows what to do when a disaster occurs, at the very least by improving the quality of information provision.

''Indeed, because you are the first player in this system: you are the one who must know how to be vigilant, to give warning, to cooperate with rescue services. When an emergency occurs – nearly always in a sudden and unpredictable way – you and your family may have to confront difficult and dangerous situations on your own, even if only for the response time needed by rescue workers to reach you and assist you'' (Dipartimento della Protezione Civile 2005, p. 3).

However, in 2009, the sudden earthquake hit the center of Italy while people were sleeping. There was no effective alarm before the earthquake. Not only did many people lose their lives, but a huge part of the city was destroyed, along with many small villages in the surrounding area. Damage to a limb cannot be compared to damage of the heart. ''The damage in city of L'Aquila, in the middle of Italy, is like a hard strike directly in the heart. L'Aquila is the heart of Italy'' said dott. Massimo Cialente, the Mayor of L'Aquila during a conference with students of the Technische Universität Berlin on Wednesday 4th July 2014 in L'Aquila.

The aim of this paper is to find out whether or not "the first players" were as well prepared for this dramatic moment as the Civil Protection Department expected. The research is based on a questionnaire designed to measure L'Aquila citizens' knowledge of the Civil Protection Department and its publication ''The Handbook of Civil Protection in Families''.

### 3.4    Aware of the handbook or: Ah, where is the handbook?

''If you are aware of the possible hazards concerning the territory where you live, if you know how and where to get information, if you know how to get organized in order to face a critical moment, you live in a safer way and the Civil Protection can function at its best'' (Dipartimento della Protezione Civile 2005, p. 3).

This is what the book claims. But in the light of the massive destruction of the city of L'Aquila and the findings set out by Anna Loghini in her publication on the ECPR Joint Sessions of Workshops Mainz, 11th - 16th March 2013, which refer to the fact that people were unaware of how dangerous the situation was, had the Civil Protection Department achieved its target? Had the citizens of L'Aquila read ''The Handbook of Civil Protection in Families''? And has anything changed regarding citizen awareness of this handbook since the 2009 earthquake?

This research paper assumes that very few people had read ''The Handbook of Civil Protection in Families''. This research paper assumes that people have in the meantime learned some safety procedures but that this may be happening through other channels which are not the topic of this paper. This paper is skeptical about the quality of information delivery regarding safety in case of natural hazard in L'Aquila. There may have been fieldwork to educate people and expose them to the Italian guidelines, but this was never taken seriously. The analysis of the interviews will show to what extent people were prepared for the earthquake. The analysis will also show whether or not they are prepared now for any future natural hazards. This research paper will reveal the level of communication between the Italian department of civil protection and the citizens of L'Aquila, before and after the earthquake in 2009. A common quote from the people interviewed was: We never heard about this book. Where is it?

## 3.5    How many know?

Fifty-nine copies of the questionnaire, in both Italian and English, were distributed among students and both employed and unemployed citizens. 55% were female and 45% were male. Equal numbers were selected in each age range,  including teenagers and people in their 20s, 30s, 40s, 50s and 60s up to 75 years old (representing the retired class in L'Aquila).

The questionnaire clearly shows the percentage of citizens in L'Aquila who knew about the Civil Protection Department and its publication "The Handbook of Civil Protection in Families" before and

after 2009. It was also able to measure the increase/decrease of this knowledge between 2009 and the date when the questionnaire was administered in 2014.

The questionnaire also reflected opinion on the street regarding the publication of the Civil Protection Department publication. The results drawn from the questionnaire, including some statistics, appear over the next few pages. The darker the blue next to any question, the higher the percentage.

14% of citizens questioned had never heard of the Civil Protection Department before 2009. The rest (86%) had heard about the department before 2009 (Figure 14). At the time of our study, 100% of citizens questioned knew about the Civil Protection Department.

It is difficult to say whether this increase occurred because of communication efforts by the Civil Protection Department or because of the earthquake situation. After the disaster in 2009, every citizen was in a position to observe the work of this department, as well as the work other organizations.
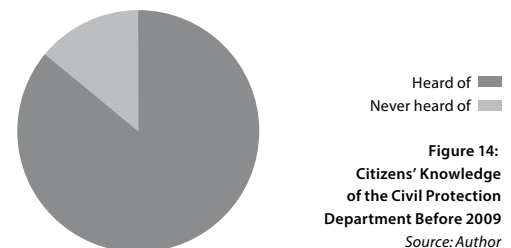


Heard of
Never heard of

**Figure 14:
Citizens' Knowledge
of the Civil Protection
Department Before 2009**
*Source: Author*
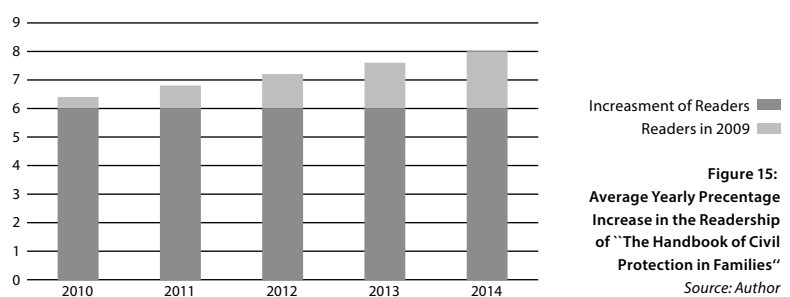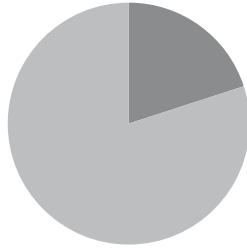


Increasement of Readers
Readers in 2009

**Figure 15:
Average Yearly Precentage
Increase in the Readership
of ``The Handbook of Civil
Protection in Families''**
*Source: Author*

Heard of
Never heard of

**Figure 16:**
**Citizens' Knowledge of ''The**
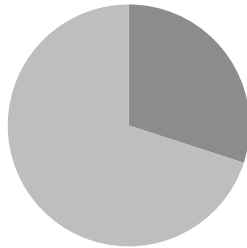**Handbook of Civil Protection**
**In Families'' Before 2009**
*Source: Author*

Heard of and read
Heard of but never read

**Figure 17:**
**Ratio Between Citizens**
**Who Only Knew About ''The**
**Handbook of Civil Protection**
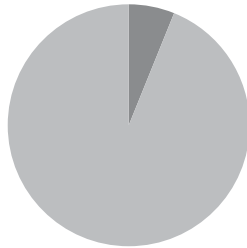**in Families'' and Those Who**
**Had Read it Before 2009**
*Source: Author*

Read
Never read

**Figure 18:**
**Citizens Who Had Read ''The**
**Handbook of Civil Protection**
**In Families'' Before 2009**
*Source: Author*

Informed
Did not Inform

**Figure 19:**
**The Ideal Situation: Citizens**
**Who Had Read ''The Handbook**
**of Civil Protection In Families''**
**and Informed Others About**
**in L'Aquila Before 2009**
*Source: Author*
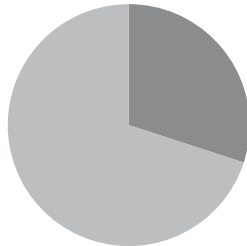
Heard of after 2009
Heard of before 2009
Never heard of

**Figure 20:**
**Citizens' Knowledge of ''The**
**Handbook of Civil Protection**
**In Families'' in 2014**
*Source: Author*
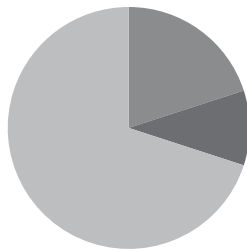
Only 20% of citizens questioned had heard of ''The Handbook of Civil Protection in Families'' (Figure 16) and only 30% of these had read it (Figure 17). This means that 6% of citizens questioned had read the handbook (Figure 18). This percentage is very low. Also, the response of the people who had read the handbook is far from satisfying as only 30% of them had informed others about it (Figure 19). In addition to the inefficient communication between the Civil Protection Department and the citizens of L'Aquila, communication between the citizens them-selves was poor. This reveals another obstacle to the passing on of information, creating another diffi-culty for the Civil Protection Department.

Since the 2009 earthquake, these figures have slightly changed. For instance, 30% of the same citizens questioned now knew about ''The Handbook of Civil Protection in Families''. This means that the number of citizens who knew about the handbook had increased by 50% compared to the number of citizens knew about it before the earthquake in 2009 (Figure 20).

According to the questionnaire results, the percentage of people who actually read the hand-book after the earthquake is 8% (Figure 21). This shows that the percentage of handbook readers between 2009 and the time when the questionnaire was administered in 2014 had increased by 33% (this was 6% before 2009). In other words, this percentage had increased by an average of 0.4% each year between 2009 and 2014 (Figure 15). This average rate is very low. The percentage of people who had read the handbook and informed other citizens was still 30%. So the ideal situation occurred in about 2.7 out of 100 persons (Figure 22).

14% of citizens questioned who still don't know anything about ''The Handbook of Civil Protection in Families'' thought that it was not useful at all. However, 57% did think it was useful. 29% didn't know whether it was useful or not (Figure 23).

83.4% of citizens questioned who had moved to L'Aquila after the earthquake knew nothing about ''The Handbook of Civil Protection in Families'' (Figure 24). Only 16.4% had read the handbook and they

considered it useless. This percentage is even lower than the percentage of citizens who had heard about ''The Handbook of Civil Protection in Families'' before 2009. This shows that citizens who had lived in L'Aquila since before 2009 were better informed than those who had moved there after 2009. It might also show that there was not enough of a campaign to inform citizens about the handbook after the earthquake in 2009. Otherwise we would expect a strong information campaign aimed especially at new arrivals, who would be expected to be less well informed than the citizens who suffered the earthquake.
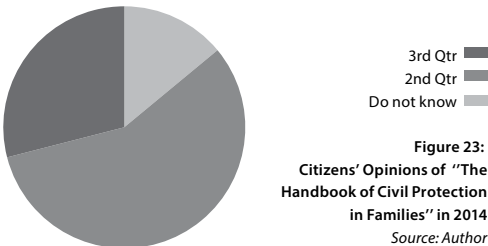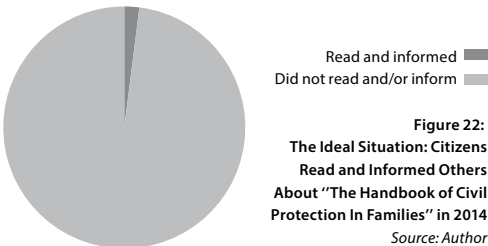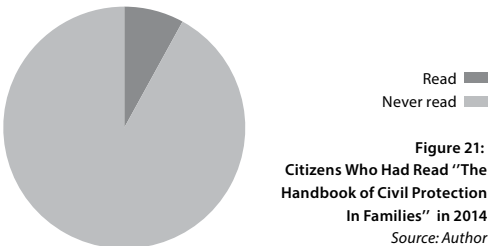
Interesting is the percentage of informed technicians who have been engaged in the reconstruction of the city since 2009. The questionnaire showed that only 15% of these experts and technicians knew about the handbook (Figure 25). At the time of the survey, 90% of them had never read the handbook. This means that only 10% of people working on the reconstruction of L'Aquila had read ''The Handbook of Civil Protection in Families''.

As shown on page 3 of the questionnaire, most citizens knew or had applied at least one of the safety procedures mentioned in ''The Handbook of Civil Protection in Families''. The best-known procedure was that the citizen should distance himself from the buildings; the least known was the injunction against using the telephone lines.

## 3.6 Conclusion

There are three reasons that might lead the majority of a society not to take a handbook of safety seriously, especially when that society is always in danger. First, is a low level of risk awareness in the society. If citizens realize that they are in real danger they will respond positively to anything that might save their lives. Second, when safety instructions are not presented in a user-friendly way, when they are, in other words, of low quality. Third, when people don't know that the book exists.

According to the Special Eurobarometer 383, published in June 2013, the percentage of Italians concerned about earthquakes is 58%, which is much

Read
Never read

**Figure 21:**
**Citizens Who Had Read ''The Handbook of Civil Protection In Families'' in 2014**
*Source: Author*

Read and informed
Did not read and/or inform

**Figure 22:**
**The Ideal Situation: Citizens Read and Informed Others About "The Handbook of Civil Protection In Families" in 2014**
*Source: Author*

3rd Qtr
2nd Qtr
Do not know

**Figure 23:**
**Citizens' Opinions of ''The Handbook of Civil Protection in Families'' in 2014**
*Source: Author*

Heard of
Never heard of

**Figure 24:**
**Knowledge of ''The Handbook of Civil Protection in Families'' Among Citizens Who Moved to L'Aquila After 2009**
*Source: Author*

Heard of
Never heard of

**Figure 25:**
**Knowledge of ''The Handbook of Civil Protection in Families'' Among People Working on the Reconstruction of L'Aquila in 2014**
*Source: Author*

higher than the EU average of 22% (Di Camillo et al. 2014, p.26). This eliminates the first reason, at least partially, from being considered in this paper.

The field research in L'Aquila showed clearly that communication between the Civil Protection Department and the people of L'Aquila regarding the "The Handbook of Civil Protection in Families" was very poor. The current situation in the city shows that the buildings were not prepared at all to cope with an earthquake. What this research paper emphasizes, is that "The Handbook of Civil Protection in Families" does not play a significant role (and never has) in achieving the Civil Protection Department's purpose. Therefore, it is obvious that one of the department's tools of disaster prevention is not effective.

It is difficult to determine the quality of the data included in the handbook. Asked about the ability of the book to save lives during a conference with students of Technische Universität Berlin in July 2014, Dott. Massimo Cialente, the mayor of L'Aquila, stated that the city planned to create a local handbook for safety in families.

However, some questions need to be answered regarding the connection between the data included in the handbook and the reality of the situation. For instance, the handbook recommends that citizens take shelter during an earthquake, but how many houses are provided with shelters?

If the citizen is not convinced that the instructions included in the handbook will save his life, it should not be expected that he take the handbook seriously or inform others about it. For example, it is recommended that one should hide under a table during an earthquake, but if the citizen doesn't have a table, or has only a flimsy one, he is unlikely to find this advice useful.

This research paper recommends the application of building standards regarding interior design which match the recommendations in "The Handbook of Civil Protection in Families". For instance, each building should have an outdoor safety shelter. In addition to structural safety measures such as the provision of stronger beams above all doors inside a building, urban standards are required when considering main roads, exits and expected escape routes for individuals.

The colorful "The Handbook of Civil Protection in Families" with its cartoon interface failed to play the role it had been designed for and didn't even reach the technicians working on the reconstruction of L'Aquila. The citizens of the city were not prepared for the earthquake of 2009 and as of this writing are still not prepared for any future earthquake.

*Right Page*
**MAP Village of Sant'Angelo and Village of Tussillo**
*Photo: Federico Rota*

# 4 Disaster Debris Management During and After the Emergency Phase: A Case Study of L'Aquila Earthquake, 2009

**Authors**
Muntari Illyasu
Aditi Poudel Dhakal

**Abstract**
Debris and waste generated after a disaster pose a serious health hazard and subsequently delay the road to recovery and reconstruction. So, effective and immediate management of debris and waste is required. This report examines the regular and exceptional measures adopted or implemented during and after the emergency phase and the institutions involved in managing the debris in the 2009 L'Aquila earthquake. The study found that a unique regulation, namely Decree 20 03 99, was enacted to specifically manage disaster debris during and after the emergency phase. The Aquilana Società Multiservizi Spa (ASM) was/is the institution responsible for debris management. This institution mainly collected, separated, sorted and classified the reusable debris, for example for use in road construction and environmental regeneration. A number of informants (professional officials) were interviewed and semi-structured questionnaires were administered for the primary data collection. This study concludes that overall debris management after the L'Aquila disaster was not effective for number of reasons. Firstly, the lack of plans and policies for debris management before the disaster affected the overall effectiveness of the operation. Secondly, there was a delay in managing the 'special debris' of historically important buildings and in addition the change in stakeholders involved and the transfer of their responsibilities were major causes of delay in the debris management.

*Left Page*
**One of the Collapsed Building in L'Aquila After the 2009 Earthquake**
*Photo: Muntari Illyasu & Aditi Poudel Dhakal*

## 4.1 Disaster debris management during and after emergency phase

On April 6th, 2009, magnitude 5.9 Richter scale earthquakes destroyed many buildings in L'Aquila, Italy and created around four million tons of waste (debris). Around 80% of this waste was aggregates which can be recycled (Brown et al. 2010).

This research investigates the regular and exceptional measures adopted or implemented in managing this debris during and after the emergency phase of the 2009 L'Aquila earthquake. It also discusses how the debris is currently managed and who is responsible for its management and treatment.

Disasters usually create large volume of solid and liquid wastes. Significant quantities of waste are also generated during the recovery phase. If not managed in time, they create not only a health risk but also an increase in many social, economic and environmental problems. Health risks are normally created by hazardous waste products  such as asbestos and other chemicals that can be present in the debris. On a social level, the traumatized people can become frustrated with the ubiquitous waste, as seen in the 'wheelbarrow protest' which was started in L'Aquila. This can hinder societal  development. The area becomes less attractive to tourists and economic activity is reduced. This is one direct economic effect. Increased expenditure resulting from the scattered waste, including the treatment of environmental pollution and the treatment of human health are indirect economic effects. Hence, debris management becomes the first priority, ranked just behind search and rescue missions, in any disaster. When there are sufficient laws, legislation and policies in place, then immediate action can be taken, reducing delays and all the harmful effects of the waste.

## 4.2 Managing disaster debris

In all natural disasters, tonnes of debris are produced. Disaster debris becomes a potential threat to safety and an obstacle to the recovery and rebuilding of a region. The debris produced needs to be collected, categorized, treated and disposed of properly. Post-disaster debris management becomes a central part of the recovery process and of the rebuilding of the affected regions. Scholars and researchers on disaster waste management have suggested that response to debris management globally appears to be significantly weak.

Depending on the scale and type of disaster, debris may include both hazardous and non-hazardous substances and waste, such as collapsed buildings, personal property, furniture, electronics and vegetation. The management of the debris depends on the ability and capabilities of residents to swiftly and successfully collect it in order to return to the area and live in a safe and healthy environment (UNEP 2012; Luther 2011).

A number of elements impact the proper and speedy management of disaster debris. The past decades have witnessed major disasters all over the world: Sumatra's Andaman Earthquake (2004), Hurricane Katrina (2005), the Great Sichuan Earthquake (2008), the Haiti Earthquake (2010), and many others. All these disasters generated a large volume of debris and waste.

According to Luther (2011), it is important to estimate the total volume of disaster debris to provide an idea of what is required in terms of landfill space, contract services and projected special handling  applicable to hazardous debris.

**Types and the amount of debris**
In general, disaster debris comprises both reusable substances and waste materials. An understanding of the types, nature, and volume of the debris to be handled is of the utmost necessity for any recovery process. However, this depends mainly on the nature and magnitude of the disaster. For instance, debris produced by tsunamis and floods differ from those generated as a result of an earthquake or tornado. For each of these categories, debris poses an individual challenge in separation and disposal depending on how significant is the volume generated and whether is is mixed with waste (Luther 2011; UNEP 2012).

Typically, disaster debris may include: municipal solid waste (MSW) such as household trash and personal property; soil and sediment; putrescible waste (animal carcasses); rotten fruit and vegetables; electronic goods and metallic and plastic materials (televisions, computers, refrigerators, freezers, air conditioners, washing machines, dryers, stoves, water heaters, and dishwashers etc.); hazardous substances (asbestos, paint, cleaning agents etc.); debris generated from collapsed buildings, roads, among others (Luther 2011).

An estimate of the volume and the proper management of these different categories of debris and waste are extremely important for many reasons. One of them is the need to identify appropriate disposal grounds for recycling and separation of wastes; another reason is the need to know how much landfill space is required and what special treatments applicable to hazardous debris are required (UNEP 2012).

In the L'Aquila earthquake (2009), the DPC (Civil Protection Department) estimated that the waste generated by the earthquake and the demolition and repair works, was between 1.5 and 3.24 million cubic meters of debris (Brown et al. 2010).

**Emergency and debris management plans**
Generally, when a natural or man-made disaster strikes, state and local authorities formulate and put into action the emergency plans. These plans activate emergency responses and operations such as fire, medical and communication operations. In the case of earthquakes, the purpose of the emergency plans is to clear the obstructed roads, restore disabled power and communication lines, save people who are trapped in the collapsed buildings and reduce further risk to human life and safety.

According to the U.S. Environmental Protection Agency (EPA) and the Federal Emergency Management Agency, it is necessary to develop a disaster debris management plan before a disaster strikes (Luther 2011). This is to ensure that debris is effectively managed. The argument is that such plans outline the types of disaster debris that will be

handled under specific emergency conditions and existing laws that apply to the handling and disposal of different types: hazardous and non-hazardous waste.

In this report, we examine the measures implemented in the management of debris during and after the emergency phase of the L'Aquila earthquake in 2009. A comparison was made between the regular EU policy and the exceptional measures adopted during and after the emergency phase of the L'Aquila earthquake, 2009. The report also examines how the debris was managed and treated during and after the disaster.

## 4.3 Discussion/elaboration of findings

**Regular and exceptional measures adopted**
When a disaster strikes, people get traumatized and this increases the probability of the situation getting even worse. In this period, when predefined policies and rescue plans are not available, management takes more time than would be expected in normal circumstances. According to the requirements of the emergency phase, people trapped in buildings must be freed, roads blocked by damage must be reopened and unsafe buildings must be demolished. The debris thus removed consists of a mixture of crumbled walls, broken furniture, door



**Figure 26: One of the Collapsed Building in L'Aquila After the 2009 Earthquake**
*Photo: Muntari Illyasu & Aditi Poudel Dhakal*

63

and window frames, broken pipes, wires and many more construction materials.

The history of disaster debris management guidance dates back to 1995. The initiative for broad national guidance on disaster debris management was taken by the United States Environmental Protection Agency (USEPA) in 1995. Unfortunately, there was no disaster debris management plan in Italy at the time of the 2009 L'Aquila disaster. Consequently, L'Aquila adopted European Union (EU) waste management policies. As these were was not intended for disaster, the DPV, the responsible authority, had to customize them under certain permission at national level. The EU played no direct role in the disaster management (Brown et al. 2010).

According to the EU policies (herewith referred to as regular measures) on waste management, only safe and controlled landfill activities should be carried out within disaster communities. However, in the case of the L'Aquila disaster, landfill sites were not predefined and as a result, for the first month, disposal of debris was carried out in an open space in the Piazza D'armi, which is neither a landfill nor a safe area. The site at Teges Pontignone was then considered as a temporary site and only allowed as an exception for emergency disposal and the treatment of debris according to Decree 20 03 99. This is a decree unique to the L'Aquila case, both in Italy and the world at large.

Generally, debris should be separated at the site of the disaster before disposal. This is categorically stated in the EU policies on waste management, 1999. However, in the case of Italy, Annex D of Part IV of Legislative decree number 152, of April, 3, 2006 was applied. This categorizes waste as municipal waste and allows disposal without separation.

According to the interview with professionals from the ASM, Italian laws do not permit the demolition of buildings but do allow what the law calls 'selective demolition', that is, demolition under special supervision to ensure safety. In other words, the demolition of the most vulnerable buildings was permitted by special (emergency) law during the emergency period.

**Disaster debris management after 2009 L'Aquila earthquake**

Aquilana Società Multiservizi Spa (ASM), a Municipal Services Company was mainly responsible for the management of the debris after the 2009 L'Aquila earthquake, using its own equipment and staff (Aquilana Società Multiservizi 2014).

According to EU waste management policies, all waste must be separated before disposal. But, in the emergency phase, it was urgent to remove debris from the city in order to rescue people. Hence, some legislative and regulatory changes were essential to assist the debris management (EU 1999).

This problem also brought as a solution some ad hoc legislation that took shape immediately after the earthquake in Abruzzo: Decree-Law 39 of April 28, 2009, converted by law 77 of June 24, 2009. This national legislation on waste made it possible to classify the rubble with the generic code 20 03 99 which is normally attributed to municipal solid waste (MSW). The national government also appointed extraordinary commissioners to deal with the emergency waste (Aquilana Società Multiservizi 2009).

These features not only distinguished regular EU waste management policy from policy made at the emergency phase but also made debris management less time consuming and less well regulated.

During the emergency phase, everything was declared as public property for the safe removal of debris and the demolition of vulnerable buildings, and after the emergency phase the same properties were separated as private and public.

Debris was classified in two groups:
1. Debris from historically important buildings such as churches and monuments; and
2. All other debris.

Therefore, all debris except that from heritage or historical importance sites was treated as Municipal Solid Waste (MSW), and other types of debris which fell into the category of indefinable waste were disposed of in the open site at Piazza d'Armi (site

identified by municipality for the emergency phase as per the emergency legislation). Debris from sites of historical importance was treated as special waste and kept for reuse purposes (Figure 27, Figure 28).

One month after the earthquake, debris was transported to the treatment site at the former quarry of aggregates of Teges Pontignone, a village between Bazzano and Paganica, east of the capital (about four kilometers from the old town). This site has a capacity of 1.2 million cubic meters, enough to accommodate the entire expected amount of debris.

**Disaster debris management
at Teges Pontignone**
Everything was transported together (valuable and non-valuable waste) for the first months after this site came into operation.

Up until 1984, this site was used for the quarrying of stone and sand. After 1984, it was abandoned. After the 2009 L'Aquila earthquake, it was used for debris treatment, but there are plans to use it as a public space after it has been filled with the treated debris. A part of the site which won't be filled will be used as a pond in the future.

The site at Teges Pontignone was considered a temporary site and only allowed as an exception for the emergency collection and treatment of debris according to Decree 20 03 99.

At this site, debris from the city is first of all disposed of. The disposed debris is manually sorted to separate any remaining reusable material. The sorted debris is then crushed by a crusher to get the desired uniform size of material which could be reused. It will be used as a base material in road construction or for filling the same landfill site. Before being used, the material is examined in the on-site laboratory to discover its chemical and acid content (Figure 29, Figure 30).

In anticipation of all this work, the bottom of the pit has been sealed with a waterproof material to avoid the percolation of harmful chemicals into the water bed. Rods have also been inserted at certain distances to check the quality of the ground water in the Teges







**Figure 27:
Piazza D'Armi (Debris Disposal
Site at Emergency Phase) 1/2**
*Photo: Muntari Illyasu &
Aditi Poudel Dhakal*

**Figure 28:
Piazza D'Armi (Debris Disposal
Site at Emergency Phase) 2/2**
*Photo: Muntari Illyasu &
Aditi Poudel Dhakal*

**Figure 29:
Debris Management Site
at Teges Pontignone**
*Photo: Muntari Illyasu &
Aditi Poudel Dhakal*

**Figure 30:
Treated Material and On-Site
Lab at Teges Pontignone**
*Photo: Muntari Illyasu &
Aditi Poudel Dhakal*

site. These rods are also used to monitor the height of the slope formed by the disposal of treated debris. Wells have also been constructed to check whether the water has been contaminated by the percolation of chemicals from the stored debris (Figure 32).

Debris management is different, than that of normal solid waste, in both method and means. ASM created a structure appropriate for debris management and gradually reached remarkable levels of efficiency, with a peak in 2012. According to the current waste management policy, 30kg/ton of impurities is permissible, but the debris treated by ASM contains only 0.5 kg/ton of impurities.

**Stakeholders involved in debris management**
At the beginning of the emergency phase, the Dipartimento della Protezione Civile (DPC) (Civil Protection Department) was responsible for debris management. Responsibility was then passed on to the president of the Regione Abruzzo, who in turn handed it over to two commissioners: the Reconstruction Commissioner and the Welfare Commissioner. Under these Commissioners, ASM managed all works regarding debris management with the help of the fire department and the army (Brown et al. 2010). With the help of the police and the fire department the municipalities assisted the public in retrieving their valuables like gold, silver, cash etc.

As a result, by the end of December, 2010, the emergency phase was over with the successful removal of all debris, apart from that generated in the demolition/reconstruction phase and debris from some buildings in the historic center in the restricted red
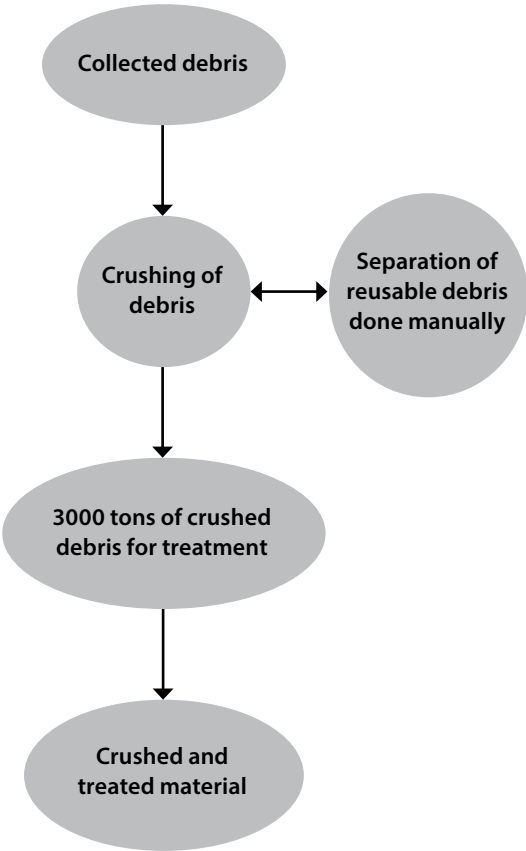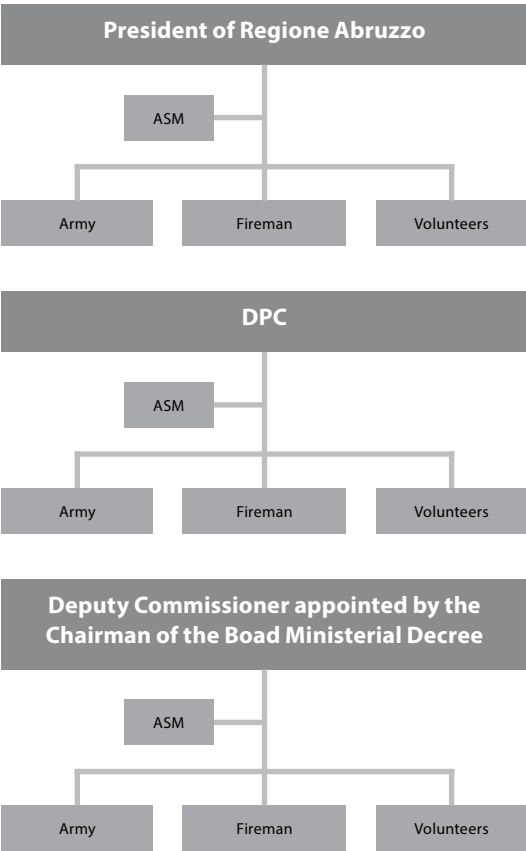


**Figure 31:**
**Hierarchy of Stakeholders in Debris Management at Different Times of Emergency Phases Before 2012**
*Source: Authors*

**Figure 32:**
**Debris Management on Site Diagram**
*Source: Authors*

zone (Tordera 2014). However, during our field visit, we realized that the debris still needs to be managed and interviews with the public revealed that they were not satisfied with the debris management. They complained that it took far too long.

After 2012 the commissioners' responsibility for debris management was dissolved, thus derogating the whole process. Their contribution had greatly assisted the debris management (Tordera 2014).

This regular switching of stakeholders involved in debris management and the transfer of their responsibilities are further major causes of delays in debris management.

According to the survey, Villa Sant'Angelo was the first to begin restoring debris consisting of construc-

tion materials. All the other satellite villages of L'Aquila followed them.

The materials from historically important buildings are numbered and stored securely in order to preserve the original character of the buildings after reconstruction (Figure 33 - Figure 35).

All the materials selected for recycling are separated and transported safely to the recycling plants. Asbestos was identified as the main hazardous component in debris. ASM followed the EU guidelines for deaingl with asbestos (Brown et al. 2010).

During our field visit, we realized that electronic debris like televisions and refrigerators was just dumped randomly without any safety measures. These items were neither recycled nor reused (Figure 36).









**Figure 33:**
**Fireman at Work on the Conservation of Materials from Historically Important Buildings**
*Photo: Muntari Illyasu & Aditi Poudel Dhakal*

**Figure 34:**
**Conservation of Materials from Historically Important Buildings for Reuse 1/2**
*Photo: Muntari Illyasu & Aditi Poudel Dhakal*

**Figure 35:**
**Conservation of Materials from Historically Important Buildings for Reuse 2/2**
*Photo: Muntari Illyasu & Aditi Poudel Dhakal*

**Figure 36:**
**Dumping of Electronic Debris in Improper Way**
*Photo: Muntari Illyasu & Aditi Poudel Dhakal*

(from top to bottom and left to right)

## 4.4 Conclusion

This report examines the regular and exceptional measures adopted or implemented in managing debris during and after the emergency phase of the 2009 L'Aquila earthquake. The study found that special Decree 20 03 99 was enacted to manage disaster debris. The institution that was/is responsible for debris management is ASM who were assigned to manage the separating, sorting and reuse of the debris, for example in road construction and environmental regeneration.

This study also concludes that the overall debris management after the L'Aquila disaster was not effective, especially during the emergency phase, for a number of reasons. Firstly, the lack of predefined plans and policies for debris manage-ment before the disaster affected the effectiveness of the operation. Secondly, there was a delay in managing the 'special debris' from historically important buildings due to the lack of proper decisions. Thirdly, the selection of a landfill site was only made after the disaster. Additionally, the change in stakeholders involved in debris management and the transfer of their responsibilities also caused a major delay in debris management. Finally, our field observation revealed that there is still debris to be collected and managed in many places despite the hard work of ASM.

In conclusion, we believe that this study of the exceptional measures adopted for disaster manage-ment in L'Aquila can be helpful for future disasters in any region of the world although every disaster has its own characteristics.

*Right Page*
**Patchwork from the**
**Well Wishers**
*Photo: Muntari Illyasu &*
*Aditi Poudel Dhakal*

# Part II: Resilience and Disaster Risk Reduction

# 5 Land Issues in Post Disaster Management: The Response of the National and Local Governments Towards Land Tenure and Property Rights for the Displaced Population

**Authors**
Carolina Lunetta
Aline Simões Ollertz Silva

**Abstract**
The present work assesses the response of the national and local governments towards the assurance of land tenure security and property rights in the Abruzzo region after the 2009 earthquake. For this purpose, the use of international guidelines supports the analysis and conducts the evaluation for the periods of early and long-term recovery. The topics that frame this research are participation, compensation and expropriation. In its conclusion this paper condenses the main lessons learned from the governments' assessment.

*Last Pages*
**Reconstruction Building
Sites in the Village of Onna**
*Photo: Jesús Salcedo Villanueva*

*Left Page*
**City Center Still in Ruins
Five Years After the
Earthquake, Onna**
*Photo: Aline Simões Ollertz Silva*

## 5.1 Introduction

A great many of the owners and tenants displaced by the earthquake lost their houses and were denied access to their land due to the massive damage of buildings. Of the 64,739 people rendered homeless, nearly half had their houses restored in a short period of time as they had suffered little damage (Dipartimento della Protezione Civile 2009). However, the majority of the 36,652 people whose houses were classified as E or F (inagibile), or who were located in the red zone (historical city-centers) still haven't recovered their houses. Immediately after the disaster, the inhabitants were allocated to tents or hotels on the Adriatic coast, then later transferred to the new buildings (C.A.S.E and M.A.P projects) or they received a subsidy for rent. Currently, the historical centers of the cities in the Abruzzo region are still in ruins and in the city of L'Aquila the reconstruction process started on a massive scale only at the beginning of 2014 with the new financing model (scheda parametrica).

Natural hazards in urban areas can displace thousands of people and expose them to land tenure insecurity. Not only their shelter but also their workplace or livelihood can be threatened. Therefore, one of the issues faced by local governments was the assurance of property rights and land tenure to its inhabitants.

In order to assess the governments' response towards damaged areas in the Abruzzo region, this research will review international guidelines, which outline the right of natural hazard victims to return safely to their homes after a disaster. The relevance of these guidelines is to provide information and a framework for governments to define measures and policies for improving their responses in moments of stress. These measures aim to protect land tenure inside communities, reduce land speculation, reduce land conflicts, guide the role of local governments and institutions and guide land readjustment where necessary.



**Figure 37:**
**The "Provisory" Houses (M.A.P. Project) and the Ruins of the Old Historical Center, Villa Sant'Angelo**
*Photo: Aline Simões Ollertz Silva*

**The guidelines**

Diverse international organizations have discussed the role of governments regarding property rights after disasters. Some examples are: United Nations Human Settlements Programme (UN-HABITAT), Food and Agriculture Organization of United Nations (FAO), The Center on Housing Rights and Evictions (COHRE). These organizations elaborate documents (guidelines) to establish principles and frameworks to guide practitioners working in diverse sectors (e.g. civil society, NGO's, government and others). Three guidelines were chosen to head this research in order to create parameters to verify if the response from the national government and municipalities of Abruzzo were satisfactory in terms of land and property rights after the earthquake:

The *Pinheiro Principles* guideline was designed to provide guidance to states, UN agencies and international communities on the issues of housing, land and property restitution. It enhances the international framework on the topic and is grounded in international human rights and humanitarian laws (COHRE 2006).

*Assessing and Responding to Land Tenure Issues in Disaster Risk Management* is a manual that provides an overview of land issues that may arise after natural hazards and is formulated for people working in emergency response and disaster risk management to guide decision-making processes associated with response, recovery and rehabilitation (FAO 2011).

The Scoping Report: *Addressing Land Issues After Natural Disasters* is a set of guidelines and a toolkit to address land issues following a natural disaster. It focuses on practical applications in the field for users who are not necessarily land experts. Its purpose is to be used by government officials, UN country teams and organizations, humanitarian NGOs and groups from civil society (UN-HABITAT 2007).

The choice of using international guidelines brought to the research a certain notion of reality as it looks at the problem from the perspective of practitioners dealing with management and advisement issues.

**The assessment frame**

The *Pinheiro Principles* states that "all displaced persons have the right to have restored to them any housing, land and/or property of which they were arbitrarily or unlawfully deprived. In this way preparedness, emergency response and reconstruction levels are crucial moments in which land rights must be recognized, respected and protected" (COHRE 2006).

After the earthquake, due to the great number of displaced persons and the high level of damage to the houses, the security of property rights and land tenure was put to the proof. In this way, a set of questions arise in regard to land issues: How did the government treat the legal framework of land in terms of restitution of rights? Did the government compensate equitably, timely and in a transparent way all affected people? Was the participation of the affected population legitimate? And lastly, are there still enough resources for those who have still not been compensated?

The guidelines conducting this research cover a wide range of topics regarding the responses of governments towards land tenure after natural hazards. However, due to the restricted size of this paper, three main topics were chosen to evaluate the governments' procedures: participation of the affected community, compensation of displaced population and expropriation of land for new projects ("new towns"). These topics were chosen based on important subjects of guidelines associated with specific issues verified in the field of study.

 – *Participation*
   According to *Pinheiro Principles*, "States and other involved international and national actors should ensure that (...) housing, land and property restitution programs are carried out with adequate consultation and participation with the affected persons, groups and communities" (COHRE 2006). In order to comprehend if the government measures covered this statement this research analyzes the extent of the participation of the community of affected areas in decision making during the provision of temporary housing and the reconstruction of damaged buildings.

– **Compensation**

Also according to P*inheiro Principles*, "All refugees and displaced persons have the right to full and effective compensation as an integral component of the restitution process. Compensation may be monetary or in kind" (COHRE 2006, p.19). The compensation process is taking place in all affected municipalities with different timing. A great amount of money from the national government has already been spent to guarantee the return of families to their houses. One of the objectives of this research is to understand how property rights and land tenure were tackled in different phases of housing compensation.

– **Expropriation**

"The most immediate risks to security of land tenure are land grabbing, speculative informal land sales and conflict over land" (FAO 2011). The need for available plots to allocate to new buildings for housing provision (C.A.S.E. e M.A.P. projects) could contribute to the speculative process due to the high demand for land. To avoid the above mentioned risks the response given to the owners of the available lands was expropriation.

## 5.2   The land context

"The nature of rights to property varies from one country to another, and even within countries there may be many institutional structures for administering decisions about land ownership. These will depend on whether the rights to land are customary, commonly held or individual rights, and whether the rights are legally recognized. Also, the administration of public lands and private lands often comes under different institutional jurisdictions" (FAO 2011, pp.23–24).

Due to historical reasons, in Italy, and therefore in the Abruzzo region, the properties are mainly owned. Despite a small number of renters, a great part of the land and the houses affected had legal titling. However, some particularities in the characteristics of construction differed between historical houses (aggregato) and non-historical individual owned house. A recognition of these was crucial for
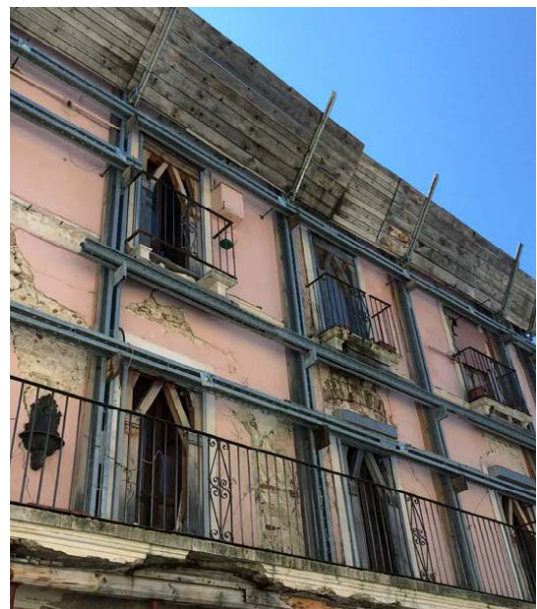
a good governmental approach to ownership and claims for compensation.

The emergency response to the displaced population was satisfactory in terms of shelter production, however the new settlements ("new towns") were not self-sustainable in terms of livelihood and reintegration of the population. Cities are facing emigration, due to scarce job opportunities, and from the lack of a major plan for the future of the cities in terms of economic aspects and livelihood.

With respect to government responses, during the process of emergency and reconstruction phase, it took into account, to some extent, the inhabitants' **participation**. This participation is verified in the decision as to the type of provisory allocation (C.A.S.E. or M.A.P. project, namely rent or self-accommodation), in the definition of the aggregato, in the claim for subsidy and in house reconstruction. Nevertheless, this participation is limited to the reallocation and start-up of the reconstruction process.

**Compensation** has been effective so far for those who concluded the claim procedures and owned houses located outside the historical center. After



**Figure 38:**
**Scaffolding City, L'Aquila**
*Photo: Aline Simões Ollertz Silva*

presentation and the approval of the plan by the commissioner's office the inhabitants applied for subsidies, which were released in phases, to cover the costs of the building reconstruction as well as personal furniture.

The **expropriation** tool used by the government to acquire land for the new housing projects allowed it to avoid the increase in land prices along with measures of land control.

The recovery process in the region is still ongoing, making an accurate evaluation difficult. It is therefore important to know that as yet there exists some uncertainty about the quality of the government's responses. The process is still vulnerable to certain risks, such as the expiration of subsidies, the forced exodus of citizens from the city due to lack of jobs and opportunities, and badly planned new towns.

### 5.3    The response: Right to housing and compensation

Using as a reference the Pinheiro Principles Guideline, the State should guarantee for all displaced persons (1) the right to housing, (2) the right to compensation and (3) property restitution, restitution being the preferred solution for displacement and the main target to restore justice.

First it is important to differentiate the process of intervention into three distinct phases: 1 - The emergency relief, the first moment of the emergency phase, that will not be detailed in this research; 2 - The early recovery, or emergency phase managed by the national government and which lasted from April 6, 2009 until August 31, 2012; 3 - The current phase of reconstruction, after the establishment of the reconstruction offices, coordinated by local authorities and special offices for reconstruction.

**Emergency relief phase**

"Shelter is one of the primary concerns during the emergency response, and safe shelter in secure settlements is necessary for durable recovery to occur" (FAO 2011, p.65). Immediately after the earthquake the whole city was declared inagibile (unusable), and even the properties with little damage were prohibited from being occupied until the civil protection could carry out an inspection to guarantee the safety of the house. In this period people lived in tents provided by the civil protection or

| | April 2014 | | |
|---|---|---|---|
| | **City of L'Aquila** | **Cratere municipalities** | **Total** |
| C.A.S.E. Project | 11.677 | 0 | 11.677 |
| M.A.P. Project | 2.459 | 4178 | 6.637 |
| Rent (Fondo Immobiliare) | 181 | 0 | 181 |
| Rent (Civil Protection) | 4 | 233 | 237 |
| Other municipal facilities | 0 | 63 | 63 |
| Contribution for self- accommodation | 4.030 | 231 | 4.261 |
| Facilities received for temporary use | | | 143 |
| **Total Assisted** | | | **23.199** |
| **Returned in their home** | | | **44.260** |
| **Total** | | | **67.459** |

Table 1:
Shelter Situation: Number of People Reallocated by Each Modality
*Source: Adapted from USRA 2014*

stayed in hotels. This phase encompasses the first 5 days after the disaster and the main actions of the government were to evacuate the risk areas and establish the emergency shelters and the transitional settlements. The gathering of information about damages and losses also began in this phase.

**Early recovery phase**

"Early recovery is defined as recovery that begins early in a humanitarian setting. It is a multi-dimensional process, guided by development principles. It aims to generate self-sustaining, nationally owned and resilient processes for post-crisis recovery. Early recovery encompasses the restoration of basic services, livelihoods, shelter, governance, security and the rule of law, environment and social dimensions, including the reintegration of displaced populations. It stabilizes human security and addresses underlying risks that contributed to the crisis." (Cluster Working Group on Early Recovery 2008, p. 69)

In the early recovery the response of the national government considered mainly the provision of houses for the families. The lack of restoration of livelihoods still challenges the capacity of the population to stay in the region; they have difficulty finding sources of income. The government proposed different modalities of allocation (rent, self-accommodation and temporary houses), considering all the population affected (renters and owners). The assistance was carried out safely and voluntarily with the options listed below.

*Housing: Providing shelter*

**Temporary houses (C.A.S.E. and M.A.P.):**
– Moduli Abitativi Provvisori (M.A.P.) – Small single unities, constructed to be temporary and planned for those who had their houses classified as uninhabitable (E or F) and are inhabitants of one of the small villages.
– Complessi Antisismici Sostenibili Ecocompatibili (C.A.S.E.) – Four-story buildings, constructed to be permanent and planned for those who had their houses classified as uninhabitable (E or F) and are inhabitants of the city of L'Aquila.

In both cases the reintegration of the population, is highly contested. This is because both types of resettlement did not provide commercial or service units and also were constructed, in some cases, in plots relatively far from the city (see map below). Also the integration of families into society was not effective as the separation of old communities weakened their social cohesion.

**Rent houses:** The provision of rental accomodation was an alternative option to the request for a provisional housing (M.A.P or C.A.S.E project) and it was a contribution for autonomous houses or hotel accommodation.
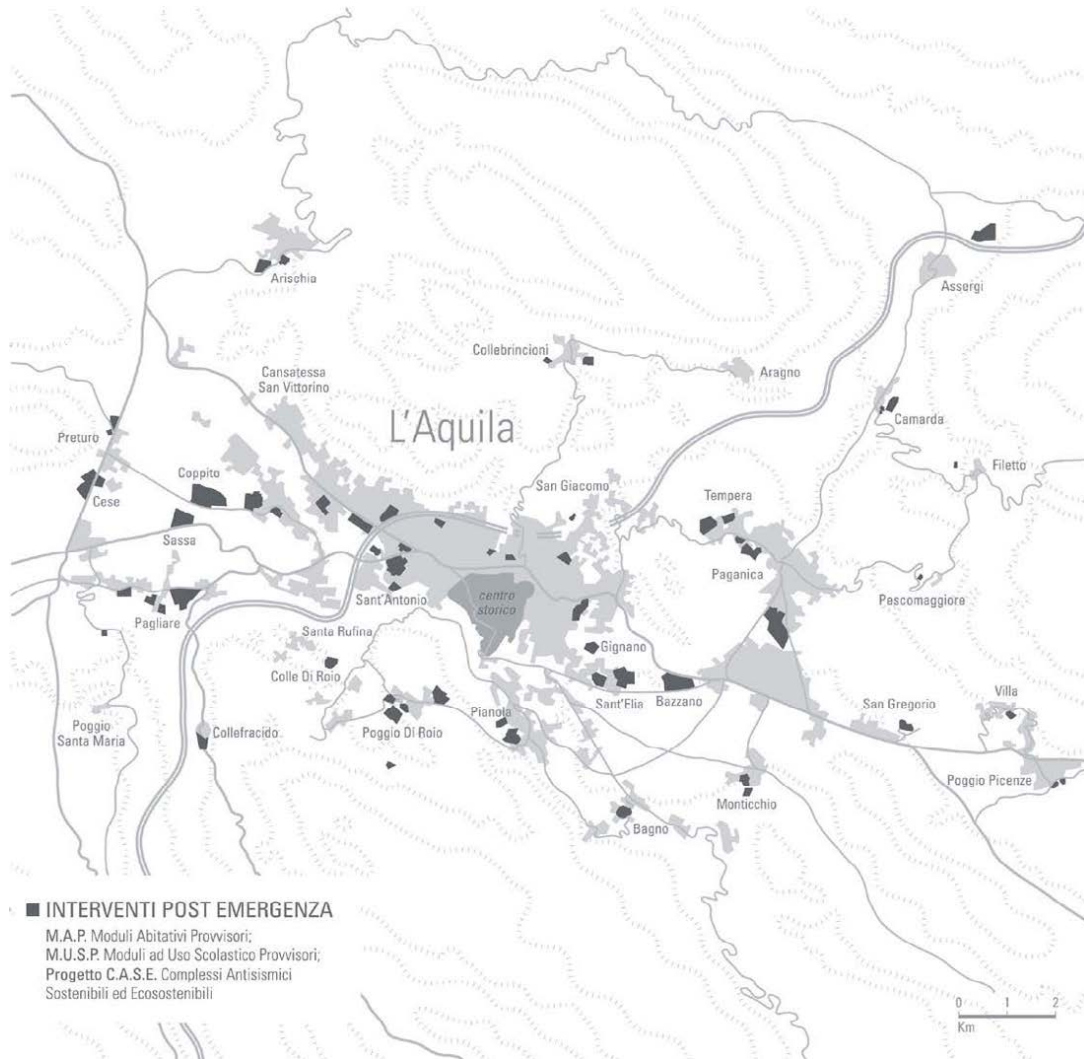
**Self-accommodation:** The contribution of self-accommodation is also an alternative to the request for an accommodation in a M.A.P or C.A.S.E project. The subsidy for this solution is a sum that varies depending on the size of the household, the age group (if the components are over 65 years old) or inhabitants with disabilities.

**The rights of tenants and other non-owners:** "States should ensure that the rights of tenants, social-occupancy rights holders and other legitimate occupants or users of housing, land and property are recognized within restitution programmers" (COHRE 2006). Tenants were also guaranteed the right to receive subsidies for provisory housing. According to one of the inhabitants of the Camarda C.A.S.E project (Barile 2014), they were benefited for a period of 2 years, with the possibility of an extension. Those who are still living in the temporary project are now paying the municipality a social rent according to their financial situation.

The first subsidies for reconstruction: During the emergency phase inhabitants from outside the city center (whose houses had little damage) could apply for subsidies of up to €10,000.00[1] for repairs. According to the Association Viviamo L'Aquila (Fagnani 2014), after receiving the money the owner had six months to finish the renovation process. During this phase the inspection of works was carried out randomly due to the huge amount of houses.

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1    Ordinanza n. 3778 del 6 giugno 2009

INTERVENTI POST EMERGENZA

M.A.P. Moduli Abitativi Provvisori;
M.U.S.P. Moduli ad Uso Scolastico Provvisori;
Progetto C.A.S.E. Complessi Antisismici
Sostenibili ed Ecososteibili

0   1   2
Km

### Expropriation: To control land speculation

After the earthquake the rents of available houses increased to an inaccessible level due to the high demand. To avoid an increase in the price of land the government took the measure of expropriating land. This tool was used in plots where the government intended to build new houses ("new towns"). These plots were chosen in accordance with axes of expansion of the city proposed in a municipal plan of 1979. The head of the Civil Protection Department set up a special mission structure based in L'Aquila in order to effectively manage the administrative procedures related to the occupation of plots necessary to the construction of temporary housing units.

One specific case that did not make use of expropriation was the new student housing. The new building was constructed as a temporary house with funds from the Lombardy region. The land belongs to the diocese and was agricultural land that was transformed as an urban area for the construction of the student dorm. In contrast with

the other temporary houses (in the "new towns"), this was the only parcel of land that has not been expropriated. In this case, the value of the land will most certainly increase with the transformation from a rural to an urban area and after a certain period of having the right to use the land the government will be forced to buy it at the updated value or reallocate the building.

**Reconstruction phase: Right to housing, compensation and property restitution**

"Reconstruction comprises processing claims to land, reconstructing or repairing buildings and resuming livelihoods. Each of these activities is interdependent and requires coordination. (…) During the reconstruction phase, some of the major land administration issues to be addressed include restoring capacity in the land institutions, securing land for public buildings and infrastructure, providing access to land for displaced people (…) and resolving conflicts over land" (FAO 2011, p.88).

For the first four years after the earthquake the management of housing provision was controlled by the national government. After this period power was returned to the local authorities. The responsibility for defining policy guidelines and the planning of public resources for reconstruction were then transferred to the local government.

As a link between the local and national governments (in the interests of guaranteeing the proper use of public resources) two special offices for monitoring the reconstruction were set up in 2013. In order to overcome the lack of professionals in most of the small villages, the *Ufficio Speciale per la Riconstruzione dei Comuni del Cratere* (USRC) was established, covering the 56 damaged villages in the Abruzzo region. *The Ufficio Speciale per la Ricostruzione dell'Aquila* (USRA) was created for the city of L'Aquila.

These offices provide technical assistance for public and private reconstruction, promote the quality of the works and monitor the financing and implementation of the interventions. Although the municipali-



**Figure 39:
Reconstruction of the City Center, L`Aquila**
*Photo: Aline Simões Ollertz Silva*

**Figure 40:
Ruined Houses Inside the Historical Center, Villa Sant'Angelo**
*Photo: Aline Simões Ollertz Silva*

Legenda

Progetto presentato
Progetto in istruttoria
Cantiere aperto
Progetto ultimato
Patrimonio edilizio pubblico
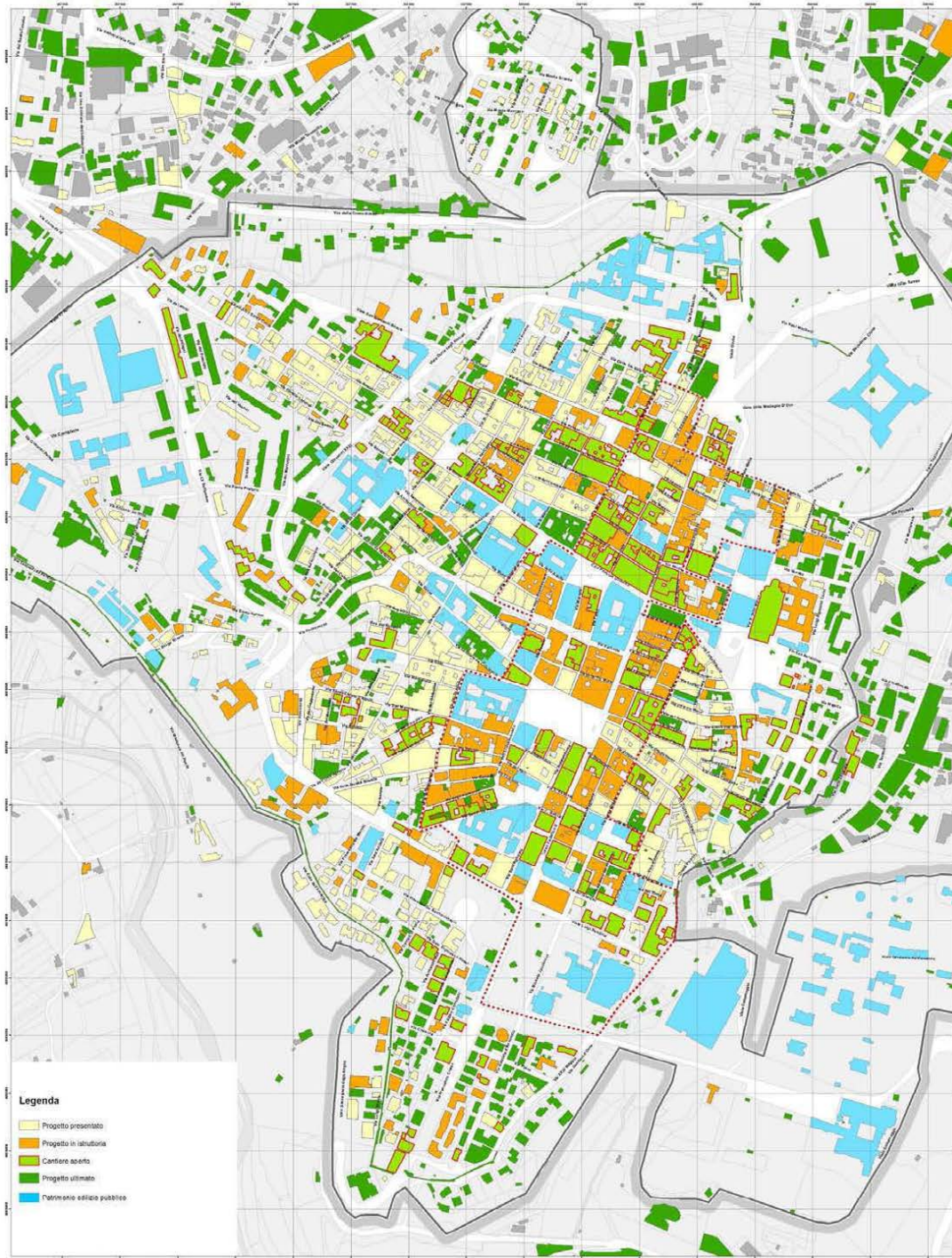
**Map 5:**
**Reconstruction of Private**
**Houses in the City Center**
**of L'Aquila, 2014**
*Source: http://www.usra.it/*
*wp-content/uploads/2014/03/*
*AQRisultatiNuovaGovernance*
*26022014.pdf*

**Figure 41:**
**Aggregato, Villa Sant'Angelo**
*Photo: Aline Simões Ollertz Silva*

**Figure 42:**
**Permanency of Ruined**
**Houses, Villa Sant'Angelo**
*Photo: Aline Simões Ollertz Silva*

ties may independently apply for subsidies and allocate the money, the special offices (USRC and USRA) monitor them.

The reconstruction of more badly damaged houses outside the historic center was permitted to start in the early recovery phase without the need for a municipal plan for reconstruction. The reconstruction of historical centers requires a plan in order to occur. In the case of the historical center of L'Aquila the massive reconstruction process only got started in 2014, due to delays in the approval of the plans.

For the villages under the responsibility of the URSC the reconstruction process began earlier, outside of the historical centers. However there still exist 23 villages without a plan for their historical center. Plans exist for the other villages, but no reconstruction in the historical centers has begun.

After the early recovery phase and the reconstruction of the temporary houses the withdrawal of the federal government allowed the local authorities to continue the reconstruction of the city without the imposition of a specific structure or guidance. With the reconfiguration of the public structure via the creation of the URSA and the URSC, the enhanced speed of the approval of reconstruction plans led to greater amounts of money being allocated and the rhythm of the reconstruction process has increased significantly since the beginning of 2014.

## 4.4  Long-term recovery: Critical issues after the disaster

**Public participation and consultation in the reconstruction process**
"States should strive to prepare and implement strategies and actions in consultation and with the participation of all people. Where boundaries of parcels and other spatial units are to be re-established, this should be done consistent with the principles of consultation and participation" (COHRE 2006). The participation and consultation of the population occurs in some specific stages of the reconstruction process, such as in the definition of the aggregato and in the option offered either to keep or sell the owned houses.

***a) Aggregato***
"Best results are achieved when the appropriate land agency is able to coordinate an adjudication process that actively includes the community in all decisions, in a manner that is consistent with public records of the rights existing prior to the disaster. For this to happen, there may need to be considerable capacity building and support." (FAO 2011, p.25). As mentioned before, there are some particularities regarding the types of construction of the historical houses. The majority of the buildings are not single units, but intertwined units called *aggregato*. To guarantee the right of land and property adjudication and the correct compensation for this typology, the government established a methodology by which dwellers' participation in the reconstruction process is essential.

"Adjudication is the process by which decisions are made about who has the most legitimate claim to tenure over a parcel of land. Land ownership disputes and claims over land must be resolved (adjudicated) prior to reconstruction" (FAO 2011, p.85).

To apply for a reconstruction subsidy, all the property owners from the aggregato were required to established a commission and elect a president responsible for conducting the entire reconstruction process, from the subsidies claim to the renovation. This process involves such actions as: establishing ownership of each parcel of land and property; defining the structural elements of the house for which the subsidy would be paid primarily; defining the entire structural and architectural project of reconstruction.

Once these definitions were made, the owners of the *aggregato* could claim a subsidy for the reconstruction of structural elements of the building (carried out by the commission) and a subsidy for the reconstruction of individual elements of the house (carried out by the individual owners).

The request for subsidies process makes use of a procedure called "*scheda parametrica*" that was tailored for the specific case of the *aggregato*. However, this methodology was not applied from

**Outside reconstruction plan**

**Inside reconstruction plan**

17%

83%

Released funds rate (both completed and not completed works)

In-trade rates

10%

90%
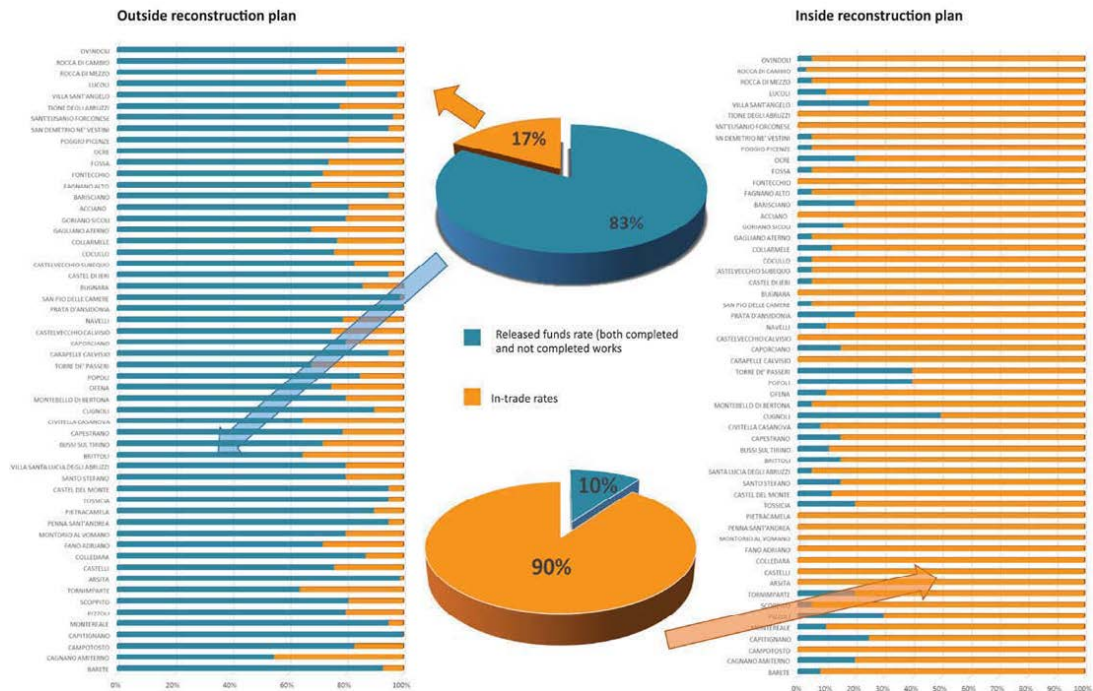
the beginning. It was created to replace an inefficient older procedure that was the target of several critics, in particular for the delays it caused in the rebuilding of the *aggregati*. The new methodology was applied first in L'Aquila and afterwards in the other 56 municipalities. The proposal unifies the type and amount of information required, based on an editable format that facilitates the identification, integration, consultation and information extraction of the projects and simplifies the evaluation of the activities of the Superintendent Commission for the Municipality. The methodology has provided a valuable database that is essential for the subsequent estimation of costs and for the monitoring of the reconstruction plan. The new procedure intends to achieve the following (Comune di L'Aquila 2013):

– Simplification of procedures for the recognition of contributions through a parametric calculation based on a unified system of assessment of damage and vulnerability (parametric card);

– Certainty and cost control intervention. The recognition of the contribution is ex ante with respect to the preparation of the final design,
– Recovery of the logical sequence of reconstruction in categories: damage repair, seismic retrofit, restoration and adaptation of energy, each with its respective threshold cost);
– Identification of two project phases (structural and individual elements) that allow for better planning for both the preparation and the assessment and funding of projects;
– Contextuality of the technical and economic evaluation of the project.

**b) Exchange/sale land with the municipality**

If the owner decides on reconstruction, the government establishes as counterpart the maintenance of the property for two years without the right to sell. If the owner decides to sell the property he will not receive the subsidy for the private apartment. Other forms of compensation are: the exchange

**Figure 43:**
**Reconstruction of Private Buildings - Released Funds Rate for the Villages Inside the Cratere Region**
*Source: USRC 2014*

of land for another available property from the government or the sale of the land to the municipality for public purpose.

**Timeframe: Slowness of the reconstruction process**

"The timing of reconstruction depends on the severity of the natural disaster and the speed of recovery activities." (FAO 2011, p.88).

Reconstruction in the Abruzzo region proved to be slow and difficult. This is demonstrated by the fact that the reconstruction of the area surrounding the city center of L'Aquila started for the most part at the end of 2011 and major of buildings in the historical center of L'Aquila are still supported by scaffolding. In most of the others 56 municipalities either the reconstruction of the historical centers has not even been started or the municipalities have had few funds released. This is shown in Figure 43.

Several factors led to this reality. Some of them are: the high level of damage to the constructions; the special care that needs to be taken in the case of historical buildings; the difficulties involved in treating the debris; the need to approach the aggregato correctly.

In the past, the lack of local experience and knowledge, and even the desire to participate, meant that most of the commissions were conducted by external actors, such as engineers and other related professionals. This led to an overlap of duties, with one professional in charge of several commissions at the same time. This resulted in delays in the realization of the juridical processes. Nowadays, the special offices impose rules to limit the number of commissions per person.

With the new parametric system, and the approval of the reconstruction plan by the majority of the municipalities, the process of claiming subsidies and consequently the reconstruction process have intensified significantly.

In an attempt to explain the reasons for slow processes of claiming subsidies, Barbero (2012) emphasizes some problems that have emerged. First, the process of validation of individual applications for financial assistance for the repair of damaged houses was bedevilled by poor communication between the various entities and the local authorities. In addition, the regulatory framework frequently caused bafflement among the different actors involved in the reconstruction, particularly the owners and the designers. The confused nature of some of the provisions was sometimes combined with a degree of slowness in supplying clarification. Another contributory factor was the citizens' lack of interest in helping to speed the process.

The USRC also contributed to the slowness (Agnelli 2014). One of the reasons is that the old method of application for funds considered every single "house" separately, rather than the whole aggregato. Likewise, the allocation of funds was not carried out properly. This was because, due to structural aspects, the first and last "houses" of the aggregato demand more money for reconstruction than those in the middle.

In addition to the failures related to specific procedures and governance, another set of problems derived from insufficient attention to the reconstruction of L'Aquila by many of the actors with decision-making powers, such as the central government and the commissioner in charge since 2010. After the emergency relief phase, the Civil Protection Department was basically ousted from its role in the local formulation and implementation of major government policies, but management remained in the hands of the national government (through the president of the Abruzzi region) which proceeded to centralize activities with no respect for local priorities. Between 2010 and 2012, with the maintenance of the state of emergency, declared after the earthquake and extended by a series of decrees by the President of the Ministers Council, an ambiguous development model was implemented. This period is characterized by its bureaucratization and for being inconclusive in terms of results (Barbero 2012). The establishment of a new government in 2012 and the creation of two special offices for reconstruc-

tion in 2013 had the effect of decisively breaking the deadlock, transferring the competences to local authorities.

**Financial aspects**

With the approval of the reconstruction plan all the municipalities are entitled to apply for a national fund subsidy for the reconstruction of houses inside the historical center. The aggregato commission and households can also request the subsidy after the approval of the project. However, despite the priority for subsidies for the reconstruction of private houses, the provision of subsidies by the national government is not guaranteed.

According to the mayor of the city of L'Aquila, Massimo Cialente (2014), there is no special fund or specific tax in the country to provide money for natural disasters and the money available to be released for reconstruction will run out in July 2014. In addition, the document La Ricostruzione dell' Aquila I Risultati della Nuova Governance (USRA, February 2014) acknowledges that there are more projects than funds available. Thus the risk of this money running out could threaten the reconstruction process and the assurance of land and property rights in a way that places in jeopardy not only compensation but also access to land, as it is not safe to return to the houses or plots if the reconstruction process is not finished.

## 5.5    Lessons learned

The process of reconstruction in L'Aquila and the basin villages has so far followed to a great extent the international guidelines in terms of assurance of property rights and land tenure in light of participation, compensation and expropriation. The main criticism at the moment is that the assurance of land tenure and property rights should not refer only to

shelter and basic services, but also take into account livelihoods, the reintegration of the population and the capacity of social cohesion, none of which were reestablished, putting the future of the city and the villages and their populations at risk. These aspects should be addressed to avoid future economic and social crises.

The participatory process has been settled in terms of land and property claims and restitution. As mentioned above, the inhabitants have been crucial in the reconstruction process. Without their participation, procedures could have become slow and impractical. The creation of specific offices also enriched the process of participation by making it more transparent (as the information is now better systematized) and efficient (giving support and facilitating the process).

Compensation allowed the return of some of the inhabitants to their houses, however the insecurity of future subsidies puts at risk the conclusion of claims that have still to be made. So the present moment is crucial due to the massive definition of plans, flow of subsidies and reconstruction work. Dissatisfaction with the response time in the reconstruction phase has been increasing because of the lack of plans for some villages or delays in reconstruction in others. Also the risk of exhaustion of subsidies (for reconstruction) is a threat to land tenure and property rights, as it could culminate in a massive forced exodus allied to a decrease of land price.

Therefore this paper acknowledges that it is too early to make a final assessment of the recovery process regarding land tenure. There is still a lot of work to be done and many people to whom land, livelihood and social bonds need to be restored.

*Right Page*
**City Center Still Inaccessible:**
**Uncertainty in the**
**Reconstruction Process, Onna**
*Photo: Aline Simões Ollertz Silva*

ZONA ROSSA
PERICOLO
CROLLI !
E' VIETATO L'INGRESSO
ALLE PERSONE NON
AUTORIZZATE
I TRASGRESSORI SARANNO
DENUNCIATI ALLE AUTORITA'
COMPETENTI E
CONTRAVVENZIONATI !

# 6 Financial Resilience: The Financial Mechanisms of Post-Disaster Management

**Authors**
Aydeen Azarnezhad
Rohit Chandragiri
Gissu Firoozmand

**Abstract**

This paper attempts to study the finance delivery mechanisms of post-disaster management after the 2009 earthquake in L'Aquila. The aim of the paper is to understand the role (share) of different stakeholders in funding the reconstruction projects after the earthquake and the attempts of the government to deliver subsidies to the people. The top priority in post-disaster management is to estimate and allocate funds for both emergency and long-term disaster recovery of the city. On the other hand, the role of insurance companies in tackling the aftermath of catastrophic events is insignificant due to several factors. In addition, the randomly conducted primary survey stated that there are huge gaps in the delivery of financial resources and that people are not satisfied with the level of compensation. The funding delivery mechanisms seem to be inefficient and this was revealed in a primary survey. The reason behind the low participation of insurance companies in the refunding process is that hardly anyone insures their buildings in Italy. It is not in their culture to do so. As there is no clear policy in law for the distribution of funds, relying on the government can be a very uncertain business. All in all, the funding mechanisms seem to be not very successful in tackling the post-disaster management scenario in Italy because, despite the allocation of huge financial resources, the reconstruction process is moving at a slow pace.

*Left Page*
**Scaffolding in Villa
Sant'Angelo**
*Photo: Jesús Salcedo Villanueva*

## 6.1 Importance of risk financing in disaster management

On April 6, 2009, L'Aquila, Italy, experienced a devastating earthquake of 6.3 magnitude which took the lives of 314 people and displaced approximately 70,000. The predominantly masonry buildings were badly damaged; approximately 22,000 were rendered unusable. Natural disasters are unpredictable and create havoc in a matter of a few minutes, resulting in the destruction of human habitations. Post-disaster recovery would be the immediate goal after the occurrence of a disaster, irrespective of the scale of destruction. Post-disaster management and reconstruction not only require huge financial resources but also the speedy mobilization of financial resources. Risk financing plays a key role in the emergency phase as well as in the reconstruction of cities in the long run. "The nature of the funding mechanisms can significantly affect the speed and efficiency of the recovery programs after disasters" (World Bank 2012). This is if the existing policies related to funding for natural catastrophes are not stringent. The post-earthquake reconstruction of L'Aquila required vast amounts of money and the state is funding the lion's share of the reconstruction costs. Despite Italy's high vulnerability to natural disasters, the country has a very low insurance penetration rate, which places a financial burden on the shoulders of the government. The problem is that relying on the government for subsidies is not safe as their contribution to reconstruction projects is dependent on many factors such as political will and the economic situation of the country.

## 6.2 Financial losses in the earthquake

Most Italian municipalities are categorized as disaster-prone zones due to geographical conditions. Nearly 40% of Italian municipalities are classified as either high or very high seismic risk areas. In Italy around 3,671 municipalities are classified as high or very high flood-prone zones (Garonna 2011). In addition, Etna's coastline and the Stromboli and Neapolitan areas are high volcanic activity regions with two active volcanoes. All these factors illustrate that Italy is highly vulnerable to natural catas-

trophes (Garonna 2011). Post-catastrophic management requires huge financial resources for emergency response and recovery. In Italy the government is the major provider of funds for reconstruction and recovery after natural catastrophes (Brown et al. 2011). Natural catastrophes occurring in Italy cost on average 0.2% of GDP per annum. The public sector deficit was 5% of Italy's GDP during the years 2009-2010 (Garonna 2011).

**National and international aid**
A number of Italian companies came forward to offer their support and were successful in doing so. Most of them were mobile phone companies offering the suspension of bills for post-paid services, free calling minutes, etc, thus reducing the financial burden on the people. All tax billing for all Abruzzo residents has been suspended by the government, as well as mortgage payments. The Italian prime minister Silvio Berlusconi refused foreign aid for the emergency, stating that Italy was rich and proud enough to tackle the post-disaster emergency response and recovery alone. The European commission signed an agreement in November offering 497 million euros for the reconstruction of the Abruzzo region. The estimate of direct damage costs comes to 10 billion euros. The earthquake which struck the Abruzzo region caused damage to dwelling units of about 2-3 billion euros (Garonna 2011). National government expenditure is increasing considerably in the course of the post-catastrophe reconstruction.

Despite Italy's known vulnerability to natural disasters only around 300 million euros will be paid out by Italian insurance companies (Garonna 2011). The Italian economy may be the third largest in the Eurozone, but it is also plagued by inefficiency and continues to shrink (RT News 2013). Although Italy is highly vulnerable to natural catastrophes only 0.4% of dwelling units have fire insurance policies that are extendable to earthquakes. This implies that the insurance penetration rate in Italy is very poor when compared to other European countries. Low insurance coverage inevitably places a burden on the government when tackling a post-disaster management scenario (Table 3).

In addition, the Italian government imposes high tax rates on fire premiums, increasing the cost of insurance, which in turn discourages people from purchasing insurance. The Italian government imposes a 22.25% tax on fire insurance premiums, whereas other European countries such as the United Kingdom impose only 5%. The tax rate in Italy is the highest of any European country (Garonna 2011). Most EU countries impose lower taxes on fire premiums because of their social usefulness in the natural catastrophe risk arena (Figure 44).

## 6.3 Government and third party funds weaken financial resilience and area threat in the long run

The immediate challenge of the government after the L'Aquilla 2009 earthquake was to estimate, allocate and mobilize funds. The key players involved in the funding of the post-earthquake reconstruction process in Italy majorly comprise:

1. National (state) government (as the main player in Italy) (Brown et al. 2011);
2. National/International donor organizations (EU);
3. Private donations (e.g. Monte Dei Paschi Di Siena, the bank which funded the reconstruction of San Bernardino church); and
4. Insurance companies (with a very small role).

Firstly, financial donations from national/international donors are not reliable sources of funding because of several factors. International donor organizations like the EU, etc. donate according to their standardized rules and regulations which may or may not meet the financial requirements of the post-catastrophe management.

Secondly, despite the fact that Italy lacks a financial preparedness plan to tackle catastrophes the government bears the financial burden of post-disaster recovery. In L'Aquila the government's share in the funding of reconstruction is dramatically bigger than the share derived from other funding sources.

Thirdly, the Italian government imposes high tax rates on catastrophe insurance. This ensures that the

|  | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| USA | 6.5 | 11.1 | 10.3 | 12.1 | 10.3 |
| Japan | 2.7 | 10.6 | 9.0 | 7.8 | 6.4 |
| Germany | 0 | 3.3 | 3.6 | 2.6 | 1.7 |
| France | 3.4 | 7.5 | 7.7 | 6.5 | 5.2 |
| United Kingdom | 5 | 12.7 | 10.1 | 7.8 | 6.2 |
| **Italy** | **2.7** | **5.3** | **5.0** | **4.2** | **3.4** |
| Spain | 4.1 | 11.4 | 9.6 | 8.5 | 7.3 |
| EMU (16 countries) | 2 | 6.2 | 6.8 | 5.9 | 5.1 |

| | |
|---|---|
| Italy | 22,25 |
| Finland | 22 |
| Germany | 15 |
| Belgium | 9,25 |
| The Netherlands | 7 |
| Spain | 6 |
| United Kingdom | 5 |
| Ireland | 2 |
| Sweden | 0 |
| Denmark | 0 |

| Country | Risks | Insurance penetration rate |
|---|---|---|
| Austria | Flood | 10% |
| Austria | Earthquake | 5% |
| Austria | Storm | 75% |
| France | All natural disasters | 97% |
| Germany | Flood | 26% |
| Germany | Earthquake | 26% |
| Germany | Storm | 85% |
| Italy | All natural disasters | Only 0.4% of fire insurance policies for dwellings have the extention to earthquake cover. |
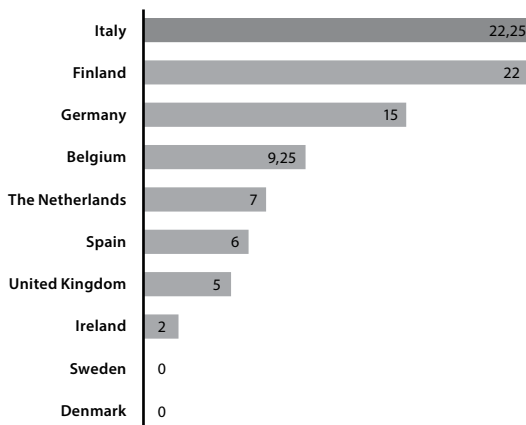
**Table 2:**
**Burden of Public Debt: Deficit of Public Sector in % of GDP**
*Source: Adapted from Garonna 2011*

**Figure 44:**
**Tax Rate (%) on Fire Premiums in Some European Countries**
*Source: Adapted from Garonna 2011*

**Table 3:**
**Insurance Penetration Rates for Different Natural Catastrophes in Different EU Countries**
*Source: Adapted from Garonna 2011*

joint efforts of the state and the insurance companies to increase the catastrophe insurance penetration rate are unsuccessful. The government's objective is to encourage people to purchase catastrophe insurance, but by imposing high taxes it dilutes its ability to reach its objective. The findings from the literature study suggest the need for further research.

Despite the huge financial resources required for post-earthquake reconstruction Italy rejected the offer of financial donations from other countries, making the national government the solo player. The financial costs of the earthquake have deteriorated the economic situation of Italy as is clearly indicated by the relatively high rate of public debt during years 2009-2010. In addition, insurance penetration rates are very low despite the fact that Italy is a highly disaster vulnerable country. The European Union contributed some funds but these were a relatively small percentage of the total estimated for post-disaster reconstruction.

Relying predominantly on government funding for reconstruction can be harmful to a country's budget in the long run. The allocation and management of funds during post-disaster reconstruction is a complicated process. So first set of questions will be:

– *When all financial responsibilities are dropped on the government's shoulders, what sorts of problems arise?* What happens when people rely largely on the government? What if another earthquake of higher magnitude occurs in a bigger city like Rome? Will the government be capable of funding the entire reconstruction process every time?

– Besides, what procedures did the Italian government adopt for the allocation of money for damaged residential buildings? How is such a baffling funding system for reconstruction arranged?

On the other hand, if the government were to support the insurance companies by initiating poli-

cies to require compulsory building insurance, then the insurance companies would be equipped to contribute more effectively to the funding process after earthquakes. So the second set of questions will be:

– *Why is the role of the insurance companies so limited?* What prevents insurance companies in Italy from playing a bigger role in financial resilience?

– How does financial resilience work in other countries which are equally disaster prone (for example Japan)? What would happen if collaboration between national government and the insurance system was more efficient? (This question leads our discussion to a comparison between Japan and Italy in the sense of urban financial resilience.)

## 6.4 High dependency on national government

A high level of dependence on government for funds is chancy; the government may not be successful in generating funds for reconstruction in the wake of every catastrophic event. In case of post natural hazard management, Italians are highly dependent on the government. But the probability of receiving money from the government depends on variable factors:

– The national government has high political interests vested in earthquake affected areas. There is no guarantee that in the case of a future similar earthquake that the government could come to the rescue as it did in L'Aquila.

– Existing economic situation of the national government at that point in time: Italy is already experiencing a financial crisis; it is obvious that any additional burden would make the government financially more vulnerable.

Therefore, the financial burden should be distributed among different players instead of depending on centralized governmental financial sources.

## 6.5 Status of reconstruction projects in comparison to similar cases in other countries

The current situation in L'Aquila displays different dimensions of problematic issues. The ongoing reconstruction is moving at a very slow pace due to several finance-related issues. The beneficiaries are not receiving an optimum amount of money to repair or reconstruct their houses. People are extremely reluctant to purchase insurance due to cultural reasons as well as various other factors. Moreover, the issues mentioned below revolve around inefficient funding delivery mechanisms.

### a) Reconstruction process at a slow pace

Five years after the earthquake the central area of L'Aquila is still full of abandoned buildings with cracked facades (like a cinema town for making historical fiction movies). "Historical data denotes that the complete reconstruction of an area of this size and degree of damage takes approximately 15 years. But the process of reconstruction in L'Aquila and surrounding region has been extremely slow over the past 5 years and cannot be speeded up. Comparing post-disaster management in the L'Aquila region with another earthquake in Emilia Romagna, we see that the process of reconstruction was much faster in the latter." (Agnelli 2014). There are several factors causing this delay in the reconstruction of the city, however financial resources as a very basic need for every construction project. To sum up, the main financial reasons for the slow process of reconstruction in the L'Aquila region include following:

The reconstruction process took a long time due to huge time gaps in finance related affairs in L'Aquila. After the occurrence of an earthquake, financial assessment for the whole process of reconstruction is a truly complex task. In the case of the L'Aquilla earthquake in 2009, a series of meetings were conducted between local government officials and national government officials as key stakeholders to estimate the damage cost. In the end they estimated 8 billion euros for the whole process of reconstruction. The national government allocated 8 billion

euros and sanctioned payment to the local government in different phases. There are two supporting organizations to monitor and channel the allotted financial resources from local government to the respective purposes.

In L'Aquila the process of reconstruction was not coherent because the reconstruction model and subsidy allocation model changed completely twice after the emergency phase of the management process, which subsequently altered reconstruction and financing priorities. Every time the model changed, the whole process had to start again from the beginning. The process of reconstruction is speeded up by having a single model from the beginning of the process right through to the end (as in the case in Emilia Romagna). The model can be improved over time but should not be completely changed again and again as the case of L'Aquila.

In L'Aquila, the national Civil Protection Department managed the first phase up until the end of 2009. The second phase was also managed by the central government, but administrative power was allocated to the president of the Abruzzi region and he failed to respect the priorities of the local community. The president was the final decision-maker whereas decisions are supposed to be taken in parliament as per the procedure. Then in 2012 the government took over and went back to following the initial approach. The state should have thought about possible complications in advance and come up with a more holistic model for the fast delivery of funding from the beginning.

### b) Inefficient process of finance transfer from national to local government

As described in the previous section, the funding procedure in the L'Aquila case, with all funds coming from one central source is not very systematic. Dissatisfaction from the people's point of view is inevitable. A random sample primary survey with a sample count of 50 was conducted to analyze the victims' experience of subsidies received for the reconstruction of their homes. The subsidy delivery procedures were lengthy and took long time to reach the people. Nearly half of the respon-

dents received money two to four years after the earthquake (Figure 45). Almost 15% of respondents did not receive any money at all which indicates a poor funding delivery mechanism (Figure 46). 63% of respondents had to bear part of the reconstruction costs themselves as the money allotted by the government was insufficient (Figure 47).

The funds were directly deposited in a bank in the name of the beneficiary and later transferred to the

developer to reconstruct the house or build a new house. Some of the dwelling units had only minor damage according to a government inspection and analysis and the owners were compensated accordingly. In reality, however, compensations was not enough to repair even minor damage and the beneficiary had to bear the remaining expenditure. There were also significant delays in allocating financial resources, which placed a burden on the people (Fagnani 2014).

According to the primary survey, most of the victims are partially satisfied or unsatisfied with the compensation provided by the state. When the funding procedure is restricted to the central government, this top-down mechanism will produce turmoil in the bureaucratic process. At the same time, such a top-down process might be feasible when the state is funding a small town like L'Aquila, but applying it to a bigger and more important city like Rome is beyond imagination.

**c) Minor role of insurance**
Despite Italy lacking a financial preparedness plan to tackle catastrophes the government bears the total financial burden of post-disaster recovery and management. This consequently weakens the financial capacity of the government and hinders future development. Also, not having specific funds for natural catastrophes necessitates the diversion of funds allotted for other developmental activities, sometimes leading to financial crisis.

The estimated amount for both the emergency response and the reconstruction was a total of 8 billion euros. Half of that amount was allocated for the emergency response which includes temporary housing, food etc., and the remaining money was allocated for the reconstruction of the city. The EU also donated 494 million euros towards the reconstruction of the town of L'Aquila (RT News 2013).

Other actors made very little financial contribution to the reconstruction process. International donations helped only in some projects. Insurance companies play almost no role in the reconstruction of buildings after natural disasters.



Immidiately
6 Months - 1 Year
2 Years - 4 Years
More than 4 Years
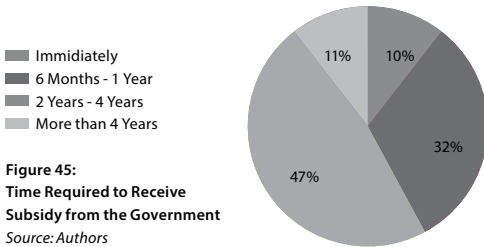
**Figure 45:**
**Time Required to Receive**
**Subsidy from the Government**
*Source: Authors*



Yes
No
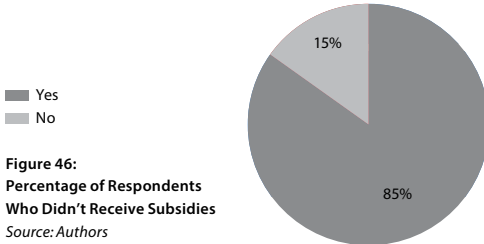
**Figure 46:**
**Percentage of Respondents**
**Who Didn't Receive Subsidies**
*Source: Authors*



Yes
No
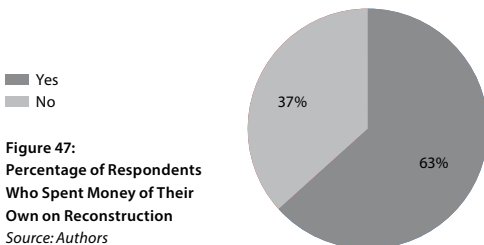
**Figure 47:**
**Percentage of Respondents**
**Who Spent Money of Their**
**Own on Reconstruction**
*Source: Authors*



It is too expensive.
It's not necessary because disasters happen rarely.
Houses should be earthquake resistant.
Other reasons
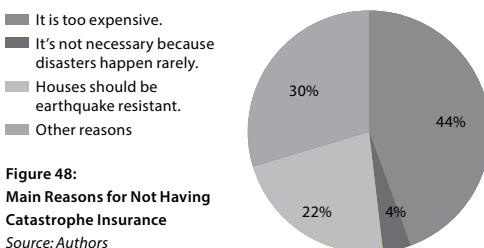
**Figure 48:**
**Main Reasons for Not Having**
**Catastrophe Insurance**
*Source: Authors*

There are no stringent insurance requirements in Italy. Insurance is not mandatory. As a result, insurance companies work as stand-alone bodies. As a proof Pierluigi Biondi, the present mayor (2014) of Villa Sant'angelo claimed:

"In villa Sant'angelo there were a couple of people who had insurance at the time of the 2009 earthquake and they were all foreigners (from Scotland and, Denmark) maybe because in their tradition and mentality they do it. Of public buildings, only the town hospital had insurance. They got both the state subsidy from the government and the refunding money from the private insurance companies. They do not have to spend the money they get from the insurance company for reconstruction. They can keep it. But they had to use the public subsidy only for reconstruction." (Biondi 2014)

The above statement refers to the fact that insurance companies act as stand-alone actors, separate from the government. The case of L'Aquila illustrates the lack of coordination between relevant stakeholders.

A comparison between Italy and Japan proves that the lack of coordination between the national government and other sectors in Italy is a significant issue. For instance, the government of Japan created the "Japanese Earthquake Reinsurance" (JER) scheme in 1966. The idea behind JER is to provide support in the form of reinsurance in the event of a natural disaster. The participation rate – those people who have an insurance contract - varies somewhat by region. Nationwide, 37.4% of fire insurance policy holders also had earthquake insurance in 2004. Compared to Italy, Japan is a much more insurance prone culture.

But how is the Japanese government able to promote such a system? The JER employs strategies to encourage clients:

"Depending on the building's earthquake resistance and year of construction, discounts of up to 30% are available. A study is underway

concerning the introduction of a system to discount insurance premiums for existing buildings as well, reflecting the results of earthquake resistance evaluation by local governments and the like. Income tax deductions for earthquake insurance premiums are also being considered as a way to promote adoption of earthquake insurance." (Zhao 2011)

In Italy the dominance of the state's role in providing financial support for post-disaster reconstruction discourages people from insuring their properties. In all the meetings and interviews with different organizations it has been confirmed that, although people in Italy are more or less aware of the seismic situation in their country, they do not feel the need to take out insurance with an insurance company. People in Italy have a tendency not to think about the future. The primary survey revealed that people expect that earthquake resistant buildings will be constructed and see this as a possible solution to the problem of future earthquakes.

In the interview with the mayor of Villa Sant'angelo, Pierluigi Biondi, he put forward a cultural explanation for this attitude:

"In Italy 98% of the residential buildings do not have insurance while only 1% of cars do not. This is because car insurance is mandatory but it is not in our culture and mentality to have private insurance against earthquakes for houses. Due to cultural issues most Italian citizens don't insure their properties. (..) People and managers are still thinking about rebuilding and recovering than insuring." (Biondi 2014)

Also, according to our questionnaire, only 3% of respondents had insurance for their houses at the time of 2009 earthquake and when asked about the reasons 44% mentioned that they find it very expensive. Other reasons include: one fifth of respondents believe that if houses are earthquake resistant, then insurance is pointless. A small percentage of respondents agree that it is not necessary to insure houses because earthquakes happen rarely (Figure 48). Other reasons:

– They do not trust the insurance companies to pay up and the process of getting money from them is complicated;
– As the government is paying nearly maximum building costs, they find it unnecessary to insure their houses.

To sum up, there are no stringent government policies for insuring buildings (unlike in the case of car insurance). On the one hand, people are disinclined to insure their houses for cultural reasons, and on the other hand they are neither obliged nor encouraged by the state to do so.

## 6.6 Conclusion

Italy has been continuously hit by earthquakes due to its vulnerable geographical position and the L'Aquila 2009 earthquake was one of the worst ever recorded. Given the absence of a national disaster fund policy in Italy, the whole process of reconstruction in L'Aquilla has been financed by the state, with the EU as a minor contributor. The huge public debt of Italy is a threat to the government and unexpected natural catastrophes can be a strong blow to the country's economy. The role of insurance companies is very insignificant due to several reasons. The analysis of the primary survey clearly reveals that the majority of respondents received insufficient or zero compensation which illustrates the unimpressive functioning of financial delivery mechanisms. Until and unless people in high seismic risk regions insure their properties the government will be required to bear a huge financial burden in the event of any future disastrous events. Also, the insurance companies and the government are acting as stand-alone bodies, and are continuously failing to encourage people to insure their houses. The government and the private sector should join hands to overcome the challenges of disaster management from the financial perspective. Overall, the funding mechanisms proved to be ineffective, signifying weak financial resilience of the government. It is envisaged that a strong emphasis should be laid on the need to strengthen financial systems in order to render the cities financially resilient.

*Right Page*
**View from Fossa**
**Towards the Valley**
*Photo: Jesús Salcedo Villanueva*

AREA DI ATTESA

PESCOMAGGIORE

ATT 9 - 3 ↓

COMUNE DI L'AQUILA

PROTEZIONE CIVILE
REGIONE ABRUZZO

# 7 Information Management System in Disaster Risk Management in L'Aquila: Evaluation of Risk Assessment, Risk Reduction and Information Provision, and Early Warning Systems

**Authors**
Uli Fadilah Siregar
Yi-ting Tsai

**Abstract**
The information management system in disaster risk management consists of risk assessment, risk reduction and information provision, and early warning systems. It is important to understand the risk in order to address and treat the risk effectively. In this article, we examine the current information system in L'Aquila from the government's side, including several methods and tools that the government uses for providing information about earthquake risks to the community. We conclude that in L'Aquila, the information system is already comprehensive, but that there is a lack of integration of information flow between the government and the community.

## 7.1 Introduction

Disaster risk management to reduce the risk of an earthquake has become an important and challenging feature of urban and regional development. How the risk can be reduced and managed depends on the quality of the information and the understanding of the risk itself. The more accurate the risk information, the more effectively the risk can be addressed and treated, especially in the most vulnerable area. Thus, risk information plays an important role in disaster risk management.

Information management of disaster risk can provide accurate and timely information before (early warning and monitoring), during and after disasters. According to the International Federation of Red Cross and Red Crescent Societies, the benefits of disaster information management are:

– saves lives through early warning

– reduces suffering in the wake of disasters, by providing tracing services, concise information on assistance packages, or clearly indicating where and when shelter will be provided

– promotes better media coverage of the world's neglected disasters so that global assistance might be more equitably allocated

In terms of earthquakes, a system specifically designed to manage earthquake information is Earthquake Information Management System (EIMS). According to Ajami (2013), an Earthquake Information Management System is a system that records, collects, stores, retrieves and analyzes inputs, produces reports and required earthquake information and passes on this data to the right people and organizations to help manage earthquake response activities. Later on, earthquake information can help make better decisions in designing policies, response planning, management of disasters, monitoring and evaluating disaster programs and services, and reducing damages.

## 7.2 Understanding disaster information management system

**Information management system in natural disaster management**

Disaster risk in urban areas has been increasing as a result of growing population and therefore urban development has to consider disaster risk. As part of reducing risk and managing remaining risk, good understanding of disaster risk is necessary as a base knowledge for risk treatment (ADPC 2013). The Hyogo Framework put knowledge of the hazards and vulnerabilities as a starting point to promoting a culture of disaster resilience. To acquire that knowledge, then identification, assessment and monitoring of disaster risks are needed.

There are three main multidisciplinary activities in organizing disaster information system:

*a)* ***Risk assessment:*** Record, analyze, summarize and disseminate statistical information on disaster occurrence, impacts and losses, on a regular basis through international, regional, national and local mechanisms. Many stakeholders such as international aid organizations, national and local authorities of vulnerable regions, and enterprises including insurance companies store different information depending on their different goals when involved in natural disasters. In order to exploit the potential of merging the distributed information, key tasks are the generation and implementation of information collection processes, information analysis processes, and information distribution processes. These information processes are components that are required in risk assessment. Other components are (distributed) information systems that connect and merge various information sources, analyze the sets of information, and distribute the aggregated information.

*b)* ***Risk reduction, information provisioning to citizens:*** Provide easily understandable information on disaster risks and protection options, especially to citizens, including the develop-

ment of user-friendly directories, inventories, and information-sharing systems and services for the full and open exchange of information on good practices at international, regional, national and local levels. The risk of natural disasters can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on disasters, vulnerabilities and capacities.

c) **Risk reduction, development of people-centered early warning systems:** Maintain information systems as part of early warning systems with a view to ensuring that rapid and coordinated action is taken and that people are warned in case of disaster; strengthen the coordination and cooperation (processes) among actors in the early warning chain. Information systems as parts of early warning systems strengthen the coordination and cooperation among actors in the early warning chain. Thus, a knowledge of how to design early warning systems, how to embed information systems, and how to use different media, including mobile devices, social networks, and web sites is required for effective early warning systems.

### Social networks in disaster management
Most buildings in L'Aquila and the nearby provinces have been damaged or have collapsed, so it is difficult to collect information. Banzato et.al (2010) describe how an information system can help people participate in the reconstruction process and support the social network. Furthermore, the system can help people recover from the shock caused by natural or man-made disasters, and mend broken social links.

### The EagleVox project
During the earthquake, the information connections between public organizations and the inhabitants broke down for two main reasons: (i) the infrastructures collapse; (ii) the usual tools people used to communicate were unavailable (e.g. internet at home). Mobile communications become increasingly important at such times.

EagleVox plans to use its technology to provide citizens with two kinds of access: mobile (sending/receiving SMS) and web terminal. The system gets information from the proper institutions and supports top-down and bottom-up communication (citizen-to-citizen, citizen-to-institution, institution-to-citizen, institution-to-institution).

EagleVox can support the sense-making process and give citizens a unique listening point where they can send information about their feelings, sensations or needs. The project is currently still in the research stage, but it is worth looking forward to its implementation in the future.

### Information system in L'Aquila
a) **Risk assessment:** The government of L'Aquila and Italy has organized an information system of risk assessment at the national and local level. At the national level, the National Civil Protection has a system for recording and collecting data about hazards and vulnerabilities in a national context. For more detailed data, the municipalities have their own risk assessment. The department responsible for this assessment is USRA for the municipality of L'Aquila and USRC for the surrounding municipalities. This assessment is used for the basis of reconstruction.

b) **Information provisioning to citizens:** The government of L'Aquila and Italy has organized an information system of risk assessment at the national and local level. At the national level, the National Civil Protection has a system for recording and collecting data about hazards and vulnerabilities in a national context. For more detailed data, the municipalities have their own risk assessment. The department responsible for this assessment is USRA for the municipality of L'Aquila and USRC for the surrounding municipalities. This assessment is used for the basis of reconstruction.

c) **Development of people-centered early warning systems:** Among the citizens, there is no initiative to develop a system for collecting information regarding risk and emergency.

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                    ┌─────────────────────────────────────┐
                    │  Information System in L'Aquila      │
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**Information System in L'Aquila**

- **Risk Assessment**
  - **National level:** data collection about hazards and vulnerebilities (National Civil Protection)
  - **Municipal level:** data collection for reconstruction (USRA and USRC)

- **Information provisioning to citizens**
  - **National level:**
    - Campaign "Io non rischio" (I don't take risks)
    - website
    - Civil Protection Handbook for Families
  - **Local Level:**
    - Website
    - Social media: television and radio

- **Development of people centered early warning system**
  - No certain initiatives from the community

Ideally, an earthquake information management system should be integrated among all the stakeholders involved in earthquake risk management. The government official, in particular the Department of Civil Protection, is responsible for the management of risk information. However, good information will be not be useful if it is not known by the community. Conversely, the community can also be an important source of information to improve disaster preparedness. Thus, a good information system that gathers and spreads information from and to the community is also needed.

L'Aquila is considered an area prone to earthquake and has suffered some damage because of the earthquake that hit the area in 2009. In this research we would like to identify how the risk information system works between top-down (national and local government) and bottom-up (community) in the case of earthquake information management to develop an early warning system in L'Aquila.

As described in the literature review section, the information management system in disaster risk management consists of risk assessment, distribu-

tion of risk information to the citizens and development of people-centered early warning systems. These activities require integration between the government (top-down) and community (bottom-up). However, some problems may arise in the integration of information flow, especially in the dissemination of risk information among the citizens.

The main research question that we are trying to answer is: How does the earthquake information management system work as part of disaster risk management in L'Aquila? The following specific research question has been formulated, namely: How is the information management system integrated between top-down and bottom-up as part of disaster risk management in L'Aquila?

Based on the research question, a hypothesis has been formulated that the government official in L'Aquila (respectively the municipalities and the Department of Civil Protection) has already developed such an information system, but that it is not sufficiently good to pass on the information to the community, resulting in a lack of community awareness.

**Figure 49:**
**Information Management System in L'Aquila**
*Source: Authors*

102

## 7.3 Evaluation of information management system in L'Aquila

During the field trip we examined the implementation of the information management system in L'Aquila by the government and the community, represented by Viviamo L'Aquila. We focused on some particular cases and problems in the management of information about earthquakes, especially in terms of integrating top-down and bottom-up sources of information.

**Risk assessment**
The losses caused by the earthquake in 2009 have led to improvements in the risk assessment system as regards the collection of information about disaster risk, especially for reconstruction. Besides following the technical process for risk assessment, such as seismic data collection, the process of developing a reconstruction plan also involves the participation of the community. Supported by the regulation that reconstruction should involve community participation, the government has conducted several meetings with the leaders of an agglomeration group, where they were given the chance to participate and provide useful information which could be used as inputs in reconstruction.

**Information provisioning to citizens**
According to the National Civil Protection, there are difficulties in transforming the scientific data of risk into understandable data that can be passed on to citizens. First, they have to collect the data, then computerize it in the GIS system, and this process takes years. The final version of the information has still to be published. They also have to define the agreement with the region and provinces as to how to make this data accessible. The region may have its own database and assessment which may not be not be compatible with the data of the National Civil Protection. They are still discussing ways to disseminate and explain this data to the citizens.

Another problem is that the scientific analysis of risk does not really reflect reality. They are able to calculate the risk, but not to translate the data to the actual condition. The Civil Protection is still working on making this data accessible to the layman.

There are also campaigns to raise risk awareness which involve interaction with the citizens. However, the events are held only once a year and on the initiative of local government. There are no campaigns or initiatives such as training programs or workshops which cover all citizens and ensure that all citizens receive awareness information from the municipality. According to the mayor of L'Aquila, two years ago a rule was enacted to organize an awareness-raising exercise in the community. Unfortunately, there is a problem with funding. Also, the municipality is more focused on construction, on building safe houses and other buildings with safe materials.

**Development of people-centered early warning systems**
According to the interview with the Viviamo L'Aquila association, information flow in the local communities is based on TV channels, two or three local newspapers, and mobile phones which only work by chance. In addition, there is no specific system in place to



**Figure 50:**
**Direction to the Emergency Assembly Area in L'Aquila City Center**
*Photo: Uli Fadilah Siregar*

facilitate communication in the communities and no training schemes or workshops for local people.

In other words, people in L'Aquila take hardly any part in and barely support the information system. Almost all information flow is top-down; there are no bottom-up initiatives. There is also no direct information mechanism or system between the government and the people.

In the meeting with the mayor of L'Aquila, he stated that the most important and urgent thing now for the whole city and its near provinces is to build safer houses. Actually, before the earthquake happened, a scientific prediction was made that could have been used as an early warning. However, the mayor and other professionals decided not to make an announcement as it was uncertain that an earthquake would really happen. They also feared that the information might lead to unnecessary panic.

The mayor also stated that the culture in Italy doesn't lend itself to the prevention of disasters. Therefore it is hard for the government to build awareness of disaster prevention among people in order to reduce the risk of disaster through the development of an early warning system.

## 7.4    Conclusion

According to the information gathered, the government of Italy and the municipality of L'Aquila already have a comprehensive information system of risk assessment as well as many means to inform the citizens of risks and thereby raise their awareness. However, the flow of information is still very weak due to the use only of one-way communication tools such as the web, and TV and radio. One channel of interactive communication is available to the citizens, namely campaign Terremoto – Io Non Rischio, initiated by the National Civil Protection, but it is held only once a year and does not involve all citizens. More organized interaction at local level, through workshops or training programs and the like, is needed.

Another important point is the lack of a prevention culture in L'Aquila and in Italy in general. The government is only focused on reconstruction and building safe houses and does not prioritize communication as part of raising preparedness and awareness in the community. Therefore, better communication with the citizens, as well as citizen empowerment, is needed in order to change the mindset about prevention.

*Right Page*
**Community Area Organized
by Community Which is
Also Functioned as an
Emergency Assembly Area**
*Photo: Uli Fadilah Siregar*

**Part III: Reclamation and Reconstruction**

# 8 Temporary vs. Permanent Housing Solutions in Case of Catastrophes: Evaluation of C.A.S.E & M.A.P Projects in L'Aquila

**Authors**
Pratiksha Gogoi
Shaimaa Mobasher

**Abstract**
This chapter focuses on provisional housing solutions to permanent housing in the L'Aquila area, to examine how government powers play an important role in the facilitation of the rebuilding process. The goals are to understand government decision-making and interventions in the process of response to earthquakes in Italy. In addition, to study the C.A.S.E and M.A.P projects and gaps related to the process of reconstruction and evaluation of both, based on case studies from Villa Sant'Angelo and Camarda. The chapter is concluded with some specific lessons that were learned from the C.A.S.E and M.A.P projects for future seismic risk reduction in the Abruzzo region.

*Last Pages*
**Reconstruction Works in the City of L'Aquila, 2014**
*Photo: Riza Avriansyah Kori*

*Left Page*
**The Old Camarda Village Seen from the Parks in the New Settlement**
*Photo: Shaimaa Mobasher*

## 8.1 Introduction

According to (Alexander 2010b), in Italian emergency response, political scandals seem to occur about once every decade. It has been observed that the major scandals revolved around an ordinance, a government decree with the status of law. This has been manifest in the implementation of disaster policies in L'Aquila, which have been deeply connected with politics as a way of exerting power. More specifically, the L'Aquila earthquake shows to what extent a natural disaster can offer a window of opportunity for exercising and showing the power struggle that lies behind politics. Furthermore, this disaster proved to be a useful tool for assessing the balance of power between national institutions at different levels of government (Longhini 2013).

To understand the governmental situation, this chapter describes who plays the most important role in the decision-making process in housing construction projects and ways in which future housing projects might be improved. It also attempts to understand the community's perceptions of the post-earthquake decision-making intervention as regards the development of L'Aquila. Based on this, we pose two main questions, as follows:

– According to the Italian government, in the case of L'Aquila, what distinguishes a provisional shelter solution from a temporary or permanent one?
– How do the C.A.S.E and M.A.P projects function in L'Aquila and how to evaluate them?

## 8.2 Government intervention in making provisional shelter a permanent solution in the recovery phase

According to the 1992 law, no.225, the elected mayors of Italy's 8,104 municipalities act as the executive heads of civil protection. It is technically proven that mayors of municipalities have more authority during local emergencies than the prime minister though the prime minister is the national head of the Civil Protection Department. In the aftermath of the L'Aquila earthquake, the city's mayor immediately came to a decision regarding disaster response and citizen protection with the help of Prime Minister Silvio Berlusconi. The Civil Protection Department and the Fire Brigade Department played an important role in rescuing civilians (Alexander 2010b). A large number of volunteers (assisted by Civil Protection) evacuated town centers and established camps, temporary containers and additional housing facilities in coastal hotels.

Within no time, a new administrative function came into existence. With the decision of Prime Minister Berlusconi, the Civil Protection decided to construct temporary houses on the periphery of the old ruined towns to provide victims with temporary shelter, i.e. M.A.P. According to the interviews, M.A.P's aim was to make provision for the inhabitants of the peripheral villages and 'frazioni'[1] that could be dismantled after the reconstruction of their villages. Another housing construction project that came into existence to deal with the recovery period aims to assist the inhabitants of the city of L'Aquila and goes by the name of C.A.S.E. (The M.A.P and C.A.S.E projects will be explained in more detail later). In interviews, some of the inhabitants of the villages mentioned that a great deal of peri-agricultural land has been taken over for new constructions. According to Calvi (2010) and Rossetto et al. (2014):

"Unlike previous Italian disasters, in L'Aquila the typical framework of providing emergency shelter, quickly followed by temporary accommodation and finally permanent reconstruction, was not adopted. Instead, the precarious phase of emergency shelter was purposely lengthened by several months to permit the construction of transitional houses of high standards, destined to last for several years."

In support of the above, in Italy it is possible to refer to technical code 2008, in which the nominal lifetime of a structure is defined as the *number of years the structure can be used for the purpose it was built*. This is indicated in a table and needs to be specified in the design documents. It is interesting to note that the

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1  The provincial structure, divided in several *frazioni*, as well as the high level of destruction in the city centre

code only indicates a maximum for provisional works (10 years) and two minima for ordinary and important works (50 and 100 years respectively). Using the technical code's data, it should be concluded that all provisional works constructed in the aftermath of earthquakes that happened in the last sixty years should actually be considered permanent, since they have had a lifetime of more than 10 years (ignoring the fact that works that date from between 10 and 50 years can be called neither provisional nor permanent). If, then, the provisional does not exist from a durational point of view, it would be useful to wonder whether it makes sense that it would exist in terms of energy consumption, sustainable environment or pollution. It would also be useful to wonder whether buildings could be constructed with environmental characteristics and safety levels similar to that required for permanent ones on a temporary basis and with costs per unit similar to provisional ones. In this case, it would be logical to propose the building of provisional houses with the characteristics of permanent ones (Calvi 2010).

It is interesting to note that in 2011, the municipality of L'Aquila published the Reconstruction Plan, which was a revised version of the Strategic Plan for the future of L'Aquila, published just before the earthquake. One of the fascinating issues discussed in the plan is the legacy of the C.A.S.E settlements (locally termed "new towns") in the reshaping of suburban areas. The plan envisages the necessity to change from a single-centered city model to a multi-centred mode; it sees the *frazioni* as adding new value to the city (Rossetto et al. 2014).

Through the studies and different interviews, it has been evidently proven that the municipality of L'Aquila was in favour of the construction of "new towns" in the suburban areas for the better development of the Abruzzo region.

## 8.3 Evaluation of provisional housing systems in L'Aquila

The remarkably high figures for transitional housing provided after the L'Aquila earthquake by the C.A.S.E and M.A.P projects represent an entirely new policy.

The two projects represent the latest evolution and most extreme form of prefabricated post-disaster transitional dwelling.

The authors introduce a brief description of the C.A.SE and M.A.P projects, followed by a description of the unsolved issues faced in general on the different sites. The authors then focus on projects in two villages, Villa Sant 'Angelo[2] and Camarda[3], where a series of observations and interviews were conducted with different stakeholders, officials, and local community members. The evaluation of the projects was done based on a questionnaire framework.

### a) The C.A.S.E project
The C.A.S.E. project is a plan that includes the construction of "seismically isolated sustainable environment-friendly" habitations in the town of L'Aquila. The mayor of L'Aquila was appointed by the Italian government as authorized person to design and carry out the construction of new housing within a very short time frame and to turn L'Aquila into an entirely new neighborhood (including all services). The infrastructure was required to be both durable and to consist of advanced technology for the citizens whose houses were destroyed by the 2009 earthquake and whose "old towns"[4] had been declared unsafe to live in.

According to the DPC's website, the infrastructure provided to the citizens of L'Aquila were meant to be *permanent constructions* and met two criteria: a) Innovative technologically and energy saving; b) Protected against earthquakes (Dipartimento della Protezione Civile 2014a, translation by the authors; see Figure 51 and 52).

C.A.S.E projects were applied in 19 different areas (Map 6). The 19 areas were identified by the deputy commissioner in agreement with the president of the region and the mayor of L'Aquila in the decree of May 11, 2009, that defines the first 6 areas for the

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2  Villa Sant 'Angelo is a commune and town in the province of L'Aquila, in the Abruzzo region of Italy, which lies in the Aterno River valley near the convergence of the Sirente and the Gran Sasso mountain ranges.
3  Camarda is a commune and town in the province of L'Aquila in the Abruzzo region of Italy.
4  "Old towns" refers to the destroyed villages where inhabitants lived before the 2009 earthquake in L'Aquila.

construction of housing units and infrastructure works and services for the affected population. As a result, a measure was amended by other decrees (no.3775 of July 1, 2009, no. 18 of August 24, 2009 and no. 26 of October 1) to identify the final areas (Dipartimento della Protezione Civile 2014a, translation by the authors).

According to the DPC website, the selection of the areas for the project was established on the basis of the suitability of the common areas from the point of view of seismic safety, hydraulics and hydrogeology, as well as access to roads and proper integration with service areas and public green spaces. The locating of settlements also took into consideration the need of the recipients of the housing units to remain close to their homes of origin. However, according to different scholars, research studies and the inhabitants themselves, the reality is that the allocation of people in the C.A.S.E projects has led to a kind of social fragmentation.

The housing units on 19 sites have the capacity to accommodate 15,500 residents in two to three-story

buildings with a base isolated against earthquakes, and constructed of wood with concrete base plates and steel frames (Figure 53).

**b) The M.A.P project**
The project was created in close collaboration with different municipalities in L'Aquila. The Civil Protection Department has launched public notices for the selection of firms and for the designing of housing units, while the individual municipalities have been given the authority to manage the construction of bases and infrastructure works (Figure 53).

The M.A.P projects were constructed in more than 50 sites, almost half of them in the municipality of L'Aquila (Figure 7.6). This option of small groups of houses made it possible for the people to either stay in the area where they used to live, as in the case of Villa Sant' Angelo, or very close to their "old towns", as in the case of other sites, giving them a sense of belonging. This contrasts with what happened in the C.A.S.E projects, where people were allocated to faraway villages or settlements.



**Figure 51:**
**C.A.S.E Post-Earthquake Housing Prototypes**
*Photo: Shaimaa Mobasher*

**Figure 52:**
**Detail of Anti Seismic Base Isolation on the C.A.S.E Units**
*Photo: Shaimaa Mobasher*

**Figure 53:**
**M.A.P Housing Prototypes in Camadra**
*Photo: Shaimaa Mobasher*

(from top to bottom and left to right)

"There are about 2,200 modules installed in the municipalities of the seismic crater, which are included among those contracted by the Civil Protection Department and those which came as a donation. 1,113 modules have been constructed in the city of L'Aquila." (Dipartimento della Protezione Civile 2014b). There are 8,500 module houses, whose sizes vary according to the needs of the family hosted and the characteristics of the geographical area, as well as the techniques chosen and the materials used to build them.

### c) Issues related to C.A.S.E & M.A.P projects

A number of studies conducted by scholars have revealed various general unresolved issues with the two above-mentioned building prototypes. Some of these issues were also identified by simple observation as they were very obvious to any visitor to the area. Others were revealed by interviews and questionnaires carried out in the study sites by the authors. As per Calvi (2010):

"Whereas the price of a basic prefabricated dwelling of 40 sq. m. is about €12,000-15,000, the

C.A.S.E. units cost more than 20 times as much, or an average of €280,607 per unit or €3,750 per sq. m., including public spaces."

The amount of money spent on the C.A.S.E projects is extremely high as compared to the temporary solution M.A.P projects, which costs approximately €1,200 per sq. m.

In both cases, the buildings provided are constructed of materials, especially wood, that require a lot of maintenance. According to Alba Fagnani[5], in the Italian context as a whole, the cultural background of houses is something built of concrete bricks and stones, not a light structure of wood or other materials, rendering the region inexperienced in dealing with these kinds of materials, as per Alexander (2014):

"Some uncorrected signs of decay were already apparent after a few months, and the local climate is one of the most extreme in peninsular Italy. One effect of the L'Aquila earthquake has been to cause an abrupt change from stone and concrete construction to building in wood."



**Map 6:**
**Location of the C.A.S.E Post-Seismic Housing Complexes**
*Source: Authors*
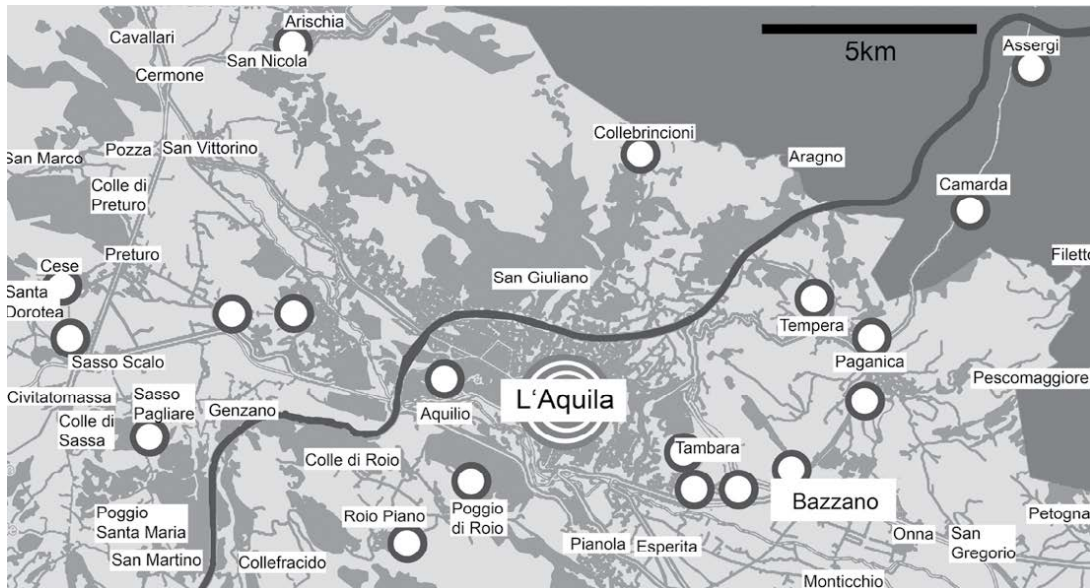
5    Alba Fagnani is an architect from the VIVIAMOLAq association. VIVIAMOLAq a project created by students and alumni of the University of L'Aquila keen to contribute and participate in the rebirth of the city.

The goal is to restore the population of the capital aggregation spaces through the organization of regional workshops to participatory architecture (translated from http://viviamolaq.blogspot.it/p/chi-siamo.html).

Another kind of risk for these kinds of buildings and materials would be fire risk, though historically this region of Italy is a low flammable area (Figure 54).

Other than some references to 'student housing', no indication was given in the original C.A.S.E and M.A.P plans of the future use of the units or their sites or of the length of time the units would exist before being dismantled. Such a huge investment demands that the transitional housing be used for a very long time, not just a couple of years. This conclusion is drawn from the fact that temporary post-earthquake dwellings are still to be found in Messina (1908 earthquake), in Avezzano (1915 earthquake), as well as in the Belice Valley of western Sicily (1968 earthquake).

During our meeting with Mr. Massimo Cialente, the mayor of L'Aquila, he told us of the future plans for the "new towns", emphasizing the need to rebuild the historic center of L'Aquila as soon as possible so that people can leave the "new towns", allowing the houses to be used for other functions (Cialente 2014). 30% of them will be used as student housing, another 30% for people with social problems

and 15% housing for old people. An unspecified percentage would be workers' housing and 15% would be for talented young people in different disciplines. He pointed out that this plan is a fight against time. Until the ruined centers and houses have been rebuilt, none of these plans is possible.

These projects provide accommodation for hundreds of people on each site, but in most cases there are no basic services and only very limited public transport. "Although designed with modern environmental compatibility in mind, some of the complexes are not connected to wastewater treatment and discharge raw sewage directly into the Aterno River." (Alexander 2010b)

In the village of Villa Sant' Angelo, for example (Figure 55), the M.A.P project was situated just a couple of meters away from the old village. A community center offering some activities was constructed, as well as a pharmacy, a small clinic, some shops and a beauty salon. This is a small number of services but is actually double the number available before the earthquake (Figure

**Map 7:**
**Location of Some of the 56**
**M.A.P Housing Complexes**
**Surrounding L'Aquila**
*Source: Authors*
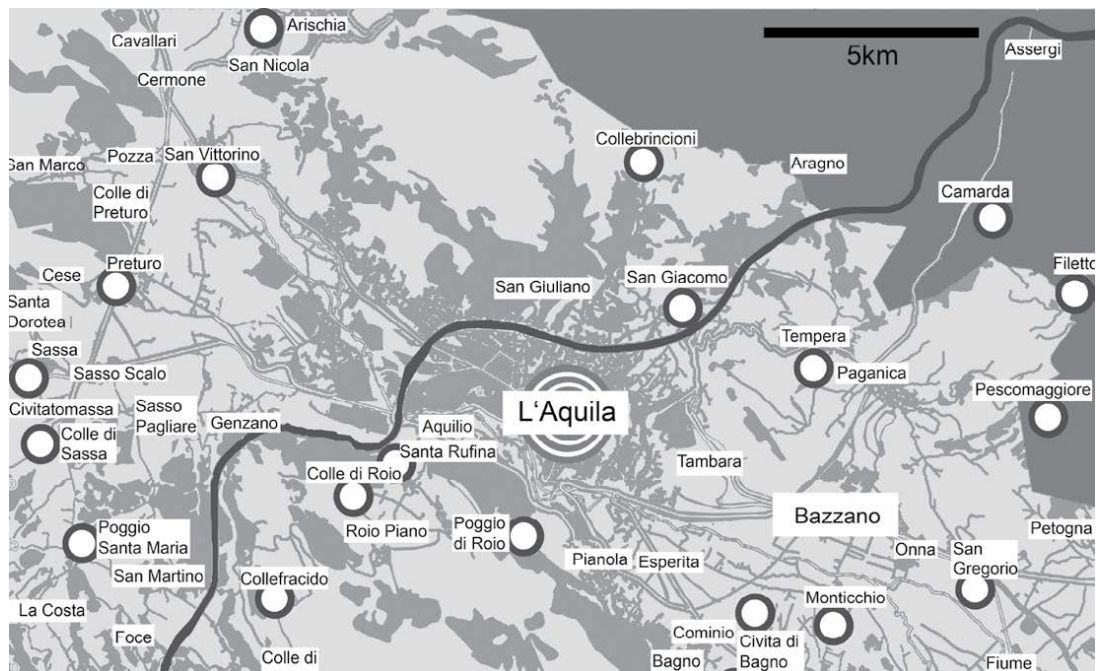
56). Mr. Pierluigi Biondi, mayor of Villa Sant' Angelo, stated that public transport was already functioning and that the situation was not much affected, with transportation to and from the village remaining almost unchanged. The main problem, according to Mr Biondi, was that Villa Sant 'Angelo was a satellite center in the same way as L'Aquila was the main center, and people had to move a lot with buses. Now, thanks to changes in social behavior, people prefer to travel

in their own private vehicles rather than use public buses. The municipality provides buses to take children to and from their schools (Biondi 2014).

Another example would be C.A.S.E and M.A.P projects across the Camarda village. Figures 57 and 58 show the contrast between the old village and the new settlement. In this project there are five C.A.S.E units, each of 24 apartments, and four M.A.P units with a total of 56 apartments. There exists only a









**Figure 54:**
**Wooden Construction**
**in Camarda**
*Photo: Shaimaa Mobasher*

**Figure 55:**
**M.A.P Units and**
**Damaged Settlements**
**in Villa Sant' Angelo**
*Photo: Shaimaa Mobasher*

**Figure 56:**
**Different Services in Villa**
**Sant' Angelo M.A.P Project**
Community center, restaurant
and market, clinic, pharmacy
(from top to bottom
and left to right)
*Photos: Shaimaa Mobasher*

115

**Figure 57:**
**The Old Camarda Village**
**Seen from the Parks in**
**the New Settlement**
*Photo: Shaimaa Mobasher*



**Figure 58:**
**C.A.S.E Buildings in Camarda**
**Seen from the Old Village**
*Photo: Shaimaa Mobasher*

provisional tent for community activities and two parks, but most of the parents interviewed preferred that their children play in their own front yard. Other services such as supermarkets, pharmacies and clinics are available in nearby villages. There is a public transport bus stop in the neighborhood, but most people tend to use private cars on a daily basis. A new community center building is under construction but it is is outside on the main road rather than enclosed within the settlement (Figure 59). Social cohesion is not helped by a situation in which all that has been provided is housing and some landscaping, as confirmed by Alba Fagnani during her visit to another M.A.P project, in Parcobaleno[6].

As shown in Map 6, at the time when the units were being assigned, the most popular site was the only one located in the city of L'Aquila itself. Other C.A.S.E sites are located far from L'Aquila; Arischia and Assergi[7] are 15 and 16 km. away (Alexander 2010a), where there is a lack of significant commercial markets, and medical and administrative centers. Most of the people from these sites use the hospital in L'Aquila, which is nearer than any other in the surrounding region.

Large amounts of money and effort have been spent on trying to provide a pleasant environment through landscaping, roads, structures, green areas and parks,but the result is a sort of forced modernization that entirely contradicts the traditional heritage of the area. This can be seen by comparing the ruins of the old villages with the modern new buildings, as in the cases of Villa Sant' Angelo (Figure 55) and Camarda (Figure 57). As Button (2006) states:

"Given the closure and—one hopes temporary—abandonment of the historical centres, there has been a precipitous loss of the genius loci of the area. It is not clear how much of this can be recovered. At its worst the closure might also represent a form of forced migration. Such a phenomenon is not unknown after modern disasters and was encountered in the southern USA in 2005 after Hurricane Katrina."

## 8.4    Conclusion

The earthquake brought a flood of monetary support from different organizations and governmental departments. As we have seen, there has







6   Parcobalena is a town in the Abruzzo region with a M.A.P project; VIVIAMOLAq had constructed some items in the settlement's open space.
7   Arischia and Assergi are two towns and settlements in the Abruzzo region 15 and 16 km away from L'Aquila.

**Figure 59:**
**Different Services in Camarda**
Provisional tent,
community center under
construction, bus stop
(from top to bottom
and left to right)
*Photos: Shaimaa Mobasher*

been a negligible level of public participation in the construction process and what the people have been provided with in the wake of the earthquake are urbanized spaces with some green areas and a community that depends on private cars for transportation, a style of living akin to that of a modern American suburb. In the meantime, as they await the reconstruction of their houses, they dream of returning to their old life. To their historic villages and the houses their families have lived in for generations, to "the place where they belong".

The policies employed in the Abruzzo region at the time of the earthquake have stored up problems for the future, rather than solving them. No actual evaluation has been carried out by the municipalities or the government. The municipality's concern was purely with providing a roof over peoples' heads.

From our evaluation study we conclude that despite the fact that natural disasters include a massive economic shock to the affected sectors and societies, the recovery process can be used for nourishing development plans and to stimulate the economy, while developing new technologies and solutions. The issues that arise from the real-life experience,, especially with regard to provisional housing, might be used to avoid repeating the mistakes made in the past. They point to the need to build an informed community and to involve the population and local authorities in the decision-making process rather than enforcing "temporary" solutions that, in the long run, tend to be taken for granted.

C.A.S.E and M.A.P as provisional housing solutions also need further research and evaluation. They should not be accepted as solutions to be used in the case of future risks. In the post-emergency phases buildings need to be different from in the past, good examples of eco-friendly, disaster-safe architecture that takes into consideration the people, their history, their needs and social cohesion as well.

*Right Page*
**A Sign Inside a Small Private Garden House in the New Settlement in Camarda**
*Photo: Shaimaa Mobasher*

# 9 Seismic Building Regulations: Re-population of the City Center According to Building Codes in L'Aquila

**Authors**
Panagiotis Achamnos
Pedro Becerra Rodríguez
Arief Gunawan

**Abstract**
The majority of residents want to move back to their houses in L'Aquila and not abandon the city. Therefore, the authorities should ensure the safety of the people by enforcing the regulations and policies in the rebuilding and renovation of the destroyed units. This paper explores the implementation of the building regulations in the rebuilding process in L'Aquila and seeks to show how the authorities enforce compliance with those codes. The current situation in the town is that reconstruction, though not completed, has been carried out on the outskirts, but the center still remains in a critical condition after the earthquake of 2009. The reasons why the city center and the centers of the villages are still in ruins include the exhaustive evaluation of heritage, bureaucracy in the process of acquiring a building license and lack of funding, among others. Nevertheless, the problem is the government's lack of tools and mechanisms for enforcing the law, despite the sufficiency of the current building regulations.

*Left Page*
**Partially Destroyed**
**Houses in L'Aquila**
*Photo: Panagiotis Achamnos,*
*Pedro Becerra Rodríguez,*
*Arief Gunawan*

## 9.1  Introduction

The majority of building structures did not meet the criteria of seismic building codes, and this led to the destruction of the centers of the city of L'Aquila and the surrounding villages. It is evident that the enforcement of building regulations was weak and only few buildings fulfilled the standards before the earthquake. On the other hand, after the disaster, the rebuilding process in the villages was delayed due to the exhaustive evaluation of heritage and inefficiency in the procedures for getting permissions, subsidies and money allocations. Consequently, the red zone remains in a critical condition and the repopulation of the city and village centers is taking a long time. Additionally, according to the Special Office for the Reconstruction of l'Aquila (USRA), the building regulations were not modified and are still in operation. Nevertheless, the procedures required to get a building license and the monitoring process for enforcing building codes have changed, in order to be more efficient and to ensure that the new structures are built safely. The enforcement of the building regulations depends on the condition and the level of damage to the buildings. Moreover, different categories were created to classify the buildings and decide the money allocation. The USRA assures that the authorities supervise the building process and that inspections are now exhaustive.

## 9.2  Situation before and after the earthquake

The building regulations that existed before the earthquake of 2009 were efficient and innovative with up-to-date technologies and required old buildings to meet the seismic standards (Momigliano 2009). However, they were not mandatory and in practise were ignored, with no inspections being carried out (Rykwert 2009). Therefore, despite the sufficiency of the seismic standards in the building codes, the earthquake, which is considered of minor intensity, caused major destruction and severe casualties.

As a result, since the earthquake, the new building codes are being enforced for both new and existing buildings (Gramling 2009). The whole procedure,



**Figure 60:**
**Reconstruction Process**
*Photo: Panagiotis Achamnos,*
*Pedro Becerra Rodríguez,*
*Arief Gunawan*

including inspections, of getting a building license has changed and became stricter in order to ensure that the codes are fulfilled.

On the other hand, the residents who had to relocate after the disaster miss their former life and want to move back to the town (Baldini 2013). The MAP villages and the CASE projects provided people with temporary accommodation, but the aim of the citizens is to return to their city and villages and their former lives.

In order to accomplish this and make the structures safer, avoiding a future disaster, it is important to investigate the procedures, inspection process and the implementation of the seismic building regulations for the reconstruction of the buildings and the repopulation of L'Aquila.

## 9.3  Problematic aspects

In L'Aquila, there are two problematic aspects that have affected, first, the structural safety of the buildings during the earthquake of 2009 and, secondly, the efficiency of the reconstruction process after this natural disaster. Two reasons why a lot of the buildings collapsed in April 2009 were the lack of enforcement of the existing building codes and the poor maintenance of the buildings; a lot of them had been abandoned and empty for years. On the other hand, the process of reconstruction has taken a long time due to the bureaucracy involved and the evaluation of heritage in the village centers, for which no clear parameters or criteria exist, according to the Office of Reconstruction of L'Aquila.

## 9.4 Identifying the condition

Our preliminary hypothesis is that the residents apply to relocate in their houses. The authorities are responsible for inspecting the condition of buildings and for granting permission for the reconstruction of buildings according to the new regulations and, at the same time, for monitoring the whole process. However, this process faces some limitations regarding the enforcement of the regulations because of corruption, lack of funding, lack of technical knowledge and even inefficient governance.

The data collected and the interviews and meetings conducted in the field revealed the current situation and how the rebuilding process functions and helped us to identify the condition of the area. An evaluation and elaboration of these data led us to a discussion of the problems that still exist and an analysis of the situation.

## 9.5 Reconstruction process

According to the USRC, building codes and regulations were neither changed nor updated after the earthquake of 2009. Therefore current building activities are operating according to the regulations of 2008 (NTC). In the reconstruction process that is taking place in the centre of L'Aquila, the authorities enforce the fulfillment of the building codes according to the condition of the structures. These different levels are shown in Table 4.

The procedure of getting a building license in the reconstruction process is far from simple and involves many different steps. In addition, the bureaucracy within the process makes it even longer and more complex.

Before April 2012, the municipality and the *filiera*, a group of four different offices, carried out the first step in the procedure for the city of L'Aquila and the surrounding area. Within these offices there are: the *Fintecna*, a state corporate, the *Cineas* and the *Reluis*, which are part-private, part-public enterprises, and the *Genio Civile*, a provincial public office where you submit your project proposal and get final approval.

These four offices were in the same building, in the *Guardia di Finanza* school (the only public building left standing after the earthquake). Once the four offices had given their approval, the municipality awarded the money directly, but it was a procedure that required a lot of time. Additionally, the buildings had to be categorized according to level of damage, as shown in Table 5. All buildings, no matter their condition (A-F), had to go through the same procedure.

Furthermore, the government took action to provide people who had lost their houses with adequate temporary housing. The MAP and CASE projects were for buildings in classes E and F and for all buildings inside the red zone. People who lived outside the red zone and whose buildings were characterized as class A, B or C were put up by the state in hotels or awarded a contribution for autonomous accommodation for the months required for the reconstruction of their houses.

In April 2012, the government changed and a new ministry for territorial cohesion was created. The new ministry decided to remove the *filiera* and establish two new offices, one for L'Aquila and one for all

| Building condition | Enforcement of building codes |
|---|---|
| For new buildings (totally destroyed after the earthquake) | 100% |
| For reparation of existing structures (not severe damage after the earthquake) | 60% - 80% |
| For reconstruction of heritage | close to 60% |

| Category | Level of damage | Improvements |
|---|---|---|
| A | No damage | Minor repairs, no improvement of seismic design. Energy consumption improvement is not necessary. |
| B | Low damage | |
| C | Medium damage | Reinforcement of joints. Energy consumption improvement is not necessary. |
| E | Severe damage | Mandatory structure reinforcement and energy consumption improvement |

Table 4:
Building Codes Enforcement
*Source: Authors*

Table 5:
Damage Categories
*Source: Authors*

123

the other villages. The first of these is the USRA, the office for L'Aquila, and the second is the USRC, which coordinates the other eight territorial offices for the surrounding area. This was approved in April 2012 but was only operative at the end of 2012/beginning 2013. In the meantime, reconstruction plans were drawn up for 33 villages, with 23 still pending approval. Basically, the reconstruction plan specifies which buildings are historical and which have heritage value.

Along with the changes in the rebuilding procedure, the subsidy methodology was modified. There is now a new way to calculate the subsidy which is easier for the office. This involves a consideration of traditional aesthetic and technique characteristics in the reconstruction process, and is at the same time more efficient in the allocation of money. For L'Aquila, a number of parametric charts have been drawn up that cover a large number of factors (aesthetic, technical, geological, environmental, position and location of house, etc.).

For the surrounding area, which has fewer factors to consider, there is a similar but less complicated chart, called MIC (Modulo Integrato Cratere). There is less money available for historical buildings in the surrounding area than for the red zone.

The parametric chart further divides the aggregates into architectural units, so it has fewer problems than before. Within the agglomeration, units are divided into class A, B or C, with subsidies divided according to each unit rather than there being a total for the whole agglomeration as before. The parametric chart is the first step that must be completed ahead of the technical project. The project is economically approved if it is below the maximum the state can award, depending on the category of the unit. Next, the technical aspects of the project are considered.

According to the USRA, the mandatory documents for the whole procedure of applying for a rebuilding license are as listed in Table 6.

In the area surrounding L'Aquila 90% of level A, B and C houses have already been rebuilt and almost 80% of level E house have either been reconstructed or are in the reconstruction process. However we have to point out that these numbers refer to houses located outside the red zones; inside the red zones no reconstruction has started. In the historical center of L'Aquila there are more or less 160 building construction sites and the majority of these buildings are historical. It is also very important is to mention that almost 90% of the houses in the area surrounding L'Aquila are located in historical centers, the red zones. Inside these historical centers no work has been done and, five years after the earthquake, they are still restricted and closed. Table 7 shows some figures.

## 9.6    Monitoring and delay of process

We found two main factors in the rebuilding process that have not worked properly. Regarding

**Figure 61:**
**Building Badly Damage
During Earthquake**
*Photo: Panagiotis Achamnos,
Pedro Becerra Rodríguez,
Arief Gunawan*

**Figure 62:**
**Reconstruction Process
in the Red Zone**
*Photo: Panagiotis Achamnos,
Pedro Becerra Rodríguez,
Arief Gunawan*

the building regulations, we believe that the codes failed to be enforced both before and after the earthquake. Furthermore, the reconstruction of the destroyed areas of L'Aquila has taken a long time due to confusing parameters for evaluating heritage and the bureaucracy involved in the procedure for acquiring a building license.

**Monitoring**

Before the earthquake of 2009, the authorities did not inspect buildings to ensure that they were built according to the regulations; therefore, there was no enforcement of the codes. As a result, the earthquake, whose intensity was 5.9, which is not high, inflicted severe damage on the majority of buildings. Thus, it is evident that the problem was not the efficiency of the building regulations but their implementation. During the field trip, we were informed by the Vigili del Fuoco that San Domenico church had undergone structural improvements prior to 2009. As a result, it suffered only minor damage in the earthquake. This shows that those structures which were strengthened according to the building regulations did not collapse.

After the earthquake, during the first stage of the reconstruction procedure, the authorities conducted a random check of only some of the houses. If the details of their written report are correct, they did not even visit the construction sites. No monitoring was carried out either during or at the end of the reconstruction process. We assume that during the first stage of reconstruction there was no sufficient monitoring to supervise the compliance of building codes. It is surprising that, in the wake of such a huge disaster the authorities failed to establish an appropriate mechanism for enforcing the regulations in order to prevent a repeat in the future.

According to the USRA, since April 2012, when the government and the reconstruction procedure changed, the authorities make step-by-step checks during the reconstruction of all buildings and conduct a final inspection at the end before issuing the official license.

| Contents of the proposed intervention | |
|---|---|
| A | Identification, information and description of single building |
| B | Data for each structural unit (9 sections) |
| B1 B2 | Cadastral data |
| B3 | Consistency building: surfaces and volumes |
| B4 B5 | Building description: period of construction, intended use, use, occupants, location, outcome of viability post-earthquake contractual obligations |
| B6 | Type of building elements |
| B7 | Consistency of historical and artistic elements |
| B8 | Damage to structural elements |
| B9 | Estimation of the surfaces and the intended use prior to earthquake and with the proposed intervention |
| C | Data summary of the individual structural units |
| D | Attachments: descriptive processed aggregate |
| E | Description of the project proposal with the support of drawings, estimated areas and destinations of use before the earthquake and after the proposed intervention |
| F | Indication and illustration of the possible coordination project between several adjacent aggregates |
| D | Notes for completing the project |

| Seismic damage conventional level | Back into habitable use | "Back into habitable use" rate |
|---|---|---|
| A (Habitable) | 9.983 | |
| B (Temporarily not habitable) | 2.343 | 51% |
| C (Partially not habitable) | 404 | 33% |
| E (Not habitable-severe damage) | 476 | 6% |
| TOTAL AMOUNT | 3.22 (Not included habitable ones) | 23% |

**Table 6:**
**Contents of the Project Tab**
*Source: Adapted from USRA*

**Table 7:**
**Private Building Reconstruction: Returned to Habitable Use Since 6 April 2009**
*Source: Adapted from USRA*

**Delay of the reconstruction process**

The rebuilding process has not been efficient due to different factors, such as lack of funding, bureaucracy and unclear parameters for deciding what is heritage and what is not. The Soprintendenza, or heritage office, is the institution that decides which are the heritage buildings. It distinguishes heritage buildings from historical ones and from those with no historical value.

Cases arose where a building was characterized as historical but without heritage value or where within an agglomeration there were not only different classes of buildings but also differently characterized buildings: historical but not heritage, with heritage value and normal. In these cases, the subsidies that the state should award, were so difficult and confusing to calculate that the whole process ended up being delayed. This has resulted in only 6% of the village centers being rebuilt and some of the villages still do not even have a reconstruction plan. Without a reconstruction plan, people cannot rebuild their houses. So, even if the buildings inside the red zones were categorized as class A, B or C, where the procedure is easier and more transparent, no rebuilding process could begin before the approval of a reconstruction plan for the whole center. In our opinion, the numbers that we found in L'Aquila regarding the percentage of buildings that have been reconstructed evidence slow progress in the red zones in comparison with the outskirts.

On the other hand, the system for allocating subsidies did not work efficiently until it was changed in February 2014 by USRA. In the previous methodology, the system of subsidies calculation was confusing and took a long time. Afterwards, a new way to calculate subsidies was implemented, making things easier for the office and at the same time taking into consideration traditional aesthetic and technique characteristics in the reconstruction process.

According to the opinion of local people, the authorities have not been able to organize the process of rebuilding efficiently and the procedure for acquiring rebuilding permissions is bureaucratic. Another factor that affects effectiveness is corruption.

*Right Page*
**Reconstruction Work in the Village of Onna**
*Photo: Panagiotis Achamnos, Pedro Becerra Rodríguez, Arief Gunawan*

## 9.7 Conclusion

After the earthquake that tore down many of its famous buildings the government of L'Aquila was keen to preserve its heritage value. It therefore needed a plan to set guidelines and regulations for the reconstruction process. Five years later, however, only 33 municipalities had a reconstruction plan in place and permission to carry out the reconstruction process. The implementation of building regulations and codes serves as a baseline for safety in the event of earthquakes which are likely to happen again in the future.

A study of the condition of L'Aquila has allowed us to form the basic idea that there was a delay in the reconstruction progress due to lack of funding, bureaucracy and ambiguity of heritage terms.

Building regulations and codes play a critical role in ensuring building safety, especially in a city like L'Aquila which is prone to earthquakes. Unfortunately, the government of L'Aquila was unable to enforce these standards and it cost the lives of hundreds of people in the earthquake of 2009. During the emergency phase, the authorities did not impose the strict implementation of building regulations and also failed to carry out monitoring actions. In pursuit of better building standards during the reconstruction process, the authorities have changed the procedures required to get a building license. The new, parametric system is simpler in theory and aims to increase the efficiency of the reconstruction process. Moreover, this new system gave the municipality a mandate to control and check the building process at every phase, for every building.

Monitoring the implementation of building regulations is very important in achieving the required level of strength and safety in buildings. However, it is assumed that the standards set out in Italy's current building regulations are sufficient to withstand a minor to moderate scale of earthquake. The major problem was a lack of willingness on the part of the people to apply these standards. At the same time, the government lacked the tools to enforce the law.

VIETATO
L'INGRESSO
AI NON ADDETTI
AI LAVORI

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# 10 Implementation Review of Critical Infrastructure Concept on the Reconstruction Process in City Center of L'Aquila

**Authors**
Riza Avriansyah Kori
Adrianto Oktavianus

**Abstract**
This research attempts to analyze the reconstruction planning process in L'Aquila city center, which was destroyed by the earthquake in 2009, and the implementation of critical infrastructure concept in that planning. This research also attempts to analyze the impact of the rebuilding that has been carrried out in relation to the concept of critical infrastructure. Data collection was carried out by interviews with several institutions responsible for the reconstruction planning process in L'Aquila and also with the major of L'Aquila. Data was also collected from internet sources, government websites and news sites, and a field study was carried out in L'Aquila. An analysis of the data shows that the reconstruction process in L'Aquila city center does not universally implement the critical infrastructure concept. The rebuilding that has been carried out has had little impact on either the city or the citizens. However, in some corners of the city where the critical infrastructure concept has been implemented a positive impact has been felt by the citizens.

*Left Page*
**Piazza Del Palazzo, L'Aquila,
with the Torre Civica
or Torre Del Municipio
in the Background**
*Photo: Riza Avriansyah Kori*

## 10.1 Critical infrastructure in L'Aquila

L'Aquila, as the capital city of the Abruzzo region and of the province of L'Aquila, has a strategic role in Italy, primarily as an administrative center for its large province and for the region. In addition, the city is also the main historical and artistic center of Abruzzo, as well as the main activity center and a center for handicrafts and agriculture in the region. So, the infrastructure of L'Aquila is highly critical in supporting the activities of the community and the government.

Critical infrastructure is an important component in urban disaster management. This is because the critical infrastructure supports the front line during response and reconstruction, in addition to their primary role of encouraging the growth of the urban economy and social development (UNESCAP 2006). The concept of critical infrastructure is really needed in the reconstruction process in L'Aquila after earthquake.

After the earthquake, the government focused on providing housing in a new area for the citizens. In spite of its importance to the city and its citizens, the reconstruction process has not worked very well for many reasons and the city center remains in a bad condition. This year, 2014, the regional arm of the Ministry of Culture in Italy plans to spend 150 million euros on 50 projects in L'Aquila to support the restoration process. Their focus is on the reconstruction of cultural historical buildings and the housing sector.

The post-earthquake reconstruction process in L'Aquila moves extremely slowly. The city government started the reconstruction planning process five years ago, after the earthquake. However, reconstruction planning only began to be implemented in the center of L'Aquila last year. As a result, most of the buildings in the city center, which are either heritage or government buildings, are still in a bad condition, turning L'Aquila city center into a "ghost city". Much of the critical infrastructure located in the city center greatly affects the life of the city, both in terms of the continuity of the government and the social life of the community.

## 10.2 The concept of critical infrastructure

Several definitions of critical infrastructure exist in the literature and in official policy documents. The European Commission defines critical infrastructures as:

"[A]n asset, system or part thereof located in member states that is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact on a member state as a result of the failure to maintain those functions." (Centre for European Policy Studies 2010)

The concept of "vital" or "critical" infrastructure was not entirely new, having appeared in some form in many of the policy debates in the 1980s. Proportionally, the Organization for Economic Co-operation and Development (OECD) provides an explanation of the concept of critical infrastructure. OECD has recently given two definitions of the term "critical" and "infrastructure". According to this definition: The term "critical" refers to infrastructure that provides an essential support for economic and social well-being, for public safety and for the functioning of key government responsibilities, such that disruption or destruction of the infrastructure would result in catastrophic and far-reaching damage. Definitions of "infrastructure" refer to physical infrastructure and often also intangible assets and/or to production or communications networks. These definitions are very broad, certainly broader than the notion of infrastructure commonly used in other fields of policy and end up including not only the tangible assets, but also the intangibles that run with them (Moteff 2004).

The White House, United State of America, in its publication, 'The National Strategy for Physical Protection of Critical Infrastructures and Key Assets' states that critical infrastructure sectors provide the foundation for our national security, governance, economic vitality and way of life. Furthermore, their continued reliability, robustness, and resiliency create a sense of confidence and form an important part of our

national identity and purpose. Critical infrastructures frame our daily lives and enable us to enjoy one of the highest overall standards of living in the world.

Table 8 shows the different sectors that are covered by national critical infrastructure plans. The table may also show some commonalities and minor differences in several sectors.

Identify and prioritize 'which of critical infrastructure assets' are necessary to know the functions of the infrastructure of a city. A case study of the city center of L'Aquila revealed that not all sectors in the above table are present in the city center. The critical infrastructure includes:

– finance (banking, securities and investment);
– transport (airports, ports, intermodal facilities, railway and mass transit networks and traffic control systems);
– government (e.g. critical services, facilities, information networks, assets and);
– public gatherings, key national sites, monuments and icons.

In determining the direction of development of a city after an earthquake, the government needs to consider the concept of critical infrastructure. The first step in applying the concept of critical infrastructure is formulated in the concept of city planning. City planning should show the layout of the critical infrastructure in the city center area. The critical infrastructure concept should apply in the city planning and in the strategies to implement it. Then, after the planning process, the implementation of the city planning should also consider the critical infrastructure concept. The concept should be applied in order to decide which priority infrastructures should be build first.

Implementation of the critical infrastructure concept is usually defined by the city development plan (master plan, city development strategies, etc.), which also determines which infrastructure or buildings are vital to a city and need to be reconstructed after disaster. This infrastructure is a major investment of public and private money. It is considered "critical" because any disruption of services or operations will have a negative impact on public order and safety (ADPC 2013).

| Nr. | Name | Australia | Canada | Netherlands | UK | US | EU |
|---|---|---|---|---|---|---|---|
| 1 | Energy | x | x | x | x | x | x |
| 2 | ICT | x | x | x | x | x | x |
| 3 | Finance | x | x | x | x | x | x |
| 4 | Health care | x | x | x | x | x | x |
| 5 | Food | x | x | x | x | x | x |
| 6 | Water | x | x | x | x | x | x |
| 7 | Transport | x | x | x | x | x | x |
| 8 | Safety | Emergency services | x | x | Emergency services | Emergency services | x |
| 9 | Government | | x | x | x | x | x |
| 10 | Chemicals | | x | x | | x | x |
| 11 | Defence industrial base | x | x | x | | x | |
| 52 | Other sectors or activities | Public gatherings, national icons | | Legal/ judicial | | Dams, commercial facilities, national monuments | Space and research facilities |

**Table 8:**
**List of Critical Infrastructure Sectorial Coverage**
*Source: Adapted from OECD 2008*

## 10.3 Current conditions and limitations in L'Aquila

The earthquake destroyed a lot of critical infrastructure in the city center of l'Aquila, such as a hospital, government buildings, banks, streets etc. This important fact is one of many reasons that obstruct the recovery of L'Aquila as a city. The lack of facilities to support the life of the city pushes the citizen to live outside the city.

Based on the results of our survey conducted in the city center of L'Aquila, the condition of the buildings and other support facilities is still very bad. Many buildings are still supported by temporary additional structures. Citizens are unable to use the majority of buildings, even though there is also some citizens who live in them illegally. The majority of buildings destroyed were housing and offices, and a lot of them were heritage buildings which carried the city's identity. Massimo Cialente,

the mayor of L'Aquila, said that the earthquake was like the destruction of the brain in a human body. The damage is vital because it destroyed the most important areas of L'Aquila and caused the city to collapse.

The long drawn out planning and regulation processes have obstructed the reconstruction of L'Aquila city center. Three years are required to carry out the reconstruction process. This is because the majority of buildings are heritage buildings (these include the government building, church, library, etc.) and are subject to specific regulations before rebuilding can be begun. These regulations are needed in order to keep the building's identity as a part of L'Aquila heritage city. In addition, funding has also played an important role in the reconstruction process problems in L'Aquila.

The condition of critical infrastructure in L'Aquila post earthquake is pretty bad. As mentioned



**Figure 63:**
**The Real Condition of City Centre (Damaged Infrastructure) 1/2**
*Photo: Riza Avriansyah Kori*

before, most of the buildings are government and heritage buildings, considered to be icons of the city. Transportation access (main road, station) is also in very bad condition and covered with debris from the buildings. Despite the slow process of reconstruction, the critical infrastructure is now visible. This is because it was made a reconstruction priority. The recovery of the main street and the reconstruction of some of the government and heritage buildings have begun to make a positive impact. The recovery of the main street has triggered the growth of the city, since the majority of buildings located there are important for the city, such as government offices, banks, hotels, market center and the central square.

## 10.4  Formulation of questions

How does rebuilding strategy cater for the needs of vital infrastructure in the reconstruction process in the city center of L'Aquila?

What impact does the implementation of the critical infrastructure rebuilding concept have on the reconstruction process in the city center of L'Aquila?

## 10.5  Reconstruction process between community needs and critical infrastructure

In the wake of the earthquake, reconstruction has focused on housing for the community, but this process is still ongoing and is running slow. The government's focus for reconstruction will switch to heritage reconstruction and housing will no longer be prioritized. Hopefully, heritage reconstruction will give life to the city as an administration, economic and social center. In addition, the prioritization of heritage reconstruction will impact community housing reconstruction, which is currently restrained.

The rebuilding of critical infrastructure in the city center is still in question, because little progress has
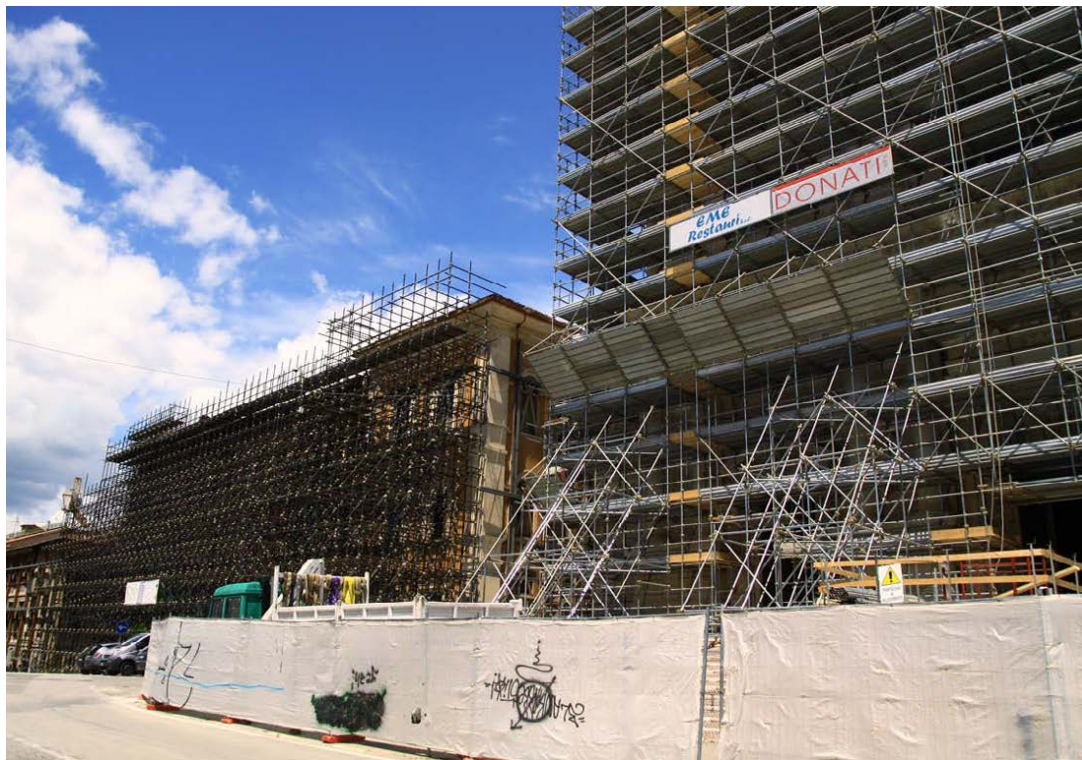


**Figure 64:**
**The Real Condition of City Centre (Damaged Infrastructure) 2/2**
*Photo: Riza Avriansyah Kori*

133

been made in the city planning and reconstruction processes in L'Aquila. Up until now, reconstruction does take place but there is still no information available regarding to what extent critical infrastructure is prioritized. This paper will be limited to the reconstruction process in the city center of L'Aquila.

## 10.6 Evaluation of the concept of critical infrastructure in the reconstruction process in the city center of L'Aquila

This chapter discusses how true the reconstruction process in the city center of L'Aquila is to the concept of critical infrastructure. The evaluation is divided into three parts that represent the running of the reconstruction process and implementation of the concept. These are: (a) strategies in the reconstruction plan, (b) priority given to the list of important infrastructure that should built, and (c) implementation of the reconstruction plan.

**a) Strategies in the reconstruction**
The first step of the government was to close the city center of L'Aquila, designating that area a red zone. The purpose of a red zone is to keep the citizens safe and to preserve the condition of the buildings in the city and prevent them from getting more damaged. At the same time, the government and the university started working on a city plan.

The aim of this plan was to design land use, building layout and strategies for reconstruction. It was also important for understanding the characteristics and functions of the city through a consideration of the essential building needs and the needs of society.

In this planning process, which began the same year as the earthquake, consideration was given to the important buildings in the center of the city, which is also the center of government, heritage and community in the L'Aquila region. This consideration can be seen in the town planning of the reconstruction process in which the government focuses on reconstructing critical infrastructure such as heritage buildings, government buildings, housing, and the main square.

With regard to critical infrastructure, reconstruction planning in L'Aquila has taken into account several important factors, including the location of buildings and the critical infrastructure needs of residents in terms of housing and daily activities.

In implementing the reconstruction process in the city center, government strategy included opening the main road, an important means of access to the city center. The gradual opening of the red zone was also deemed important in the early stages of the reconstruction process. Later, the strategy was to begin the reconstruction process in the central area of the city center, this being the center of activity.

Reconstruction of the central area of the city center is a way of restoring the lives and activities of people in the city municipality. This strategy considers the mobility of the citizens which in turn is expected to speed up the reconstruction process through the restoration of the social lives of the citizens.

Moreover, the government formulated the concept of "smart city" in the reconstruction process, with the aim of making the city of L'Aquila 'working better'. The concept was given the names: "Abruzzo in 2030: On the Wings of the Eagle", or "How to build a stronger region after a natural disaster".

All these strategies within the reconstruction process show how the government has given priority to the concept of critical infrastructure. It understood that the city's main street and critical infrastructure is vital to the restoration of life and society in L'Aquila.

**b) Finding priorities**
In order to start the reconstruction process, the city government of L'Aquila had to select some buildings to be given priority (see Map 8). The majority of buildings chosen were religious buildings (churches) and heritage buildings. Both religious and heritage buildings are very important factors in the city's identity. Government offices and public service buildings are also priorities in the first stages of reconstruction implementation in the city center of L'Aquila.

Housing and educational buildings are also very important in the reconstruction process in the city center. The fact that the government has not fulfilled the housing needs of the citizens who lost their homes makes housing particularly important. The development of 19 "new towns" outside L'Aquila city center is not sufficient to accommodate all citizens. Only 20% of houses in the city can be used. Based on these facts, the government decided to make housing a priority in the reconstruction process. In the case of housing, the application of the reconstruction process is quite different than for other buildings. This is because the government is not completely responsible for reconstruction costs. They award a subsidy to the citizens to help them rebuild their houses.

From a critical infrastructure aspect, the L'Aquila government's decision to determine a scale of priority for buildings is not completely appropriate. Five categories of building were given priority in reconstruction planning: religious buildings, heritage buildings, housing, government offices, and schools (educational). The concept of critical infrastructure does not include educational and religious buildings. The decision to make religious buildings a priority was made because they form part of the city's identity. There was also encouragement from other stakeholders (outsiders) to rebuild the religious buildings first, not only for the identity of L'Aquila but also for that of Italy as a center of catholicism.

| Strategic guidelines | Direct write-off capital construction projects | Direct write-off construction projects fractions | Excerpt strategic projects |
|---|---|---|---|
| General report<br><br>general tables :<br>• Boundaries of the historic centers of L'Aquila - the capital and fractions former DCR n. 3/2010<br>• Landscape heritage and the natural heritage<br>• Regional Plan for the Landscape<br>• Master Plan Flood Defense (PSDA) and Piano excerpt of the basin for the hydro geological<br>• General Plan (general format)<br>• General Plan - Old Town of the capital (general format)<br>• Structure Plan<br>• Urban Mobility Plan adopted in 2009<br>• municipal civil protection and emergency (Table 1)<br>• municipal civil protection and emergency (Table 2)<br>• The relocation of the population after the earthquake: CASE Project and MAP<br>• The municipal school system<br>• Identification of interventions and stakeholders<br>• Strategic projects<br>• The mobility in the historical center<br>• Progress of funding<br>• Charter of the macro seismic intensity<br>• Identification of interventions and stakeholders<br>• Identification of interventions and stakeholders<br>• Identification of interventions and stakeholders | Report excerpt direct capital construction projects<br><br>attachments:<br>devices direct coordination of construction projects<br><br>• requirements for interventions in the historic centers of the fractions<br>• prescriptions for the coordination and management of the safety and legality yards<br>• prescription SBAP capital town centers<br>• materials and colors<br>• prescription logistics<br>• outcomes verify proposed framework to the eagle<br><br>boards :<br>• perimeters and areas<br>• regular general plan<br>• cultural heritage and landscape<br>• Micro zonation map of the investigation<br>• micro zoning geological map<br>• micro zoning level 1<br>• micro zoning level 3<br>• collapse and demolition<br>• safety measures | Direct write-off relationship building interventions fraction<br><br>attachments:<br>devices to coordinate action<br><br>• requirements for interventions in centers<br>• prescriptions for the coordination and management<br><br>list tables (for each village):<br>1. photo area with perimeter DCR<br>2. general plan<br>3. goods and cultural information landscaped spaces<br>4. paper of the investigation<br>5. geological map<br>6. cart micro zones homogeneous perspective of seismic<br>7. paper of seismic micro-zoning<br>8. collapse and demolition<br>9. safety measures in buildings and subsequent analysis of fixtures<br>10. monitoring definitive contributions<br>11. construction aggregates<br>12. types of private interventions<br>13. hypothesis of sub-areas of intervention | Related strategic projects<br>cards strategic projects |

Table 9:
Strategy of Reconstruction
Process in L'Aquila
*Source: Authors*

The government's decision to give educational buildings (university, schools) priority was made because L'Aquila is also famous for its education system, especially its university. Large numbers of people from outside come to L'Aquila for study purposes, and the city has an important role as an educational center in the region. Since education has a big impact on the city, its buildings were given priority.

Religious, educational and housing buildings were given a special place in the reconstruction planning of the city center of L'Aquila. This was based on the government's considerations regarding the needs of the city. The selection of these three sectors (housing, religious, school) as priorities shows that the government of L'Aquila did not refer only to the principle or concept of critical infrastructure for rebuilding the city. Other needs of the citizens also influenced their decisions.

**c) Implementation of reconstruction planning**
After the selection of priorities came the implementation process. Because of financial constraints not all buildings with priority could be rebuilt immediately.
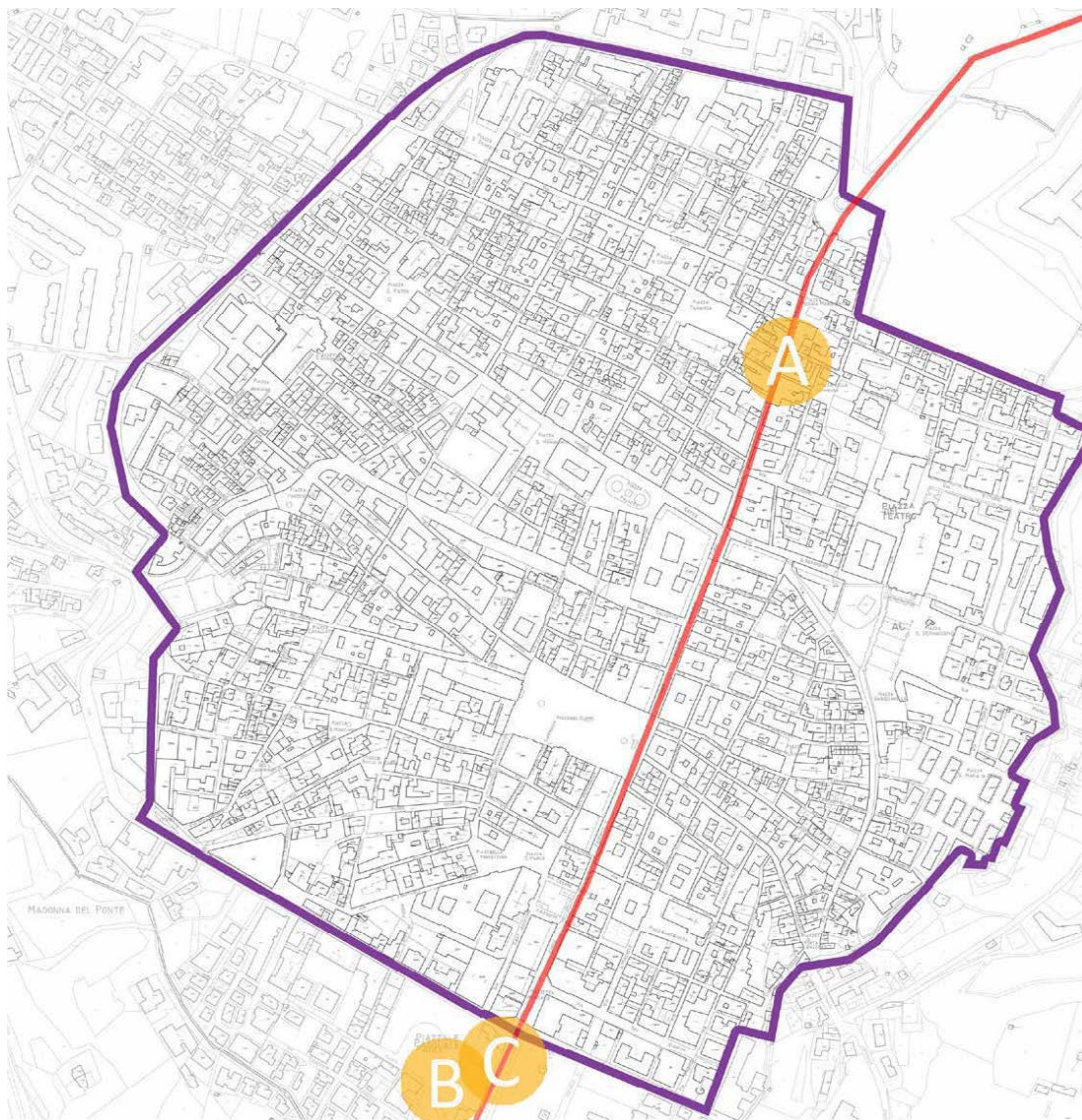
Main Street ▬

**Map 9:**
**Reopening of the**
**Main Street in the First**
**Reconstruction Phase**
*Source: Authors*

So the government had to take into consideration several aspects, such as funding, citizens' needs and political will. The reconstruction of a building could go ahead depending on the priority given to each of these three aspects, with consideration also for the technical aspect.

The reconstruction of government buildings can be carried out with money from central government. However, central government cannot provide full funding for religious buildings. Local government, central government, and the Vatican provide funding for the reconstruction of religious buildings (churches). The reconstruction of church buildings was deemed important because of the country's identity as a world religious center and also for the identity of the city. The reconstruction of several historic buildings received financial support from a number of foreign countries and the private sector. Among them were a theatre and a bank. The rebuilding was funded by private investors interested in the functioning of the buildings because of their relationship to work. For example, one foreign private sector contributor provided funds to rebuild a bank because of the bank's links with his country.

From a critical infrastructure aspect, the implementation of the reconstruction process by the government of L'Aquila is not entirely appropriate. Although the government set priorities for the implementation of rebuilding, not only factors that limit funding will determine which buildings are rebuilt. Political will and the interests of private parties providing finance become an important factor in decision making in the implementation process.

## 10.7 Conclusion

Based on these three factors (reconstruction strategy, priority definition and the implementation of reconstruction planning), L'Aquila city has so far not implemented the concept of critical infrastructure in their reconstruction process. The majority of buildings are still in the reconstruction process and in a very bad condition. This is because of the long time taken in reconstruction planning and the fact that reconstruction only began in 2013. As a result, the reconstruction process is still ongoing. It is therefore clear that very little impact has been made. Most of the city center of L'Aquila still looks empty and there is very little activity. The reconstruction that has been carried out (for the most part on historical buildings and churches) has had no significant impact on the life of the city.

There are, however, some corners of the city where the implementation of the concept of critical infrastructure is making a positive impact. Making the main street and the government offices a priority in the reconstruction plan has stimulated growth. Lack of access to the city was an obstacle to the city's recovery and the reopening of the main street provided citizens with valuable access that had long been denied. One of the positive consequences was the reopening of a store in the main street by its owner. The renewed access is likely to trigger other activities in the area and could become the first step in recovering the city center of L'Aquila. This recovery process shows the direct impact of critical infrastructure concept implementation in reconstruction planning in L'Aquila.

*Right Page*
**Reconstruction Work at the Church of Santa Maria Del Suffragio or Delle Anime Sante at the Piazza Duomo or Piazza Del Mercato, L'Aquila**
*Photo: Riza Avriansyah Kori*

**Part IV: Population in Action**

# 11 Reactive Citizenry: Citizen Action and Ineffective Participation in the Regeneration Process of the Post-Earthquake L'Aquila

**Author**
Carlos Felipe Gonzalez Gonzalez

**Abstract**
Decisions, outcomes and scandals surrounding the post-disaster management of the L'Aquila earthquake of April 2009 triggered social unrest and an associative "revolution". The momentum created among diverse tiers of society forged a sense of unity and pushed them on to the streets to demand a transparent, inclusive and integrative reconstruction process. This research report exposes the state of peoples´ participation at the current stage of the reconstruction process, the challenges, achievements and roadblocks that civil organizations and individuals face when attempting to contribute to the regeneration process in the L'Aquila region. It concludes with potential opportunities for articulation with the reconstruction plan for the affected area.

*Last Pages*
**MAP in Wooden
Construction in Camarda**
*Photo: Jesús Salcedo Villanueva*

*Left Page*
**Children´s Playground in
MAP Pescomaggiore**
*Photo: Jesús Salcedo Villanueva*

## 11.1  Introduction

As the reconstruction process in the city center of L'Aquila enters its second year of effective- operative phase, advances in the physical dimension are visible. Several working sites inside the old center evince that the former state of stagnation in the reconstruction plan is no longer the status quo. Both citizens and officials acknowledge the progress.

Nevertheless, improvements in the physical infrastructures are just one side of the challenge the city is currently facing, where high degrees of uncertainty or even a lack of interest by both citizens and officials surround the process of social reconstruction. The strategy for recovering the social fabric currently relies on what physical improvement might bring, thus social reconstruction is a "mere" spillover of the physical reconstruction.

Several associations (Table 10) inside the affected area have been working non-stop since the early stages of the emergency to contribute – to some extent- and create awareness not only of the need to replace stones and bring back the old town, but also of the importance of restoring the social tissue, the places for encounter, culture, thoughts, dreams, everyday life. These efforts are at best parallel to or else clash with the official reconstruction plan. In this paper the author analyzes the work, role and potential contribution in the social/physical reconstruction process of a handful of civil organizations, collectives and individuals located in the L´Aquila region.

## 11.2  Spaces in crisis

Through a review of relevant literature, press reports and audiovisual material it was possible to identify the existence of community action and its contribution to the urban regeneration process. Initiatives such as: Vivamo L'Aquila; Colletivo 99; Comitato Civico per un Manifesto per L'Aquila; the C.A.S.E residents' committee from Bazzano; or Il Comitato 3e32 are just a few examples of the need, will and determination of a portion of L'Aquila's population to be protagonists in the long recovery process and establishment of collective priorities. As one L'Aquila

citizen stated when complaining about the disconnection of the new settlements from the old city center: "Life is not only having a house or a roof over your head."

The gap between citizens and institutions and the crisis that traditional means of participation are facing in terms of effectiveness, transparency and power sharing are exposed. So alternative means for allowing citizens to manifest their very real needs, expectations and fears must be established (Banzato et al. 2010). In this regard, a number of research programs - and other, spontaneous, initiatives – to study alternative tools (e-tools) for broadening the scope and ease of the process of citizen participation during and after disaster scenarios are being developed. Such e-tools as mobile apps or online platforms for information sharing are not a comprehensive answer to the roadblocks the inclusionary processes might encounter. However, the development of alternative mechanisms shows that the existing channels of communication - cornerstones of participation - inside institutional bodies are *offline*.

Assessments of the current legislation and infrastructure for participation in specific contexts of heritage value show that mechanisms such as *Consorzios* (Vivola 2012), failed to effectively boost citizen input, while empowering private contractors/interests. They ended up being the "key" articulators and negotiators of the reconstruction processes inside the city center, giving a particular emphasis to the physical/material upgrading of the affected area and thus neglecting the social dimension of the challenge. In the face of this complex situation of social stagnation and prioritization of physical betterment there seems to be no other way for the citizenry but to (re)organize, exploit existing resources and act, instead of waiting for official – top-down - responses.

"Like every Sunday, Sunday 18th April 2010 was no exception: the People of the Wheelbarrows organized a "scarriolata"[1]  in the red zone. As usual, a few days before they created the event

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1    *Scarriolata* is an Italian neologism used by the group's activists, with the idiomatic meaning of "to go down to the square with a wheelbarrow" (Farinosi and Treré 2011).

| CVO | Mode of Association | Dates of Efficiency | Objective(s) | Main Activities |
|---|---|---|---|---|
| **Collettivo 99** http://www.collettivo99. org | Spontaneously gathered group of under-40 architects, urban planners and engineers | 2009 to date | Sharing an idea for the future of L'Aquila | Elaboration of guidelines, master plan, pilot projects |
| **3e32** http://www.3e32.com | Group of Young professionals, social entrepreneurs and political activists. | April 2009 to date | Sharing collective awareness and ideas for an equitable reconstruction, creating social cohesion | Organization of regular public assemblies, demonstrations and cultural events |
| **Cittadini x cittadini** http://www. cittadinixcittadini. blogspot.it | Citizens association | April 2009 to January 2010 | Social civil and cultural solidarity, information and safeguarding of all citizens affected by earthquake, participated and transparent reconstruction | Organization of public assemblies, working tables |
| **Ricostruire insieme** http://www. ricostruireinsieme. blogspot.it | Group of several laic and religious associations | April 2009 to 2012 | Providing special attention to social reconstruction, sharing experiences, providing human and administrative-legal assistance | Organization of public encounters |
| **Comitato Osservatorio Nordovest** http://www. osservatorionordovest.org | Civic committee | April 2009 to date | Providing citizens with transparent information, defending collective goods and interests, influencing choices for the future of the city | Publication of authoritative opinions and debates over specific matters |
| **Stage Spazio Pubblico** http://stage. spaziopubblico.it/wiki/ Rete-AQ | Wiki administrators | 2009 to date | Providing a platform for sharing experiences, sharing information | Publication of data and useful information, links to relevant websites, review of the papers |
| **Un manifesto per L'Aquila** http://www. unmanifestoperlaquila.it | Group of several professionals of L'Aquila | April 2009 to date | Drafting a Manifesto for L'Aquila | Publication of letters, acts of seminars or symposiums, authoritative opinions |
| **La cittá che vorremmo** http://www. laquilachevorremmo. blogspot.it | Parco Nazionale del Gran Sasso e Monti della Laga | June 2009 | Collecting the ideas of a group of high school students for the city | Publication of students inputs on addressed subjects |
| **L'Aquila eMOTION** http://www. laquilaemotion.it | Heterogeneous group of citizens from L'Aquila | April 2009 to date | Sharing ideas and reflection on L'Aquila and on topical interests, sharing useful information and updates | Publication of written documents, review of papers, videos, images, organization of events |
| **Laboratorio Città L'Aquila** http://www. laboratoriocittalaquila.it | University of L'Aquila – Human Faculties | 2009 to September 2001 | Creating participative occasions for social cohesion and learning processes, analyzing community needs and perspectives, designing community projects for the city | Organization of participative working tables and assemblies |
| **EVA Project** http://www. pescomaggiore.org/ progetto-eva | Local/Social entrepreneurs and activists from Pescomaggiore | 2009 to date | Community life and sustainable livelihood | Auto-construction, design/ construction workshops, knowledge sharing, open source architecture, open-doors infrastructure, international network of ecovillages |
| **Viviamo L'Aquila** http://viviamolaq. blogspot.de | Young professionals and students from L'Aquila University | 2012 to date | Auto-construction as means of creating social interaction/reconstruction within communities affected by the earthquake | Auto-construction, material up-cycling, collaborative design workshops, video documentation and media exposure |
| **Architect Laura Vivola *** *Individual included for the relevance of her area based research on participation* | PHD Researcher on infrastructures for participation in the context of the L'Aquila earthquake | | Assessment and recommendations for the improvement of the current infrastructures of participation in the context of reconstruction for historical centers | Improvement of official web platforms to open the participatory scope to civil input |

**Table 10:**
**Shortlist of CVO´s Engaged in Communicative Platforms and Participatory Processes in the Post-Disaster Scenario**
*Source: Adapted from Laura Vivola*

145

page on Facebook and invited all the members of the group to join with their own wheelbarrows. In order to remove the debris from Piazzetta IX Martiri and Piazzetta del Sol, the gathering was arranged at 10:00 a.m. in Piazza Duomo. They went there in a small rally and started to shovel and remove the rubble in the two squares. There was a real team work, where each citizen gave his/her contribution: they made a human chain, passing pails from hand to hand to remove the debris". (Farinosi and Treré 2011)

## 11.3  Communication breakdown

Civil initiatives contributing to the regeneration process exist in L'Aquila. The context is still amenable to such actions being taken into account not only in the context of physical reconstruction but also in its overall social dimension. As a response to the current top-down approach, these civil associations (CVOs) established clear agendas (Table 11) on how the process of inclusive reconstruction should be carried out and what kind of approach in governance strategy could lead to a multilevel and collaborative regeneration process. However, both CVOs and individuals are facing challenges within the current context due to: a) Lack of political will to include grassroots initiatives in the reconstruction plans; b) Lack of clear channels for communication and information sharing with local authorities; c) The need to focus on the improvement of the physical environment.

To what extend is it possible to articulate the existing regeneration initiatives and network of community-based organizations with the reconstruction plan for L'Aquila?

The hypothesis is that with the existing legal structure and mechanisms for participation in the context of reconstruction for historical centers, articulating bottom-up initiatives with the physical reestablishment of the city of L'Aquila is not feasible due to: a) Strict regulatory parameters for intervening in heritage settings; b) The conservative approach of the reconstruction plan; c) The advanced stage of the operative phase for which the local authorities did not foresee the need for greater citizen input, and d) Economic scarcity.

However, the inclusion of grassroots undertakings is both necessary and achievable in the social dimension of the reconstruction process, where legal frameworks allow citizens to easily organize, register and take action in cultural, social and political matters. The major challenge for the CVOs at this stage of the reconstruction process is to push local authorities towards the creation of a specific and collective agenda for social reconstruction, triggering an integrative approach in the process with clear responsibilities and tasks on both sides. A continuous flow of communication with the institutions behind the reconstruction process is required, as well as the assurance of an independent budget for the execution of bottom-up rather than parallel initiatives to be included in the general plan for the physical/social restoration of the city fabric. This would result in the decentralization of the reconstruction process, boost social interaction outside official spheres and open up the pathway to regeneration.

## 11.4  Reconstruction process vs. regeneration process

"…they [the citizens] say there were two earthquakes, the one that struck in the early morning of April 9th and the social earthquake that came after and boosted the associative capacity".[2]

| CVO / Promoter | Bids / Agenda |
|---|---|
| VivamoLaq | (1) Self organization and self-management of economical and human resources; (2) Auto-construction as means of creating social interaction/reconstruction within communities affected by the earthquake. |
| 3e32 / CaseMatte | (1) Culture, occupation and activism as means of awareness rising over the exclusionary and non-transparent process of reconstruction; (2) demand for effective citizens' input in decision-making levels. |
| EVA Project | Community life and sustainable livelihood. |
| Arch. Laura Vivola | (1) Assessment and recommendations for the improvement of the current infrastructures of participation in the context of reconstruction for historical centers; (2) institutional web platforms as mechanisms for multilevel data collection, information and good practices sharing. |

**Table 11:**
**Main Agenda of the CVOs Taking Part in the Study Case**
*Source: Author*

2    from an interview with a resident of L'Aquila

This singular associative "revolution" might seem an act of open democracy and voluntary/direct participation where people use existing mechanisms to take part, contribute and actively engage in decision-making for matters that concern collective interests (Nabatchi 2012), but it was not the case. Without neglecting the existing regulations that allowed and helped citizens to easily organize and act, this new wave of civil associations was nothing but a reactive response to the top-down approach in the post-disaster (after the emergency and rescue phase) response of the Italian government (OECD 2012), acknowledged as such in press reports[3]. It brought to attention the low level of civil involvement in the process of decision-making and execution.

The exclusion of citizens from the process led to a shadowy reconstruction plan plagued by controversies over corruption, misuse of funds and poor construction standards, as in the case of the flagship C.A.S.E housing project. This situation, combined with peoples' frustration over the slow and non-inclusive reconstruction process, led to the birth of several collective actions (Figure 65) and associations to reclaim the peoples' right to participation in the physical and, more importantly, the social reconstruction of L'Aquila.

In the official discourse, technicians, local authorities and even in popular argot it is common to refer to the restoration of the city center and the overall affected area as "reconstruction", which generally implies only the physical dimension of the process

(Figure 66). The improvement of infrastructures also affects the social dimension, either positively or negatively. To refer to this process as merely reconstructive is to neglect the opportunity for the social dimension to be considered equally in the local reconstruction agenda.

In this sense, referring to this process as a "regeneration"[4], that comprises diverse dimensions of the challenge and, transversally, involves the public, private, community and voluntary sector (Roberts & Syk 2000), would allow citizens, technicians and local authorities – in the best case scenario - to start giving relevance to the restitution of the social fabric with the same "enthusiasm" and resources as are invested in the physical infrastructures, or at least to encourage a shift in the discourse and public opinion. As architect Laura Vivola points out: "At this stage people are more concerned about timing and the advancement of the physical reconstruction of their own properties than with losses in terms of the social dimension and social fabric. If you [as a citizen] had to ask something [of the officials] you would ask about advances in the physical aspects rather than the social aspects." (Vivola 2014)

With regard to the difficulties involved in balancing physical recovery and social recovery, Ms Vivola stresses that existing and traditional participatory mechanisms such as *Consorzios*[5], do not facilitate

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3  L'Aquila, cittadini prigionieri delle "C.A.S.E" di Berlusconi", Il Fatto Quottidiano, 2011.

4  Comprehensive and integrated vision and action which leads to the resolution of urban problems and which seeks to bring about a lasting improvement in the economic, physical, social and environmental condition of an area that has been subject to change (Roberts and Syk 2000)

5  Ordinances n.3881, n.3820 and n.3832: Interventions within the historic perimeter have to be compulsorily presented by "aggregates"; for each aggregate, owners should group up to form consorzios [consortiums]

**Figure 65:**
**Rally of the "Il popolo delle cariole" Movement**
*Photo: Comitato 3e32*

**Figure 66:**
**Heavy Works in the Historic Center**
*Photo: Jesús Salcedo Villanueva*

Figure 67:
Parcobaleno Project
of ViviamoLaq;
Autoconstruction,
Community Participation
and Material Up-cycling
*Photo: Jesús Salcedo Villanueva*

nor prioritize civil input in practice, rather acting as an opportunity for private contractors to take command of the reconstruction process, that from a corporate perspective is mainly a business/profit opportunity.

This participatory mechanism for historical centers merges a simple functioning assembly structure with a complex process of negotiation/coordination among contractors-owners and owners-owners process that can hardly be carried out by regular citizens with no technical or legal experience, and no assistance provided by the authorities during the process (Vivola 2012). In this scenario the door is open to private contractors (engineers, architects or lawyers) to take over the lead in the "participatory" process as articulators, coordinators and, of course, executors, due to their interests, resources, background and mind set on the potential economic benefits that the construction projects represents.

On the one hand, this approach has the advantage of making the reconstruction process faster in operative terms. On the other hand, it perpetuates a hierarchical/traditional structure where contractors end up being the cornerstones, the final decision-

who are supposed to take assembly decisions for each aggregate as a whole. (Vivola 2012)

makers and information filters of a mechanism that is meant to include everyday citizens in the process of physical reconstruction.

The previous situation of "participatory illusion", which should not be a problem in non-historical contexts, actually is. To give an example of how the prevalence of private interest and the basic lack of will of municipalities and private companies to include alternative mechanisms and citizens' practices in the reconstruction process, we can briefly refer to the M.A.P project in Pescomaggiore. Directly facing the site of this project was another housing project called E.V.A. whose promoters/activists urged the M.A.P contractors to include some of E.V.A's low-tech assets (e.g. waste water bio filter, rainwater harvesting) in their new temporary housing units, with the aim of tuning into the new vision of the town as an eco-sustainable and touristic spot for the region (D'Alessandro 2014). The initiative found itself up against a rigid and profit-based format of reconstruction and the request was denied. In the same dynamic, other demands also encounter similar roadblocks (Table 12).

The above list portrays a complex scenario and eliminates economic scarcity as the main argument for disregarding public input, thus modifying pre-existing agendas. Instead, a lack of political,

institutional and corporate will is what creates the highest barrier to an inclusive and transversal reconstruction process. On the political side, when the head of the local government of L'Aquila city (Cialente 2014) was asked why he thought that efforts and initiatives to contribute to the regeneration process by the population/civil associations were mostly parallel to the official reconstruction plan or clashing with it, his response revealed a paternalistic approach. Mayor Cialente argued that this associative wave was part of the normal cycle of dealing with the consequences of the tragedy, an expression of various emotions, such as the need for protection, rage and anger, guilt and. depression), an interpretation that effectively devalued the people's demands and their potential contribution to a social and physical regeneration.

As acknowledged by sections of the scientific community, although important psychological distress has been reported by the population, a capacity for resilience can also be observed (Stratta et al. 2012). Thus, in spite of the complex emotional shock combined with a patronizing government, alternative mechanisms (Table 13) have been implemented by these CVO's to readjust to the circumstances (Figure 67).

From the institutional/technical side, when asked how the participatory process and demands/input from the population are currently articulated with the official reconstruction plan, officials from the technical offices for reconstruction (USRC – USRA) systematically argued that the participation stage is now over and the operative phase is underway

| CVO / Promoter | Demands |
|---|---|
| VivamoLaq | Improvement of the physical condition of public/communitarian spaces in M.A.P projects. |
| 3e32 / CaseMatte | (1) Steady funds for reconstruction; inclusion of local labor on the reconstruction process; (2) Citizen participation in decision concerning the collective interests of the L'Aquila population; (3) modification of the institutional framework for disaster response; (4) safeguard of public owned assets in city center. |
| EVA Project | Possibility of inclusion of eco-infrastructures/technologies in the reconstruction process. |
| Arch. Laura Vivola | Open access to disaster records and integration of databases in Italy to allow better understanding thus improving reaction in future catastrophes based on past experiences. |

| CVO / Promoter | Mechanisms to Boost Participation and Public Input |
|---|---|
| VivamoLaq | Auto-construction, material up-cycling, collaborative design workshops, video documentation and media exposure. |
| 3e32 / CaseMatte | Public space occupation, popular assemblies, demonstrations, systematic cultural programming. |
| EVA Project | Auto-construction, design/construction workshops, knowledge sharing, open source architecture, open-doors infrastructure, international network of ecovillages. |
| Arch. Laura Vivola | Assessment and future Improvement of official web platforms to open the participatory scope to civil input and not only private sector and governmental institutions. |

| CVO / Promoter | Challenges / Weaknesses |
|---|---|
| VivamoLaq | (1) Due to the background and work environment of the members in the organization, it is evident the reliance on academic contexts and approach, leading to an operative phase with strong community labor/participation, whereas the previous conception phase is steered from the base of a technical/architectural discourse, establishing a clear division between the professional vs the citizen; (2) lack of steady financial support (challenge faced by most of the organizations). |
| 3e32 / CaseMatte | The current state of frustration produced by the blockage of the Law by populare initiative in National Parliament and legal battles over the land where CaseMatte is located leads to a current organization stress and stagnation, not allowing the creation of a clear long term strategy for pursuing the battle over the institutional reforms required for the better management of post-disaster recovery. |
| EVA Project | In spite of the advanced stage of the physical infrastructures and social project for Pescomaggiore implicit in the E.V.A community, the organization acts as an isolated island within the L'Aquila region, embracing openly the international/foreign input, leading to a passive attitude towards the potential contribution that the project could bring in terms of the social experiment and alternative pathways to a sustainable reconstruction in the overall regeneration process of the region stroke by the earthquake. |
| Arch. Laura Vivola | Due to the background, work environment and experience of the architect, the discourse has a deep technical/official approach, devaluating the demands and critics in important aspects and decisions of the reconstruction (e.g. C.A.S.E project) with the argument of prominent technical achievements. |

**Table 12:**
**Demands of the CVOs Taking Part in the Study Case**
*Source: Author*

**Table 13:**
**Mechanisms of the CVOs and Individuals Taking Part in the Study Case**
*Source: Author*

**Table 14:**
**Identified Weaknesses of the CVOs Taking Part in the Study Case**
*Source: Author*

(from top to bottom and left to right)

(Agnelli 2014; Biondi 2014). This inflexible point of view undermines any possibility of achieving a continuous and integrative approach towards regeneration, dividing the process and establishing unique phases where citizens can, or cannot, contribute. This climate of institutional apathy deepens the current mood of stagnation in the civil society and in the sphere of the CVOs where already a deep sense of frustration is mixed with their occasionally conflictive principles, posing major challenges (Table 14) in the unclear panorama for integrative reconstruction and exposing their weaknesses.

The consequence of these approaches is that social unrest and public mobilization maintain an active presence in the life of the city as a parallel reality. The fight for social and symbolic spaces and the acts of resistance, occupation and mobilization (Figure 68) appear as means of awareness building and as mechanisms to ensure that it never be forgotten that the restitution of the social fabric needs to be part of

the official agenda for reconstruction. A significant group of civil organizations has managed to achieve a degree of recognition in that direction, reaching tangible goals (Table 15) in terms of higher levels of organization, the safeguarding of public space assets and the upgrading of physical spaces for social interaction.

So, tangible achievements on diverse scales have been accomplished by the CVOs (Figure 67). However, as previously shown, these organizations face a complex panorama of challenges in terms of how appropriate the articulation of their initiatives/actions is to the physical reconstruction process in the region. Once again, the physical dimension might not be the strongest asset these CVOs possess. Nevertheless, as a much-needed integral and inclusive regeneration process gets underway, with social restoration as the key, they do have clear opportunities for making an impact if a "punch" of tactics is included in their future

| CVO / Promoter | Achievment(s) |
|---|---|
| VivamoLaq | (1) Auto-construction and improvement of green vacant areas of M.A.P project in the L'Aquila region (Parcobaleno); (2) video documentation and media exposure - National/International- of the process of participatory architecture in a postdisaster context. |
| 3e32 / CaseMatte | (1) Place of birth of the Carriola movement; (2) safe guard -by occupation and legal means- of the former mental institution of L'Aquila now serving as an open public space and cultural venue in the city center; (3) active participants of the movement for the creation of the "legge di iniziativa popolare per la riconstuzione dell'Aquila" (Law by popular initiative for the reconstruction of L'Aquila);(4) Systematic cultural programming/activities in the old city center. (5) Hub for local meetings and citizens" assemblies. |
| EVA Project | (1) Fully developed strategy for eco-tourism in the city of Pescomaggiore based on the urgent need for reactivation of the city life; (2) implementation of ecotechnologies (wastewater biofilter; straw/earth based architecture; (3) rain water harvesting) for -emergency/ temporary housing and infrastructure; (4) National and international "marketing" strategy for bottom up development to gain visibility of the region as an alternative to the traditional top-down approach. |
| Arch. Laura Vivola | (1) Academic research on new infrastructures for effective citizen participation trough web-based and multi level information platforms. |

| CVO / Promoter | Oportunities for Articulation |
|---|---|
| VivamoLaq | Factors such as academic environment and support, technical approach, media exposure, link with communities of the area affected and systematic work in the upgrading of public/communitarian infrastructures in sites previously intervened by national/local authorities, would allow the organization -or members of the organization- to merge with the technical approach of the reconstruction plan. As exposed by the organization, contacts with the local authorities were recently established to open the possibility for new small-scaled interventions on the remaining M.A.P compounds and a possible contribution in the production of the future plans for the conversion of the housing infrastructures once the families move back to their place of origins. |
| 3e32 / CaseMatte | The reach/size of the organization with its broad audience within the local scene and its critical approach enriches and puts citizens in the frontline of the discussion over the strategies for an integrative and inclusive reconstruction process. The shifting -yet challenging- point for this initiative to acquire long lasting impact in the local context -could- rely on the political strategy to gain voice in decision-making levels whether by non co-opting alliances with local leaderships or placing members/supporters trough traditional means of participation (voting) in the local assembly, by political "acupuncture tactics" increasing the chances of structural changes for the reconstruction approach. |
| EVA Project | The technical achievements are suitable to be reproduced in several contexts of the affected region whether in future infrastructures or existing ones. The inclusion of these initiatives radically depend on the marketing strategy to promote the low-tech and low-impact technologies and its benefits -economic, environmental but mostly social. Social benefits in the sense that such technologies can be used as mechanisms for promoting interaction between residents of selected areas (e.g. maintenance of biofilter/garden does not need high skilled labor, therefore can be executed by community members of diverse ranges of age, creating a collective and systematic social activity). |
| Arch. Laura Vivola | The technical background and several years of experience in diverse stages of the reconstruction process (e.g. CASE project/Civil protection department; Office for the reconstruction of L'Aquila), allow the architect to asses and develop the work towards improvement of the web-based participatory platforms inside the institutions that have control over the flow and management of information. Privileged access to databases and closeness to decision-making and operative levels give an advantage in terms of the process of assessment of the existing platforms of information, its potential upgrading and opening to multilevel input – including individuals-. Currently, such platforms only allow officials, technicians and contractors to upload information of the reconstruction process. |

initiatives (Table 16). These organizations and individuals manage to establish clear social - yet operative - agendas and are current, active and relentless contributors to the social regeneration process despite the institutionally muddled context and the ubiquitous sense of frustration with national and local authorities.

The set of opportunities for articulation with the reconstruction process (Table 16) is a direct result of the achievements (Table 15) these have CVOs accomplished. Moreover, these tangible achievements and opportunities are the strongest argument for demanding that attention be paid to alternative dynamics of urban regeneration and the mechanisms (Table 13) used to execute them. A wise move by local authorities has been allowing these initiatives to impregnate the "reconstruction" process. Political will and strong local organizations are the factors that allow the establishment of the clear collective cause and the return of trust in times of crisis (Hamdi 2014).

**Table 15:**
**Achievements of the CVOs**
**Taking Part in the Study Case**
*Source: Author*

**Table 16:**
**Identified Opportunities**
**of the CVOs Taking Part**
**in the Study Case**
*Source: Author*

## 11.5 Challenges lying ahead

In the light of this discussion, it is possible to conclude that what happened on the larger scale cast a shadow over the smaller scale. The sidelining of the local government of L'Aquila by the national government during the post-disaster response (see Chapter 2) was repeated throughout the story: decisions that concerned and affected local levels were mostly made unilaterally - even arbitrarily- at national level. Later, when the national government withdrew and decision-making was back in local hands, the L'Aquilan authorities undervalued civil input.

The consequence of the above chain of events was a narrowed approach by the authorities, defining the reconstruction process as "physical betterment". Actions taken to address the remaining dimensions of the urban regeneration process were spillovers from the goal of physical reestablishment. This is manifest in the mainstream discourse where the buzzword was riconstruzione (reconstruction), a term that needs to open the door to an inclusive and transversal vision/ notion: regeneration. This wider concept will help all dimensions, actors and, hopefully, interests to be embraced equally in the challenges ahead.

What other challenges lie ahead? Although, a legal framework for participation and community involvement exists, the concept of participation itself is seen by officials and technicians as a procedure with a specific timeframe within the process of formulation and execution. Thus, the major tasks for the institutional and planning bodies are not only the assessment and improvement of legal frameworks, mechanisms and infrastructures for participation, but, above all, the provision of assurances that the professionals selected to enforce such infrastructures are capable of maintaining an intercommunicative flow by adapting to the context in order to discover, learn and understand it (Healy 1996). In other words, just as important as the infrastructures behind the participatory processes are the "participatory specialists" who implement them.

In this context, there is no need for major economical investments, for bureaucratic and vertical structures, for prioritizing the physical tissue over the social tissue or for excluding citizens from decision-making in collective matters that would open the pathway to regeneration.

*Right Page*
**Rally of the "Il Popolo Delle Cariole" Movement, Lady's Banner Reads: "Let Us Re-Embrace the City."**
*Photo: Marco Giancarli, InAbruzzo.com*

RiabbracciAMO la città

SE NON ORA,
QUANDO!

L'Aquila 13 febbraio 2011

# 12 Urban Pioneers of L´Aquila: The First Residents and Entrepreneurs of the Recovering Historical City Center

**Author**
Lukas Terrence Hoye

**Abstract**
This article draws attention to the urban pioneers of L´Aquila and illustrates through original material the current status quo of the recovery of buildings for residential and commercial uses. The research will look deeply into the conditions of the citizens living in these recovered houses and will consider their situation in relation to the scarcity of stores to cover their basic needs. To understand the role of the shop owners, conclusions are drawn from inter-views with various entrepreneurs. Special em-phasis is placed on the living conditions of the students who are identified, along with the entrepre-neurs, as pioneers in the revitalization process of L´Aquila, which still has a long way to go.

*Left Page*
**Older Lady Visiting Her Home**
*Photo: Lukas Terrence Hoye*

## 12.1 Status quo of the recovery of historical L´Aquila

The newspaper *Salzburger Nachrichten*, Arens (2014) reports that there are currently about three thousand construction sites in L'Aquila, of which one hundred fifty are located in the historical center. Back in 2012, the restricted area, including the restrictions on moving around and the number of army units present, was reduced. In June 2014, the restricted red alert zone was reduced to a number of specific buttressed buildings with a high degree of damage and deterioration. In any event, the number of buildings that have been restored is still remarkably small given that five years have passed since the earthquake in 2009. I chose the historical center as the site for my research because of its relevance to emerging categories and concepts.

> "Comparing the human body and the structure of a city, the central district in L'Aquila is the social, financial, institutional and cultural heart of the city; if the heart is not active, it is not possible to talk about recovery in the city [...]" (Contreras et al. 2013, p.1787)

Rather than assessing the entire recovery process of the historical center, which would involve a variety of complex indicators, this article draws attention to the phenomenon of the urban pioneers who can be found in a specific spatial context and are therefore a valid spatial indicator and as such a component of the overall qualitative or quantitative measurement of the revitalization of the old city center. Spatial indicators are visible measures that provide an insight into a recovery process (Contreras et al. 2013). The aim of the research is to illustrate through original material, which I collected as a primary source during my fieldwork in June 2014, the current stage of progress in the restoration of buildings for residential and commercial uses. Looking at the map, which highlights residential buildings and buildings which accommodate smaller retail shops currently in use, it is evident that the former restricted area is far from being regenerated. The research will look more closely at the conditions of the citizens living in these restored houses in terms of economic aspects, services etcetera and will

draw conclusions regarding the scarcity of smaller retail shops providing products which cover basic needs. Interviews with various shop owners provide an insight into the difficulties they encounter and how these difficulties explain the severely limited presence of stores. In addition to the mapping and interviews, I was given the unique opportunity to experience living conditions in one of the apartment buildings of the historical center first hand when I was invited by a group of Urban Studies PhD students at the GSSI to be their guest. As a result of this original experience the findings will lay special emphasis on the living conditions of the city's students, who can be considered pioneers in the revitalization process of the historical center of L´Aquila. Within this context I will draw attention to the higher education and research sector, which, according to OECD (2013), is one of the two most important sectors for stabilizing the future economic development trajectory of the city.

> "To set for the city the objective of becoming a university city meeting top European standards seems highly reasonable [...] This would turn the University of L'Aquila into a key pillar of the local economy in terms of employment and income generated." (OECD 2013, p.167)

When looking at the technical aspects of the recovery, the first group of practitioners that might come to mind are the structural engineers and the officers of the fire brigade, whose work may have contained some of the most developed buttressing ever to be used to reinforce buildings damaged by an earthquake. "Indeed, the safeguards activities of the historical and architectural heritage in emergency conditions after this seismic event demanded an exceptional effort." (Modena et al. 2010, p.2) But, looking beyond the technical and institutional achievements, what really stands out are the individuals who, with their personal history embedded in the place and in spite of all the obstacles, have committed to picking up their daily routines in the still widelydevastated historical center of L´Aquila. This article will reveal that the shop owners of long-established businesses, who are strongly motivated to reopen their businesses, can be considered urban pioneers. The term urban pioneer is applicable since they are not part of an

■ Study Area
■ Red Zone (2011)
■ Commercial Uses
■ Residential Uses
■ Residential Uses (subordinated)

**Map 10:**
**Buildings with Residential and Commercial Uses**
*Source: Author*
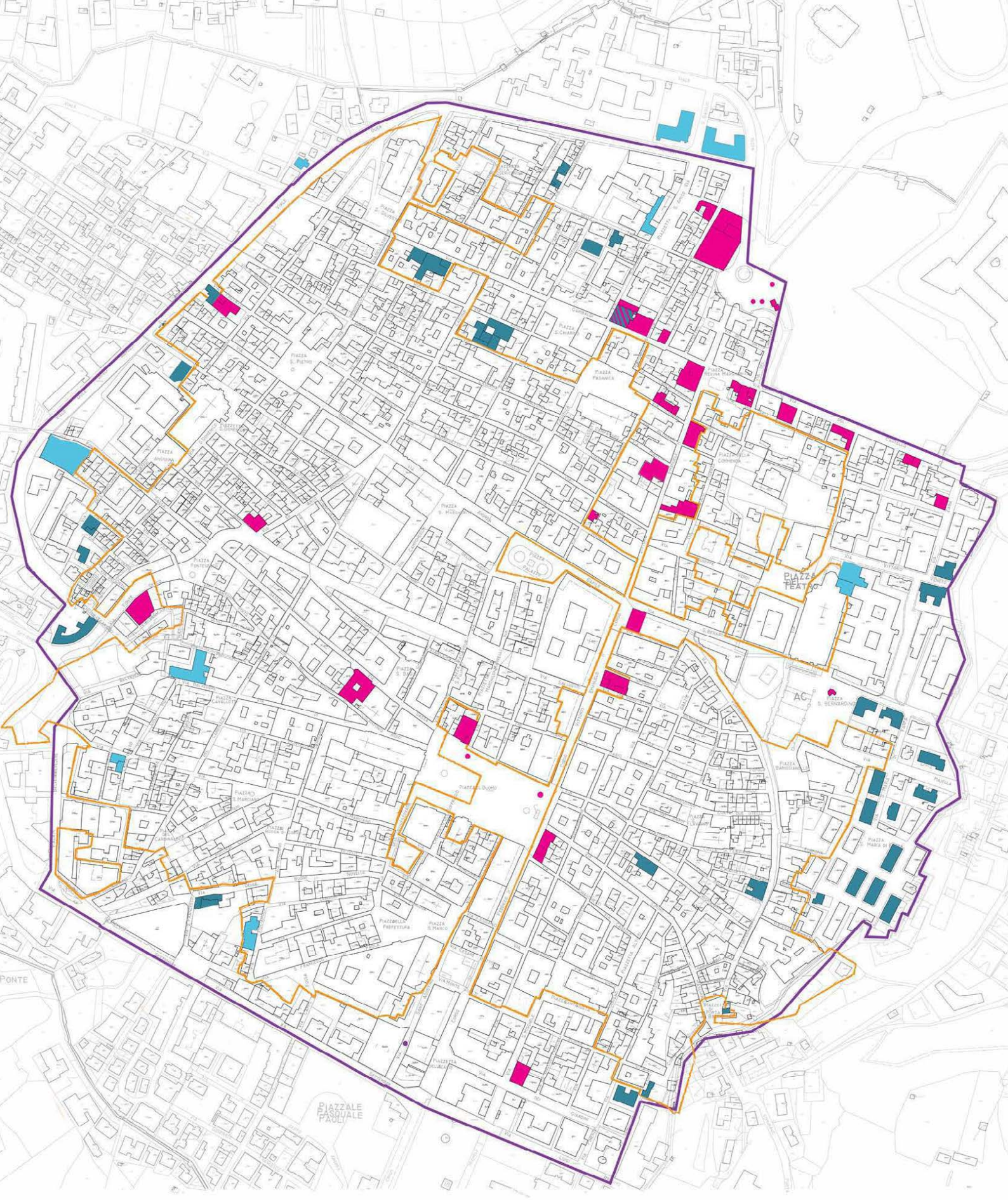
urban development strategy but are important for the development of the area. The interviews reveal that the municipality has done little to support the few businessmen that are trying the re-establish their shops. Fiscal incentives for employment have been severely limited (Alexander 2013, p.4). Another group of people I would consider urban pioneers are the citizens of L´Aquila who have chosen to move back to the still devastated center of the city. From my fieldwork I got the impression that the majority of these



**Figure 69:**
**Examples of Buildings**
**with Residential Uses**
*Photos: Lukas Terrence Hoye*

urban dwellers are students who have the willingness, and maybe also the curiosity, to accept such an extraordinary living environment.

In order to identify the conditions of the resettling residents and entrepreneurs and paint an up-to-date picture of the recovery process in the defined area, I collected raw data through three different methods of fieldwork: (1) the mapping of recovered residential buildings and buildings accommodating commercial uses within the limits of Zone A of the *Piano Regolatore Generale*, which includes the former restricted red alert zone; (2) three interviews with shop owners running businesses in the defined area, focusing on the socio-economic aspects and in particular on the role of the municipalities in facilitating the reestablishment of the stores; (3) first-hand experience of living conditions in the historical center, giving consideration to ease of access to services as well as socio-economic aspects. Once collected, the raw data is tagged and categorized and checked against the GIS of the monitoring and management platform of the USRA reconstruction of L'Aquila. As an observer I was also interested in capturing the atmosphere or even detecting a certain buzz, or zeitgeist, in the form of qualitative data. If one avoids preconceptions this method can expand perception and lead to a deeper understanding of the genius loci. By spending a couple of days walking through an environment from morning till evening, one will eventually encounter everyday life situations and experience fruitful conversations. In addition to personally experiencing living conditions, these impressions allowed me to gain a deeper understanding of the conditions of the citizens living and working in the historical center of L´Aquila.

## Physical and socio-economic recovery of the historical centre

The highly dispersed composition of active buildings in contrast to the density of the urban fabric is obvious from the first glance at the map of buildings with residential and commercial uses (see Map 10). Regarding the incidence of residential use one can identify smaller hubs of agglomerations of residential uses consisting of smaller hubs of two to three buildings as well as isolated houses. Outside of the former

red zone, such as on the *Viale Duca degli Abruzzi*, there is a higher incidence of residential use than within the delimitations. The reason for this can often be found in the lower density and more modern construction techniques applied to these agglomerations. The neighborhood at the eastern delimitation of *Via Luigi Signorini Corsi*, which shows the highest degree of recovery of residential housing, cannot be clearly identified as being inside or outside of the historical city center. Between *Porta di Bazzano* and *Porta Castello* the historical city wall dissolves and also in terms of defining contemporary and historical housing typologies this area is more diffuse than others. Some of the residential buildings, which can be identified by the brighter blue color, stand out due to atypical characteristics, e.g. being a contemporary construction, bordering with the study area, being as good as ready for habitation, being a retirement home or a monastery. When plots are marked with red and blue stripes they accommodate both residential and commercial uses. Regarding the arrangement of commercial uses one can identify two major axes; the north-south axis along the *Corso Vittorio Emanuele* intersecting with the east-west axis of *Via Giuseppe Garibaldi* with its prolongation throughout the *Via Castello*. Out of the 52 units of commercial uses, which are documented in the map, only five fall into the category of covering the basic needs of the nearby residents. The vast majority consist of bars, cafés, and restaurants.

One of the main principles contained in the frameworks of an OECD report (2012) is the creation of high quality living by 2030. In the agenda for L´Aquila towards 2030, published by the OECD in 2013, the reconstruction of the historical center is said to be a priority:

"First, physical reconstruction, as a consequence of the architectural peculiarity of the settlements making up the city and in particular its historical centre, is extremely difficult. Yet reconstruction conserving the architectonical and historical identity is to be considered a moral imperative." (OECD 2013, p.165)

In the supplement of the German newspaper *Frankfurter Allgemeine Zeitung*, Bartetzko (2014)

writes about the photography exhibition *Monditalia: L'Aquila's Post-Quake Landscapes* 2009, which was part of the *Biennale Architettura* 2014. He describes how the stagnation of the reconstruction of L'Aquila was illustrated by shamefully romaticized color photographs of the ruins. These ruins were still visible in June 2014 since reconstruction work in the city center was at a standstill between 2009 and 2012, but I would strongly contest the claim that reconstruction continues to stagnate, as it has in fact accelerated. In April 2014 the military operation *Operazione L'Aquila* finally came to an end, allowing construction workers more extensive access to the area.

According to Contreras et al. (2013) recovery is defined as a complex multi-dimensional process of decision making after a disaster which, apart from the physical reconstruction, has the goal of restoring liveable conditions to the people and revitalizing the environment ecologically as well as culturally. Considering the desire of most of the citizens of L'Aquila to move back to their homes and the fact that half a decade has already passed since the earthquake in 2009, it is clear that there are insufficient housing opportunities in the center. In a report, the OECD (2013) presents a strategic plan featuring, among four axes of intervention, the reconstruction of the historical center. "There are many examples where the rehabilitation of old buildings or old neighborhoods provides exactly the ideal setting for fostering creative activities." (OECD 2013, p.179)

According to Alba Fagnani, spokeswoman for *Viviamo L'Aquila*, some victims of the earthquake, especially those who lost family members who shared their accommodation, are afraid to move back to their previous homes, but the large majority of the residents of the new settlements express the wish to be back in the old town in the future. During my daily walks through the city center I saw quite a few elderly people who appeared to be mentally disturbed wandering around the streets. I heard one old lady, for example, talking to herself about the shops that used to be in a now abandoned building. "Social surveys have revealed high levels of post-traumatic stress and depression, especially among women, the unemployed and the elderly." In the course of

my fieldwork I had a short conversation with an elderly lady who was visiting her house, which was still restricted in terms of accessibility (see Figure on p.154). According to the regulations, she needed to be accompanied by a fireman, but her desire to spend some time in her home on the *Festa della Repubblica* holiday was stronger than her sense of compliance with regulations. This face-to-face encounter gave me an insight into the emotional attachment of the residents of L'Aquila to their living environment with its architectural and natural heritage.

During my preliminary studies I was interested in finding squatters but once I started my fieldwork I realized that thanks to the very real danger posed by the seriously destroyed houses this is not a phenomenon of any significance in this recovery phase in L'Aquila. Nevertheless, two occupied houses, the *Casematte* (close to the *Basilica di Collemaggio*) and the *Asilo Occupato* (at the beginning of *Viale Duca degli Abruzzi*), can be found in the wider city center. Both are stakeholders in the cultural and night life spectrum, offering concerts, parties etcetera.

Different groups of the population dominate at different times in the historical center and due to the exceptional conditions in L'Aquila the predominance of any one group is very apparent. When the construction workers finish for the day and disappear from the scene, new sets of groups dominate. Especially at nighttime, the streets and bars are populated almost exclusively with students. On weekends and especially during the *Festa della Repubblica* holiday, families and tourists are the most visible group. Then, from Monday morning on, the construction workers are once again by far the largest group in the city center.

As the guest of the PhD students of the GSSI, I was able to experience first hand the living conditions in the historical center, with respect in particular to ease of access to services as well as social aspects. The rent of the holders of a GSSI scholarship is covered by the institute. In addition, technical equipment, food vouchers and other services are provided. When the course started there were still not sufficient houses recovered to provide accommodation so a hotel was financed for the students' use. Subsequently, for the

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Study Area
Red Zone (2011)
Commercial Uses
Residential Uses
Residential Uses (subordinated)

| i | Tourist Information |
| | Hotel |
| | Bar / Pub |
| | Restaurant |
| | Fast Food / Kiosk |
| | Butcher / Delicacies |
| | Bakery / Pastry Shop |
| | Instruments |
| | Café |
| | Newspapers |
| | Clothes Store |
| | Laundry |
| | Monastery |
| | Book Store |
| | Souvenirs / Paper |
| | Tobaccos |
| | Pharmacy |
| | Jeweler |
| | Antique Dealer |
| | Housing Insurance |

**Map 11:**
**Commercial Uses**
*Source: Author*

majority of students, housing has been provided about twenty minutes outside the center. Only three out of eleven participants in the PhD program actually found an apartment in the historical city center. They pay 300 euros each for their shared two-story apartment of approximately 120 square meters. However the house owner wants to convert the apartment into bed and breakfast accommodation once the students leave. These types of conversions, which can also be observed in other cities, can have a negative impact since they reduce the already scarce housing opportunities for citizens and often contribute to rises in rent. For regular grocery shop-

ping I had to walk about twenty minutes from the apartment in the *Via ed Arco dei Veneziani* to the nearest grocery store on *Viale De Gasperi* outside of the inner city. In order to get to the bus station with my luggage I had to take a taxi since public transport on Sunday was very inconvenient.

The Smart Ring project, which has recently been approved by the Municipality of L'Aquila and is being carried out by ENEA, includes many aspects of a Smart City, such as smart mobility based on electric buses (OECD 2013). According to my interviews with some of the inhabitants, public transport in

**Figure 70:**
**Examples of Buildings**
**with Commercial Uses**
*Photos: Lukas Terrence Hoye*

L'Aquila was deficient even before the earthquake. Looking at the bus frequencies and the bus stops in the center with notes posted saying that the route is temporarily out of service it is clear that public transport is still restricted.

A reliable indicator for inhabited houses are the waste bins, which are usually placed at the outer facade of the building or in the courtyard. Buildings with only a few habitants have smaller bins, while houses with more residents are provided with larger bins (see Figure 69). This adaptation of the size of bin to the waste produced in each unit shows a certain degree of management and there were no complaints from the inhabitants regarding this service. Also the provision of electricity seems to function well. Symptomatic of a service operating at an incipient stage might be the fact that the electricity company still does not know their clients' addresses, so that bills have to be picked up at the post office. The distribution of gas is very vulnerable to earthquakes but once houses have been recovered and fulfil safety requirements they can be reconnected to the system.

> "The functionality reinstatement process of the L´Aquila gas system showed a fair level of resilience […] However, it is worth highlighting that despite the functionality [that] was restored for 70% of the network, only 30% of the costumers were actually reconnected to the systems." (Esposito et al. 2013, p.18)

## 12.2  Discussion of results

### Findings are being compared
### with the GIS of the USRA

The reconstruction database provided by the USRA classifies the status of implementation according to the following categories: (1) Presented project; (2) Assigned project; (3) Project appraisal; and (4) Project undergoing the process of evaluation. Yet, they do not provide information as to whether a project is finished and the building is in use, which is why the present research can be understood as additional information to the database of the USRA. On their website they point out that they are only just embarking on

the collection and organization of data and therefore invite users to report any errors. Although the information provided is extensive (nearly 30,000 registered projects) and easily understandable, some projects I came upon in the course of my my fieldwork (for example, the houses at *Via Baldassarre Nardis* 7 and *Via delle Bone Novelle* 42) are not included.

**Assessment of interviews with shop owners**

I visited various shops, bars and restaurants during my field study and often had short conversations with, among others, desk clerks in hotels and waitresses in bars and restaurants. In three long-established businesses I held more extensive interviews. All three businesses were located in the historical center of L´Aquila before the earthquake and were among the first to reopen after 2009.

Mr. Nurzia (pseudonym), a bartender at the Caffè *Fratelli Nurzia* (see Figure 70) in the *Corso Federico II*, which runs laterally to the *Piazza del Duomo*, stated during the interview with certain amount of  pride, "our business was the first store to reopen in the historical center in December 2009." The family business dates back to the 19th century and, given that it is one of the longest-established businesses in L´Aquila, the owners had a particular interest in reopening as soon as possible. The same is true for the adjacent delicatessen store *La Camoscina Di Laterza Vito* (see Figure 70). Here I had the chance to speak directly to the shop owner, Mr. Camoscina (pseudonym), whose emotional attachment to the place and strong motivation to resurrect his business in his life-long environment was even more apparent. Mr. Macelleria (pseudonym), the owner of the butcher´s shop *Macelleria* (see Figure 70), located in the *Via Leosini* 5, reopened for business in July 2010. He had spent a year working in a supermarket outside the city center but since he is also the owner of the building his links to the place are very strong. According to Mr. Nurzia a large proportion of customers are tourists, which was also true before the earthquake. Today's tourists, however, come mainly to see the damage done to the city by the earthquake, whereas the tourists who came before April 2009 tended to be drawn by religious motives. On Saturdays and Sundays the tourists still form

the largest group of customers at the Caffè *Fratelli Nurzia*. Mr. Camoscina told me that before 2009 a lot of Romans, who were willing to pay the price for high quality products, had houses in the area around L'Aquila. In contrast to Mr. Nurzia he claimed that the tourists only stop by sporadically these days since the city has lost its attraction as a shopping center. Due to the fact that his business depends largely on well-heeled clients, he registers more income losses than his neighbor. He complained that the construction workers, who represent the majority of the people in the center during the week, only buy a sandwich in his shop once in a while since their employers make deals with restaurants and hotels to provide them with food and accommodation. The short conversations I had with bartenders at other bars and restaurants confirmed that most of them depend on the construction workers as consumers. The Caffè *Fratelli Nurzia*, unlike the *La Camoscina Di Laterza Vito* delicatessen, does get its share of construction workers as well as others in related professions, such as architects, who constitute the large majority during the week. A smaller proportion of weekday customers are employees from the banks and administrative offices in the neighborhood. Long-standing regulars also keep coming. This is the dominant group at the *Macelleria* butcher´s shop. Compared to the other shops in the city center of L'Aquila the butcher's shop was frequented by quite a large number of customers. The clients who came to the store before and during the interview were exclusively older people and no doubt the familiar atmosphere contributed to their long-time loyalty. The owner told me that a great proportion of his customers are loyal and that some even come from their new homes outside of the city center specially to buy his local produce.

In an article, Alexander (2013) argues that few financial incentives have been granted. Of the three interviewees only the butcher had received financial support from the municipality. The *Comune di L'Aquila* supported him with a 1,800-euro grant and helped him get a permit to reopen his shop. In addition he did not have to pay taxes for the first few months. Nevertheless, he stated that the city should have reconstructed at least the main road (*Corso*

*Vittorio Emanuele*) so that this lifeline in the heart of the city would be accessible for commercial use. Mr. Camoscina's experiences with the city are severely negative. He asked the municipality for a permit to place some tables outside in front of his store. Since his business does not fulfil the requirements of a bar, he did not get the permit. Aware of the fact that that he wanted to make use of public ground he was willing to pay for this concession. Although his request was declined he put out a few tables anyway and was fined 180 euros. The lack of support from the municipality is seen as one of the obstacles to opening up a business in the center at this stage.

"Very little progress has been made in the implementation of non-structural measures. Business continuity management, for example, is almost completely lacking in large parts of Italy. The effects of this in L'Aquila meant that employment which could have been saved was lost." (Alexander 2013, p.9)

Another obstacle is the high cost of starting a business at the moment. Mr. Camoscina had to invest 10,000 euros to restore the shop and has to pay 1,600 euros a month rent. Previously, he paid only 1,200 euros rent. Although the buildings are just partially habitable the tax on real estate has to be paid for the entire property. Mr. Nurzia explained that most of the buildings in commercial use in the historical city center are only accessible on the ground floor. Once the reconstruction work starts the businesses will have to be relocated until the building is completely habitable. Due to these restrictions most business owners assess the financial risk of opening a shop in the city center as too high. In fact all three interviewees will be required to vacate their premises once a competition for the restoration work on the upper floors is won and the reconstruction work starts.

## 12.3 Urban pioneers are necessary to revitalize the city

During my literature review I came in contact with articles by, among others, Alexander, Contreras and the OECD who all point out the significant role the historical centre has in the recovery process as
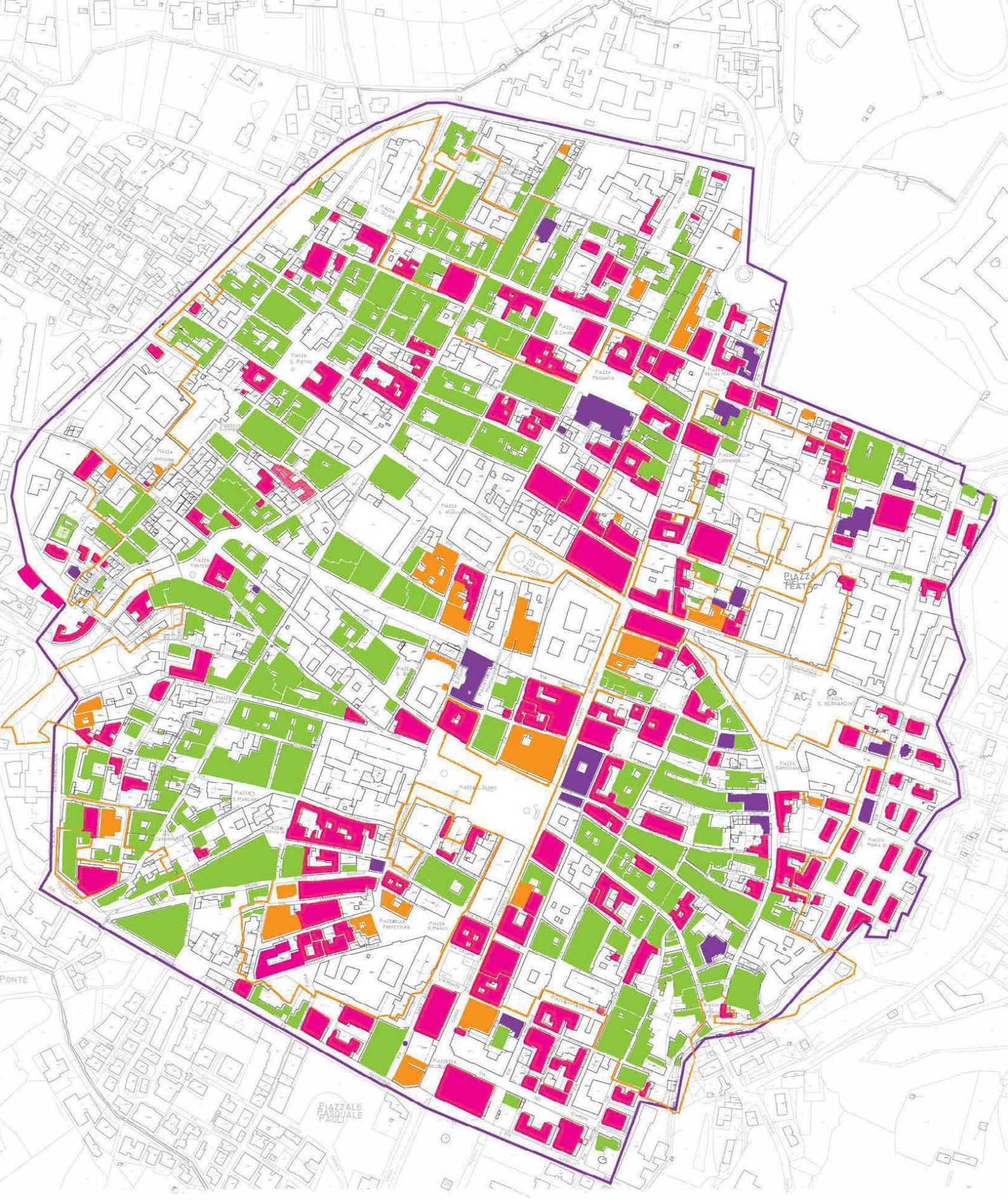
a driver of cultural, economic and socio-economic revitalization. This research emphasizes this aspect and the graphics with the data collected illustrate the deficiencies. The hypothesis that the supply of housing and shops providing products for the everyday requirements of the few residents needs to be improved can be easily comprehended on the basis of the maps. There is an obvious imbalance between bars and restaurants and stores providing for everyday needs. Apart from the butcher's shop, a bakery, a shop selling home-made pasta, a laundry service and a shop selling clothes for pregnant women, all of the fifty-two other units in commercial use fall into the category of gastronomy. The predominance of gastronomy can be understood in correlation with the needs of the different groups occupying the center. These groups are mainly temporary and need to be provided with cooked food and drinks.

The criticism that there is a lack of government support in the form of incentives for entrepreneurs and service providers is grounded in first source data gained during conversations with shop owners and residents and observations made in the course of the fieldwork. Mr. Camoscina stated during the interview: "The municipality and authorities should help the shops since they would be able to earn taxes through the business created but in fact they do the opposite." Besides the need for incentives to attract new shops, the provision of everyday commodities would attract new residents, who again need more housing opportunities. This is especially true for the students who mostly have to live outside the former restricted area. On the other hand, the OECD's call for an expansion of the higher education and research sector market seems to have been taken seriously by the local government. Students are being attracted through financial support, good university facilities and a better qualified teaching staff. Nevertheless, a more ambitious objective than merely returning to the pre-earthquake status quo, as claimed in the OECD (2013), should be considered.

The goal of the present research was also to look beyond an analysis of the implementation of structural and non–structural measures and get a sense of the genius loci. By encountering everyday life

situations as well as experiencing living conditions in the historical center first hand, I gained a deeper understanding of the conditions of the citizens living and working in the historical center of L′Aquila. My observations of elderly people, sometimes wandering lonely around the city, and my face-to-face encounters with house owners and others gave me an insight into the emotional attachment of the residents of L′Aquila to their living environment with its architectural and natural heritage. Walking through the oftentimes empty streets, I could smell the debris of the historical buildings with their erstwhile grandeur. Yet, I also captured an atmosphere of a departure towards a better future - especially when experiencing the inspiration and willingness of some citizens to accept the living conditions of their devastated environment and contribute with creativity and vitality to the recovery of the heart of the city. Alongside the above-mentioned entrepreneurs and a few other citizens living in the center, I identified the students as urban pioneers. The revelation that they are not part of an urban development strategy but nevertheless important for the development of the area substantiates this hypothesis.

All data collected during the fieldwork was grounded in reality and subjected to careful on-site examination and should reflect with accuracy the recovery process status quo in June 2014. Indicators such as waste bins and conversations with residents and shop owners provide a substantiated collection of first hand data. However, due to the limitations which can arise from human fallibility, the information is under caveat and without warranty.

By comparing the information generated against the USRA database one can see that for most advanced projects the process of evaluation is still not complete, while some buildings for which the process is complete are still classified under the early stage status of an assigned or presented project. These research findings could be applied as an additional source of information to the USRA database and be of relevance in the practical world from which they were derived. Based on the work of this research, future developments could be monitored by comparing the resulting indicators with future data.

*Right Page*
**Old Man Walking with his Dog**
*Photo: Lukas Terrence Hoye*

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*Left Page*
**Research Team in a Site Visit to the Red Zone of L'Aquila**
*Photo: Florencia Carvajal S.*

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# List of Interviews

| | | |
|---|---|---|
| **Agnelli, Leonardo** (Special Office for the Reconstruction of l'Aquila Basin, USRC) | Villa San Lorenzo | 04/06/2014 |
| **Barile, Anna** (C.A.S.E project inhabitant) | Camarda, L'Aquila | 02/06/2014 |
| **Biondi, Pierluigi** (Mayor of Villa Sant'Angelo) | Villa Sant'Angelo | 29/05/2014 |
| **Carosone, Fabio** (Comitato 3e32) | L'Aquila | 02/06/2014 |
| **Cialente, Massimo** (Mayor of L'Aquila) | L'Aquila | 04/06/2014 |
| **D'Alessandro, Dario** (EVA [Self-constructed Eco Village] Project) | Pescomaggiore | 01/06/2014 |
| **Del Pinto, Christian** (Seismologist) | L'Aquila | 31/05/2014 |
| **Fagnani, Alba** (Viviamo, L'Aquila) | L'Aquila and Santa Rufina | 31/05/2014 |
| **Goretti, Agostino** (Department of Civil Protection, DCP) | Rome | 05/06/2014 |
| **N.N.** (Waiter at Caffè Fratelli Nurzia) | L'Aquila | 04/06/2014 |
| **N.N.** (Shop owner of La Camoscina Di Laterza Vito) | L'Aquila | 04/06/2014 |
| **N.N.** (Shop owner of Macelleria) | L'Aquila | 04/06/2014 |
| **Tordera, Rinaldo** (ASM (Aquilana Società Multiservizi)) | L'Aquila | 04/06/2014 |
| **Vivola, Laura** (Ministry of Infrastructure and Transport) | L'Aquila | 30/05/2014 |

# Lists of Figures/Tables/Maps

## List of Figures

## List of Tables

## List of Maps

# Personal Profiles



**Panagiotis Achamnos** was born in 1987 in Athens, Greece. He studied in the School of Civil Engineering of the National and Technical University of Athens and after his graduation worked in the construction field. He is interested in urban planning and housing.



**Ana Laura Alcántara Castillo** is an architect from the Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico. She has been working in a Canadian-Mexican architecture firm and gained experience in the development of urban and architectural plans. She is currently a CONACYT scholar and is writing her thesis on heritage sites and sustainable tourism in Al Buraimi, Oman.



**Riza Avriansyah Kori** is an architect from Jakarta, Indonesia. He received his Bachelor degree in architecture at the university Gadjah Mada, Yogyakarta. After his graduation, he worked in an architecture company in Jakarta. He is interested in transportation and tourism.



**Aydeen Azarnezhad** has studied architecture at Tehran Art University and has been working as an architect before he joined TU Berlin. He got involved in some urban design projects, therefore he decided to move to Berlin in 2013, to pursue his education in Urban Management.

**Portraits of Urban Management Students and Advisers**
*Photos: Riza Avriansyah Kori*

**Pedro Becerra Rodríguez** was born in Bogota, Colombia and received a degree of architecture in the year 2007. With professional experience in design, construction and landscape architecture, his field of interest are urban planning and sustainability.



**Florencia Carvajal S.** comes from Ecuador. She studied architecture at the Pontificia Universidad Católica in Quito. After graduation she settled in China to build her professional experience. She has worked in urban design and architecture firms and realized self-employed design-related projects. She is interested in implementing city development projects in the near future.



**Rohit Chandragiri** graduated in urban and regional planning in India. He worked as an urban planner at Administrative Staff College of India (ASCI), India and acquired work experience in the field of urban development. His motivation and interest drove him to gain experience in cities and climate change.



**Renato D'Alençon Castrillón** is an architect and senior researcher at Habitat Unit. He graduated from the School of Architecture of the P. Universidad Católica de Chile and holds a MArch degree from Cornell University. His research, teaching, design and consultancy work focuses on energy efficiency and environmental performance of buildings, the recovery and development of heritage building and habitability in social housing.

**Maged Elgendy** holds a Bachelor of Science in architecture from Cairo University, Egypt. His experience is in implementation and design. He is interested in public participation, migrants integration. At TU Berlin he is working on *crime prevention through environmental design* (CPTED) in the European context.



**Uli Fadilah Siregar** graduated in the year 2011 with a major in urban and regional planning from Bandung Institute of Technology, Indonesia. She worked as a junior expert in the Government of West Java Province, where she took part in several projects of metropolitan development. Her particular interests are urban and metropolitan governance.



**Gissu Firoozmand** from Iran graduated with a Bachelor of architectural engineering at Art University of Tehran in 2010. She has worked at "Amood", an architecture and urban consulting firm in Tehran, for two years. After completing her master degree in Urban Management from TU Berlin, she is planning to continue her education in the urban field focusing on just government criteria.



**Pratiksha Gogoi** has a Bachelor and Master degree in Environmental Science from India. As a young environmental consultant she has more than 5 years of experience in the environment sector with different reputed organisations such as Blacksmith Institute. She wants to continue her work with special focus on urban water management combining with social inclusiveness and climate change resilience.

**Felipe González González** is a Colombian architect. Since 2008, he actively participates in architecture collectives and NGO´s, focusing his work on exploring alternatives modes of practicing architecture mainly in socio-spatial peripheries of his hometown, Bogotá. His interests are in participation, collaborative work, auto-construction, informality, and the cultural/social construction of space.



**Arief Gunawan** is an urban planner from Indonesia. He graduated from Gadjah Mada University School of Planning in Yogyakarta, Indonesia and started his professional career as urban planning consultant in Jakarta. His main interest is in land use planning.



**Lukas Terrence Hoye** has worked as an architect/ urban planner in the United States, Spain and Germany. Recently he worked in a Berlin based office for urban and regional development. His motivation to add a new perspective to his international work has lead him to the South Africa, where he wants to gain further experience in the field of inclusive violence prevention.



**Muntari Illyasu** holds a Bachelor's degree in sociology and a Master's degree in development studies from the University of Ghana.  As a social development specialist, he has work experience with national, local, and international agencies on social development programmes and projects. He aspires to continue research in urban social issues focusing on poverty and sustainability in the Sub-Sahara African Region.

**Carolina Lunetta** is an architect and urban planner from São Paulo. She focused her studies on social housing projects and policies in Brazil. After working in the private sector of architecture in São Paulo she got involved with consultancy companies to develop plans for social housing. She wants to continue her work with special interests in land issues and gentrification studies.

**Shaimaa Mobasher** is an architect by profession. She graduated at the Faculty of Engineering of Cairo University, Egypt and has several years of work experience in private firms and offices and as a teaching assistant in a private university in Egypt. She is particularly interested in informal settlements and policies related to them in developing countries and the Arab region.

**Marina Moscoso Teixeira Mendonça** has a bachelor degree on international relations from Rio de Janeiro, Brazil. She has work experience in municipal management and participatory planning. Currently, she is working for GIZ Kosovo and developing her thesis research on the informal waste sector in Pristina.

**Adrianto Oktavianus** is a civil engineer from Indonesia. He was born in Solo and moved to Bandung to earn his Bachelor degree in civil engineering at the Institut Teknologi Bandung. Before studying Urban Management he worked as a research assistant and also as an engineer in several projects in the fields of construction, transportation, and infrastructure. He is interested in these three areas, especially in the social and technical context.

**Aditi Poudel Dhakal** is a professional architect graduated from Kathmandu Engineering College, Kathmandu. She has worked for more than 7 years in different private architectural firms and is interested in the management of solid waste and collaborative housing projects.

**Daniela Roque Montes** is a civil engineer graduated from Universidad Autonoma de Baja California, Mexico. During her studies she did internships in areas such as project development in urbanization, construction bids and supervision. As engineer she had worked on construction supervision and the development of budgets and bids for rural areas. Her interest is sustainable transportation related with the urban form.

**Federico Rota** is an architect currently working in Italy as consultant in architectural and urban design. He studied at the Politecnico di Milano and the TU Berlin, obtaining his Master in architectural design in 2103. He is co-founder of the international association Reclaiming Heritage that develops post-disaster reconstruction projects. Since 2012 he is teaching assistant at TU Berlin and Politecnico di Milano for design studios and international workshops.

**Jesús Salcedo Villanueva** graduated in architecture at the National Autonomous University of Mexico and has experience on social development projects in Mexico's rural areas. He is currently a DAAD scholar working at the Institute for Transport Research at the German Aerospace centre and writing his thesis on Omani regional development.

**Aline Simões Ollertz Silva** graduated in architecture and urban planning in São Paulo, Brazil. Since her graduation she worked with social housing and urban projects.



**Yi-Ting Tsai** is an urban planner from Taiwan. She got her Bachelor of Science degree in urban planning at the National Cheng Kung University in Tainan City, Taiwan in 2012. She used to deal with land issues and worked in a consulting company for management and development. Her interests are community-based participatory planning and urban/rural regeneration.



**Siqi Wang** has her Bachelor degree in environmental economics, policy and management from Renmin University of China. After graduation, she has worked in an environmental consulting firm for 3 years in the field of climate change mitigation, participated in multiple energy-efficient and renewable energy projects. Her future interest is energy efficiency in transportation sector in developing countries, especially in China.

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On April 6th 2009, the city of L'Aquila, 120 km north-east of Rome, was hit by an earthquake of intensity between VIII and IX on the Mercalli scale, widely destroying both the traditional, non-monumental architecture that characterizes a majority of residential buildings in the historic center and the considerable monumental architecture. The rebuilding process that began in the following months, addressed the issue making an emphasis on quantity solutions, largely disregarding the qualities of the heritage loss.

Catastrophes management and reconstruction of built heritage after catastrophes have in recent time exceeded the technical dimension of building techniques and financing to include social, cultural and environmental elements, thus turning into a complex, multidimensional challenge. While the actions of reconstruction attempt a response to the immediate need for housing through construction methods of rapid development, several other issues arise in dealing with damaged built heritage assets such as the appropriateness of restoration and reconstruction of urban fabric and buildings, its social acceptance, its cultural pertinence and its comprehensive sustainability.