



4th ISUFitaly International Conference | Bari, 26-28 september 2018

READING BUILT SPACES

Cities in the making and future urban form

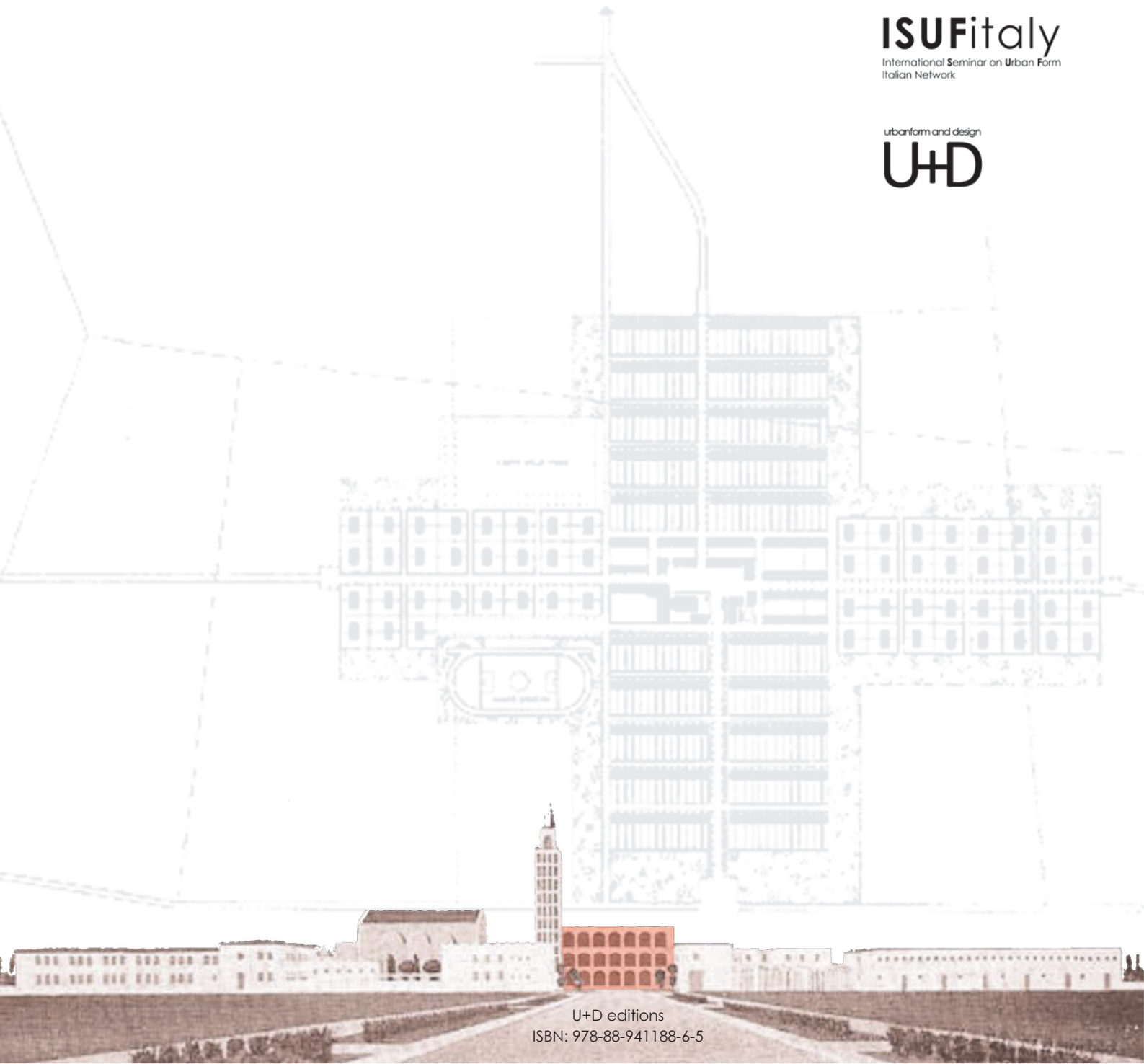
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Paolo Carlotti
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Politecnico di Bari

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READING BUILT SPACES | cities in the making and future urban form

Presentation

The city is an “organism in the making”, an entity in constant transformation, not a complex of immutable elements. The city represents the entire human experiential field of the world, considered as expression of a “fundamental movement of existence” in its completeness and historicity, expressed by the formative structure of tissues and building types, by the urban hierarchies, by the relations with the territory, by the social relations, and by the values and criticalities.

The conference's aim is to propose a dialectical comparison between scholars of Architecture, Urban Planning, Urban History, Restoration, Geography, on the theme of urban morphology with an interpretative perspective based on the concept of “operating history”. Search for a multidisciplinary syncretism that eludes single analyzing techniques and aims to the complete reconstruction of the urban phenomenology in its totality and concrete essence, through the study of the changing and inflexible condition of ‘fluidity’ hinged on the world's events. An integrated thought based on the critical concept of ‘making’ that constitutes, phase by phase, the signifying element of each present, explained through the relationship between the before and the after: that is the research perspective of ‘being’ that announces the notion of transformational process.

Therefore, the projection in the future of the urban form is the central theme of the conference that proposes to stimulate the reflection on the issues as: recovery (not only of the historical city), re-use of existing urban spaces, regeneration, ex novo design in peripheral and peri-urban areas and natural spaces. All that, without neglecting the issue of sustainability, not considered with the strabismus of those who surrender to the “technique” pre-domain.

Organization

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Gentucca Canella, Anna Irene Del Monaco

1251 **Indice dei nomi**

Morfologia urbana e resilienza. Strumenti e modalità del progetto contemporaneo tra 'permanente e temporaneo'

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Keywords: *Morfologia urbana, resilienza, progettazione architettonica e urbana, ricostruzione post sisma*

Padre Cristoforo Sarti nel suo Saggio di congetture su li terremoti afferma che "(...) gli edifici in forma consimile (rotonda) sono molto a proposito per iscansare i danni dell'aeromoto"¹. La regolarità strutturale e morfologica degli edifici unitamente alla continuità ed omogeneità dei materiali costituiscono la condizione primigenia in materia antisismica. Infatti, la progettazione architettonica spesso precede quella strutturale: la concezione dell'architettura (intesa come definizione degli aspetti formali, estetici e distributivi), condiziona inevitabilmente la configurazione del sistema strutturale preposto a resistere alle azioni sismiche. Analogamente, in tema di disegno urbano, la storia conferma che vi sono città che a causa della loro forma risultano più resistenti, o resilienti, di altre e già in passato la ricostruzione post-sisma si è interrogata sulla morfologia urbana per far fronte all'emergenza delle catastrofi ambientali, emblematico il caso di Palmi dopo il terremoto di Messina del 1783. Oggi i Piani di Emergenza rappresentano il tentativo di fornire una risposta concreta in termini di sicurezza. La ricerca indaga quindi quali strumenti progettuali mettere in campo per prevenire ed assorbire i rischi delle calamità naturali e trasformarli in opportunità. Allo stesso tempo, i drammatici eventi del sisma mettono però in luce la sottile linea di confine che intercorre tra il concetto di temporaneo e permanente e, nella permanenza della temporaneità, l'evidente e inevitabile fenomeno che vede affiancarsi, accanto ad inagibili nuclei antichi, nuove strutture temporanee che alterano in modo 'permanente' il contesto insediativo. Il contributo qui proposto, attraverso l'analisi di alcuni casi studio nazionali e internazionali mira a fornire alcuni spunti critici in tale direzione indagando possibili approcci del progetto contemporaneo in tema di ricostruzione, resilienza e riqualificazione paesaggistica.

Introduction

What does a resilient town mean today? After the seismic events in Central Italy, the topic of reconstruction has become very complex. Firstly, in relation to the urgent need to repopulate territories that for a long time have been under constant risk of depopulation and abandonment, and secondly, in terms of both the conservation and restoration of ancient villages of high historical and artistic value. Above all, the consideration of safety and prevention for the people who live there.

Living in areas with high seismic risk means being tolerant of a territory that is perpetually in motion. How is it possible to live alongside such a reality? How can these cities be rebuilt in order to preserve what is left, and to heal the wounds of an environmental catastrophe? How can damage and loss be repaired in new ways, while continuing to respect the identity of the place? Using these questions, The University of Perugia study analyzed the resilience that certain urban areas have developed over others, due to their urban morphology, conformation and material homogeneity, which greatly reduces the seismic vulnerability of a building. However, resilience often means activating strategies aimed at reducing risk in the event of natural disasters. Italian legislation has in fact developed Plans of Emergency, MS and CLE maps and operational plans such as SUM, but what really happens after the devastation of a seismic event? In reality, the dramatic episodes in the Apennine Mountains in the last twenty years have shown the difficulty of successfully linking the primary emergency phase with the second phase of reconstruction; in fact, the first one goes well beyond the established deadlines and temporary villages are often never removed.

1176 It is evident that if on one hand the construction of temporary houses involves the design of permanent elements and infrastructures, on the other hand, the emergency structures are very often are not taken down, becoming a strong and definitive blot on the territory. Research carried out by the Engineering Department of Perugia in the last two years, on the Internal Area of Valnerina in Umbria, has investigated these themes according to the concepts of permanence and temporariness, emergency and resilience, as well as security and the Smart City.

Royal Instructions after the earthquake of 1783 in Calabria and the Plan of Norcia of 1859

Cristoforo Sarti in his book 'Saggio di congettture su li terremoti' states that "(...) buildings of a similar form (round) are very likely to survive earthquake damage"¹. The structural and morphological regularity of buildings and the continuity and homogeneity of materials constitute the primary condition in anti-seismic matters. In fact, architectural planning often precedes the structural solution: the concept of architecture (as a definition of the formal, aesthetic and distributive aspects) inevitably affects the configuration of the structural system designed to resist seismic actions. Similarly, with regard to urban design, history confirms that there are cities more resistant or resilient than others, due to the shape of their buildings. In the past post-earthquake reconstruction studied the urban form to cope with the emergence of environmental catastrophe. "If, in fact, some spatial construction characteristics can be explained by an analysis of the individual building, the organization of ancient structures can only be understood through an interpretation of the relationships that exist between the different buildings on an urban scale"². After the events of 1783 in Calabria, Royal Instructions were issued by the Bourbon Government (March 20, 1784) which in fact turned out to be "the first European attempts to introduce anti-seismic regulations aimed at reducing the risk of earthquakes"³. The royal regulation in particular expressed generic provisions concerning the width of roads⁴, the geometric regularity of buildings and the distribution of public spaces, a main market square and smaller squares with churches or other public buildings. The ruling required that all *case baraccate* - wooden-framed houses, could be only two floors high at the most. Higher floors had to be demolished, balconies and other protruding elements eliminated, and floor beams had to be fitted into the walls. The shape of the urban structure aimed at the symmetry of the ideal city of the Renaissance period as an effective solution to reducing seismic vulnerability, with stylistic influences from the European cultures of the period. The coexistence of the modern city of Pierre Patte with the suggestions of Laugier in 'Essai

sur l'architecture' of 1753, introduced into Italy by Francesco Milizia in 1781, contributed very different images of towns than those dictated by local tradition. The vision of an industrial city and the secular philosophy of enlightenment moved religious buildings into secondary streets, creating space for large boulevards. Examples can be found in Palmi, inspired by Craig's project for Edinburgh, or Cortale with obvious references to both the Place Royale in Bordeaux and to English gardens. The pure geometry of the town of Bianco was derived from a design by Pietro Cataneo, while the town of Mileto reproduces the architectural plans of Filarete and Scamozzi. It does not seem to matter what the aesthetic-formal choice or functional distributions were, but it is clear that the urban area of Calabrian cities tried to define safety parameters according to a new model that was as resilient as possible. In the case of Norcia in Umbria however, which was the epicenter to an earthquake on October 30 2016, the ancient urban structure provided resistance, and so greatly reduced damage despite a seismic intensity of 6.5. "Differences must be sought in history; Norcia is an example of a city that has resisted seismic events over a one-hundred-and-fifty year period"⁵. In 1859 Luigi Poletti, an architect from Modena, and the geologist Angelo Secchi, commissioned by the Pontifical Court of Pius IX, were instructed to draft the plan for the reconstruction of the city. The New Building Regulations of Norcia, which became executive on May 15 1860, dictated precise construction rules in terms of prevention and safety, such as the use of simple geometric shapes and volumes, building height which was limited to two floors, and 60cm walls reinforced with buttresses. The project also suggested, where possible, to enlarge the width of the roads and consolidate them. Poletti also designed a new area outside the walls called *Borgo Pio* after Pope Pius, which was to be a forerunner in anti-seismic districts but which, due to a lack of funds was never built. The Norcia plan was a restoration project, of the urban morphological structure, through the provision of preventive safety measures. The main difference between the two case studies is the conservational state of the buildings, but also a different design approach. The two cases highlighted on one hand the theme of new construction and on the other hand, the conservation of the existing urban system. 1177

It gives rise to the many considerations of post-earthquake reconstruction, which can also be applied in a contemporary context. In the first place, it opens scenarios on possible planning directions but also shows the urgent need to equip cities located in seismic zones with an aggregative and morphological structure that can sustain an earthquake and be equipped for natural risks.

What does reconstruction mean?

"In the face of a dramatic event such as an earthquake we have to understand its nature and observe its context with an awareness so that even the emergency services should be focused on the final goal which is not reconstruction. [...] The real goal is that of rehabilitation"⁶. From this, we infer that there are there are two areas to consider. Firstly, 'reconstruction' means implementing strategies and programmed actions, and understanding that the distinct time phases of assistance and then reconstruction are part of the same process and involve two-way planning. It is therefore difficult to divide temporary and permanent actions. The Italian experiences of Friuli, L'Aquila and Emilia Romagna, show different design approaches and the effectiveness or ineffectiveness of the solutions of continuity and synchronization between the primary emergency period and the time of reconstruction. At the present, temporary interventions are permanently altering the landscape so we have to ask ourselves how emergency housing can be installed according to more careful criteria of integration and environmental protection, even in the case of temporary relocation. Secondly, we need to understand why the word 'rehabilitation' is used and not 'reconstruction'. In fact, it is not enough to simply restore compromised buildings following an earthquake, it is essential that the right conditions are created in a territory so that it can be inhabited once again.

Law no. 229/2016, which integrates the Decree Law 189/2016 of the Extraordinary Commissioner for the Government of Reconstruction, is a document for correct reconstruction, its focal points are to respect and enhance local identity and the regeneration of earthquake areas through new uniform visions. In fact, earthquake areas are already heavily penalized

by territorial marginality and a consequent depopulation process that is difficult to contain. "The earthquake not only destroyed the heritage but also a dense network of communication between heritage and landscape" ⁷. This implies an urgent need to act but also the need for a strategy to reactivate the anthropic equilibrium of a territory already affected by numerous critical issues. Similarly, it is necessary to plan for the safety of towns in respect to the indigenous building techniques and processes, through a combination - not necessarily incompatible - of technology and local building customs. Finally, it is essential to rebuild not only buildings, but also communities, thereby reducing the risk of isolation of these territories. According to the UNISDR (United Nations Office for Disaster Risk Reduction), two factors are crucial in terms of prevention and security: preparing and sensitizing individuals to deal with disasters, and building places that can mitigate future disasters. We need to design as many towns as possible, as resilient communities.

The case of Valnerina: Community Centers

The planning of community centers is one of the results of the research conducted in the last two years by the Engineering Department in the field of reconstruction after an earthquake, a project in collaboration with the Civil Protection and the Region of Umbria. The Community Centers are modular rescue units; these buildings are used as emergency sites in case of disaster, and as public spaces for citizens on an everyday basis. "The permanence of shelter structures (which can be buildings with other social functions in the absence of earthquakes), is a priority in seismogenic areas" ⁸. These units are quick to install, can be distributed throughout the Valnerina area, and are sized according to the number of residents in each municipality. The project - extended to the whole territory - puts fourteen municipalities on the network and aims at creating a resilient coverage. Valnerina is just one of the three Internal Areas of Umbria. The Internal Areas represent a substantial part of the county; almost three fifths of the population inhabit these territories. These places are extremely diversified, distant from other cities and centers of agglomeration, with demographic problems and unstable developmental trajectories, but nevertheless they have numerous resources for regeneration. The great landscape value, polycentrism and the growing attractiveness of these places gives them a great potential for development. Making these places safer, improving infrastructures and strengthening the cohesion of a community is a primary condition in avoiding depopulation, and permits the survival of smaller villages. The design of the Community Centers was created to fill this urgent need. From the architectural point of view, the research focuses on the development of a repeatable design type, which can be calibrated in different variations based on territorial needs. For a greater integration with the historical typological texture of the towns, the formal solution chooses a volumetric coherence of new buildings based on the dimensional and morphological characteristics of the territory. In fact, the typologies have a rectangular plan with a double pitched roof elevated to a maximum level, similar to the houses in the zone. Two different house sizes have been selected, which offer either one or two floors. The structures, characterized by the same section, are produced using three main structural elements:

- a) The structure in elevation is made of continuous sections in reinforced concrete with polystyrene formwork.
- b) The wooden cover and first floor.
- c) The east and west facades with large fixed windows in steel/PVC.

The structural conformation and building technique ensures maximum safety in the case of a destructive earthquake. Maximum energy sustainability for the morphological characteristics, construction details and materials used. Moreover, the buildings - which are equipped with a photovoltaic roof and electricity accumulator - are connected to micro smart grids linked to a set of intelligent totems for lighting and distribution of services including Wi-Fi, malfunction signals, environmental monitoring etc. The micro-smart grid guarantees lighting even in the case of natural disasters as well as Wi-

Fi, SOS, a radio communication system and GSM / Umts networks. There is interconnection between the various infrastructures via radio and video, a centralized storage system for each center capable of collecting renewable energy, and finally, electric mobility (also used for local tourism) which provides fast recharging for bikes, motorcycles and quads.

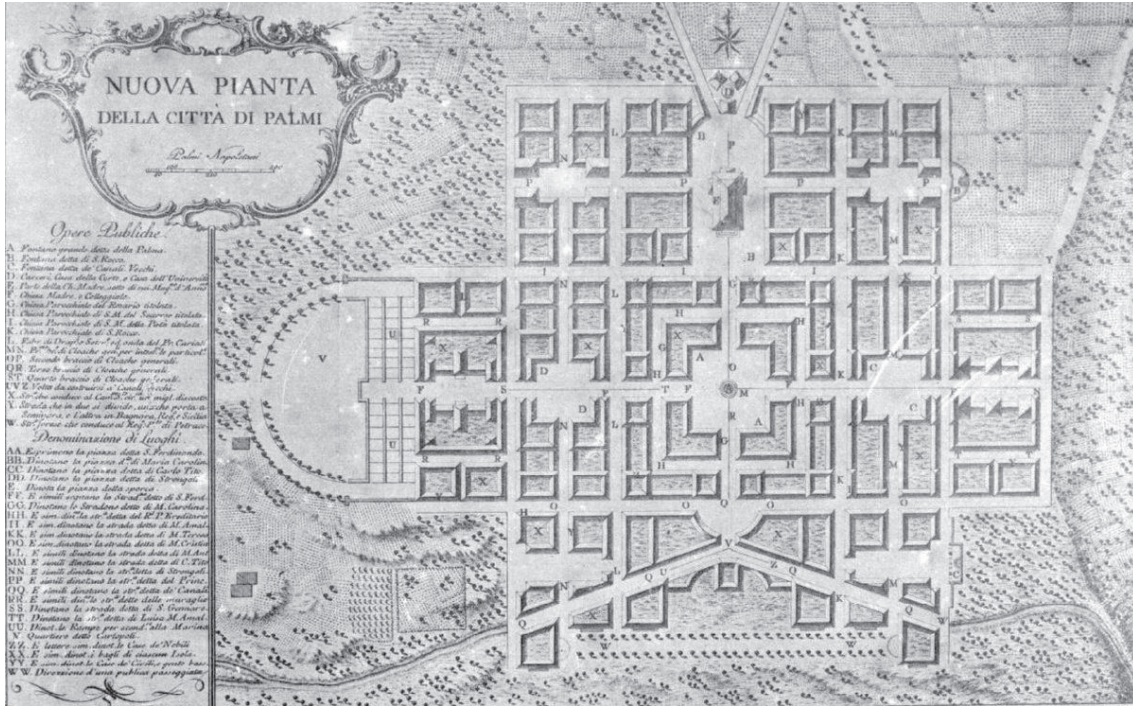
Conclusion

From the 'where it was how it was' approach, to the building of entirely new parts of a city, reconstruction after an earthquake provides various intervention strategies, whose success is conditioned by many factors, not least

the economic resources and administrative policies of the areas involved. It is also true that rebuilding an area exactly as it once was is not possible, or even desirable in many cases. Often it is difficult to imagine that the creation of entirely new parts of a city can be a valid solution to the problem; the new town of L'Aquila is an emblematic example.

At the same time, it must be said that relocation in temporary housing villages during the primary emergency phase, cannot be a long-term answer to the responsibility of rebuilding work that respects the zone and protects its landscape. Both temporary and permanent work has to be undertaken with the awareness of the extreme fragility of certain, already highly compromised, contexts, and should be done by looking at the quality of life of those who live there, enhancing safety and encouraging repopulation. From this standpoint, it is important to rehabilitate and not simply rebuild; facing disasters is an opportunity to do more and do better. It is therefore necessary to transform these damaged areas into resilient communities and then into resilient towns, and to make that happen, it is essential to equip the towns with the right instruments. The design of a more cohesive landscape is of primary importance, through stronger infrastructural links that utilize new technology and the historical networks made available by the territory, and which need to be boosted. In short, to rebuild a social network that has been fragmented not only by seismic events but also by gradual abandonment, it is necessary to support communities, instill hope and limit difficulties. Community centers have the dual function of being strategic rescue units and flexible spaces for citizen use. They integrate the needs of a temporary town with those of a more permanent one, and offer valid support during all the sequential phases of operational planning after an earthquake. 1179

Figure 1. New plan of Palmi, 1783 <http://www.blueplanetheart.it/2017/03/i-devastanti-terremoti-della-calabria-del-1783>.
<http://www.blueplanetheart.it/2017/03/i-devastanti-terremoti-della-calabria-del-1783>



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Figure 2. Plan of Norcia, 1859.

Modena, Biblioteca Civica di Storia dell'arte "Luigi Poletti", Fondo Poletti, 1859.

<http://www.blueplanetheart.it/2017/03/i-devastanti-terremoti-della-calabria-del-1783>



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Figure 3. Internal Area of Valnerina.

Layout by A.Fiorelli, V.Palini.

<http://www.blueplanetheart.it/2017/03/i-devastanti-terremoti-della-calabria-del-1783>

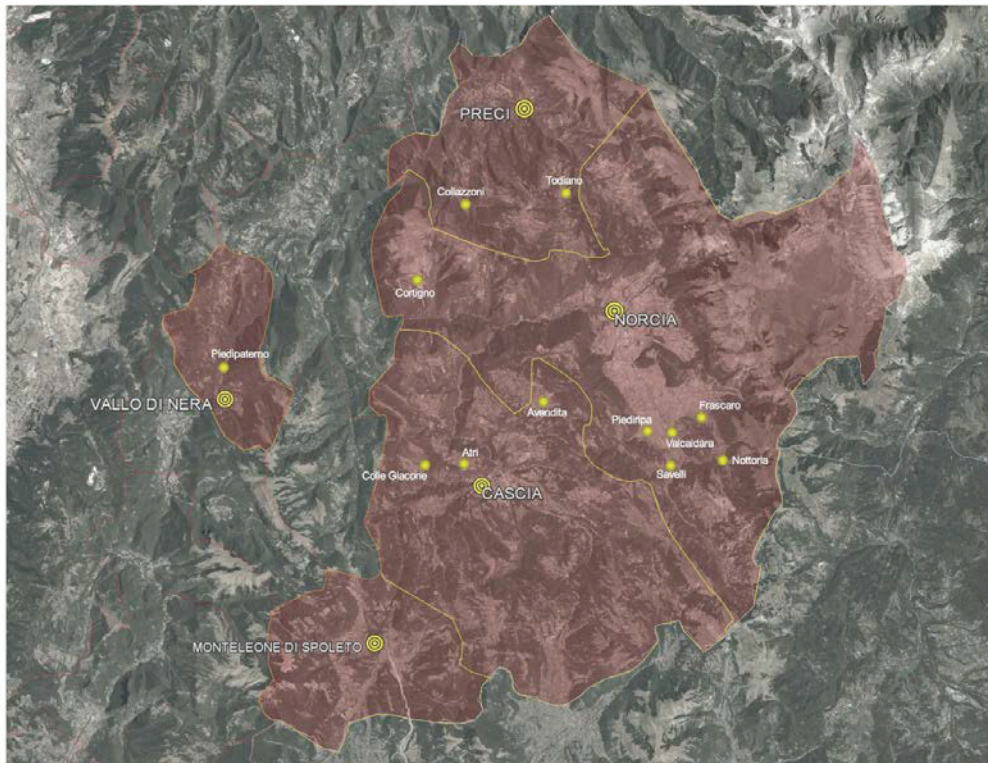


Figure 4. Community Centers, 2018.

Layout by A.Fiorelli,V.Palini.

<http://www.blueplanetheart.it/2017/03/i-devastanti-terremoti-della-calabria-del-1783>



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- 1184 Sarti C., Saggio di congetture su li terremoti (Lucca 1783), Il nuovo giornale dei letterati, Società Tipografica, Modena, 1784. Storchi S., Antichi edifici e rischio sismico. Dall'analisi alla prevenzione, Diabasis, Reggio Emilia 1999.

Note

- 1 Sarti C., Saggio di congetture su li terremoti (Lucca 1783), Il nuovo giornale dei letterati, Società Tipografica, Modena, 1784.
- 2 Storchi S., Antichi edifici e rischio sismico. Dall'analisi alla prevenzione, Diabasis, Reggio Emilia 1999, p.53
- 3 Faccio P., 'Lezione 5: Il Sisma', materiale didattico, Università IUAV di Venezia, A.A 2014/2015.
- 4 The main roads had to be at least 8 meters for smaller cities, from 10 to 13 meters instead for the most important ones. The secondary roads, from 6 to 8 meters wide, straight and orthogonal to each other.
- 5 Mariani M., La previsione e gli interventi per ridurre la vulnerabilità degli edifici, in L'IU, L'ingegnere umbro, Ordine degli architetti di Perugia review, n°99 dicembre 2016, p.7.
- 6 Giacché L., Riflessioni sul terremoto dell'Appennino Umbro-Marchigiano del 30 ottobre 2016, Perugia 2016, p.1
- 7 Gambino R., Sargolini M., La rigenerazione dei nuclei e dei borghi storici dell'Italia Centrale danneggiati dal sisma 2016, RI_VISTA 02/2017, p.222.
- 8 Giacché L., ibidem, p.3