

ADAPTIVE PLACES: ACHIEVING RESILIENCE BY FACING RISKS

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ABSTRACT

Multiple kinds of crisis increasingly occur simultaneously, making it difficult to resolve challenging urban conditions as different risks are overlapped and involve social, economic, environmental, health and liveable topics. Furthermore, each place is different and has its peculiarities with respect to material and immaterial characteristics and, for this reason, faces crisis at different times and modalities. In line with this concept, risks are also different among and, for example resilience to environmental risk is different from resilience to an economic one. To achieve a sustainable adaptation and regeneration of the places affected by multiple risks it is important to study the questions using many points of view and using suitable urban methods. Starting from these premises, the aims of this study, carried out in the framework of the “PRIN2020 20209F3A37” research project, within the ISMed-CNR Unit with the author’s responsibility, include the following. First, to define and identify what the types of risk are and the main types of overlapping of them in sites. The identification of risks requires an accurate analysis of places, while the possible overlapping could require a certain degree of uncertainty, with it being difficult beforehand to know the periods in which the different crises will occur. Second, to identify what are the main places which are – or could be – subjected to multiples risks. Main places include: historic places in poor state of maintenance; historic places with mass tourism; public spaces; places interested by earthquake or other environmental disasters; and places characterized by isolation for many reasons. Third, to propose an original and ad hoc method to comprehend what the better and sustainable solutions are in terms of adaptation and regeneration of different kinds of places affected by multiple crisis. The observation concerning the method in relation to the mentioned topics will also be covered in the paper.

Keywords: adaptation, resilience, multiple risks, sustainability, urban regeneration.

1 INTRODUCTION

Risk is commonly defined as the probability that a certain event will occur and cause damage to property and people. A place with multiple risks is a place that may be affected by multiple types of risks simultaneously.

Indeed, in contemporary territories it is increasingly happening that different types of crises occur simultaneously, making the resolution of difficult urban conditions complex as the different risks overlap, involving social, economic, environmental, health and liveability issues [1]–[11].

Furthermore, each place is different and has its own peculiarities with respect to the material and immaterial characteristics and, for this reason, it needs different times and methods to deal with crises.

Zolli and Healey [11] define the resilience as “the ability of a system, firm, or person to maintain its core purpose and integrity in the face of dramatically changed circumstances”.

In this sense, spaces with a good degree of resilience are spaces that are capable to dynamically adapt to change [12].

Accordingly, risks are also different from each other, determining that, for example, resilience to environmental risk is different from resilience to economic one. In order to achieve a sustainable adaptation and regeneration of places affected by multiple risks, in line with the principles of the 2016 Quito’s New Urban Agenda and the Agenda 2030’s 17 SDGs



[13], it is important to address the issues from many and integrated points of view and using suitable urban methods.

The NUA [14] contains three important principles in this direction, namely: “14. To achieve our vision, we resolve to adopt a New Urban Agenda guided by the following interlinked principles”: “© Ensure environmental sustainability by promoting clean energy and sustainable use of land and resources in urban development, by protecting ecosystems and biodiversity, including adopting healthy lifestyles in harmony with nature, by promoting sustainable consumption and production patterns, by building urban resilience, by reducing disaster risks and by mitigating and adapting to climate change”; “65. We commit ourselves to facilitating the sustainable management of natural resources in cities and human settlements in a manner that protects and improves the urban ecosystem and environmental services, reduces greenhouse gas emissions and air pollution and promotes disaster risk reduction and management, by supporting the development of disaster risk reduction strategies and periodical assessments of disaster risk caused by natural and human-made hazards, including standards for risk levels, while fostering sustainable economic development and protecting the well-being and quality of life of all persons through environmentally sound urban and territorial planning, infrastructure and basic services”. “67. We commit ourselves to promoting the creation and maintenance of well-connected and well distributed networks of open, multipurpose, safe, inclusive, accessible, green and quality public spaces, to improving the resilience of cities to disasters and climate change, including floods, drought risks and heat waves, to improving food security and nutrition, physical and mental health, and household and ambient air quality, to reducing noise and promoting attractive and liveable cities, human settlements and urban landscapes and to prioritizing the conservation of endemic species”.

Accordingly, the 17 SDGs [13], that follow this approach are almost all and among these: “9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation”, “11: Make cities and human settlements inclusive, safe, resilient, and sustainable”, “13: Take urgent action to combat climate change and its impacts”.

The holistic approach of both agendas is also at the base of the method which will be proposed; resilience and adaptation should be obtained through policies and strategies which involve all the elements and factors which *compose* a place.

Starting from these premises, the objectives of this study, carried out as part of the research project “PRIN2020 # 20209F3A37”, and in particular of the ISMed-CNR Unit of which the author is responsible, are the following.

First, to define and identify the types of risk and the main types of overlap between them in the sites. The identification of the risks requires a precise analysis of the places, while any overlap could require a certain degree of uncertainty, since it is difficult to know in advance the periods in which the different crises will occur. Second, identify which are the main places that are – or could be – subject to multiple risks.

Third, with particular attention to public spaces, to propose an original and ad hoc method to analyse the places affected by multiple risks in order to be able to direct research, plans, programs towards sustainable and innovative solutions in terms of adaptation and regeneration understood in its three-fold meaning. The observations relating to the proposed method, also in relation to the cited topics, will complete the study.

2 RISKS AND PLACES

The risks that can occur in a place are of different types. Some of the main risks and related causes – both tangible and intangible – will be mentioned below, as well as the places that may be affected by them [6]–[11].



The *social risk* can be caused by (a) a significant use of virtual places, typical of social networks, followed by little use of real places and (b) lack of physical places of socialization in good state of maintenance, which can lead to a loss of socialization between people. The *cultural risk* can be caused by rapid consumption of culture as in the case of places with intensive use due to mass tourism that can lead to a consequent degradation of cultural heritage. The *urban risk* can be caused by poor quality of urban design, materials used in the built environment, and lack of connections and that can lead to disuse or degradation of the sites in object. The *anthropic risk* can be caused by mass tourism and therefore overcrowding of places, which can cause degradation. The *identity risk* can be caused by invasive territorial marketing operations and can lead to homologation of places and loss of uniqueness. The *safety risk*, can be caused by poor quality of materials of the built environment, low public light and disuse, which can lead to deterioration of the place. The *environmental risk*, which can be caused by earthquakes, floods and other natural disasters, which can lead to partial or total destruction of places. The *landscape risk*, which can be caused by poor maintenance of green or its lack and can lead to unhealthy and unliveable places. The *pandemic risk* can be caused by health emergencies and can lead to public places characterized by social distancing [15]–[18].

The places that can be particularly affected by the risks now mentioned are the historical places in a poor state of maintenance, historic centres with mass tourism, public spaces, parks and gardens, places with a high degree of seismic vulnerability or subject to flooding, places characterized by isolation due to lack of adequate mobility networks and depopulation, peripheral, mountain or internal areas.

The listed risks have several points in common, as well as the typology of places can be further expanded. What is important is the use of a dynamic and flexible approach to the reading of the places that makes possible different options of solutions to unexpected events.

The MultiRisk method that was created has the purpose of being able to be applied in areas of these typologies and with high possibility of presence of at least one of the mentioned risks.

3 THE METHOD

The MultiRisk method is an original method that aims at identifying: what are the present or possible risks – both single and multiple with attention to those related to intangible aspects – that may affect in particular public spaces; the factors that determine them; and the perception of the risk that users of the places have.

The final product is a map that systematizes and integrates all the data collected separately in the previous phases in order to obtain a mosaic of risks, factors, user's perception.

The method consists of seven steps. In the first phase, analysis of the place with identification of single “urban” risks, an analysis of the place is carried out with the identification of individual present or potential urban risks.

This analysis is carried out after a definition of the limits of the area to be analysed. The risks that can be detected by observation include: the *cultural risk*, the *urban risk*, the *anthropic risk*, the *identity risk*, the *safety risk*, the *environmental risk*, the *landscape risk*, and the *pandemic risk*.

Here the presence of the risk and the quantity in which it is present expressed in light, medium and notable is observed. The result will be a mosaic of the individual present and possible risks.

The second phase concerns Analysis of factors contributing to the risks which will be carried out by observing which elements and factors influence or can influence the present or possible risk or risks. These include: poor state of conservation of public places including

floors, furnishings and equipment; presence of buildings without maintenance or with scaffolding for maintenance works that last for decades; presence of mass tourism; presence of fast food, street vendors and shops selling low quality products with use of the street for display; problems of extreme temperatures and lack of protection from them such as canopies and shelter spaces; presence of events such as floods, albeit periodic; area affected by seismic phenomena; poor accessibility; presence of architectural barriers; presence of furnishings, equipment, maintenance that denote little attention to the identity of the places. The result is a mosaic of factors that influence or can influence the emergence of risks of different nature.

Table 1: MultiRisk method scheme.

Phase	Objective	Actions	Product
1	Analysis of the place with identification of single “urban” risks	Observation of the places	Mosaic of the single risks
2	Analysis of factors contributing to the risks	Identification of the factors	Mosaic of concurrent risk factors
3	Analysis of the effects due to the coexistence of risks	Observation of the effects	Mosaic of effects
4	Risk perception questionnaires	Questions asked onsite to users of places and social network analysis	Mosaic of risk perception by place users
5	Analysis of plans/ projects/programmes/policies for adaptation	Identification of projects and plans that provide for adaptation to risks	Mosaic of plans/projects/ programmes/actions
6	Analysis of potentialities and qualities	Identification of factors which contribute or can contribute to the quality of the place	Mosaic of the quality elements from the urban point of view
7	MultiRisks analysis	Identification of all present and probable risks, related factors, and user perceptions	MultiRisk map

The third phase analysis of the effects due to the coexistence of risks concerns the analysis of the effects that may occur if several risks analysed in the first phase occur or may occur simultaneously.

The effects can be of different types and not foreseeable before the inspection. On the basis of the experiments already carried out with the method in question, the following effects can be hypothesized.

If adequate access is lacking, there are architectural barriers, poor state of maintenance of the public space, the place may be depopulated, perceived as unsafe, affected by decay.

If the public space concerns a city affected by seismic risk or flood risk and at the same time the space is made by poor quality materials and an unattractive urban design or lack of minimal furnishings, the place will not fulfil its function as a place of socialization, as the lack of security could be combined with the perception of an unwelcoming and uncomfortable place.



There may be other mix of risks such as those due to mass tourism and the lack of attention to the identity of places that can result in an anonymous and globalized place similar to many others found in the world without its precise characterization.

The fourth phase concerns the risk perception questionnaires. In this phase, two types of surveys will be carried out: the first relating to the perception of risk by the people who use the place, through the administration of a questionnaire; the second related to the perception of the place present on social networks – including Facebook, TripAdvisor, Instagram, Twitter – from which to extrapolate – if these are contained – useful information for the study.

The questions of the questionnaires will include:

1. What general perception do you have of this place?
2. Do you think this place is affected by one or more types of risk?
3. What perception do you have of the risk or the risks to which it refers?
4. Do you think that these are permanent or transitory risks?
5. What do you think are the causes?
6. How much the quality of the places contributes to the perception of risks?
7. Do citizens already contribute in any way to the resolution?
8. How do you think citizens can contribute to the resolution of the risk/s?

The questions may be modified depending on the objective of the survey. The product will be a mosaic of information obtained both from the answers to the questionnaires and from the research carried out on social networks.

The fifth phase concerns analysis of plans/projects/programs/policies for adaptation to the risks that are active in the place under analysis. A research will be carried out on actions, if any, aimed at mitigating the different types of risk present or possible. These can be at different scales and of different types, of a general nature or very specific and sectoral.

The product will be a sort of mosaic of plans, projects, programs, and policies that may be present in the area in question.

The sixth phase is the analysis of potentialities and qualities with the identification of factors which contribute or can contribute to the quality of the place. The product is the mosaic of the quality elements from the urban point of view.

The seventh phase concerns the MultiRisks analysis, which is the creation of a map that presents all the risks and the quality factors. This will contain all the risks – present or possible – in relation to public spaces, as well as the results of the questionnaire on the perception of risk by people and the factors that contribute to this perception of present or possible risk. The map will contain also quality urban factors in order to support urban design ideas. The map/mosaic is an open product that is flexible and adaptable to change. This map will be created together with a related system of symbols created ad hoc and, like the method, it will support a flexible and adaptive planning capable of welcoming but also predicting sudden and different events and responding to them in a sustainable way [13], [14], [19]–[21].

4 THE CASE STUDY

Pilot case studies of the MultiRisk method have been carried out in Europe. Among them: the parc Rives de Seine in Paris, Cittaducale and Leonessa in Lazio Region, the historic centre of Siena, the historic centre of Madrid.

The case studies have been chosen for the presence of one or more present or probable risks. The parc Rives de Seine in Paris is affected by flood risk and mass tourism; Cittaducale



and Leonessa by seismic risk and depopulation; the historic centre of Siena and Madrid by mass tourism and globalization [22].

The pilot cases were carried out to verify, as mentioned before, the protocol, but also the time required to carry out the various parts, the possibility of reversing the order of the various phases, the type of products.

By way of example, the case of Leonessa in the province of Rieti Region of Lazio will be summarized, which was affected by earthquake in 2016. Despite it was not having suffered major damage as several other nearby centres, the place is subject at risk of depopulation.

The case study of Leonessa, which will be illustrated in the following, was previously carried out in the framework of SISMI research project within The Centre of Excellence of the Technological District for cultural heritage in the Lazio, task 1.5 “Italian and international best practices and placemaking”, with the Author’s co-responsibility. Among the objectives, of the whole research, the main one was “to provide methods and tools for assessing the degree of local seismic hazard which is preparatory to quantifying the risk conditions on the scale of the urban system, of the single building”.

The MultiRisk analysis was focused on the Leonessa historic centre and in particular on Via Mastrozzi, Via San Francesco D'Assisi, Corso San Giovanni da Leonessa, Via Durante Dorio, Via della Ripa, Via Brunoni Bucarini, and on Piazza VII April (Figs 1–5).

The analysis, carried out in the historical centre of Leonessa, evidenced different types of risks and related factors, together with many potentials and qualities.

Risks and factors contributing to them include: the social risk – which is present in medium quantity – due to a scarce presence of public spaces intended as places of socialization and capable to accommodate people of all ages and for different functions; the urban risk – which is present in high quantity – due to the lack of connections both between



Figure 1: Leonessa – Detail of map and main monuments displayed on the Spoletina Door, main entrance to the ancient medieval city.



Figure 2: Leonessa – Detail of a church damaged by the seism. (Source: Author's archive.)



Figure 3: Leonessa – The historical centre, perspective. (Source: Author's archive.)



Figure 4: Leonessa – The historical centre, detail of a public space. *(Source: Author's archive.)*



Figure 5: Leonessa – The historical centre, perspective. *(Source: Author's archive.)*



public spaces within Leonessa, and between Leonessa and its surroundings; the environmental risk – which is present in high quantity – as this is a seismic area affected by the 2016 earthquake; pandemic risk – which is present in medium quantity, caused by the recent COVID-19.

The answers to the questionnaire administered to 50 users – both locals and visitors – of the sites return an awareness of the seismic risk as a permanent risk and lack of rapid connections with the province of Rieti, an attachment to the territory, a willingness as locals to contribute to its enhancement, and lack of fast connections with the surrounding.

The main plans of the phase five include: the 2016 Municipal emergency plan and the 2000 Provincial Civil Protection Plan. As regards the territory and its quality elements, Leonessa has a medieval urban system with Corso San Giovanni, Via Mastrozzi, Via San Francesco D'Assisi axes which connect the entrance of the historical centre to Piazza VII Aprile, and three secondary axes, namely Via Brunoni Bucarini, Via della Ripa and Via Durante Dorio.

This is a territory full of traditions, memories, nature and architecture, especially religious. As regards the qualities to be analysed in phase six, the main square of Leonessa, Piazza VII Aprile, is a place that can be considered both a place of traditional socialization and a place of multiple value. The major historical buildings of Leonessa are churches, including: the Church of San Francesco, the Church of San Pietro, the Church of San Carlo, the Church of San Giuseppe da Leonessa, and the Church of San Nicola. Furthermore, the Terminillo Mountain constitutes a strong element of the cultural landscape of Leonessa. It can be observed that there is a balanced mix of history and nature that, despite the destruction caused by the earthquake, has not lost its urban quality.

The last phase concerns the construction of the map/mosaic of risks, people's perceptions, and quality of place. What emerges is the presence of four types of risk, namely social, urban, environmental, and pandemic. Of these, the most perceived are: the environmental one, probably due to the 2016 seismic event, and the lack of fast connections with the surrounding. The main qualities of the place that could constitute an important support to the mitigation of risks and the enhancement of the places are constituted by the medieval urban tissue that remained intact, the religious architecture, and the paths in the nature of Terminillo.

5 OBSERVATION AND CONCLUSION

The MultiRisk method is an original method that was created to analyse complex urban situations where the presence of multiple risks makes the place in question particularly subject to degradation, disuse, or depopulation.

The innovative aspect of this method is that it is capable to identify at the same time both tangible and intangible factors and risks and people's perceptions. This can support a sustainable project that is more attentive to urban situations where the coexistence of several overlapping crises – generated by quality and quantity elements – makes resolution difficult.

In addition, users' perceptions are of great importance to understand their awareness with respect to important issues affecting the space in question.

The problematic aspects of the method concern: the survey of possible risks as it is not easy to analyse the unexpected ones; the indication of risk in quantitative terms; the collection of useful information on social networks.

The presence of a poor state of preservation of public space and little accessibility can predict a situation of disuse or degradation; but the presence of seismic risk and little accessibility, does not necessarily lead to degradation, as the seismic event may not occur for many years. Similarly, the presence of mass tourism together with a low quality of design of the places can predict a cultural risk and a loss of identity of the places. The presence of mass



tourism together with the risk due to climate change could also result in a decrease of tourism due to difficult climatic conditions and therefore paradoxically to a better maintenance of the place.

Another aspect concerns the indication of the risk in quantitative terms, which is light, medium and considerable. Indeed, the presence of a risk is due to changing factors and therefore defining mass tourism as a risk for the identity of that place probably means approximating the quantity detected to a specific period of time (e.g. spring or summer). Furthermore, indicating the due effects of multiple risks in quantitative terms requires averaging as each effect will present different quantities of risks.

Again, the collection of information on social networks requires a survey with parameters that can change from time to time depending on the type of risk to be detected, and, in any case, a complex interpretation of the data for the purpose of the case study.

The results of the case studies of verification of the method have the possible inhomogeneity among them, due to the peculiarities of the places and relative impacts of the risks. In any case, the results of the case studies must be able to be updated in order to accommodate changes, overlapping factors, but also new types of risk.

Finally, the general idea is that the risk can be an opportunity to review aspects of the territory that can be improved and enhanced and therefore resilience can be interpreted as a component of sustainable regeneration [23]–[27].

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