

Prerequisites for Post-Disaster Regeneration of Historic Cities



Judith Ryser
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Editors



Silk Cities

Silk Cities is an independent professional and academic initiative for knowledge exchange, research, engagement and raising awareness on under-explored contextual and global challenges and opportunities. Its initial geographic focus was on those countries along the Silk Roads in the Middle East and Central Asia. This region is the home of long lasting urbanism and civilisations, therefore enjoys rich tangible and intangible heritage built over millenniums and centuries of history. However, the region also suffers from contextual and global challenges affecting societies and cities. Additionally, it has suffered from a variety of destructive incidents especially in recent decades, ranging from natural hazards to human induced origins, from earthquakes to wars.

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Book edited by Arefian F.F., and Moeini S.H.I., 2019, Springer

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Preface

Post-disaster reconstruction, disaster management, risk reduction and urban resilience form important themes of Silk Cities activities as the initial geographic focus of Silk Cities is the Middle East and Central Asia which during recent decades have suffered a variety of destructive incidents, ranging from natural hazards to conflicts and wars. This is also linked to my personal practice-based experience. My four years of working with reconstruction stakeholders including disaster-affected families during post-disaster urban reconstruction in the historic city of Bam, a world heritage site, triggered my doctoral study and further research and academic activities on the subject matter at international level. This experience was influential in founding Silk Cities.

Post-crisis city recovery is multidimensional and post-disaster reconstruction is a manifestation of physical recovery that should facilitate other kinds of recovery, including psychological, social and economic recovery and enhance future resilience of residents. Nevertheless, even in normal situations cities are complex mega-systems and managing them in historic contexts is even more complex as it also connects with collective memory and layers of history underneath tangible and intangible urban aspects. Dealing with disasters in such contexts significantly intensifies complexities and requires understanding layers of complexities from disaster management, urban development and heritage perspectives, their overlapping areas, stakeholders and practical consequences in the field, especially when working with disaster-affected locals.

There is a need for multi-perspective and multidisciplinary examinations of cases, listening to different voices and trying new approaches and tools. This publication aims to contribute to such explorations by bringing together different disciplines and standpoints. It is the first self-published and open access e-publication by Silk Cities and represents another milestone in its journey.

As acknowledged separately, chapters are based on peer reviewed and updated revisions of a selection of papers presented at the 3rd Silk Cities international conference, Silk Cities 2019, entitled: Reconstruction, recovery and resilience of historic cities and societies, held at University of L'Aquila, 10-12 July 2019. The idea of holding the third Silk Cities international conference on historic cities suffering destructive disasters emerged from the 2nd Silk Cities conference in 2017, hosted by the Bartlett Development Planning Unit (DPU) at University College London (UCL) in

2017. The focus of Silk Cities 2017 was on reconnecting population with urban heritage in the Middle East and Central Asia that included a theme on post-disaster reconstruction. During and after the related thematic sessions at the second conference the need for further discussions and more in-depth attention to this urgent matter was highlighted. Soon after, I first visited L'Aquila in 2018, nine years after the 2009 earthquake, and heard the testimony of the city's disaster-affected residents. It was a clear case that, when disaster occurs, it is the city and its residents who bear the consequences of insufficient attention paid to complexities of organising urban reconstruction and to their role in the multidisciplinary aspects of city recovery. Given the specific nature of the conference subject and the fact that L'Aquila, like many disaster-hit cities in the Middle East and Central Asia, enjoyed a rich history of urban life and heritage it made sense to take the conference there.

The large geographical coverage of the papers presented at the conference portrays the subject matter as a global challenge, for which this e-publication together with the Silk Cities printed book on historic cities in the face of disasters (published by Springer in 2021) act as frontiers. Aligned with Silk Cities strategy, they are forward looking and aim to set new directions and to initiate new discussions. Directions set out in this publication can be traced further in the printed book.

What next?

Under normal circumstances we would have been preparing our 4th international conference, but nothing has been predictable nor normal in 2020 and 2021 so far. Confronted by a global health crisis the challenges the global community had to face because of Covid-19 tested the resilience of us all. With social distancing in place and cautionary measures likely even after successful vaccinations Silk Cities moved toward digital tools. "Urban Talks" around new directions and critical thinking on our cities in the context of a global pandemic and beyond is one example.

Silk Cities continues to engage with both younger and experienced generations of academics and practitioners and the public who care for and have experience in dealing with real life urban matters of cities of concern.

Hope you enjoy the book!

Dr. Fatemeh Farnaz Arefian



Fig.I Geographic coverage of this publication - global level (created by Maria Diez, Fundacion Metropoli)



Fig.II Geographic coverage of this publication - Italy (created by Maria Diez, Fundacion Metropoli)

Preparing a peer-reviewed e-publication during a global pandemic requires collective dedication. The editors therefore are grateful to Nafiseh Irani and Ali Puya Khani our colleagues at Silk Cities, Maria Diez, and all the authors for their commitment to the project, patience, and flexibility to pursue it as it was envisioned. Thanks all who made this publication possible in a challenging period of “Work-from-home”.

Chapters of this e-publication are based on peer reviewed and updated revisions of a selection of papers presented at the third Silk Cities international conference, Silk Cities 2019, entitled: Reconstruction, recovery and resilience of historic cities and societies. It was held at the University of L’Aquila, 10-12 July 2019. Initiated by Silk Cities, the conference was organised by Silk Cities, University of L’Aquila and University College London (UCL). Organising conferences is a collective effort and this conference enjoyed support and contribution of the conference conveners, strategic advisors, and the scientific committee which reviewed papers for the conference and provided feedback, also as guest speakers. They are acknowledged in alphabetic order: Prof. David Alexander, University College London, UK; Dr. Fatemeh Farnaz Arefian, University of Newcastle, Silk Cities & University College London, Singapore, UK; Prof. Yves Cabannes, Emeritus Professor in Development Planning, Portugal, UK; Prof. Lina Calandra, University of L’Aquila, Italy; Prof. Simonetta Ciranna, University of L’Aquila, Italy; Prof. Julio D Davila, University College London, UK; Dr. Donato Di Ludovico, University of L’Aquila, Italy; Prof. Alireza Fallahi, Shahid Beheshti University (SBU), Iran; Arch. Barnaby Gunning, Independent, UK; Mr. Arif Hassan, Independent, Pakistan; Prof. Andrew Hopkins, University of L’Aquila, Italy; Prof. Paola Inverardi, University of L’Aquila, Italy; Prof. Cassidy Johnson, University College London, UK; Prof. Hidehiko Kanegae, Ritsumeikan University, Japan; Dr Alexy Karenowska, University of Oxford, UK; Prof. Ramin Keivani, Oxford Brookes University, UK; Prof. Jamie MacKee, University of Newcastle, Australia; Dr. Roger Michel, The Institute for Digital Archaeology, UK; Dr. Iradj Moeini, Shahid Beheshti University (SBU), Iran; Mr. Babar Mumtaz, DPU Associates, Pakistan; Dr. Florian Mussgnug University College London, UK; Prof. Antonella Nuzzaci, University of L’Aquila, Italy; Dr. Richard Oloruntoba, University of Newcastle, Australia; Dr. Lucia Patrizio Gunning, University College London UK; Prof. Paola Rizzi, University of L’Aquila, Italy; Prof. Salvatore Russo, Iuav University of Venice, Italy; Ms. Judith Ryser, ISOCARP and Fundacion Metropoli, UK; Prof. Antonello Salvatori, University of L’Aquila, Italy; Ms. Anna Soave, DPU Associate, UN-Habitat Iraq Programme, Iraq; Prof. Alessandro Vaccarelli, University of L’Aquila, Italy; Prof. Suzanne Jane Wilkinson, University of Auckland, New Zealand.

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Organising the conference to become a success is undoubtedly owed to the support of professional teams at Silk Cities, University of L'Aquila and the Bartlett Development Planning Unit (DPU) at UCL who behind the scene took the responsibility for various stages and tasks during the whole process and made it happen. They are acknowledged here. Professional team at Silk Cities: Maryam Eftekhari Dadkhah, Belgium; Nafiseh Irani, Singapore; Mona Jabbari, Portugal; Ehsan Fatehifar, Iran. Professional team at University of L'Aquila: Carlo Capannolo, Italy; Michela Fazzini, Italy; Sabrina Madia, Italy; Massimo Prosperococco, Italy; Alfonso Pierantonio, Italy. Professional team at The Bartlett DPU at UCL: Jacqueline Hartley, UK; Alexander Macfarlane, UK; Ottavia Pasta, UK.

Thank you all!



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Setting the scene

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Cities are complex interconnected social, economic, political and ecological systems. Dealing with disasters, enhancing resilience and managing urban reconstruction and recovery require decision makers to understand these interdependent processes and their interactions. Doing so in a historic landscape adds significantly to complexity. In practice, making sense of such complexities is easier said than done. There is a need for multi-perspective and multidisciplinary study of cases, listening to different voices and trying new approaches and tools to deal with them. This publication offers an opening to such explorations by connecting the built environment, heritage and disasters. Disasters referred in this book are twofold. Most of them originate in natural hazards such as earthquakes, but they also address 'human induced disasters' like deliberate destruction or destructive consequences as a result of development. These calamities are indeed devastating for the built environment, heritage and most of all society and have to be treated accordingly as disasters.

In practice, urban reconstruction programmes and heritage preservation strategies are greatly interdependent for disaster management during and after disastrous situations affecting historic cities and their societies. Influenced by subjective as well as technical and political considerations both reconstruction and preservation are undergoing continuous change driven by material as well as cultural values and priorities.

In recent decades the way disasters were perceived moved away from being an act of god and since 1990s those who analysed disasters were beginning to link their studies to development and to attribute more importance to society. International advancements in this field and the increasing importance of pre-disaster risk reduction evolved alongside each other and led to the Sendai Framework which has set the global agenda for 2015-2030. Since then, reconstruction has become the strategic physical agent of urban recovery, closely linked to future development strategies and the need for resilience. Yet the question of how this is to be achieved in practice is still underexplored (Arefian 2018). Expectations of what can be achieved in reconstruction are changing continuously. To date two expectations are most commonly acknowledged. They are: to integrate strategies, measures, and other tools to reduce future disaster risk in the reconstruction process while enhancing urban resilience; and to enable active participation of disaster-affected people in both the reconstruction of their physical assets and the preservation of their social-cultural identity. Other case-specific expectations, such as maintaining heritage values, are also becoming more prevalent.

In parallel, cultural heritage studies have also progressed. It is now widely acknowledged that cultural heritage is not confined to the preservation of monuments and the collection of historic objects (UNESCO, n.d.). More specifically, urban heritage was gradually perceived as a dynamic asset for the future instead of a dead weight from the past. This led to a move away from static, museum-style conservation of historic buildings and neighbourhoods to the recognition of the many multi-faceted aspects of urban life. The UNESCO Recommendation on Historic Urban Landscape of 2011 promoted a significantly more global vision and gave special prominence to the communities which inhabit historic towns, as well as to their broader built environment. This approach also implied a disciplinary expansion of horizons, with an increasing number of inputs sought and coming from the social sciences (García-Hernández and Calle-Vaquero, 2019). Yet, many of the historic cities whether they are admired by local, national or international communities are potentially at risk. An example is Hoi An in Vietnam that its city centre is a world heritage urban fabric recognised as a living heritage (Fig. Intro.1). The city is in Central Vietnam which is highly exposed to climate change-related incidents (Fig.Intro.2).



Fig.Intro.1 Hoi An, Vietnam, a world heritage urban fabric recognised as a living organism (source: Arefian, 2019)



Fig.Intro.2 Flood levels in historic urban fabric of Hoi An (Source: Arefian, 2019)

Another step which became important in the urban context and for the New Urban Agenda (UN 2017) adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador in 2016 was to bring together the UNESCO recommendations of 2011 with other qualitative aspects considered essential for cities and urban development.

Nevertheless, the global challenge of what to do when historic cities are hit by destructive incidents prevails, considering that disastrous and destructive incidents in historic cities are not waning. Recent examples of cities which have undergone natural disasters are L'Aquila, Aleppo, Kathmandu, Erbil and Bam. Figure 3 presents the city centre and historic heart of L'Aquila in Italy that more than a decade after its 2009 earthquake resembles a vast construction site. Figure 4 presents the scale of damage in the historic city of Bam in Iran after its 2003 earthquake. The gravity of the impacts historic cities

and disaster-affected people underwent due to these disasters have triggered further experimentation with innovative approaches to reconstruction and preservation and, in particular, of how to balance competing forces and urgent demands in such a context of highly complex and uncertain post-disaster situations. Acknowledging the wide and diverse range of expectations about how to deal with the historical landscape of a city greatly intensifies and amplifies the complexities of post-disaster urban reconstruction, which is already high and requires multi-objective operational mega-systems (Arefian, 2018). When disaster strikes policymakers, professionals and stakeholders have to confront these issues in the field and in practice, even if they have not thought about them before. They need to be able make sense of the bigger picture, interconnections of competing forces and overlapping policies and operations which may be originated from different disciplines. Highlighting such complex scenarios, ICOMOS has acknowledged the urgent need of bringing together the complexities of post-disaster reconstruction and urban development processes in historic contexts (ICOMOS, 2014, 2016).

The growing international and national recognition of the importance of the population affected by disasters has attracted new entrants to this debate beyond the built environment professionals and the heritage experts. They often belong to those struck by both natural and planned destruction, among them teachers, artists, youths and community activists defending their right to their local identity and some of their experiences are included in the book.



Fig.Intro.3 L'Aquila city centre after 10 years from its 2009 earthquake (Source: Arefian, 2018) **Fig.Intro.4** The extent of damage after the 2003 earthquake in Bam (Source: Arefian, 2004)

The examples in this e-publication are chosen from both developing and developed countries with a broad variety of cultural and political values. They are comprising the following countries in alphabetic order: India, Iran, Italy, Latvia, Mexico, and Pakistan. The chapters discuss a wide range of situations and approaches to heritage issues related to urban disasters and resilience, exploring innovative approaches to the everlasting dilemma between reconstruction and preservation in both historical and contemporary cases. The presented experiments and studies focus on urban planning issues and research tools connected to post-disaster reconstruction; how to deal with listed and

unlisted heritage; seismic construction technologies; as well as pedagogical, perceptual and emotional aspects concerning a broad understanding of heritage, including more active involvement of the affected population in making decisions on reconstruction and preservation.

The publication starts with a planning critique on the notion of cultural heritage and urban planning. Chapter 1 poses the question of “whose cultural heritage?” in India and makes the case for the significance of socio-economic values associated with cultural heritage and the importance of local actors in strategic plans. Chapter 2 uses a technical research tool to analyse the impacts of such plans on the Kashan bazaar in Iran and argues that they reduce the resilience of a historic urban fabric to disaster.

A number of chapters address the still prevalent and unresolved dilemma between rebuilding post-disaster the exact past of a certain period “as it was” and updating damaged historic urban fabric using a broader range of criteria about what to retain, what to repair and what to reconstruct. Chapter 4 compares the two opposing methods and their relative measures in the historic case of post-war reconstruction in Latvia and the contemporary case of the post-earthquake reconstruction of L’Aquila, Italy, while Chapter 3 uses local heritage to build resilience and deal with complexities of reconstruction, arguing that reconstruction is not only about preserving past values, but handing down values and contemporary buildings that leave traces of memory to future generations. Chapter 5 deals with human-induced destruction by dams planned to submerge existing settlements under water-reservoirs and how to deal with regenerating memory when resettling the affected communities elsewhere.

Chapters 6 and 7 deal with earthquake resilient building technologies. The former discusses a patented design of round structures applied but not realised for the reconstruction of Messina Italy. The latter develops a model of nonlinear technical analytical procedures to understand seismic impacts applied to the post-earthquake reconstruction of a cathedral in Mexico, also applicable as preventive measure. Chapter 8 also deals with reconstruction methods in Italy but by focusing on a psychological dimension when proposing to use physical ‘debris’ as a tool to reconstruct memory rather than just physical objects.

The last two chapters are intrinsically forward looking. Chapter 9 advocates cracking silos to make different institutions cooperate in educational processes in Italy by means of a strategy to communicate and disseminate joint actions on cultural heritage sites in cooperation with schools. Chapter 10 focuses on the young generation in Italy and Pakistan, advocating heritage education as a tool of rethinking cities and local areas, thereby mobilising civic engagement and heritage activism.

The objective of this collection is an invitation to think of the bigger picture and how to balance different forces or disciplinary mindsets around heritage conservation, disaster management and urban development programmes. The publication provides an entry point to such explorations and indicates directions for future understanding and action. It aspires to assist researchers and practitioners alike, among them reconstruction managers, urban governance officials, built environment professionals and academics interested in bringing together historical and contemporary cases of reconstruction, as well

as opportunities for self-reflection on the past for stakeholders, academics and affected communities, and the current state of theory, policy and practice in this field.

Publishing these experiences in an easily and widely accessible e-book aims to reach beyond an academic and professional readership and to attract new participants in cultural as well as material reconstruction.

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Whom and whose cultural heritage?

Reflections on the notion of “cultural heritage” in contemporary Indian conservation and planning systems

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Abstract

The objective of this research is to portray a better understanding of history, significance, and socio-economic values associated with Indian cultural heritage and its contexts. The research depicts two examples of stepwells to investigate them as “cultural heritage,” with the aim to highlight the fundamental concerns about the role of diverse local actors involved in the conservation process of such a cultural heritage.

The process of post-industrialisation and rapid urbanisation in the historical cities and villages of western India dramatically affected the social, cultural and economic structure of those contexts in which stepwells, were very well rooted. The stepwell was one of the most important fundamentals of traditional Indian life within the ritual of daily water collecting. Now these stepwells lost their original functions, they were either drastically abandoned or became centres of speculation for the real-estate market targeting immigrants or wealthy clients and tourists. One can observe the same situation around the two stepwells under investigation in this research. They have approximately the same physical, historical, and architectural settings. Both are recognised as recorded monuments of “national importance”. However, as they were in two completely different contexts, policy and management situations, they were dealt with totally differently as regards their capacity to serve as cultural heritage for their people.

The current strategic plans and policies affecting those two stepwells, rise considerable doubts about the very notion of who “benefits” from these stepwells as cultural heritage, and from the conservation of their authenticity, under heavy post-industrialisation and rapid urbanisation processes. Therefore, the main challenge which this research addresses is the valid concerns about the identification of legitimate “beneficiaries” from the notion of “cultural heritage” in Indian contemporary planning and conservation strategies.

Keywords: Stepwell, Cultural heritage, Conservation, Post-industrialisation, Rapid urbanisation, Ahmedabad, India

1.1 Introduction

In India, heritage conservation has mainly focused on the fabric of the monuments or, in other words, on “material-based approaches”, because in most cases the “colonial-based heritage policies” constituted the heritage legislation and policies in India. Even after independence the Archaeological Survey of India (ASI), established during the British colonial period, has been the sole governmental organisation in India - under the Ministry of Culture - with the responsibility of the protection, conservation, and maintenance of the listed monuments and sites, already recognised as the monuments and sites of “national importance” by Indian law. Alongside the ASI, the archaeological departments of the States are conducting protection and preservation activities for the other protected monuments in the States and the National Trust for Art and Cultural Heritage (INTACH) – the non-governmental body of professionals – is also involved in the identification, documentation, protection, and conservation of the Indian unprotected heritage.

During the post-colonial period, ASI and INTACH have adopted several heritage discourses as well as international charters and guidelines formulated by UNESCO, ICOMOS and international funding agencies, to define conservation approaches for Indian monuments better (NPC – AMASR, 2014). Recently, the first ‘National Conservation Policy’ deliberated by the Government to safeguard, protect and conserve the ASI’s protected monuments and sites was taking into account the contemporary heritage discourses and, in particular, those attempts which demonstrate a paradigm shift from “material-based” to “values-based” approaches. Lately, the ‘Council on Monuments and Sites’ (COMOS) of India, registered as the national committee of ICOMOS in 2012, started some fresh initiatives through the network of various National Scientific Committees and the Professionals Working Groups of young professionals “to dialogue, develop and advocate appropriate mechanisms, policies and frameworks relating to India’s diverse heritage” (COMOS India, 2020, p. 13).

Meanwhile, the “Five-year Plans” of the “Planning Commission” centralised and integrated the contemporary planning system in India with the national economic agendas. The planning system followed the “predict and provide”¹ approach. This was making plans, such as “excessively deterministic”² development plans with the strong intention to achieve stable and “secure, balanced and planned development of the urban areas”³ in Indian cities. More recently the Indian planning system adopted contemporary international trends, such as the “smart cities” concept and approaches like “smart development”, as well as the integration between “land use and transportation planning contemplations”. The aim was to drive economic development and the quality of life of people in the Indian cities and regions through the empowerment of local development. In 2015, the Government of India launched a policy “think tank”, ‘The National Institution for Transforming India (NITI) Aayog’, to design “strategic and long term policies and programmes for the Government of India”, as well as to “provide relevant technical advice to the Centre and the States”⁴.

1 Bimal Patel 2020, in conversation with B. R Balachandran on the *Planning the city for an unpredictable future*.

2 Ibidem.

3 See: <https://townplanning.gujarat.gov.in/#:-:text=The%20Town%20Planning%20and%20Valuation,the%20urban%20areas%20in%20Gujarat.%E2%80%9D&text=Disseminate%20information%20for%20Land%20Development%20and%20Building%20Construction> (Accessed 10 August 2019).

4 See: <https://niti.gov.in/> (Accessed 20 June 2020).

Looking into both recent national planning systems and heritage conservation programmes in India, it can be argued validly that India has made a long journey of prised and robust efforts to arrive to its 21st century planning and conservation by contextualising, and sensitising the adaptations of these plans, policies and regulations. Nevertheless, this research tries to identify the main limits and potentials of these attempts to bring critically to the light the actual condition of heritage conservation and its role in the Indian planning systems. To do so, the research examines the recent stories of two of the most significant examples of Indian historical underground water structures, known as stepwells; the Rudabai and Dada Harir Stepwells. Both stepwells are very similar in origin, yet they had different fates in facing the process of urbanisation over last 60 years. Taking advantage of this comparison, the main aim is to trace the key policies, development plans, conservation plans and actions, the process of decision making and the significant actors involved in those stories in order to picture a clearer landscape of conservation in India and specifically the critical contemporary condition of these stepwells.

Historically speaking, Indian stepwells were a brilliant response to the conditions of scarcity of water resources. The stepwell was one of the most fundamental traditions of Indian life when men and especially women founded their principle of social freedom within the ritual of daily water collecting. The finest types of stepwells and the most intense use of a variety of its types could be found in the Gujarat state in the west of India. Ahmedabad city and its hinterlands hosted a significant amount of those water-related buildings. Gujarat has a semi-arid climate with raining monsoons and a dry season of almost half a year. In pre-modern India, stepwells were the strategic infrastructures and celebrated architectures with the capacity to store the water collected from the monsoons underground and to make it accessible during the dry season. Their strategic locations in the vicinity to the main roads and settlements, were well complemented by the nature of rural India. With the late arrival of modernisation to India, almost all these stepwells lost their original function. At present, they are either drastically ignored or, on the contrary, their cultural image is used as the centre of speculation for the real-estate market. The process of suburbanisation took advantage of the geopolitical location of these stepwells usually near lakes or ponds, and of their vicinity to the new infrastructures which made their contexts desirable for real-estate investments.

1.2 Rudabai and Dada Harir Stepwells: two similar historical, physical, and architectural settings

The Rudabai and Dada Harir stepwells were both constructed around 1499⁵ A.D, during the reign of Sultan Mahmud Begarah (1458-1511 A.D.), a Muslim ruler. However, both stepwells were built with ladies' patronage. The Rudabai stepwell was built by Queen Ruda, the wife of the Vaghela chief Virasimha (Burgess, 1874; Jain-Neubauer, 1981) at Adalaj village, and the Dada Harir Stepwell was constructed by Bai Sri Harira, a lady who belonged to the court of Mahmud Begarah (Jain-Neubauer, 1981) at the north-eastern part of Ahmedabad city. Both stepwells were established in the fusion style between Hinduism and Islamic periods. Although they were built in the Solanki style (Hindu style) with its architectural and structural features, one can observe the Islamic

⁵ The date mentioned here is according to the Sanskrit inscriptions.

influence in the specific carving, decorated sculptures and motifs. The architecture and sculpture of those stepwells fit into the context of the late eleventh century of the Maru-Gurjara⁶ monuments of the period of Karnadeva (1064-1093 A.D.). The two stepwells were typologically linear subterranean water buildings, with a plain basic structure. Both had their main entrance on the ground floor, raised from the soil by a few steps as the demarcation which led a linear stepped corridor to the underground, reaching the final well shaft at the end of the building⁷. In a more detailed view, both stepwells introduced the journey into the depth of earth, with pillared multi-storeyed pavilions and supporting frameworks that accompanied the stepped corridor along the five floor journey, passing from an octagonal shaft with a square tank, to reach the last stop to the water. The octagonal shaft with a trabeated system of pillar and beams was constructed to counterbalance the earth pressure exerted from both sides of the corridor's retaining walls of the structure (Figs.1.1 and 1.2).

At present, the Rudabai stepwell, its temple, and its small garden and the Dada Harir stepwell with its mosque are confined, protected and categorised as monuments of "national importance" by the Indian Government under the provision of the 'Ancient Monuments and Archaeological Sites and Remains' (AMASR) Act of 1958 (amended and revalidated in 2010). According to the act, no new construction, development, or alteration of the monument, site, or the protected surrounding area can be undertaken without the approval of the National Monument Authority and ASI. Both stepwells are in a proper consolidated condition and protected by the ASI, which under the Ministry of culture is responsible for the excavation, exploration, protection, conservation, and maintenance of the listed monuments and sites of "national importance" throughout India. The Rudabai stepwell, located in the outskirts of Adalaj, a small historical village in the northern periphery of Ahmedabad city of Gujarat State, has recently become one of the destinations for tourists, due to the gradual loss of its original function. The stepwell itself acts like a heritage site and a museum. Conversely, having the same historical and architectural values the Dada Harir stepwell, located in the city of Ahmedabad near the core historic city which since 2017 has been inscribed in the UNESCO World Heritage List, is somewhat ignored, not only by international and domestic tourists but also by the State Government, decision makers, as well as citizens and local people.

⁶ Maru-Gurjara style was the combination of two styles, which "inherited the propensities of its parents, the basic structural forms and architectural ability of the one, and the ornateness and rich ornamental designs of the other". (Dhaky, 1975. p. 120.)

⁷ Jutta Jain in "the stepwells of Gujarat," classified them into five non-chronological categories, based on semi architectural and structural features. While Dada Harir stepwell was the representative of the first category with the straight stepped corridor and one entrance, Rudabai stepwell can be put in the second category which was the variation of the first type with three entrances (two perpendicular ones to the main one).



Fig.1.1 Rudabai stepwell at Adalaj (source: author, 2016)



Fig.1.2 Dada Harir stepwell at Ahmedabad (source: author, 2016)

1.3 Rudabai and Dada Harir Stepwells: two contexts within historical Ahmedabad city developments

Originally, stepwells were built within the village or in proximity with the settlements, as well as on overland-roads or cross-roads. They were also resting places for villagers, travellers, and caravans. The Rudabai stepwell at the edge of the historical Adalaj village, in the outskirts of Ahmedabad city, and the Dada Harir stepwell, located on the outer part of the Ahmedabad walled city at the edge of the historical village of Asarwa, followed similar principles of location and construction. Throughout history, the Adalaj village and the Ahmedabad walled city were the main exchange points of trade between northern cities and southern ports of India, and agriculture was the main occupation of the historical villages in western India. That situation gradually changed when the British East India Company (1818–1857) launched its significant career of commercial enterprise, focusing primarily on trade and later the erection of the British Indian Empire (1857–1947).⁸

During the nineteenth and twentieth centuries, the Ahmedabad district and its historical villages, such as Adalaj, had faced significant transformations which changed their social, economic and political structures, mainly due to the opening of the Bombay, Baroda and Ahmedabad Railway system in the 1860s. Consequently, Ahmedabad city “opened up the door of opportunity toward industrialisation of the mill system and the historical city extension beyond the city wall” (Heidari Afshari and Rajabi, 2016, p.936). Once the textile mills were successfully incorporated in the city, the new immigrant labour forces located messily around the mills outside the historical core city around its eastern walls. Thus, rapid population growth in those areas dramatically transformed the settlement patterns of that part of the city edge in which stepwells such as Dada Harir, were once well embedded in their local villages. In contrast, the western side of the Sabarmati River where the Adalaj village is located “was still considered as hinterland [with] a network of villages located beside water lakes or tanks and agricultural land oriented along the geographic and hydraulic system” (Heidari Afshari and Rajabi, 2016, p.936).

After Indian independence in 1947, while the eastern side was urbanised by industries and mostly low-class workers, a better environment was planned in the western part, accommodating a large number of middle-class cooperative housing societies and educational establishments, research institutions and universities. Accordingly, both the eastern and western sides of the city witnessed partial agriculture deterioration and neglect of related water networks, such as the ones vital for Indian villagers’ lives. Furthermore, once the new hydraulic engineering system – a piped system- was introduced by the British in India, the “social ecology” of water-related buildings were dramatically altered in the whole region. Although “caring for the wells was once a critical community responsibility and created an invisible circle around a well”, “they stopped cleaning it” (Livingston, 2002, p.139). The new piped system became an overarching substitute for the traditional water structures.

⁸ See: <https://www.britannica.com/topic/East-India-Company> (Accessed 5 August 2019).

From the late 1960s, emergent start-ups led to the Green Revolution of agriculture and the introduction of new technologies such as deep bore wells. It transformed not only the agricultural watering system forever, but it also changed the pumping system of the thirsty industrial district. By overloaded mass drawing of water, the ground water reached a lower level than the bottom level of the wells, which caused the stepwells such as Rudabai and Dada Harir, to dry up completely. That was the final blow to leaving the water-related buildings abandoned. In the late 1980s, the collapse of textile mills led them to closure. That process was already accelerated by the Central Government's New Economic Policy of 1991 (Mahadevia et al., 2014). The eastern areas of the city around the mills – originally inhabited by working class families – gradually accommodated more informal settlements and slums which remain till today, especially around the water bodies and stepwells such as Dada Harir, as well as backyards of the railway. Finally, the main significant event for Ahmedabad city was the shift in the state administrative capital from Ahmedabad to the new-built Gandhinagar city in the 20th century. As a result, the Adalaj village which belonged to the Ahmedabad District was added to the Gandhinagar District. The construction of Gandhinagar revived the Adalaj village as the geopolitical point between Ahmedabad and Gandhinagar which opened up further developments of the two districts (Figs. 1.3, and 1.4).

1.4 Rudabai and Dada Harir Stepwells: actual condition of the two contexts

According to the economic reforms and policies of the 1980s and 1990s, the textile industry crisis and the effects of the “liberalisation of the Indian economy”, Ahmedabad's major economy shifted to tertiary or service sector activities and at present the city is one of the “important economic and industrial hubs in India”. Around the city and in its periphery at regional level “petrochemical and pharmaceutical enterprises, automobile industries, agro-food processing, and chemical and dyeing factories” had settled among historical villages. Thus, land prices increased and attracted “large speculative investments” by the private sectors, which transformed the social, cultural, economic, and spatial structures of this context significantly (Mahadevia et al. 2014) and accelerated rapid urbanisation and population growth.

Consequently, several urban projects were initiated by the ‘Jawaharlal Nehru National Urban Renewal Mission (JNNURM)’ supported by the ‘city development plan of Ahmedabad, 2006-2012’. They all formed part of that comprehensive vision which transformed Ahmedabad into the sixth largest city of India, with 5,633,927 population according to the Census of 2011. Although, the post-industrial context of the eastern side of the city was earmarked for development in the ‘city development plan 2006-2012’ and the ‘Comprehensive Development Plan of 2021’, it still accommodated industries and settlements of low-income populations where different castes and religions lived together in close proximity. A similar condition can be observed around the Dada Harir stepwell which is threatened by the degraded backyard of the historic railway, besides the informal settlement and an active coal yard located controversially very near several new hospitals, colleges, schools, shops, temples, and mosques.

Local heritage to build resilience

The case of Arquata del Tronto in the Marche Region

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Abstract

Recent seismic events have caused extensive damage to cultural heritage in the inland areas of the Marche region of Italy, showing the extreme fragility of the territorial system, with strong consequences on the economic and social context. In historic villages, the high seismic vulnerability of the buildings has caused the most significant damage; it is particularly complex to apply regulations and design tools there, aimed at protecting and preserving historical-cultural values; the strategies of re-building are also very complex. Therefore, it is necessary to start from an expansive knowledge of the peculiar features of the historical system of the central Apennines, mostly unknown, to identify recurrent types and techniques through which the foundations and subsequent development of the buildings were laid.

In the present research, a methodology is proposed for an evaluation of the resilience of historic villages, analysing in particular historical building techniques, to verify their effectiveness for seismic purposes and to propose an increase in safety, on which to base conscious reconstruction. The aim of the research is to propose sustainable measures, both from a technical and an application point of view, considering the historical and cultural value of the buildings. In general, the development of specific risk assessment methodologies is necessary to propose strategies to increase the resilience of historic centres. With this purpose, the area of Arquata del Tronto is taken as a case study. The territory is rich in ancient testimonies, tangible and intangible assets. It's a stratification of cultural and figurative elements, which start from the pre-classical age and, through the Middle Ages, up to the modern age, in a continuum of life and agro-silvo-pastoral activities. The different post-earthquake situations therefore require the development of a complex and articulated strategy to build resilience, that considers the specific local conditions.

Keywords: Earthquake, Heritage, Resilience, Arquata del Tronto, Italy

3.1 Introduction

This work presented here is the result of research carried out on the Arquata del Tronto area that began before the seismic events and was carried out in collaboration with the local administration after the earthquake for preliminary studies related to the planning of a recovery plan for the city. The complexity of the territory, already in strong crisis before the seismic events, was analysed, highlighting a series of still open questions. For the purpose of imagining a scenario of reconstruction of the historical centres that characterise the territory of Arquata del Tronto, it is necessary to take into consideration the local identity, because this identity and the local relations constitute a resource and a source of development, on which to rely when community members face a natural disaster. Therefore, within the general study an in-depth knowledge of the features of the places was launched. A “repertory of memory” has been prepared, as a representation of the past and a prefiguration of the future to identify the system of signs that a territory recognises as identity. The research activity concerns the aspects inherent in the assets of historical and artistic interest in the territory of Arquata del Tronto and its constituent parts. It derives data on their consistency and quality as a basis to propose an abacus of the characterising elements, accompanied by the “Linee Guida” (guidelines) for the interventions. Many villages have suffered significant damage in these areas without being completely destroyed. In this case we are speaking of “restoration”, meaning with this term a series of operations ranging from consolidation with improvement of buildings to the reconstruction of collapsed parts. The reconstruction of other historical centres, strongly damaged or destroyed raises the question of being attentive to the return of their lost values. To that effect, it is necessary, scientifically, to find those elements of identity that represent reality value of these places. This knowledge will permit to restore the structure of these centres before seismic destruction and in their most mature state, as it was before the numerous and widespread transformations that have altered their architectural and urban quality over time.

For many of the destroyed or severely damaged sites, it will be necessary to identify a qualitative criterion of reconstruction. In some cases, this means minimum interventions, to improve the accessibility and the security of the context. In other cases, reconstructions with the same volumes and on identical sedimentary areas are conceivable, referring to a repertoire of identity elements. In particular cases, a new volume may be proposed, preferring contemporary solutions that open the way for new local development while ensuring the preservation of identity values. For those villages that are completely destroyed, it is a question of implementing a series of actions for the preservation of memory that enable us to evoke the village that no longer exists in a different and more evolved context that guarantees better living conditions for its citizens, with new resilience capabilities.

Recently, in literature there has been a tendency not only to focus on possible risk factors, but also to turn attention to variables capable of supporting a comprehensive development path. In this sense, the capacity for resilience can be transformed into opportunities, giving rise to positive change. In this research, the “capacity of resilience” tends to be defined as the ability to “recover memory” to define a new identity. With reference to international strategies for disaster risk reduction, it is necessary to mention the “Hyogo Framework for action from 2005 to 2015” and “The Sendai Framework for Disaster Risk Reduction 2015-2030”. The latter outlines seven clear targets and four

priorities for action to prevent new and reduce existing disaster risks. It aims to achieve the substantial reduction of disaster risk and loss of lives over the next 10 years. The United Nations “International Strategy for Disaster Reduction (UNISDR)” developed “The Ten Essentials of the Making Cities Resilient Campaign” including aspects of local governance, financial and technical resources, policies and plans, and participation and engagement of citizens.

Multiple descriptive statistical techniques were used to analyse the ordinal data. Content analysis, a form of thematic analysis, was used to identify key challenges, opportunities and recommendations, based on the comments given by respondents; numbers 4 and 10 are particularly taken into consideration in this research. In this context, the research is making use of specific models, methods and analyses to simulate the effectiveness of vulnerability reduction systems.

3.2 Methodology

The inland areas of the Marche region are showing extreme fragility of its territorial system, with strong consequences on the economic and social context. It is necessary to start from an expansive knowledge of the peculiar features of the historical system of the central Apennines, mostly unknown, to identify recurrent types and techniques through which the foundations and subsequent development of the buildings were laid. Through these analyses it is possible to derive the necessary elements to guide a conscious reconstruction of the founding characteristics of the places, in order to develop new resilient strategies.

The preliminary phase of the research focused on an accurate historical-archival survey of the sources, to try to reconstruct the development of the analysed historical centres and any interventions that determined the level of damage following the 2016 earthquake. This enabled us to recognise the values (historical, architectural, structural, material, colour, etc.) that can guide the design of reconstruction interventions, while identifying the parts and elements to be preserved or reintegrated, and those that can be transformed and / or reinterpreted.

In a first phase the methods of carrying out the research activities were determined to identify an approach to the topic that could make a significant contribution by analysing the current state of the selected places. In particular, the historical cadastre “Pio Gregoriano” was consulted (all the available updates, indicatively datable between 1820 and 1881). There was also critical reading of the Brogliardi, preserved in the State Archive of Ascoli Piceno. Thanks to the computerised Imago project of the State Archives of Rome, it was possible to consult the original cartographies deposited in the archival office of Rome. Some photos and period sketches were consulted to reconstruct the state of places in history. Most photos were found at the Iconographic Archive of the Municipality of Ascoli Piceno.

The empirical research began with a series of inspections in all the thirteen hamlets that make up the Municipality of Arquata del Tronto, to reconstruct a picture of the post-earthquake situation. The recognition of the construction elements made it possible to assess the extreme vulnerability of the architectural heritage, especially in relation to the techniques used in history that are far from respecting the “state of the art”. Among

the vulnerabilities, there are those associated with modern reinforcement interventions (masonry roofing, reinforced concrete curbs) but also pre-modern (non-effective wooden or metal tie bars). These features were mapped and described in a critical manner. Where possible, the survey was accompanied by a geometric-architectural survey for a more in-depth metric and formal knowledge.

The complexity of the district of Arquata del Tronto (Fig.3.1), already in major crisis before the seismic events, has been analysed, highlighting a series of issue.

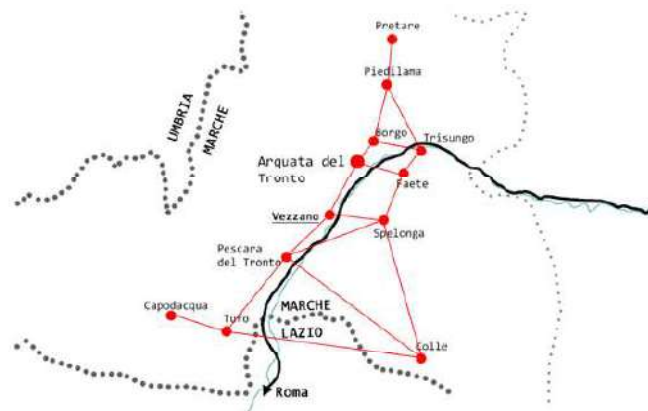


Fig.3.1 The network of historic villages of the in the territory of Arquata (source: authors)

For many of the destroyed or damaged sites, it will be necessary to identify a qualitative criterion of reconstruction. Some cases require only minimum interventions to improve the accessibility and the security of the context. In other cases, reconstructions with the same volumes and on identical sedimentary areas are conceivable, referring to a repertoire of identity elements (Fig.3.2). In particular cases, a new volume may be proposed, preferring contemporary solutions that open the way for new local development while ensuring the preservation of identity values (De Felice, Pugliano, 1993).

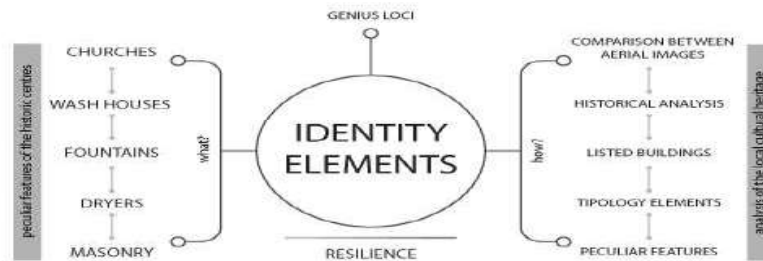


Fig.3.2 Research model (source: authors)

3.3 Case study: the territory of Arquata del Tronto

This research focuses on three different historic centres of the territory of Arquata del Tronto which have very similar features but really different post-earthquake situations: Arquata (chief town), Vezzano and Pescara del Tronto. The different post-earthquake situations therefore require the development of a complex and articulated strategy to build resilience that takes into account the specific local conditions (Fabbrocino, et Al., 2016).

The territory is rich of ancient testimonies, tangible and intangible assets. It is a stratification of cultural and figurative elements, which start from the pre-classical age and, through the Middle Ages, reach up to the modern age. All the historic centres have a poor architecture, responding to the economics based essentially on agriculture. The most important building in each of them is the church, whose prevailing typology is that with a single nave without an apse or with a little accentuated apse. The facades have a very simple decoration and the three portals modified over time have different configurations (Fig.3.3).



Fig.3.3 Churches in Arquata del Tronto. (source: authors)

The survey on the territory of *Arquata* started with a study of those worthy of particular architectural interest reported by institutional sites (MiBAC and Marche Region). Each of them was assigned a colour, red for the bound property, yellow for those deserving of interest but without specific protection obligations. To these was added a further “minor” category, identified during the inspections, to which a green colour was assigned. These assets were chosen for constructive, architectural or decorative continuity. In addition to the main elements of the architectural heritage there is a set of minor elements that are related to local traditions:

a) **Memorials:** this typology has been erected in many cities and towns of Italy in memory of those who died in the First World War, taking on a value that goes beyond the artistic form, rich in symbolic meanings largely unknown in traditional monumentalism.

b) **Wash Houses (Lavatoi):** places where people used to wash their clothes or supply water. They form part of thousands of other minor architectures, the result of spontaneous planning, closely related to the needs of local communities. For this reason, the study of the Lavatoi linked to the use of water is interesting, both as a rediscovery of a systematic framework of solutions distant from the codified models, and for the purpose of understanding the ways in which these architectures fit into the landscape.

c) **Dryers (Essiccatoi):** poor buildings used to dry food in order to preserve it; since ancient times, drying has been the most used method for food preservation. The architecture conformed to this need, through the creation of underground cavities but also of rooms on the upper floors of residential buildings. These rooms were left open to the outside through wooden grilles, with inside wooden accessory structures useful for the ignition of foodstuffs. The size of these rooms was such as to allow the preservation of food for the use of a family community (Figure 3.4).

Very peculiar are also the **access portals** (Fig.3.5) to the buildings. There a certain homogeneity can be found. In particular, the round-headed portals are very widespread, with decorations and shaped keystones, often made of local stone, travertine or sandstone. Conversely, new buildings have only a travertine frame, and the geometry also undergoes a clear simplification. The only exceptions are the representative buildings, almost all for civic use, which have more articulated geometric forms instead and richer architectural features.

3.4.1 The main historical centres of the territory of Arquata

Thirteen hamlets are located in the analysed area with the main hamlet *Arquata del Tronto* in the middle (Carfagna, 1996). Each of them has evident features that refer to a long and articulated local tradition (Borghini, 2017). This territory is relevant in terms of nature and rich in testimonies of the past. It is a stratification of cultural and figurative elements, which start from the pre-classical age through to the Roman age, the Middle Ages and up to the modern age. Unfortunately, this is an area that has been hit over history by substantial seismic events that have contributed to leading to a situation of extreme fragility (Bucciarelli, 1982).



Fig.3.4 Examples of dryers in Arquata del Tronto. (source: authors)



Fig.3.5 Examples of portals in the historical centres of the area (source: authors)

The most recent events took place between 2016 and 2017. They began in August 2016 with epicentres located between the upper Tronto valley, the Sibillini Mountains, the Monti della Laga and the Alto Aterno Mountains. The first strong earthquake of the 24th of August was characterised by a magnitude of 6.0, with its epicentre in Accumoli and hypocentre at a depth of 8 km. The duration was 15-20 sec. During the night numerous shocks were recorded in the area of Norcia and in the Rieti area, among these several higher than the 4th grade. In the municipalities of Amatrice and Arquata del Tronto damage equal to the X degree of the European Macroseismic Scale (EMS) has been reached. Two strong earthquakes took place on 26 October, with epicentres between Visso, Ussita and Castelsantangelo sul Nera. The first earthquake was characterised by a magnitude of 5.4, while for the second a magnitude of 5.9 was recorded. On 30 October 2016, the strongest magnitude 6.5 was recorded with its epicentre between Norcia and Preci, in the province of Perugia. On 18 January 2017 a new sequence of four strong shocks of magnitude over 5 and epicentres located between Montereale, Capitignano and Cagnano Amiterno took place.

The places affected by these events lie in a very active seismogenic area, already characterised in the past by phenomena of considerable magnitude. The main events which occurred in the past are those of 1328, 1703, 1730, and 1859 (Boschi et Al. 1995). During the twentieth century, minor damage occurred, such as the 1915 earthquake that destroyed the city of Avezzano, causing several collapses even in the Arquata area. After the 1997 earthquake, the area did not suffer significant damage, although some interventions were undertaken, following the procedures identified by the Marche Region, mainly oriented to seismic improvement of the structures, especially for those of significant historical-artistic value.

Currently the situation of the centres is very diversified. Three examples have been taken into consideration. The first is Arquata del Tronto in which a substantial removal of collapsed buildings was carried out, but where evident signs of the oldest nucleus remain where new reconstruction was added. Secondly, Vezzano is a small hamlet composed mainly of buildings that, although damaged, are still standing and for which restoration work is conceivable; Thirdly, Pescara del Tronto has totally collapsed and it is impossible to hypothesise an in situ reconstruction for it, despite the fact that positive requests have already been made that require its rebuilding. These examples are illustrated below to understand how the reconstruction strategy should be measured in this specific case, representing each of the Arquata centres as a particular situation (Galiè, Vecchioni, 2006; Lalli, 2017).

3.4.1 Arquata del Tronto (main centre of the municipality)

The main centre of Arquata del Tronto is strategically located on a rocky outcrop in the border strip that still acts as a hinge between the Marche, Lazio, Umbria and Abruzzo. In the middle of it there is the Umberto I square dominated by the tower on which the memorial of the Great War was placed (Mandolesi, Ferrero, 2001). The square was the heart of the town as the most important city events are held there and it is located between the main public buildings (Fig.3.6).

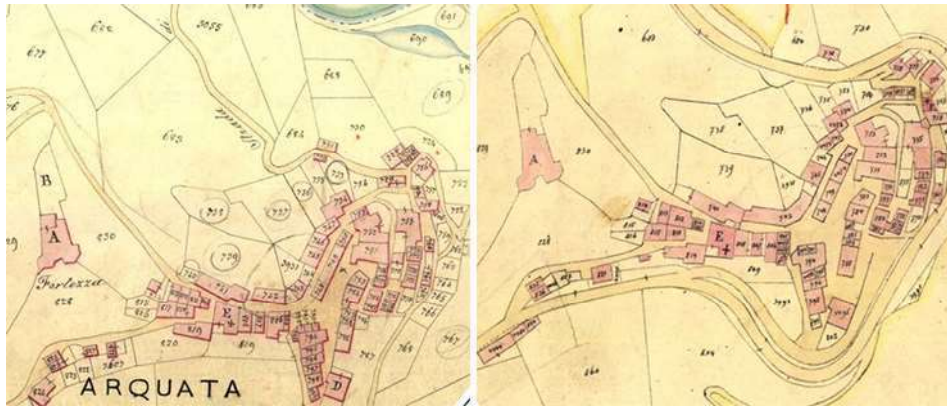


Fig.3.6 Catasto Pio Gregoriano, a.1820 c. and subsequent Catasto, a.1881

Currently, the surrounding buildings have been demolished while faint signs of their plane-altimetric formation have been preserved (Fig.3.7). In the case of Arquata, the central square offers a space of high symbolic value for the community, becoming a sort of lighthouse of memory to remember the effects of the earthquake and those who lost their lives after the building collapses. In dealing with the theme of a conscious reinterpretation of places hit by the earthquake, some useful reflections can be developed whose fundamental issue are considered the architectural and urban relationship included between pre-existence, although mutilated and fragmented, and new interventions. These can be graduated in a real restoration, more or less reintegrated in various forms of reconstruction, oscillating between the operations according to “how it was and where it was” or the most current methods of intervention.



Fig.3.7 Arquata del Tronto faint signs of Umberto I square where plane-altimetric formations have been preserved. (source: Francesco Riti)

The project is focused on the reconstruction of the buildings surrounding the square of Arquata del Tronto. It has sought to identify the tools for an intelligent, sensitive and historically conscious reconstruction of the need for a reinterpretation act, through new linguistic codes. More than the abstract preservation or the pseudo-mimetic reproduction of the pre-existing ones, the path pursued was of a reconstruction of the “civilisation of a place”, composed of immaterial culture and updated ways of life and work, through a richer architectural narration, ancient as well as contemporary (Varagnoli, 2013; Serafini, 2017). The proposal for Arquata based on the total reconstruction of the square started from identifying its character. The new construction project is developed on the ground footprint of the previous volumes, based on the presence of the portals as identity elements and the relationship of the buildings with the landscape (Bartolomucci C., et Al., 2012; Amoroso et Al., 2014). This could be an example of Rebuilding without forgetting who and where we are (Fig.3.8).



Fig.3.8 Square Umberto I: Hypothesis of reconstruction (source: authors)

3.4.2 Vezzano

The village of Vezzano is located at an altitude of 645 m above sea level and can be reached by a road that branches off directly from the SS Salaria, which is a few hundred meters away. It is located near a forest and near a small water spring. This position had been chosen since its medieval foundation to accommodate the direct necessities of sustenance of the inhabitants. It is located directly below Arquata and, along with a few other centres, suffered in a limited way from the earthquake of 24 August 2016. The damages to the buildings are quite contained and are due to the event recorded on 30 October 2016. The lack of serious damage was confirmed by the inspection. Most of the particularly significant damage occurred to those buildings that were already in bad condition due to neglect and lack of maintenance. Vezzano is made up of single-family terraced houses with an external staircase with a central portal and an internal stair-

case to serve the various floors (2 or 3 on the basis of residential height differences are concentrated on the upper floors while the basements and ground floors are livestock shelters and warehouses). The starting point for the characterisation of Vezzano was the historical analysis, through the study of the historical maps dating back to the 19th century. From the representation of the Gregorian Cadastre of 1820-30 (Fig.3.9) we see how the building of the hamlet of Vezzano is essentially a historical one, made of multi-storey buildings and of a collaborative place on the periphery of the built spaces.



Fig.3.9 Catasto Pio Gregoriano, a.1820 c. and subsequent Catasto, a.1881

The 1881 update brings us back to the saturation of some voids, especially in the western part of the countryside. In the eastern part, what used to be a fork in the secondary road tends to lose importance. The buildings facing it advance towards the street front with a further portion of building. From the comparison with the recent maps it has been possible to give a characterisation of the inhabited area based on the age of the buildings. The research also tried to identify the successive modifications and necessary elements to understand what the possible critical issues of the buildings are at present (Figs.3.10 and 3.11).

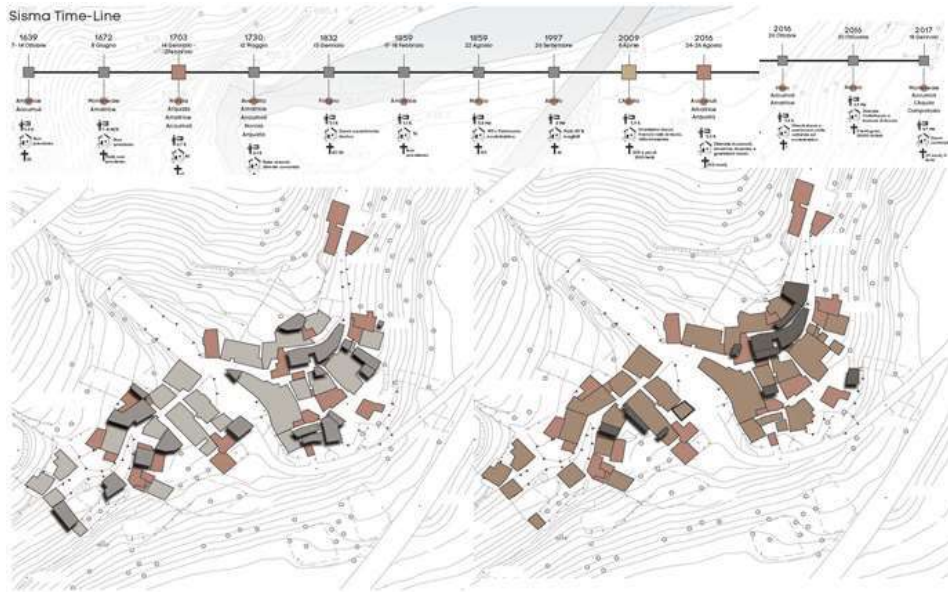


Fig.3.10 Modifications of Vezzano through the years related to the different seismic events (source: authors)



Fig.3.11 The damage of Vezzano after the 2016 seismic events (source: authors)

The typological element in Vezzano were then extrapolated: the portals and the entrances with “*profferlo*” (type of external staircase, ending with a gallery supported by an arch, characteristic of medieval architecture). The whole elevations with a series of portals are all different from each other, some of them re-used in a modern way, others probably disfigured by today’s needs. The examples shown refer to the round arc, set on key segments often decorated with a regular octagon, and with a keystone sometimes shaped, others only carved. The materials used are local ones, ranging from very widespread sandstone to more limited travertine and some examples of tuff (Figs.3.12 and 3.13).

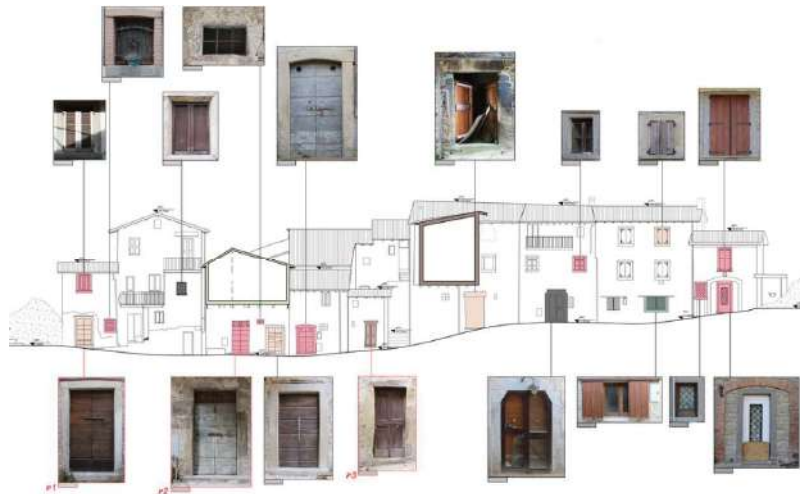


Fig.3.12 Repertoire of the elements that characterise the buildings in Vezzano (source: authors)

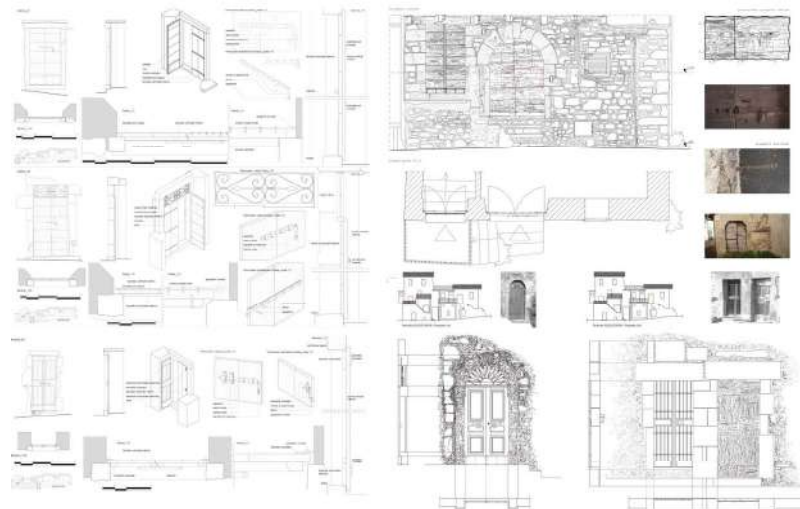


Fig.3.13 Repertoire of the elements that characterise the buildings in Vezzano (source: authors)

Windows consist of a single structure supporting architrave, made of sandstone. In cases where the opening was carried out later than that of the construction, there is an insertion of wedges in bricks, used as a window frame. There are few balconies. Some more representative examples use beams and vaults, with a decorated wrought iron balustrade (Zampilli and Brunori, 2018). An accurate analysis of the masonry we carried out showed a widespread use of local materials, such as sandstone or river pebbles. Some elements are arranged in pseudo-regularity of horizontal courses, while there is a tendency to respect the phase shift of vertical joints. Cantonal corners are generally made of more squared and broader stones. No internal ligaments are observed in the thickness of the masonry (*diatoni*). The only regulatory elements consist of wooden elements inserted inside the walls (dormienti). The construction “magisteriums” are however far from respecting the “regola dell’arte” (rule of art) and results are tied to spontaneous constructive practices. (Fig.3.14).

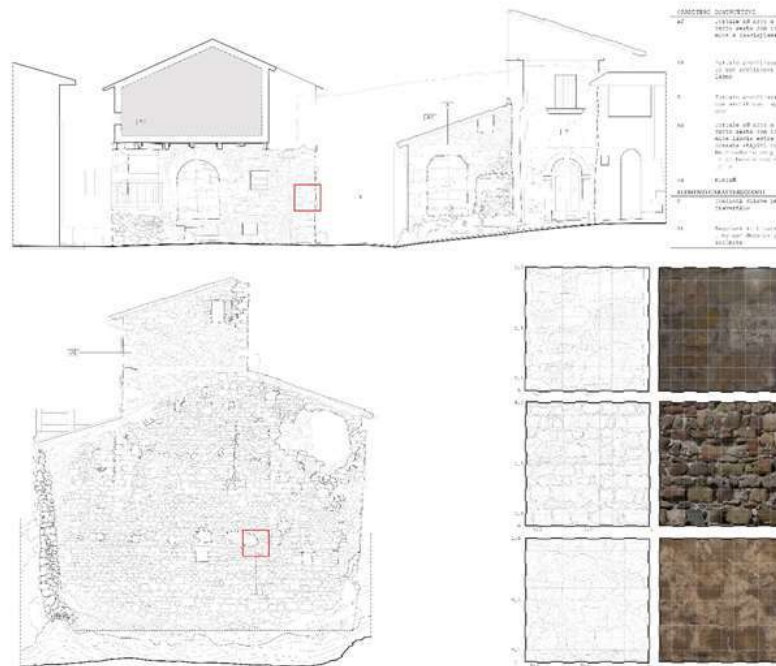


Fig.3.14 Analysis of the masonry in the buildings of Vezzano. (source: authors)

The analyses conclude with an interpretation of the damage suffered during the earthquake. There were several collapses and many damages. Aggregate behaviours are generally complex and poorly codified. The understanding of the activated mechanisms, however, appears fundamental to the perspective of acting with interventions aimed at improving the seismic behaviour of historical buildings. The various project proposals made for Vezzano aim at maintaining the heritage of the historic centre, repairing it, together with seismic damage improvement and redevelopment of the territory through the enhancement of activities in the territory (Fig.3.15).



Fig.3.15 Project proposals for Vezzano. (source: authors)

3.4.3 Pescara del Tronto

The origin and the foundation of Pescara del Tronto, from whose aqueduct comes the mountain water that serves the entire province of Ascoli Piceno, can be traced back to the displacement of small communities coming from the areas of the coast. They went up the waterways including the Tronto river to escape looting and settled in the mountains, choosing a location that guaranteed security. The town acquired importance following the passage of the Salaria, a consular road built by the ancient Romans to connect the city of Rome with the Adriatic Sea, generating a commercial channel for traffic and salt transport. With the presence of the road arrived also dangers and it was then that the inhabitants protected their houses by encircling the small village with walls.



Fig.3.16 Catasto Pio Gregoriano, a.1820 c. and subsequent Catasto, a.1881

Pescara was the most affected town in the Arquata area by earthquakes. Its tuff and sandstone houses were literally crushed by reinforced concrete roofs and 49 of almost 200 inhabitants did not manage to survive the earthquake. Currently, passing near Pescara you cannot see anything, only rubble: a countryside demolished on the night of the first earthquake and then pulverised by the earthquakes of October 2016 and January 2017 (Fig.3.17).

In hypothesising a reconstruction scenario, we must take into account the specificity of this community which has needs different from all the others (Nimis, 2009; Gribaudo 2010; Petrucci, Romagni, 2018). Above all it is necessary to consider that it is the only village in the whole earthquake area of Central Italy that has suffered total destruction and cannot be reconstructed due to the geological causes that have determined its devastation.

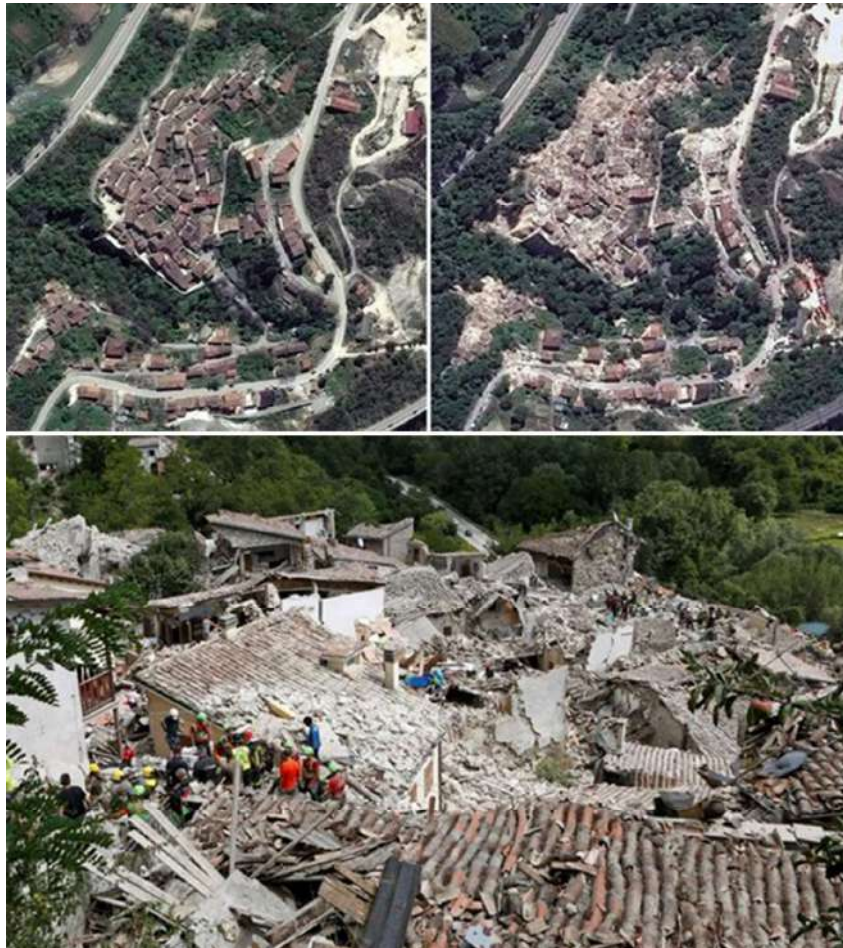


Fig.3.17 Views of Pescara del Tronto before and after the earthquake (source: https://www.archiportale.com/news/2018/02/concorsi/dare-un-futuro-alla-memoria-di-pescara-del-tronto_62460_30.html)

The identification of elements is almost impossible, except through the study of historical images (Fiorani 2019). Most crucially, the reconstruction in the same place is not possible due to site instability problems and inevitably Pescara will have to be relocated. If we cannot reconstruct in the same place, and we no longer have elements of identity that tell the story of the place, the question arises: has a bit of resilience still remained? (Castells, 2008). These issues are still open and no decisions have been made.

3.5 Conclusions

The complexity of the territory, already in strong crisis before the seismic events, was analysed, highlighting the need to take into consideration the local identity as a fundamental element on which to rely when a community is facing the consequences of a natural disaster. In order to identify the system of signs that a territory recognises as identity, a “repertoire of memory” of decorative and functional elements can represent a useful linguistic reference to undertake an effective reconstruction strategy that differs according to the conditions of the different villages, including restoration, philological reconstruction and delocalisation. For many of the destroyed or severely damaged places, it is necessary to identify qualitative criteria for reconstruction. In some cases, they are minimal interventions to improve accessibility and security of the context. In others it is possible to hypothesise reconstructions with the same volumes and on identical areas of the site by referring to the repertoire of identifying elements. In particular cases, a different or differently positioned volume may be proposed, preferring contemporary solutions that pave the way for new local development while contributing to safeguarding the identifying characteristics in the small historical centres with medieval foundations hit by the earthquake. Overall, we can talk about “Restoration” as a series of operations ranging from consolidation with improvement of buildings to the reconstruction of collapsed parts. In the strongly damaged or destroyed centres “Reconstruction” must be attentive to the return of the lost values. In the case represented by Pescara del Tronto, the need is for the “Preservation of memory” in a different and more evolved context that guarantees better living conditions for its citizens, where new capacities of resilience can appear.

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