Deliverable: Guidelines for a New Approach to Integrated Planning Strategies Based on Co-Design

From emergency planning to the identification of safe places as an educational process, fostering community-based risk prevention

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The objective of the deliverable is to define an integrated method for planning the various stages of risk, from prevention to post-disaster, in relation to open spaces and built heritage, providing the direct involvement of communities in co-design processes.

The actions outlined in the document aim to develop Disaster Risk Reduction **(DRR)** and Climate Change Adaptation **(CCA)** strategies in fragile contexts that are exposed to multi-risk scenarios and the impacts of climate change. The strategies are structured with a view to anti-fragility, adaptability, and replicability, with a place-based and people-based approach.

The deliverable focuses primarily on:

1. Communities in at-risk contexts:

- Active involvement of local communities in planning processes through participatory approaches and co-design.
- Raising awareness among communities to promote informed and appropriate behaviour in risk management.

2. Cultural Heritage:

- Preservation and enhancement of built and cultural heritage in areas at risk.
- Integration of cultural resources as a key element in risk reduction.

3. Open Space and buildings intended for civil protection purposes:

- Role of public open spaces and buildings in risk mitigation and disaster response.
- Identification of safe spaces as safeguards, educational tools, and means of prevention.

Index:

Premise: From Context to Theory. An Introduction

The normative framework

In light of the Directive of the President of the Council of Ministers (DPCM 30 April 2021), concerning the Civil Protection Code, which highlights the fundamental need to update, or rather, to re-evaluate risk prevention processes through citizen participation, the research group chose to investigate the process of participation within the architectural discipline. This involved verifying the applicable methods and tools, starting from a careful analysis of the regulatory framework preceding the Directive.

The regulatory framework (*quadro normativo*) comprises an initial Legislative Decree of 2018 (D. Lgs n° 1/2018) and subsequent integrations (D. Lgs n° 4/2020), in which, among the definitions provided in the Code, participation is immediately defined as a relevant competence for risk prevention practices promoted by Civil Protection. An initial reference to citizen participation is introduced in Art.18, Capo III *Attività per la previsione e prevenzione dei rischi* (Activities for risk forecasting and prevention), where:

«*la pianificazione di protezione civile [...] è l'attività di prevenzione non strutturale, basata sulle attività di previsione e, in particolare, di identificazione degli scenari [...]. È assicurata la partecipazione dei cittadini, singoli o associati, al processo di elaborazione della pianificazione di protezione civile, secondo forme e modalità individuate con la direttiva di cui al comma 4 che garantiscano, in particolare, la necessaria trasparenza*». (cfr "DECRETO LEGISLATIVO 2 Gennaio 2018, n. 1 (Raccolta 2018)" in Gazzetta Ufficiale, s.d).

However, it is particularly in Capo V of the Code, titled *Partecipazione dei cittadini e volontariato organizzato di protezione civile* (Citizen Participation and Organised Civil Protection Volunteering), and divided into two sections (*Sezione I. Cittadinanza attiva e partecipazione, e Sezione II. Disciplina della partecipazione del volontariato organizzato alle attività di protezione*), that the issue of active citizen participation is underscored as a genuine instrument and possibility for prevention across various risk domains and scenarios. Within this Capo, the figures of the volunteers and the associations that contribute to risk management are listed and defined, establishing a vast and detailed network of potential subjects for involvement.

Chronologically, the regulatory framework culminates with the DPCM of 30th April 2021, the document from which the two analysed D. Lgs were initially traced. It is finally within the Technical Annexes of this Directive that the focus shifts and begins to outline not merely the question of "**who**" and the need to incentivise citizen

participation in risk prevention, but also the important definitions of "**how**" to encourage direct public engagement and "**how**" to communicate with communities in a coordinated manner.

Furthermore, point 5 (p. 28) introduces different types of drills and exercises, which are intended to test, verify, and hypothesise possible solutions in various risk scenarios. These exercises are not merely listed but are described through the operational process of their implementation. Point 6 (p. 32) also reiterates the need for effective, shared communication at the national level, highlighting the crucial importance of using uniform linguistic codes and mutually consistent georeferenced databases. It proposes the adoption of an integrated IT platform called the *Catalogo nazionale dei piani di protezione civile.* Unfortunately, none of these specifications were to be found anywhere, nor is the catalogue accessible to private citizens. However, even if further operational guidelines are deferred to subsequent indications from the Head of Civil Protection, **how is it possible to reach national coordination and risk prevention if none of this information is not easily accessible?** Finally, regarding citizen participation in risk prevention, the theme is revisited particularly in Points 8 (p. 34) and 9 (p. 36), where it is expanded upon and specifies how these participation and risk communication actions can be carried out, and by which bodies. **But how to build up community participation in the preparation of risk?**

A **critical gap (a "*lacuna*")** thus predominantly emerges within this regulatory framework, which serves as the premise for this introduction: there is an inverse relationship between the frequency with which the importance of participation is underscored and the frequency with which the methodology for its implementation is specified. The dual themes of constructing risk prevention (thereby safeguarding human beings from disaster) and the descriptive analysis of places are intrinsically linked to the discipline of architectural and urban design. In this context, specific tools and methods already tested within the disciplinary field can be reinterpreted and adopted to address the identified *lacunae* in the regulatory framework, thereby incentivising direct citizen participation. The aim of this deliverable is thus to verify, test, and adapt the relevant theoretical framework to the real-world context of risk, and to propose methodological guidelines and suggestions useful for accompanying participatory risk prevention processes.

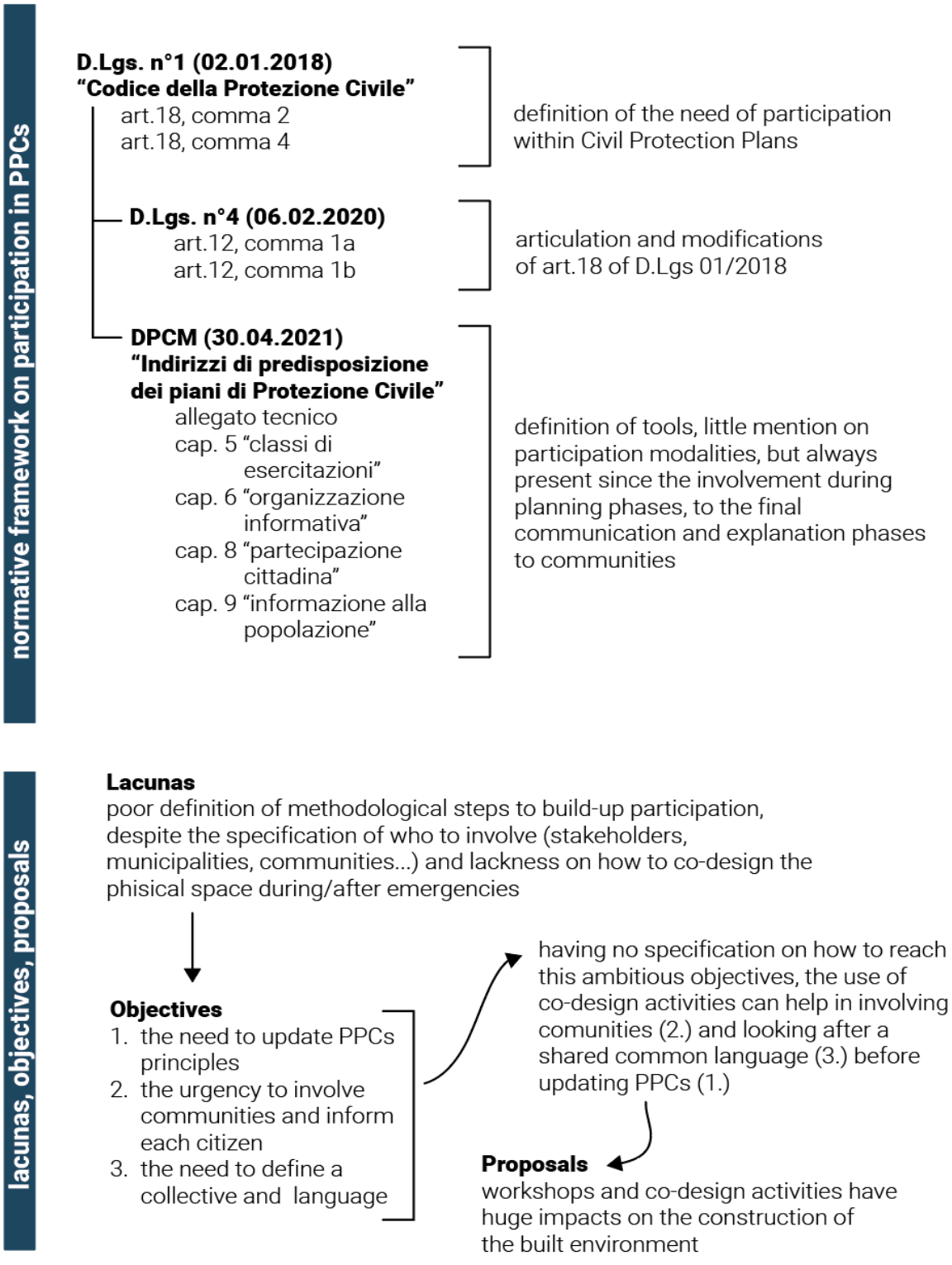


Figure 1 – Normative framework on participation in PPCs and research objectives

Research questions and gaps

The effective management of hazards and the promotion of **resilience** or **anti-fragility** within the built environment are critical challenges of our contemporaneity. This challenge addresses significant *gaps in both current practice and academic discourse by exploring the discrepancies between official risk documentation, established planning frameworks, and local socio-cultural perceptions* of safety and hazard. It is evident that there is a need to deepen the relationship between risks, architectural design, and communities. Specifically, the research aims to answer three interrelated questions: **What can architectural design do to address specific inconsistencies** identified within existing case studies and literature reviews? **How to overcome the distances** between technical production and avoid risks, and community perception? And finally, **which methods and tools** can be specifically tailored to address these multifaceted problems in actual territories?

Indeed, a review of design and planning practices in disaster response reveals persistent issues that, in different shades, a well-coordinated activity can mitigate, stemming from the lack of consistency and communication in the participatory process. In this, a fundamental lack of coherence is frequently observed among technical documents detailing risk analysis and mitigation, presenting a significant mismatch between the risk analyses, developed during the analytical phase of hazard assessment, the Emergency and Civil Protection Plans (**PPC/PEC**), which outline intervention scenarios in high-risk areas, and the Ordinary Regulatory Planning instruments such as the *Piano di Governo del Territorio* in Lombardy (**PGT**); furthermore, the notions expressed within the plans and designed in real places, hardly were sound among people of the communities. This systemic misalignment means that research on co-design activities and tools in risk scenarios **must be framed within a broader and more complex understanding of risk communication**. A lack of consistent, coherent spatial representation of risk scenarios exacerbates this problem. While general technical guidelines for mapping exist, they often conflict with the realities of local representation, leading to ambiguity and confusion in the field. The **absence of a single, unified representational style or of unambiguous, standard parameters for visualising risk** and safety inhibits clear communication not only between technical experts from different disciplines but also, crucially, between technical bodies and the public, consequently undermining coordinated action.

Following catastrophic events, a recurring topic is the revelation of poor previsional knowledge about the opportunities within the existing built environment. Often, there is no prior assessment of how edifices and complexes could contribute to resilience or recovery efforts. Conversely, there is a consistent lack of awareness concerning dangerous habits, both in design practices and in everyday behaviour, that amplifies the danger and vulnerability in risk scenarios. This oversight represents a missed opportunity to leverage pre-existing capital (social, built, and open space) to effective antifragility. A further critical divergence exists between the official, technically designated “safe” or “unsafe” locations and the local community's perception of risk and safety.

Communities frequently deem certain places or structures secure, despite evidence to the contrary in official plans. At the same time, it has been observed that ordinary (**PGTs**) and extraordinary (**PPCs/PECs**) administration plans may fail to adequately safeguard those critical community recognition points, which, although perhaps technically vulnerable, constitute fundamental social and cultural pillars of the city. This **disparity in risk perception and designated value** can critically affect a successful resilient recovery, failing to protect sites essential for restoring social cohesion.

From fragile territories to anti-fragility strategies

The topic of the relationship between risk and the built environment suggests the existence of a **profound connection between places, communities, and context**. The integrated approaches used today to address disaster emergencies require the contributions of architectural, urban design, and conservation disciplines to frame risk issues in a spatial context.

In recent decades, the definition and configuration of urban and territorial spaces have radically changed in relation to the impacts of natural and anthropic risks: uncertainty, which is the main characteristic of «*risk society*» (Beck, 1986) and determines new spatial complexities, has always been a factor of fragility for territories and communities. The acceleration of the recurrence of disastrous events and their increased intensity are phenomena that exacerbate spatial inequalities worldwide (Lobao and Hooks, 2025), generating new geographies (Galderisi et al., 2020). Moreover, multi-risk scenarios intensify the processes of abandonment, depopulation, and underuse of buildings. The role of design disciplines is to read and interpret these circumstances, juxtaposing the objectives of **resilience** and **preparedness** with those of prevention.

The RETURN project aims to identify strategies, projects, and methodologies for disaster risk reduction, mitigation, and adaptation to climate change. The research group is investigating these objectives using a community-based approach that combines the social dimension with the impact of risks on local areas. The relevance of a research project conducted through the experimental **application of architectural and urban co-design methodologies to risk issues** lies in the rapid changes taking place – climatic, environmental, socioeconomic, and cultural – and the effects these changes have on the built environment and those who inhabit it.

In this, the aim, answering the posed questions and gaps, is to facilitate:

- The coordination of emergency plans with ordinary planning tools (e.g., analyses, on-site surveys, stakeholder networks).
- Information about local communities through experiences of participation and co-design (e.g., workshops, seminars, focus groups).
- The development of tools and procedures for creating participation (e.g., how to set up workshops, how to improve preliminary knowledge through the implementation of checklists, such as survey forms to assess the suitability of places (*schede di adeguatezza degli edifici e degli spazi aperti* developed in this research Task).

I.Research objectives

General objectives

The deliverable proposes a unified approach to the various phases of the risk cycle (prevention, mitigation, response, recovery), overcoming the traditional separation between urban planning tools and civil protection tools. This approach was implemented through:

- Definition of an integrated **DRR/CCA** method;
- Development of Place-Based and People-Based Strategies;
- Strengthening participatory processes.

Specific objectives

The specific objectives of **enhancing heritage and identity-defining spaces**, **recognising the centrality of places for social cohesion even in risk scenarios**, and **supporting territorial and community regeneration** to turn risk into an opportunity for sustainable development, cohesion and social innovation were pursued through:

- Coordination between ordinary planning (**PGT**) and emergency planning (**PPC/PEC**);
- Activation and Training of Local Communities;
- Production of operational tools (fact sheets, toolkits, guidelines);
- Enhancement of heritage, public spaces and places of identity;
- Support for territorial and community regeneration.

In this way, communities become informants, co-producers of knowledge, and co-authors of mitigation and adaptation strategies.

II. Research Methodology

A methodological and design proposal as a response

The methodology adopted is defined as inductive, place-based and community-based. In fragile contexts, the mechanical application of standardized procedures (top-down) risks producing ineffective solutions. It was therefore chosen to:

- Directly observe the territory;
- Testing tools in the field;
- Iterate and adapt according to feedback;
- Build shared knowledge;
- Relate technical knowledge and local knowledge;
- Development of a replicable but non-standardised method.

The methodology is divided into three main phases, preceded by **Phase 0**, a preparatory phase for the field applications. To address the identified gaps between technical knowledge and common understanding, the current research has adopted a highly **inductive methodological approach**. The central necessity was to proceed with specific checks of these discrepancies between the technical knowledge (held by architects, specialists in architectural conservation, urban planners, and analysts) and the common sense (represented by local communities, volunteer emergency teams, and their linguistic signals used for public information and warnings) **by using co-design and participatory activities** with a local community. This inductive process aimed to test and bridge the discrepancies and was employed to rigorously verify the initial hypotheses derived from the theoretical phase of the research. Participation in the transformation processes of at-risk contexts can indeed bridge the potential gaps between communities and places threatened by growing uncertainty and extreme events. When understood in a «*transformative*» sense (Till, 2005, p. 27) and applied to the dynamics of *co-production* of spaces (Petrescu, 2005), participatory processes can lead to the development of effective co-design methodologies that bring the project temporalities closer to those of risk, working «*before, during and after disasters*» (Lari et al., 2013, p. 5). The need for an *ex-ante* approach, as an alternative to the post-disaster interventions that have characterized most recent reconstruction policies, stems from the ineffectiveness of these interventions as preventive actions. In contrast to the Western narrative of the changes underway and the 2050 agendas, which seem to want to push the “catastrophe point” forward, into a technocratically predetermined future moment (Post Disaster et al., 2023), the research considers community-based approaches as an *alternative in architecture* (Ward, 1976) that is effective in achieving anti-fragility conditions for territories and communities.

The research developed **a suite of tools and activities, largely originating from architectural and urban design practices**, but adaptable to facilitate varying degrees of user participation and involvement. These included in-depth interviews to gauge lived experiences and perceptions, visual **comparisons of official planning maps** and produced documents to identify discrepancies, detailed **photographic surveys** to document the physical environment, and **on-site design workshops** conducted in a location affected by multi-crisis scenarios to foster collaborative problem-solving. It is believed that the identified *lacunae* can be substantially mitigated through the application of these tools and methods directly to the affected area. For this reason, the research process was oriented towards an inductive methodology, grounded in the development of field observations and experiments from which a replicable and adaptable strategy (or method/process, etc.) could be derived for application in other contexts.

Tools produced by research

In summary, by verifying information systems, maps, risk classifications and their mutual consistency, the research aims to identify activities capable of strengthening local awareness through co-design by identifying criteria for activating workshops, focus groups, participatory mapping and interviews, and developing operational tools, including a methodological toolkit consisting of the following research tools:

Territorial analysis tools

- Unified summary maps on risk and criticalities;
- Comparative analysis of plans;
- Perceived risk maps (co-mapping).

Participatory tools

- Online questionnaire;
- Stakeholder form;
- Focus group form;
- Graphic kits for workshops;

Operational tools for Municipalities and Civil Protection

- Survey form A: buildings (identity, use, risk, accessibility, maintenance);
- Survey form B: open spaces (surfaces, escape routes, accessibility, context);
- Flowchart for process implementation.

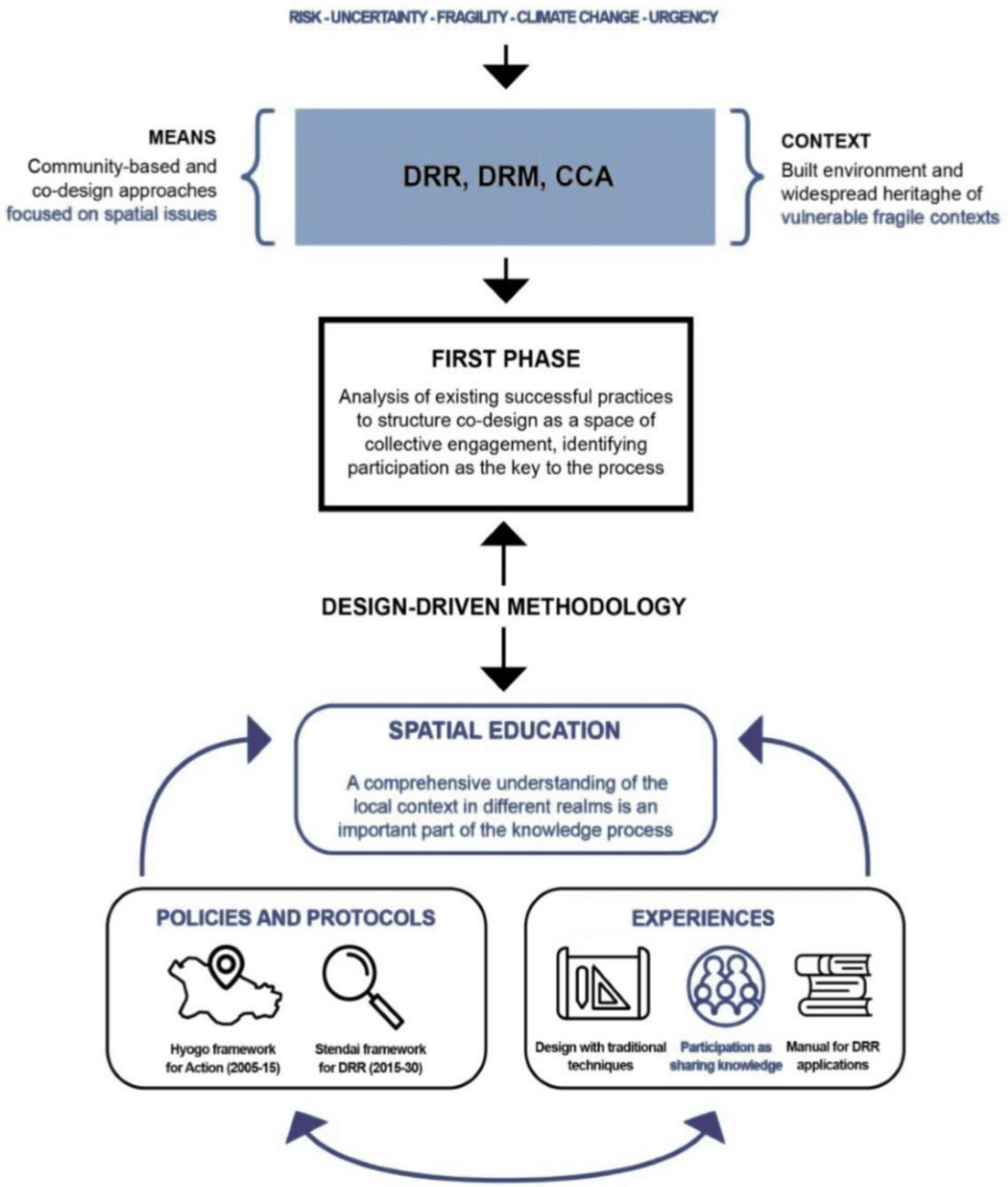


Figure 2 – Conceptual diagram of the first analysis of existing co-design successful practices

Following an inductive process

Despite this structure being founded upon a robust framework of experiences, the shift towards an inductive process was deemed essential to pursue the overall objectives of the Task. In fact, in fragile contexts, applying a standardised top-down procedure, defined on a broad international, national, and even regional territorial perspective, to investigate different territories often leads to critical spatial and social issues at the local level. The approach was then outlined in terms of the circularity of the methodology, which takes the form of a set of interconnected moments. While the limitations of the inductive method might, at first glance, appear to restrict the research field, this approach has proven fundamental for rigorously testing and validating context-specific planning interventions. It enabled the research team to recognise, adapt, and tailor general principles of design in risk scenarios to the specific local requirements, from which the research team has been able to abstract adaptable tools. The rationale for this is clear: **it is inherently impossible to establish *a priori* and in a universally potent procedure,** a fixed set of instruments suitable for every risk scenario and every distinct territory that comprises a complex national context. Therefore, the inductive, place-based investigation was essential to developing truly applicable, contextually sensitive planning solutions. These phases, consisting of both analytical studies and fieldwork, do not have a predefined level of participation, but are conceived as open systems: active citizen participation is regarded as a possibility throughout the entire process, and co-design is understood within the methodology as both an object and a research tool. The achievement of these objectives is strongly influenced by the specific characteristics of the territorial and social context, which therefore require a place-based and community-based research approach.

In the field of architecture and urban studies, the inductive methodology has been applied through a variety of approaches. Some have explored the morphological and typological relationships between the city and architecture, as in the works of Camillo Sitte (1889), Saverio Muratori (1959), and Aldo Rossi (1966). Other approaches have examined the social and perceptual implications of urban form, as exemplified by the works of Kevin Lynch (1960), Jane Jacobs (1961), and Giancarlo De Carlo (1972). The morphological and typological approaches use architectural tools, such as site visits, measurements, drawings, comparisons, etc., to analyse spaces and buildings and to convey theoretical meanings. The social perspectives instead focus on citizens' behaviours and activities, aiming to understand living conditions and gather information from interviews, discussions, and graphic works created by people (such as sketches, drawings, and photos). The approach developed by the research group combined aspects from both perspectives useful for the knowledge of the place and involvement of the community. So, the methodology was structured on three phases and an introductory **Phase 0**. They are based on actions defined by specific objectives, activities, and tools, which can be adapted and applied to address context-specific needs. Objectives articulate the aims of each action and guide the participatory process towards achieving shared outcomes. Activities indicate the means through which these objectives may be pursued and must be adapted to the specific implementation context. To

support the defined activities, a set of tools has been developed, forming a flexible, expandable toolkit that facilitates the production of expected outputs and results.

Phase 0 – Literature review and case studies analysis: An early stage of the process (mainly typical of a top-bottom procedure), has been focused on literature review and the case studies research, briefly narrated in the next sub-chapter, while the other stages (phase one, phase two, and phase three) required to be developed and shaped after direct contact with the place and its communities. The preliminary phase 0 consists of:

- Action 0.1 – literature review.
- Action 0.2 – case study analysis.

Phase 1 – Setting a PoC: the aim is to understand the territorial implications of DRR, on the one hand, and to identify weaknesses and critical issues. On the other hand, identified actions help to define actors and tools to be involved in future steps:

- Action 1 – Comparison analyses of ordinary planning and emergency planning;
- Action 2 – Stakeholders mapping;
- Action 3 – Online Questionnaire.

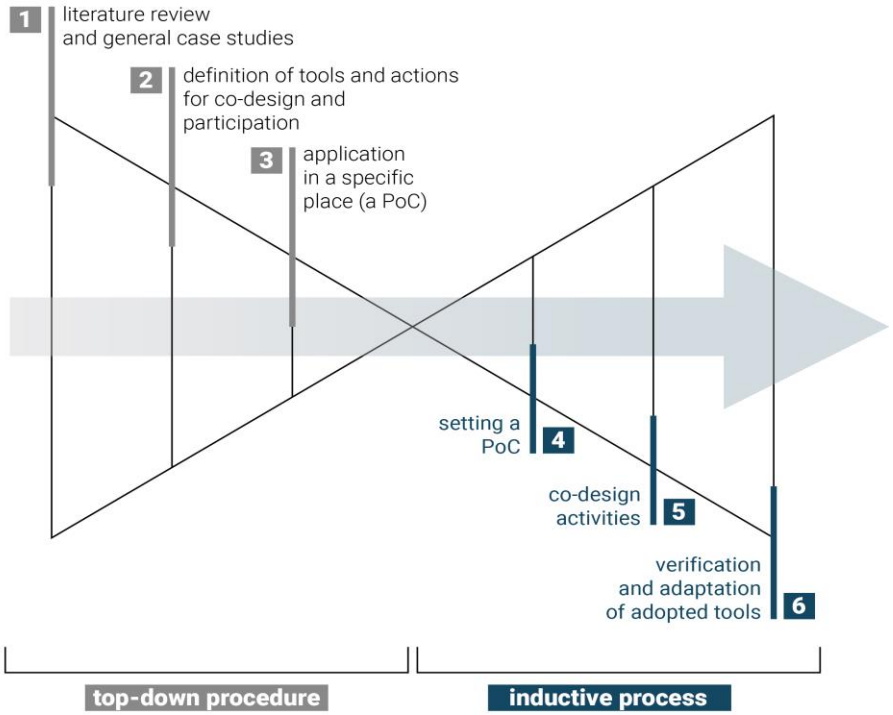
Phase 2 – Co-design activities and participation: the phase refers to the modalities for involving people and communities to implement place knowledge and risk awareness, to interact with the research, provide information and feedback, and to integrate planning and design for **DRR**. The following actions were identified:

- Action 4 – Spatial education through common shared languages;
- Action 5 – Co-mapping vulnerable and safe places;
- Action 6 – Adequacy of places: survey and evaluation;
- Action 7 – Co-design workshop.

Phase 3 – Research output: The phase consists of a methodological framework based on co-design experience developed as **PoC**, as well as a series of operational guidelines on "how to set" the actions in a generic context.

- Methodological framework based on co-design;
- Operational guidelines.

Finally, it must be specified that *Setting a PoC* (**Phase 1**) and C*o-design activities and participation* (**Phase 2**) are conceived as parallel phases, not strictly consequential; they require constant interactions. Each Action is described in terms of goals, activities, tools and **PoC** implications.



Even though there is a roboust theory of co-design and participation, the teamwork decided to test the literature review experiences (1) and the tools already present in the discipline (2) into a specific place (3),

this opration gives birth to an inductive process, in which a specific multi-risk place is set as a PoC (4) where to experiment co-design activities (5) to verify and adapt the metodology in further contexts (6).

Figure 3 – Main phases of the research process

Phase 0: Literature review and case studies analysis

The "phase zero" of the research is represented by an extensive review of scientific and grey literature, as well as of key documents on **DRR**, **DRM** and **CCA**. The literature review was defined to delineate the theoretical scope of the field of investigation, starting from the international reference Frameworks on disaster risk (UNDRR, 2005; UNDRR, 2015). This analysis was accompanied by a review of the state of the art in the management of heritage at risk, as well as cultural production in architectural and urban co-design in fragile contexts. The analysis and systematisation of the literature have enabled the placement of the research within a regulatory and bibliographic framework, from which certain difficulties in combining the different semantic fields of risk and co-design have been identified.

Thus, a comprehensive critical review, systematisation, and analysis of existing literature were conducted with explicit reference to the domains of **CCA** and **DRR** in relation to architectural design, the **conservation and management of built and landscape heritage, and participatory processes**. The objective was to assess existing methodological approaches, evidence gaps, and operational frameworks relevant to integrated **CCA/DRR** strategies.

The activity included:

- The analysis of **scientific literature indexed** in Scopus, Web of Science, and Politecnico di Milano OPAC of Electronic Resources;
- The analysis of **scientific literature not included in indexed databases** consists mainly of volumes reporting research outcomes in the fields of architectural design, architectural restoration, and architectural history. This latter component was analysed through a systematic consultation of the Politecnico di Milano OPAC, University Library catalogues and of the National Library Service OPAC, enabling the integration of disciplinary contributions traditionally not represented in bibliometric platforms;
- The analysis of **grey literature**, including research reports, toolkits, guidelines, and policy framework documents related to **CCA** and **DRR** initiatives at national and international levels (e.g. reports by the Italian Civil Protection Department, UNDRR, UNESCO, ICCROM, ICOMOS);
- The review of **planning documents and regulatory frameworks** produced by Regione Lombardia.

The literature review was then integrated by collecting, verifying, and structuring information on the **research themes and the PoC territorial context available in major open-access repositories.** Activities involved:

- The consultation of the ISTAT Digital Library (digitised volumes up to 1991) and the Institute's dataware from the *14th General Census of Population and Housing* (2001 onwards);

- The use of the ISTAT *8mila Census* platform for municipal-scale demographic and socio-economic indicators;
- The consultation and retrieval of risk-related environmental and territorial datasets from ISPRA;
- The consultation of the *Vincoli in Rete* database (*Istituto Superiore per la Conservazione ed il Restauro / Ministry of Culture*);

This activity ensured a consistent and validated data foundation for the subsequent analytical phases.

- The analysis of best practices was useful in bridging the gap between the literature on design in risk contexts and that on co-design. The selection process was based on the following criteria: a) the application of participatory and community-based approaches in projects; b) a transformative interpretation of participation in architectural and urban co-design; c) the presence of natural risks in the context of the case studies; d) the coexistence of *ex-ante* and *ex-post* approaches in the methodology, which bring the temporalities of risk closer to those of the project; e) national and international relevance as evidenced by publications and/or exhibitions. These criteria enabled the identification of a broad set of best practices that attest to the global nature of the issues addressed and the need to adopt a perspective that transcends administrative boundaries and local trends.
- By focusing on experiences rather than individual projects – that is, by looking more at the architects' overall research and design work than at individual projects – it was possible to study the research and design methodologies adopted in best practices. This led to the formulation of project themes and the identification of approaches and tools for developing research. A subsequent step was therefore to examine three exemplary experiences in depth – those of Giancarlo De Carlo, Yasmeen Lari, and Shigheru Ban – chosen to explore three different aspects considered relevant to the present research. The construction of a solid theory of participatory architecture and its application in plans and projects, in the case of Giancarlo De Carlo; the formulation of a design philosophy that allows for ex-ante work with communities at risk, combining languages, techniques, and knowledge to build shared understanding, as in the case of Yasmeen Lari and Barefoot Social Architecture; the communitarian power of designer networks in emergencies and risk adaptation, in the spatial co-production of Shigeru Ban and the Voluntary Architects' Network (VAN).

Although *co-design* and *risk* – the two principal subjects of this research – both possess extensive bodies of academic literature, they are **rarely positioned side by side** within contemporary research. Despite their shared spatial implications, architectural discourse engages with them in distinct disciplinary territories, each marked by a diversity of methodological approaches. Co-design, for instance, is commonly explored through the lenses of urban planning or participatory policy. However, when attention shifts toward the architectural scale, the focus typically narrows to interventions within urban or neighbourhood contexts, where the communities

involved express needs linked to housing typologies, spatial quantity, and the quality of the built environment. Within these domains of research and practice, risk and uncertainty are often relegated to the background or, when addressed, confined to climatic or environmental dimensions – primarily in the realm of landscape and open-space design. Conversely, risk, when treated not as a purely theoretical or scientific abstraction but as **a spatially embedded phenomenon**, tends to emerge in post-disaster reconstruction scenarios, where architectural and urban design adopt *ex-post* approaches that intertwine with the temporalities of catastrophe.

Architectural research that seeks to intersect co-design and risk finds a point of convergence in the role of communities (through participation and co-creation) in cultivating shared knowledge around the use and transformation of space. This convergence recalls the surge of interest in user-centred design and participatory planning that began in the 1970s, spurred by both theoretical and practical contributions from figures such as John F. C. Turner, Giancarlo De Carlo, Lucien Kroll, and Ralph Erskine. Their work combined the political charge of early participatory movements with a growing sensitivity to the lived experience of dwelling. Initiatives such as Community Architecture (Wates and Knevitt, 1987), informed by theoretical frameworks on participatory practices (Arnstein, 1969; Davidson, 1998) and the valorisation of tradition as a source of innovation (Fathy, 1973), evolved into contemporary practices of engagement and empowerment animated by a renewed focus on collective needs and the idea of space as a shared good (Druot et al., 2007). In recent years, scholars and practitioners have further redefined the contours of co-design, distancing themselves from past models to embrace a vision of active community creativity. This perspective situates participatory architecture as a cultural endeavour (Marini, 2013, p. 33), reinterpreting twentieth-century experiences and theories of participation (Jenkins and Forsyth, 2010) through a renewed collective consciousness of social and spatial complexity. Within this framework, transformative participation (Till, 2005, p. 27) is understood as a bridge between participation and co-design; it frames a community-based approach attuned to contextual intricacies, grounding shared knowledge in local realities, offering more authentic representations of communities (Till, 1998), and reconfiguring the architect's role within the circulation of specialized and situated expertise.

Case studies analysis

Within architectural research addressing risk and co-design, a robust literature review must necessarily be paired with an examination of exemplary practices that guide research toward a culturally and design-driven framework. The study of case studies becomes essential along this trajectory, not only because of the paucity of literature explicitly bridging co-design and risk at the architectural scale but also because these cases reveal how design processes can synthesize participation, adaptation, and resilience.

The following examples highlight designers who have explored community engagement as a pathway to achieving anti-fragile conditions in territories exposed to natural hazards, and architects who have made these themes a *fil rouge* throughout their careers.

In Italy, Marco Navarra from NOWA with the research project Riparare Fiumare stands out (Navarra and Adamo, 2017), along with Laboratorio Alta Valle Aterno, Orizzontale with La Rivoluzione delle Seppie, Post Disaster Rooftops (Fosbury Architecture, 2023), the VIVIAMOLaq collective, and organizations that organize self-build workshops such as Camposaz, Bosco Colto and many others. In South America, there are contributions from Peru with Marta Maccaglia and Semillas NGO, from Ecuador with Juan Carlos Bamba and the AL BORDE group – represented by David Barragán and Pascual Gangotena –, from Argentina with Rafael Iglesia, from Paraguay with Solano Benítez, from Chile with ELEMENTAL and Alejandro Aravena's research by design, Eugenio Ortúzar, and Tania Gebauer, and from Brazil with Nivaldo Vieira de Andrade. The broader Asian landscape includes the activities of Yasmeen Lari – with her Barefoot Social Architecture – and the Heritage Foundation of Pakistan, the interventions of Shigeru Ban and Atelier Bow-Wow in Japan, the initiatives of the Voluntary Architects' Network VAN by Ban and Home for All by Toyo Ito, as well as the experiences of Eko Prawoto in Indonesia and Hsieh Ying-Chun in Taiwan. Moving to Africa, participatory practices often encounter climate-risk contexts and environmental emergencies (e.g., Diébédo Francis Kéré), while in Australia, there is an interesting anthropological approach applied to design, derived from the experiences of some architects who rooted design in local culture (e.g., Glenn Murcutt). Architects Without Borders, TAO-Pilipinas, and the US organization ADPSR also have a place on the international scene. The projects considered most relevant among those produced within the aforementioned experiences are listed at the end of the document's final bibliography.

As explained above, the in-depth analysis of three specific experiences has allowed us to explore topics considered fundamental to this research development. These are Giancarlo De Carlo's participatory architecture in Italy (De Carlo, 1972), Yasmeen Lari's Barefoot Social Architecture in Pakistan (Lari et al., 2013), and the Voluntary Architects' Network promoted by Shigeru Ban in Japan (Ban, 2010).

Giancarlo De Carlo is one of the most important Italian architects of the 20th century, known not only for his practice but, above all, for developing a design approach based on the active participation of users. His thinking, well explained in the 1972 text *An Architecture of Participation*, emerged in a complex cultural climate between the post-war period and the 1970s, when the crisis of modernist models and the transformation of the social fabric called into question the idea of a top-down design capable of interpreting the needs of the community on its own. As a member of Team X in the 10th CIAM of Dubrovnik, De Carlo identified this gap between designers and users as one of the main causes of the ineffectiveness of contemporary architecture (Modern Movement) and proposed to bridge it by building inclusive, open, and dialogical processes.

De Carlo's concept of participatory architecture is not simply a technical methodology or a set of codified tools, but it is an ethical and political position that recognizes the community as a competent subject, a source of knowledge that the designer cannot ignore: this is the «*architecture's public*» (De Carlo, 1992, p. 3). According to this notion, architecture arises from the interaction among places, people, and aspirations, and the architect's role is to facilitate this interaction. This is the basis for the theorised necessity of open processes, capable of bringing to light conflicts, desires, memories, and concrete uses of space.

One of De Carlo's most significant practices can be seen in his plans for Urbino City and projects for the University of Urbino, where the construction of spaces for users' everyday life becomes an opportunity to develop strategies for listening to and involving the university community – teachers and students. Emblematic in this regard was the collaboration between the architect and the Rector Carlo Bo, which began in the 50s and produced notable outcomes, such as the Facoltà Magistero project. Even more explicit is the case of the Quartiere Matteotti in Terni, a famous example of community participation: here, De Carlo organized meetings, public discussions, and moments of shared planning, not only to gather functional information, but also to build a sense of collective responsibility towards the built environment and urban space.

Participatory architecture thus takes on a transformative value (Till, 2005, p. 27). For De Carlo, participating means understanding social complexity, accepting the plurality of viewpoints, and recognising the project's evolutionary and iterative nature. Participatory architecture does not impose definitive forms, but embraces adaptation, growth, and spatial appropriation over time. De Carlo's legacy can be found today in the spread of collaborative practices, co-design workshops, and bottom-up urban regeneration processes based on dialogue with communities. His literary work continues to offer valuable critical tools for addressing contemporary challenges, reminding us that the built environment is, first and foremost, a shared space and a place.

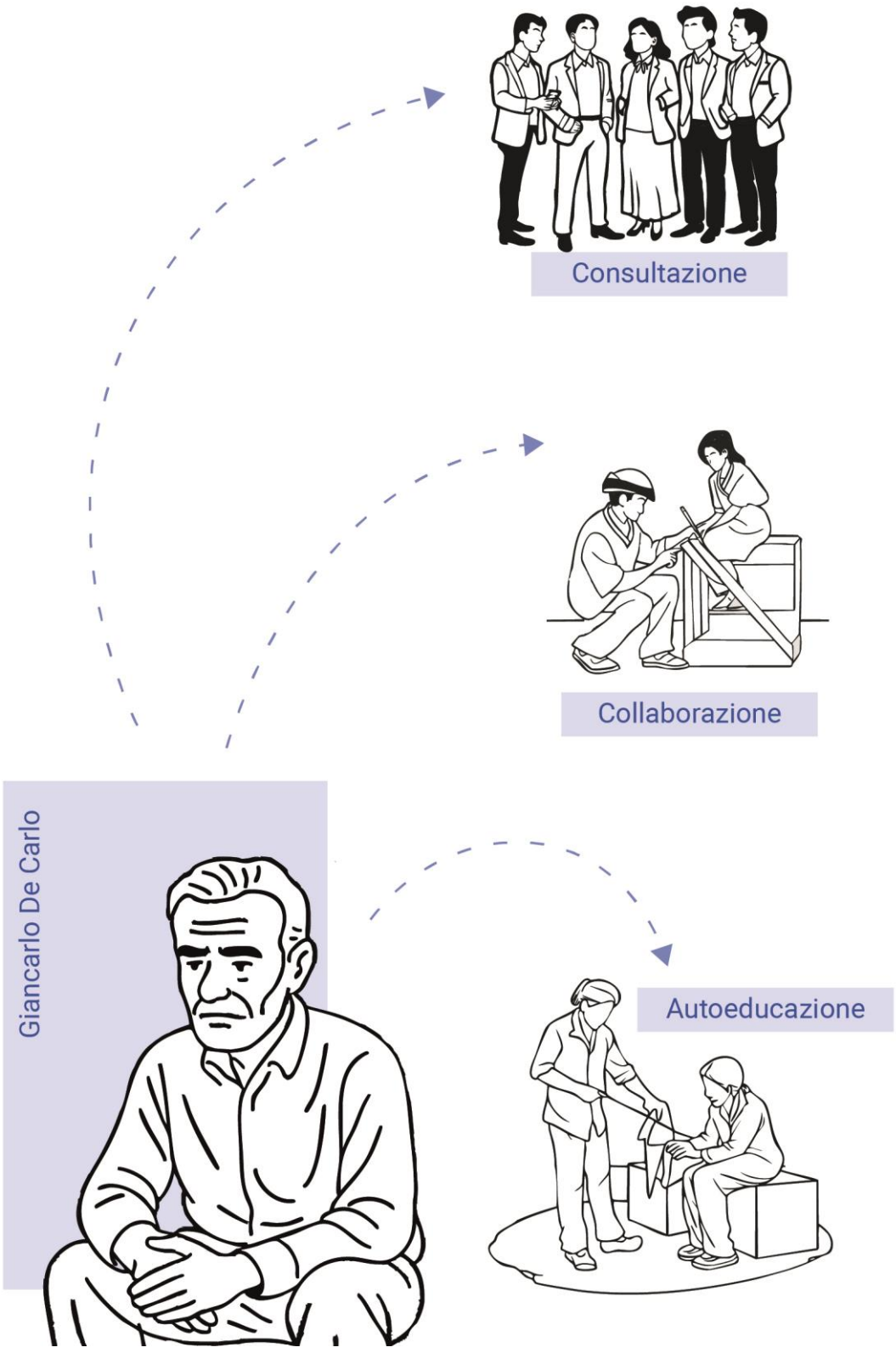


Figure 4 – User centred design and participatory process promoted by Giancarlo De Carlo

A second experience unfolds in a non-Western context: **the work of Pakistani architect Yasmeen Lari** in response to some disasters in Kashmir. Her humanitarian design practice and deep community engagement following the 2005 earthquake and subsequent crises underpin the formulation of *Barefoot Social Architecture* (BASA), conceived as a «*holistic ecosystem of multidisciplinary actions»* employing «*appropriate technologies to enable vulnerable communities to withstand predictable disasters […] and plan disaster preparedness, prevention, and management through sustainable zero- or low-carbon methodologies*» (Cozza in Berlingieri et al., 2021, pp. 43-44).

A design approach rooted in communities' ability to transform their environment is therefore proposed, using minimal resources, appropriate techniques, and self-organising processes. The BASA philosophy rejects the idea of an architecture that relies on expensive technologies or on exclusively specialised external expertise, and focuses on people's creativity, recognising that adaptation stems from autonomy and local knowledge. The approach aims to reduce vulnerability through solutions with low economic and environmental impact, favouring natural materials, simple construction cycles, and zero- or low-emission strategies.

The methodology consists of a series of progressive actions that directly involve communities: practical training, collective experimentation, shared construction, and shared maintenance. Diagrams, elementary drawings, and visual protocols (Lari et al., 2013) make instructions accessible, enabling immediate learning even in contexts with low literacy rates. Lari's architectures – often housing modules, open spaces, protective devices – are designed to be adapted, replicated, and improved by the community itself, creating a continuous cycle of empowerment.

Through the architectural co-design of self-built housing units, public spaces, shelters, furniture, and communal facilities, Lari’s approach has facilitated a shared spatial education among disaster-affected populations. This process heightened risk awareness while empowering communities through self-determination rooted in vernacular construction techniques and traditional knowledge reinterpreted for contemporary use. Her *Disaster Preparedness Manual* (Lari et al., 2013), developed in collaboration with the Heritage Foundation of Pakistan and other researchers, exemplifies this ethos. Using simple visual communication – cartoon-like drawings annotated in English and Urdu – it illustrates the potential damage from natural hazards, safe spatial practices, and emergency behaviours, translating risk awareness into accessible, actionable knowledge.

The social dimension is an integral part of the method: cooperation, commoning, and the transmission of skills generate collective preparedness for disasters, transforming architecture into a tool for self-determination and care for the territory.

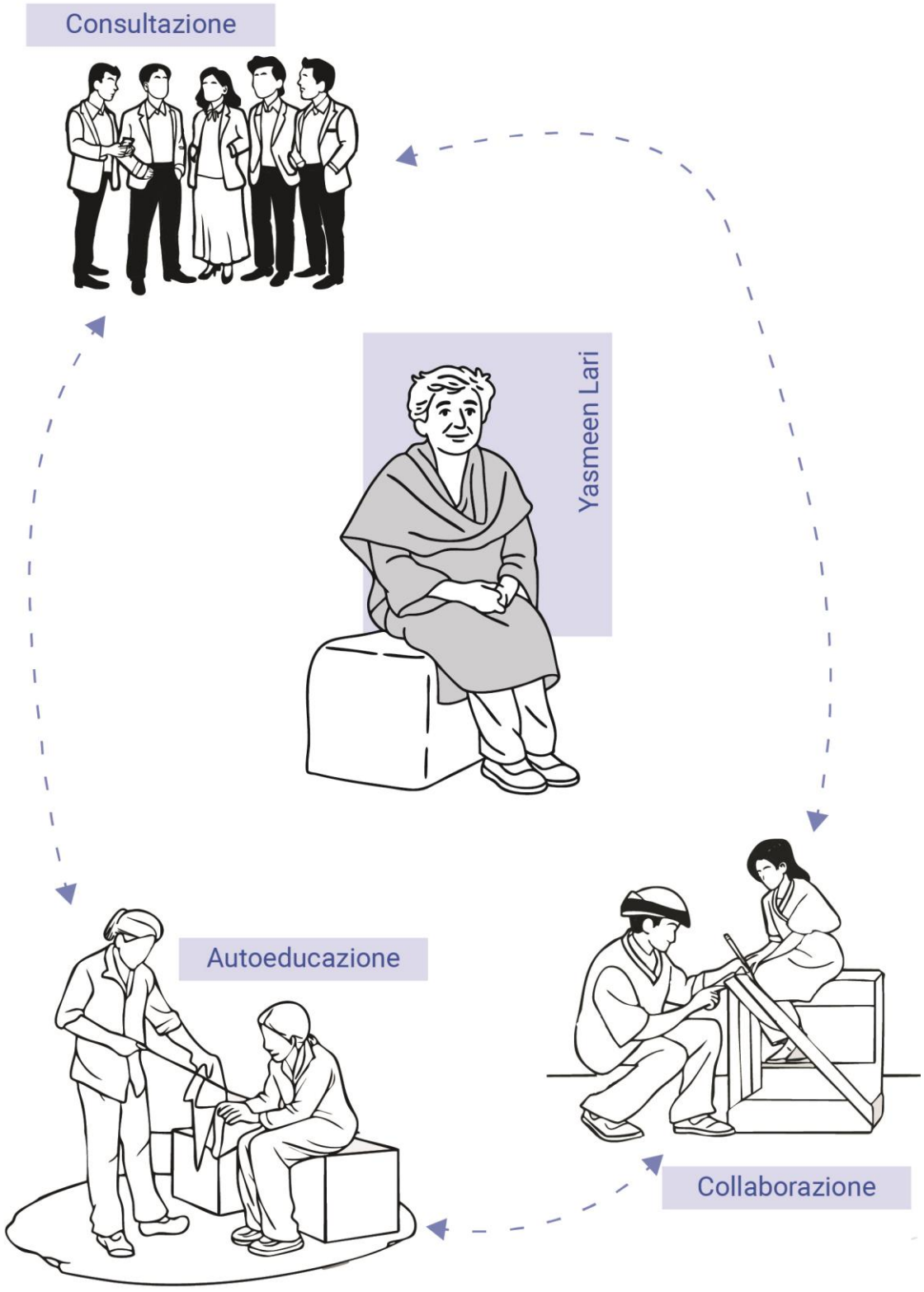


Figure 5 – Co-design and self-construction training promoted by Yasmeen Lari

In Japan, where extreme events such as earthquakes and volcanic eruptions are recurrent, many architects have engaged with emergency contexts and vulnerable communities, transforming these challenges into long-term research trajectories. The Japanese experiences of Home-for-All and VAN (Voluntary Architects' Network) exemplify how architectural and urban design can meaningfully engage with the post-risk phase as a crucial moment of spatial and social reconstruction.

Similarly, **Shigeru Ban's Voluntary Architects' Network (VAN)** operates through a flexible, community-based model that integrates rapid-response architecture with participatory engagement, from temporary shelters to transitional public spaces. Both approaches foreground the post-disaster phase not merely as a time of reconstruction but as a laboratory for rethinking spatial practices under conditions of vulnerability. By embedding notions of risk, temporality, and care into architectural form, Home-for-All and VAN advance a design culture that transforms recovery into an opportunity for reimagining the relationship between people, place, and resilience. Similarly, Atelier Bow-Wow's ethnographic approach (Kaijima et al., 2018) manifests a sensitivity to adaptation and localized social structures, situating architectural design as an evolving dialogue with place and community in conditions of risk.

The Voluntary Architects' Network develops projects that focus on communities' ability to adapt and regain autonomy after a disaster. Each architecture is conceived as an evolutionary process: the initial structures, which are lightweight and easy to assemble, are not definitive solutions but starting points that residents can modify, expand, or replace as needed. This adaptive nature allows users to quickly reclaim the space, transforming the built environment into a tool for recovery rather than a simple emergency response.

Empowerment comes from direct involvement in construction. The construction systems, based on locally available materials and intuitive techniques, enable immediate participation, reducing reliance on external specialists. Communities learn transferable skills that are useful not only for assembling shelters but also for managing subsequent stages of reconstruction. In this way, the network promotes a collective preparedness process in which architecture becomes an opportunity to strengthen social bonds, operational capacities, and confidence in one's own resources.

Together, **these experiences and the associated literature inform a design-driven research methodology** that is acutely responsive to contemporary challenges and situated within a broader multidisciplinary framework. They reveal how co-design, when interwoven with an understanding of risk, can nurture architectural cultures of resilience, where the production of space becomes both a collective act of knowledge and a means of confronting uncertainty through design.

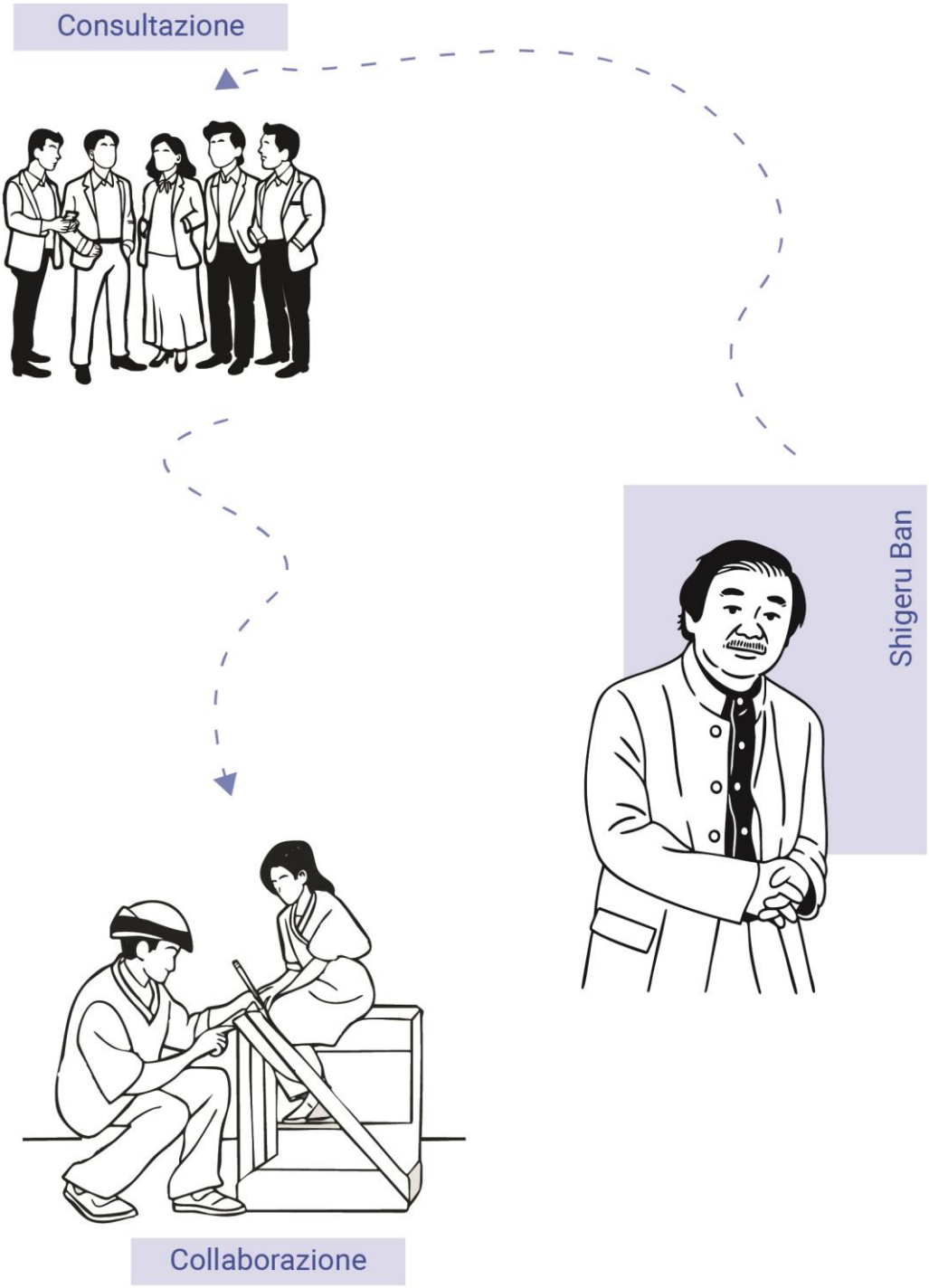


Figure 6 – Participatory process promoted by Shigeru Ban

III. Phase One: Setting a PoC

The research methodology stems from an inductive process based on a specific **Proof of Concept (PoC)**. In the awareness of possible limitations related to site-specific analysis and strategies, the expected results aim to define tools (e.g., survey sheets) for the knowledge and enhancement of the built environment, heritage, and open spaces, while promoting community empowerment (Gangemi, 2019), within the framework of **DRR** and **CCA**. Within Work Package 4 *Community-Based* **(CB)** *approaches, codesign and policies,* Task 7.4.4 *New approach in integrated planning based on co-design processes for* **DRR** *and* **CCA** *policies*, **Lomellina** is assumed as **PoC** and as a testbed for methodologies, strategies and tools structured in the three-year research process. Whilst the PoC analysis is still ongoing, the research group expects to find similar results across the whole Lomellina area. Indeed, not all the municipalities considered had an accessible **PPC** (*Piano di Protezione Civile*) or a former version of their **PEC** (*Piano di Emergenza Comunale)*. For this reason, the first step of this comparative analysis is the creation of thematic territorial maps, which illustrate the locations mentioned in the above-listed documents for each municipality in the **PoC**, thereby shifting the focus from the urban to the architectural scale. The subsequent phases of the research will deliver a comprehensive outcome comprising an Atlas of Safe and Vulnerable Spaces, a Toolkit for Participatory Planning (including survey forms, mapping tools, and educational materials), and Operational Guidelines for Integrated Risk Reduction, developed through co-design and replicable in other contexts. Task 7.4.4's objective is to develop co-designed strategies for fragile territories exposed to multi-risk scenarios, demographic decline, ageing populations, and remoteness from essential services. These strategies will integrate ordinary and emergency planning through participatory approaches, based on three objectives:

- **Prevention, preparedness, resilience and adaptation:** developing integrated strategies to prevent and mitigate the risk of natural disasters and climate change, with a view to disaster risk mitigation **(DRM)** and **DRR**. The strategies stem from a critical analysis of the spatial structure of municipalities, guiding the transition from planning to projects, and the definition of criteria for identifying safe places;
- **Regeneration:** promote territorial and community regeneration processes with a participatory approach and co-design actions, to enhance the built environment and open spaces towards risk resilience (Till, 2005, p. 27);
- **Education and Participation:** Strengthening community awareness and building a shared knowledge between citizens and specialists to enhance capacities in risk prevention and management.

In the early stages of the research, a methodological framework was developed to pursue a comprehensive analysis of the **PoC**. This approach entailed delineating distinct and subsequent phases, each with a defined objective, to facilitate an extensive exploration of the territory's multifaceted nature.

Introducing Lomellina: a fragile Inner Periphery in Lombardy

Lomellina is a historical-geographical region comprising 57 municipalities in the province of Pavia, Lombardy. This territory is in the western portion of the province, bordering the provinces of Vercelli, Novara, and Alessandria in the Piedmont region. Lomellina's topography is defined by an extensive plain, characterised by abundant water bodies fed by the three rivers that traverse the region. The Po River defines the southern border, the Sesia River marks the western border, and the Agogna River forms the eastern border. The Po, Sesia, and Agogna branch to numerous tributaries. Throughout history, watercourses have been organised into a dense network of canals, which continue to be utilised for the cultivation of rice, the region's principal crop. The prevalence of major rivers and torrential tributaries signifies not only a valuable resource but also a significant flood risk, jeopardising settlements along the primary watercourses.

Most of the population is concentrated in Vigevano, Mortara, Mede and Sannazzaro de' Burgondi. The majority of other municipalities have a low population density, with fewer than 5,000 inhabitants. These settlements present a primarily inhabited centre equipped with essential administrative and service infrastructure. The centres in question are generally characterised by a consolidated urban fabric built along the main access roads and cover a limited area; yet the administrative areas are generally extensive, presenting scattered farmsteads (*cascine*) set isolated within cultivated terrain. Until the mid-twentieth century, these complexes provided accommodation for hundreds of workers engaged in manual rice harvesting. The organisation of inhabited settlements around rural economic activities is still identifiable. Today, Lomellina's predominant economic activity remains agriculture, though this has undergone significant transformations throughout the twentieth century. After World War II, an important shift towards agricultural mechanisation led to a progressive depopulation of farmsteads, as cultivation required fewer workers. The acceleration of this dynamic was triggered in the mid-fifties by the construction of a refinery by the *Ente Nazionale Idrocarburi* (ENI) – the National Hydrocarbons Board – which started operations in 1963. Situated within the municipalities of Sannazzaro de' Burgondi and Ferrera Erbognone, the complex covers 320 hectares. The establishment of the refinery resulted in a substantial population increase in Sannazzaro, driven by the demand for workforce. Whilst the refinery has undoubtedly resulted in the creation of employment opportunities and contributed to the development of the industry sector within the territory, the presence of the industrial plant poses a significant hazard. The refinery is, in fact, classified as being at risk of major accidents; moreover, six other establishments at risk of major accidents involving hazardous substances are present in Lomellina. Over the past forty years, Lomellina has experienced demographic decline and the progressive loss of essential services, such as schools, hospitals, and public transport. These factors have led to a trend of population ageing and a lack of territorial attractiveness for young, highly educated people. Therefore, many buildings and business activities in historical centres have been demolished, causing residential and commercial desertification and

resulting in poor maintenance of the historical fabric. These dynamics are particularly relevant in small municipalities with fewer than 5.000 residents.

For all these reasons, even though Lomellina is not far from cities such as Milan, Pavia and Alessandria, the area is considered peripheral. In 2021, the Lombardy Region included 43 of the 57 municipalities in Lomellina in its Inner Periphery strategy, *Agenda del Controesodo*: territories where population decline, a lack of essential services, and social and economic fragility are well-established trends. The overall objective of the *Agenda del Controesodo* strategy is to promote territorial cohesion by encouraging municipalities to work together, investing in essential services, and reversing the trend of depopulation. The effects of the strategy, which definition started in 2022, will presumably be noticeable in the next twenty years. Currently, Lomellina is a fragile area affected by negative socioeconomic trends and fragmented governance. It is also affected by a multi-risk scenario due to its exposure to multiple hazards, including floods, droughts, industrial hazards, and, to a lesser extent, seismic hazards.

For the purposes of the research activities and the objectives of the Task, 12 municipalities have been selected as **PoC** within the borders of the inner periphery as defined by the *Agenda del Controesodo.* The **PoC** area was defined primarily by its exposure to different risks, specifically hydraulic, drought, and industrial. This was due to:

- The position of the 12 municipalities along the Po and Sesia rivers, affected in time by flood events;
- The high presence of rural activities related to rice cultivation, which are increasingly affected by climate change;
- The presence of two industrial plants at risk of major accidents involving hazardous substances.

Thus, the **PoC** comprises a portion of south-west Lomellina, including the following twelve municipalities: Pieve Albignola, Sannazzaro de' Burgondi, Ferrera Erbognone, Mezzana Bigli, Pieve del Cairo, Suardi, Gambarana, Frascarolo, Torre Beretti e Castellaro, Sartirana Lomellina, Breme, and Candia Lomellina.

The initial phase of the research programme involved a series of field surveys in the area of twelve municipalities selected. These on-site activities facilitated the acquisition of direct knowledge through rapid surveys of settlement characteristics, the built environment, and open spaces. A particular focus was placed on the relationship between public buildings and their associated spaces, with consideration given to both their potential vulnerability to the main risks in Lomellina and their strategic importance across the various stages of the risk chain. The preliminary field surveys provided the basis for defining and collaboratively developing the application tools developed during the research process.

Concurrently, an initial mapping of local and supra-local actors, along with their relationships, was conducted in the 12 PoC municipalities. The mapping facilitated the delineation of the network of institutional stakeholders (e.g., mayors, the director and the president of the Local Action Group) and of civil society (e.g., representatives of the local Ecomuseum and of Foundations active in the area, municipal groups of Civil Protection volunteers). Thus, this framing phase identified several key issues about the research questions.

A thorough analysis of data and cartography was conducted, with a focus on risk assessment and the interpretation of emergency documentation (**PPCs** and **PECs**). This investigation was undertaken in conjunction with the analysis of documents that constitute ordinary territorial planning (**PGT**). This preparatory phase preceded the subsequent fieldwork, entailing the verification of locations deemed safe or vulnerable using emergency or ordinary planning tools, along with the delineation of the prevailing critical issues pertaining to the built environment and open spaces (streets, squares, parks, courtyards). Particular attention was paid to the shape and territorial section of the settlements, to spatialise the risk and understand its relationship with the typological and morphological characteristics of the urban fabric.

A third part of the research was conducted on 18 October 2024, and consisted of a focus group involving local authorities, the third sector and communities. The event took place at the headquarters of the Local Action Group *Risorsa Lomellina* in Mede (Pavia). This phase was dedicated to the definition of a shared understanding of risk in the area through participatory mapping activities with the communities (Fig. 5). The safe spaces and vulnerable places in the area were then compared with those identified by the planning tools analysed in the first phase of the research. The focus group also facilitated the identification of buildings and open spaces considered “identitarian” for the communities, which in some cases coincided with “safe” or “vulnerable” places. The presence of divergence in some of the results obtained was an essential component of the study, fundamental to the subsequent phases of the research.

On-site activities in the 12 municipalities designated as **PoC** resulted in the analysis and mapping of buildings and open spaces, labelled as "safe" or "vulnerable" using planning tools, as described in the interviews. Buildings and open spaces were investigated in relation to their proximity to one another, taking into account their state of use, conservation, and architectural features.

This analysis will result in an atlas depicting the current situation, considering critical aspects and strengths. The physical characteristics of places are analysed to bridge the gap between policies and the actual status of places, spaces and built heritage. The initial findings from the desk-based and on-site investigations served as the basis for implementing participatory activities throughout the research process.

To stimulate dialogue across different areas of expertise and stakeholders, and to strengthen community capacity by sharing updated knowledge, a focus group was held with representatives from the PoC

municipalities (e.g., heads of municipal technical offices, local Civil Protection groups, and mayors). The initial aims of the focus group were to assess preliminary research outcomes, define a “common ground" with respect to planning tools and policies, and integrate different levels of action by setting updated design approaches. In the long term, the objectives of the participatory process will be to raise awareness of vulnerable and safe places and to reinforce the territorial network of stakeholders and territorial synergies to define shared **DRR** and **CCA** design and preservation practices.

Although 78% of municipalities in the Lombardy region have adopted **PPCs**, this figure drops to around 40% in the province of Pavia. Among the **PoC** municipalities, only four have a **PPC**, representing an implementation rate of 30% (Dipartimento della Protezione Civile, 2022). Thus, the analysis of planning tools in Candia Lomellina, Breme, and Sannazzaro de’ Burgondi is based on the accessibility of **PPC** (Civil Protection Plans) and former **PEC** (Municipal Emergency Plans). The investigation compares the documentation and cartographic materials of **PECs/PPCs** and **PGTs** (*Territorial Governance Plans)* to verify correspondences and discrepancies in the identification and classification of buildings and open spaces as either “safe” or “vulnerable”. Furthermore, an analysis focusing specifically on the classification of cultural heritage and its role in **PPCs** was conducted. This information is then associated with the results of semi-structured interviews and a focus group involving over 30 stakeholders.

The analyses focus on identifying and evaluating “safe places” in built and open spaces based on their typological and spatial characteristics. The evaluation considers the surrounding context and adjacent open spaces, which will contribute to the development of an atlas mapping these safe areas. Initially, this verification process involved local stakeholders through a focus group. Subsequently, the research team identified and listed potential discrepancies between **PPCs**, **PECs** and community perceptions. They also integrated a third classification related to built heritage and identitarian places into the analysis.

In this section, the application of the research methodology is presented, starting from a preliminary analysis of Lomellina as introduced.

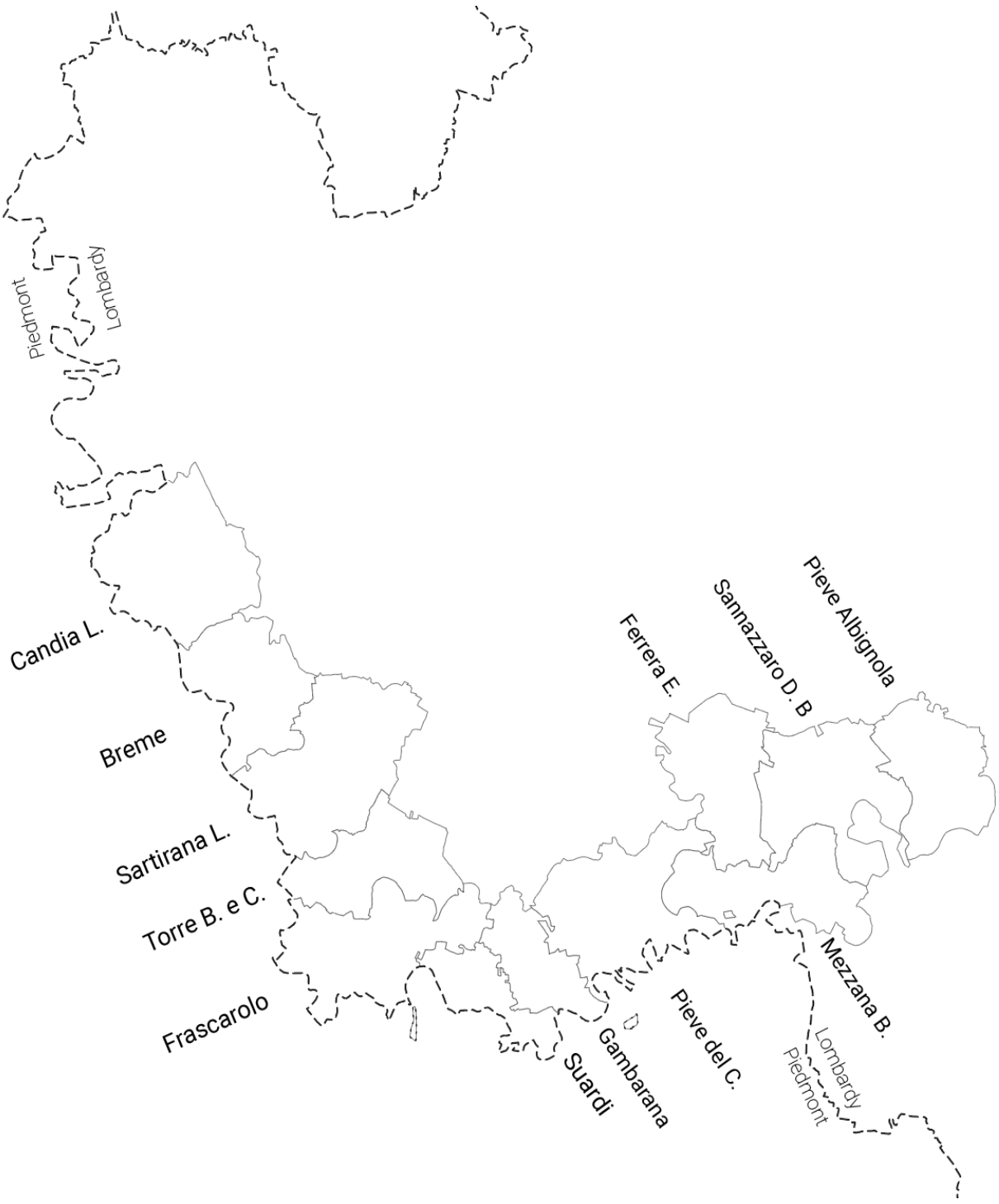


Figure 7 – The twelve municipalities included in the PoC

Action 1 – Comparison analyses of ordinary planning and emergency planning

GOAL:

Producing one initial document to be used for framing the risk and hazards situation before starting the co-design activities of phase 2. This activity enables checking the presence of mandatory documentation and the presence of building/areas to test in co-design activities.

ACTIVITIES:

- a) Collection of data and formal documents;
- b) Analytic comparison of data;
- c) Graphic comparison of risk/hazards and safe spaces.

TOOLS:

- a) PGT web: online platform for downloading the municipal ordinary planning documents;
- b) Municipal Website: try to find the current PPC or PEC produced;
- c) GIS databases: online multiple databases are available to find georeferenced data to produce the above-mentioned layers.

OUTCOME:

- Comparative analysis map (see **Annex 1**).

PoC APPLICATION:

As a preliminary step in interpreting the site through the lens of risk and participation, it is essential to ask: **what official information can actually reach local communities?**

Every Italian municipality is required, under the provisions of its regional legislation, to adopt planning instruments (formerly the General Regulatory Plans). In Lombardy, where the research **PoC** is located, these instruments take the form of the **PGT**, governed by L.R. 12/2005 and made accessible through the online platform *PGT WEB – Archivio Documentale.* By its very structure, ordinary spatial planning collects and disseminates substantial information to the community about hazards, risks, and vulnerable areas within the local territory. This includes:

- The ***Documento di Piano (DP)*** provides cognitive elements on the territory at various levels of detail, as well as the development guidelines the municipal administration intends to pursue. This document outlines essential information, including geological, hydrogeological, and seismic conditions

(pursuant to Article 57), which are closely linked to the risk scenarios to which the municipality may be exposed.

- The ***Piano dei Servizi (PS)***, which concerns facilities of public or general interest within the settlement framework. This document often highlights specific elements relevant to assets and services significant to the local community.
- The ***Piano delle Regole (PR)***, which compiles the regulatory aspects of the built environment.

To these must be added the documents required by the Civil Protection Code for the drafting of the **PPC**, which every municipality is expected to have. These documents are often outdated and may also appear under the designation **PEC**.

Once these documents have been gathered, it is advisable to conduct an **analytical comparison using a spreadsheet or a handmade matrix** for each location mentioned in the **PPC** (both safe buildings and exposed areas). What is the name of the place? How do they correspond to those identified in ordinary planning and emergency planning? Where are they located (the use of coordinates might be useful to overcome toponymic discrepancies)?

The outcome of this comparison enables identification in advance of any requirements on which ordinary and extraordinary planning should converge. For example: Are there restrictive constraints or limitations affecting the buildings or areas designated in the emergency plan? Are the community's identity-bearing places – crucial in a post-risk scenario – included within the emergency planning framework?

nome luogo	definito come...	coordinate	PEC/PPC	DP	PS	PR	Ridisegno
piazza del municipio	spazio aperto sicuro	45.126701, 8.621496	- Area di attesa n. 4 (1198 mq)*	tav. 4a = ST1_Attrezzature pubbliche di interesse comune	- tav 1b = individuato come mobilità e sosta (ST1_Attrezzature pubbliche di interesse comune esistenti)	Delibera 30 del 19/12/2012 Provvedimento di compatibilità con il PTPC n° 158/30929 del 22/05/2013	☐
Municipio	edificio sicuro	45.126829291824 34, 8.6213693996221 75	**01. Municipio** - Edifici strategici e Sedi operative (edifici pubblici) - Area di attesa n. 4 (1198 mq)* - Municipio	- tav 2a = aree antropizzate AU - Aree urbanizzate - tav 3a = previsioni urbanistiche: servizi di livello comunale - tav 4a = destinazione d'uso fabbricati: Servizi di interesse pubblico (municipio) - tav 7a (vincoli) = vincolo Centro Edificato_L.865/71 art.18. - tav 7a (vincoli) = Centro Abitato_Nuovo Codice della Strada D.Lgs 285/92 e D.P.R. 495/92. - tav 7a (vincoli) = Zona di rispetto da derivazioni idropotabili - Pozzi - (Vedi tavole della Componente Geologica) - tav 7a (vincoli) = Zona di tutela assoluta da derivazioni idropotabili - Pozzi - (Vedi tavole della Componente Geologica) - tav 8a (paesistica) = classe IV (sensibilità elevata) - tav 9a = area adibita a servizi	- all. b1 = **01 municipio** - tav 1b = individuato come servizio di interesse comune (ST2_Attrezzature private di interesse comune esistenti)	Delibera 30 del 19/12/2012 Provvedimento di compatibilità con il PTPC n° 158/30929 del 22/05/2013	☐
cascina Bertolina	luogo identitario luogo vulnerabile	45.145949817797 51, 8.5885428476537 45		- tav 2a = aree antropizzate AU - Aree urbanizzate - tav 3a = previsioni urbanistiche: zone golenali - tav 7a = SIBA (Sistema Informativo Beni Ambientali) - tav 7a = nel limite della fascia PAI B e C - tav 7a = Ambito di tutela paesaggistica dei corsi d'acqua_D.Lgs 42/04 art.142c - tav 8a = architettura di rilevanza comunale - agricola - tav 8a = edifici circondati da multipli vincoli paesaggistici e naturalistici - tav 9a = azioni strategiche previste: ambiti agricoli strategici naturalistici - ecologici	/	Delibera 30 del 19/12/2012 Provvedimento di compatibilità con il PTPC n° 158/30929 del 22/05/2013	☐
cascina mezzana	luogo vulnerabile luogo identitario	non reperibile		/	/		☐

Figure 8 – Example of analytical comparison using a spreadsheet (excerpt from the document produced on Breme municipality)

Given that both ordinary and emergency planning documents are only minimally regulated with respect to the comparability of their visual outputs (such as scales of representation, graphic styles, colour-linguistic codes, and levels of detail in legends, etc.), it has been considered appropriate to recommend the production of **a synthetic document** structured according to the following parameters:

- **One only panel** (una sola tavola) with the total extension of the Municipality;
- Scale of representation **1:5000** (able to include both the hazards on the territory and the people's perception of places, such as buildings, streets, piazzas, gardens, etc.);
- **Graphic-linguistic code unified:** a black and white background (composed following layers: black buildings, black water rivers, grey for infrastructure width areas, dotted forests). On that, only two layers should emerge: the physical extension of hazards identified in the analyses, and the safe spaces highlighted in the **PPC** (or **PEC**). We choose a **darker blue** for major hazards and a **brighter orange** for safe building and safe open spaces (the combination of these colours should also improve readability for people with colour blindness).

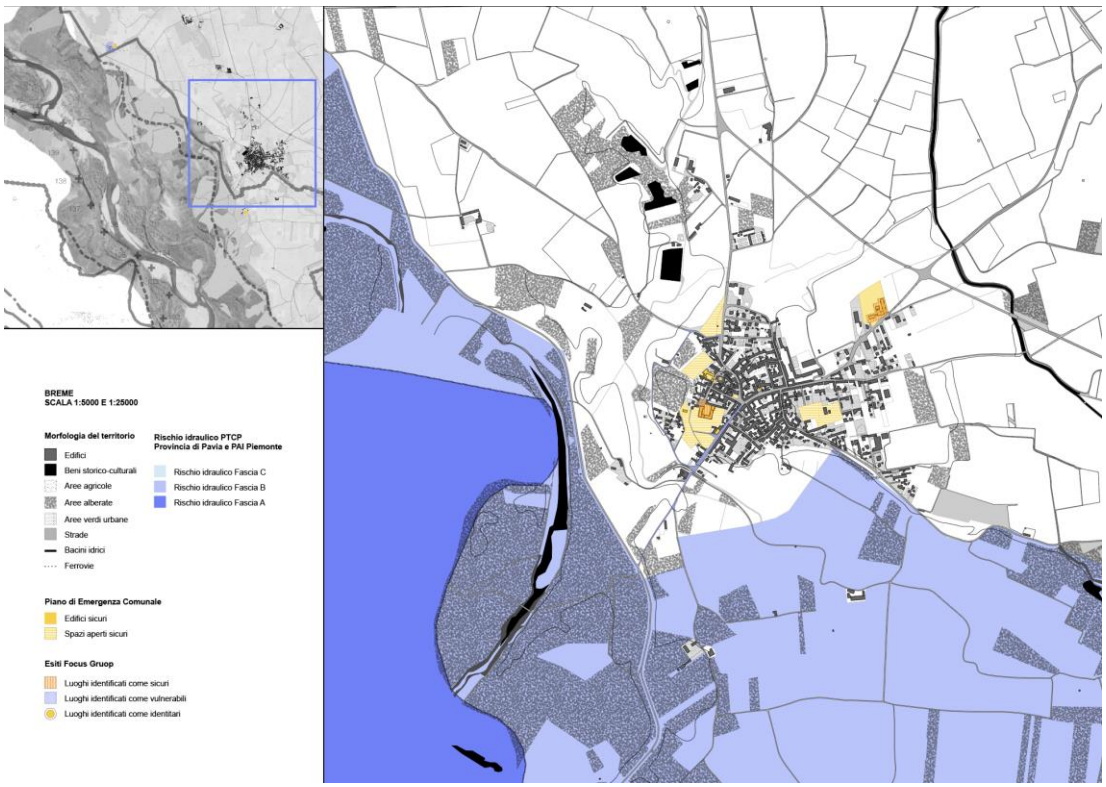


Figure 9 – Example of synthetic panel for graphic comparison (municipality of Breme)

Action 2 – Stakeholders mapping

GOAL:

Having a restitution of the territorial governance of the context (supra-local and local) and its stakeholders. This goal allows identifying and selecting "who" might be useful to involve in co-design activities (focus groups, workshops, site surveys, etc.), excluding random participation. Citizens are always welcomed to be included.

ACTIVITIES:

- Collection of data and formal documents about the locations of stakeholders active in case of emergency: (*Registro regionale e provinciale delle ODV – Ordine del Volontariato, VVFF – Vigili del Fuoco, ANPAS – Associazione Nazionale Pubbliche Assistenze, Civil Protection Bodies, and GC - Gruppi Comunali*);
- Mapping the distribution in the area and in a wider framework (for the **PoC**, it was considered a circumference of 20km able to reach the major capitals of provinces);
- Try to make connections with most of them: meetings, online calls, and reunions are meant to discover and highlight the relationships between "who" is an active participant in emergency scenarios;
- Restitution of the data in a relational diagram of the stakeholder analysis. This restitution might discover gaps and potentials in the network system.

TOOLS:

- Interviews with institutional and selected stakeholders;
- Regional databases of **ODV** and Civil Protection associations (e.g.: ELENCO TERRITORIALE DEI SOGGETTI DEL VOLONTARIATO ORGANIZZATO DI PROTEZIONE CIVILE ai sensi del Regolamento Regionale del 19 dicembre 2022, n. 10);
- Contact and information form;
- Restitution of the data in a relational diagram of the stakeholder analysis. This restitution might discover gaps and potentials in the network system.

OUTCOME:

- Stakeholders' survey form (see **Annex 2**);
- Stakeholders' database (see **Annex 2**);
- Stakeholders' network diagram (see **Annex 2**).

PoC APPLICATION:

While analyses can interpret and map the physical condition of the context during an emergency scenario, another context should be investigated before starting co-design activities: **who is involved? Where and with whom do they operate?**

If the physical impact of an emergency scenario can be described and quantified through a map, the effort of a community to counterattack a hazard is not. It might not be the quantity of association/civil protection bodies displayed in a place, but the network between them operating in the territory might.

Once the information is gathered from the regional and local databases (like the *registro regionale e provinciale delle ODV*, or by the *ELENCO TERRITORIALE DEI SOGGETTI DEL VOLONTARIATO ORGANIZZATO DI PROTEZIONE CIVILE)* who is conducting the research shall take into consideration both supra-local actors and local one. E.g.:

- Supra-local actors: which Italian Region is regulating the territory? Is there any **GAL** (*Gruppo di Azione Locale*) or *Comunità Montana* which is helping governating? In the **PoC** Case, the major hazards elaborated from the previous action are coming from the rivers. For this reason, the AIPO agency (Agenzia Interregionale per il fiume Po) has also been considered.
- Local actors: all the municipalities (i Comuni) involved in the **PoC**, represented by their Mayors and Municipal Technical Employees, as well as by ODV personnel, such as Gruppi Comunali (GC) and a Civil Protection Group.

It was interesting to note that in a 20 km-wide area around the **PoC**, 192 associations have been listed (Figure 11). Amongst them, 104 could serve in an emergency scenario (Figure 10).

It has been necessary to look at a wider framework, as the selected **PoC** shows its features of the Inner Periphery: within the 12 municipalities, only 5 associations could help in an emergency scenario (Figure 12). Counting also sportive association, cultural ones, social ones, and general ones, it appears that the majority are in bigger municipalities.

Associazione	Comune	tipologia	Indirizzo	point	fonti	Note
AUSER sartirana solidale APS ETS	03 Sartirana Lomellina	Sociale	Sartirana Lomellina, via Amedeo d'Aosta, 32	45°06'53.1"N 8°39'51.2"E	https://www.auser.lombardia.it/Pavia/sartirana/CHI_SIAMO/1664-Vieni_a_trovarci e https://mappa.italianonprofit.it/record-cf-92007450189	Opera a sostegno degli anziani, per la tutela dei diritti, delle opportunità e dei beni comuni. Nel 2016 l'Auser Sartirana 248 soci e 10 volontari.
GRUPPO COMUNALE DI SARTIRANA LOMELLINA	03 Sartirana Lomellina	Emergenziale	Sartirana Lomellina, Piazza XXVI Aprile, 6			https://protezionecivilesartirana.jimdofree.com/contatti/. ELENCO TERRITORIALE DEI SOGGETTI DEL VOLONTARIATO ORGANIZZATO DI PROTEZIONE CIVILE (ai sensi del Regolamento Regionale del 19 dicembre 2022, n. 10)
Associazione amici del museo in Lomellina	05 Frascarolo	culturale	Frascarolo, via castello, 1	45.04742, 8.68199	https://www.ecomuseopaesaggiolomellino.it/associazione-amici-del-museo-in-lomellina-amlom-onlus-di-frascarolo/	*Note*
Società cooperativa sociale San Giovanni A R.L (STRUTTURE DI ASSISTENZA RESIDENZIALE PER ANZIANI E DISABILI)	07 Gambarana	Sociale	Gambarana, via Alfonso Corti, 72	45.02822, 8.76078		*Note*
GRUPPO COMUNALE DI PIEVE DEL CAIRO	08 Pieve del Cairo	Emergenziale	Pieve del Cairo, Piazza Paltineri, 9	45.05057, 8.80463		ELENCO TERRITORIALE DEI SOGGETTI DEL VOLONTARIATO ORGANIZZATO DI PROTEZIONE CIVILE (ai sensi del Regolamento Regionale del 19 dicembre 2022, n. 10)

Figure 10 – Example of restitution of the ODV and associations, reported in a classification based on the typology and the location in which they operate

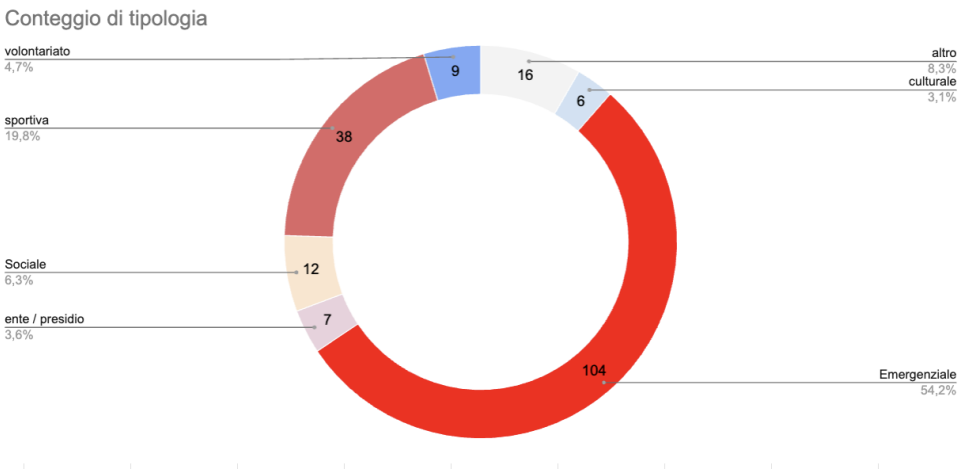


Figure 11 – Final restitution of the number of associations in the area (a quantitative analysis)

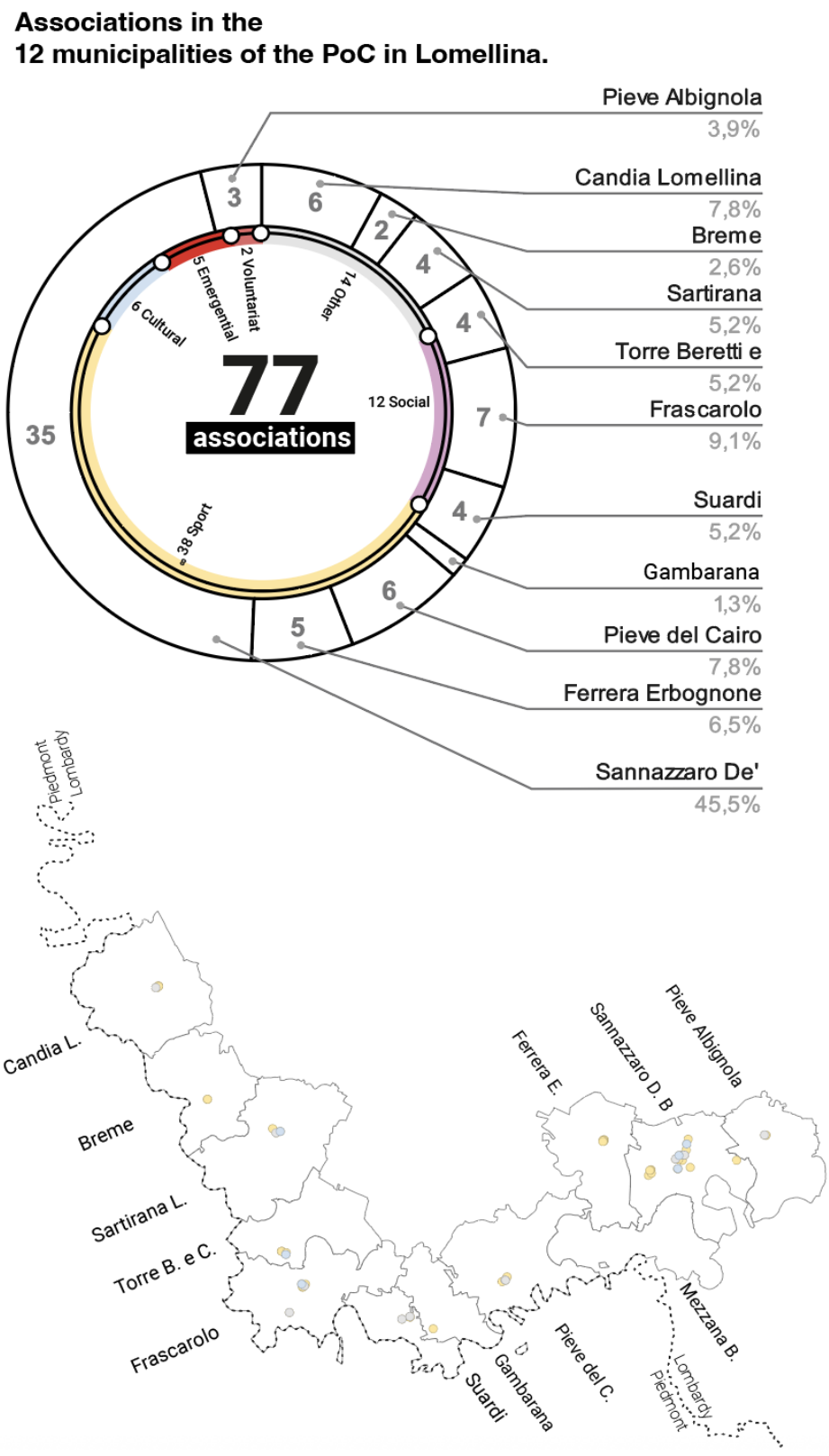


Figure 12 – The 77 associations of various typology located in the PoC

As previously said, the mere number is only a starting point, because during a stakeholder analysis it is influent to understand and reconstruct the relationship between the association. This passage of **Action 2** has been developed through direct contact between the research unit and a few stakeholders, following a few interviews to determine who is in charge of each association. It has been discovered that, most of the time, a single person was deployed across multiple municipalities, and that the emergency associations (**ODV, GC**, Protezione Civile) were entangled in a complex network throughout the **PoC**. The final network – the stakeholder analysis (Figure 13) – has been represented, highlighting some municipalities we called "comuni aggregatori", as they proved to be a major reference for smaller communities by sharing people in multiple roles, and also the majority of associations in emergency scenarios. The restitution was particularly useful in understanding the relationship of Power that would take place if a hazard occurred: to begin a co-design strategy, it will be mandatory to involve these figures, because they will be the major reference points for the community.

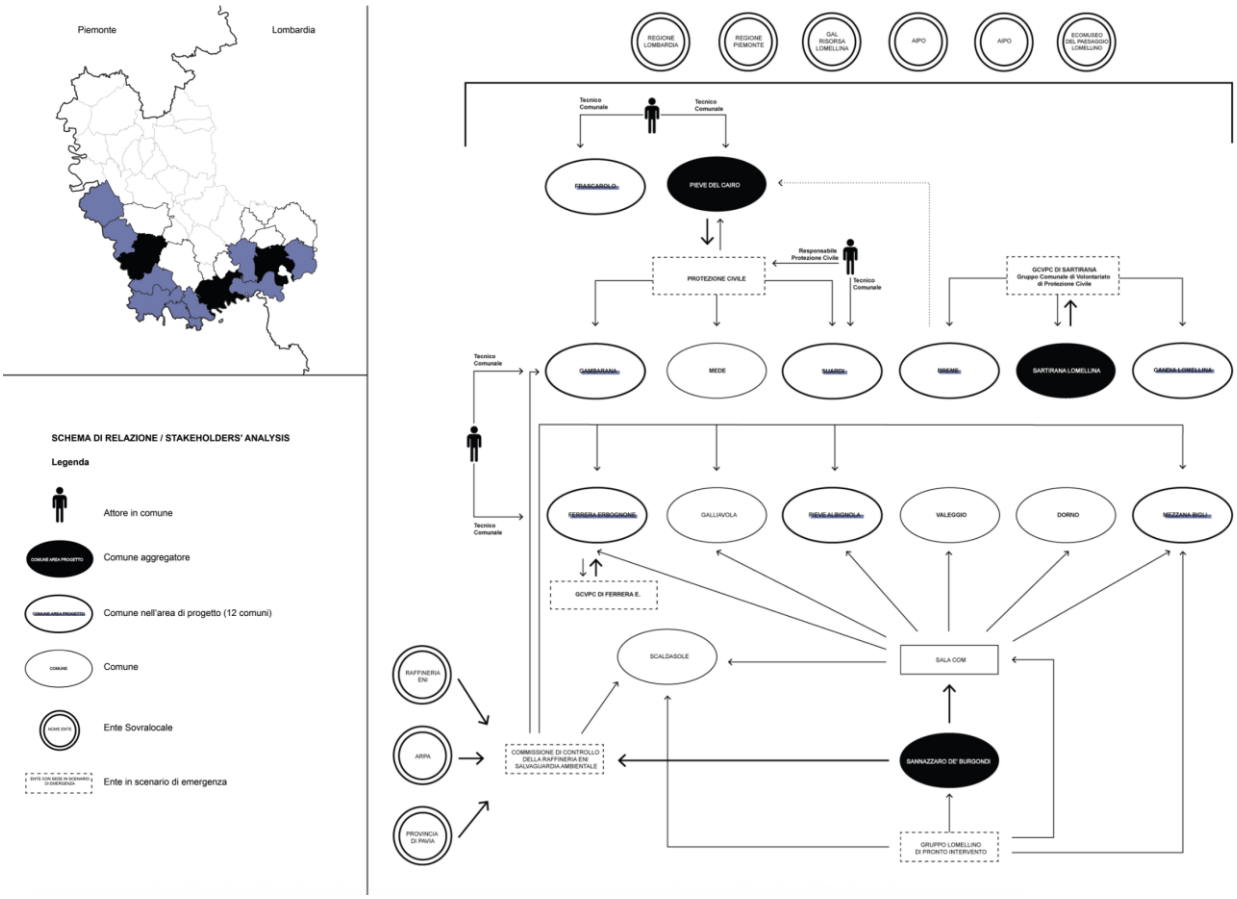


Figure 13 – Example of restitution of the data in a relational diagram: showing the interactions in the network of the PoC

Action 3 – Online questionnaire

GOAL:

The questionnaire *Knowledge and Management of Natural Risks in the Lomellina Territory*, developed by Eurac Research in collaboration with the Department of Architecture and Urban Studies - DAStU of Politecnico di Milano, collected insights from local experts on floods, droughts and earthquakes, as well as on the enabling and limiting factors influencing institutional adaptive capacity. The results fulfil a dual purpose: they offer a critical overview of vulnerabilities, institutional capacities, and opportunities for strengthening risk governance in Lomellina, while also demonstrating the questionnaire's value as a transferable and adaptable tool for assessing risk management in other multi-risk contexts.

ACTIVITIES:

- Questionnaire design;
- Sampling and stakeholder engagement;
- Data collection;
- Data analysis;
- Return of the questionnaire results.

TOOLS:

- Submission of the online questionnaire *Knowledge and Management of Natural Risks in the Lomellina Territory*, SurveyMonkey platform.

OUTCOME:

- Online questionnaire (see **Annex 3**).

PoC APPLICATION:

Eurac Research selected the questionnaire as data-collection tool for the Lomellina case study, as it provided a structured way to gather input from a broad range of stakeholders and complemented the information already obtained through participatory activities. Its efficiency allows meaningful insights to be collected quickly while limiting the need for in-person engagement, thereby reducing stakeholder fatigue. The standardized format supports comparative analysis and ensures consistent responses, while its simplicity and adaptability make the tool easily replicable in other territorial or institutional contexts.

The questionnaire is structured around two core dimensions: a knowledge dimension and a behavioural dimension. The knowledge dimension explores participants' understanding of the impacts and vulnerabilities associated with natural hazards in the Lomellina area, as well as their awareness of territorial emergency plans

(Municipal Civil Protection Plan). The behavioural dimension examines participants' preparedness to manage disasters, the actions and strategies implemented by key actors, and the potential barriers to effective disaster management.

It focuses on three key **hazards, i.e.** floods, droughts and earthquakes. It was organized into three sessions:

- The first section gathers information on participants' knowledge of the impacts and vulnerabilities associated with natural hazards in the Lomellina area. It also aims to assess the level of preparedness of the main actors involved in managing these risks.
- The second section focuses on emergency planning, specifically evaluating the effectiveness of the Municipal Civil Protection Plan **(PPC)**. These municipal-level emergency plans are designed to prevent, manage, and respond to natural and human-made emergencies, including earthquakes, floods, landslides, industrial accidents, and fires. A key component of this section is the assessment of "safe places", understanding which locations are considered safe by local actors, to help improve the practical effectiveness of emergency planning.
- The third section collects basic socio-demographic data to contextualize the responses. This includes information such as the organisation's name, the respondent's role, gender, age, and education level.

To ensure a smooth and accessible experience for participants, the questionnaire features a mix of multiple-choice, single-answer, and Likert-scale questions, along with maps to support geographical references. Several questions also include open-ended options, allowing participants to provide comments or specify alternative answers. The questionnaire was built using the "filter logic", which directs respondents to specific questions based on their previous answers. This approach shortens the overall length of the survey and ensures that each participant only responds to relevant items (see questionnaire structure in the Annex). The questionnaire was tested by several researchers at Eurac Research and Politecnico di Milano - DAStU and only later was made available online through the platform SurveyMonkey and formulated entirely in Italian, the primary language of all respondents.

To ensure the efficiency and effectiveness of the questionnaire and to appropriately handle sensitive issues, the questionnaire was developed in collaboration with Eurac Research's Statistics and Legal Offices and subsequently submitted to Eurac's Ethics Review Board for evaluation and approval.

Sampling and stakeholder engagement | Data collection

15 organizations were identified and invited to participate in the survey. The selected organizations include municipalities, associations, and organizations operating in the Lomellina area, actively engaged in risk prevention, emergency management, or territorial planning (e.g., Municipality of Suardi, Civil Protection Group, Confagricoltura Pavia). The questionnaire was sent to the city councilor, as well as to the directors, coordinators, or technical officers of these organizations. Participants were asked to represent their respective local organizations, associations, or institutions and to take part in their official capacity. Due to the voluntary nature of participation and stakeholders' availability, achieving a balanced gender distribution among respondents was not guaranteed.

The data collection phase began on July 15, 2025, and it remains open until the 1st of November 2025. Participants received an invitation via email, which included a brief project overview and a link to the online questionnaire. All responses were collected anonymously and aggregated, in full compliance with data protection regulations. The collected data will be used solely for scientific purposes and will contribute to the development of participatory planning tools and recommendations aimed at improving emergency preparedness and resilience in the Lomellina area.

Data Analysis:

The questionnaire was sent to representatives of 15 organizations, and 9 responses were received. However, starting from **Question 8**, the number of answers decreased to **7 and 8**, especially for questions related to Civil Protection Plans and organizational details. Some questions, such as **15 and 16**, received only **4 responses**. All responses were translated into English and organized in an Excel file. We reviewed and plotted the results to check for consistency and identify patterns. For questions with **open-text answers**, we read and summarized all responses to extract common themes and relevant details. This approach allowed us to combine **quantitative analysis** (counts, averages, charts) with **qualitative insights** from descriptive answers.

Results:

Data on respondents: We received responses from 8 organizations. Most respondents held technical roles, apart from a city councillor, an association president, and a director. Of the eight respondents, six were male. The majority were aged between 36 and 55 years (five individuals), one was between 56 and 65, and two were over 66 years old. Regarding education, one respondent had a three-year professional qualification, two had completed secondary school, four held a bachelor's degree, and one had a postgraduate qualification.

Knowledge dimension

Knowledge of impacts of natural risks on the territories: For the identification of most exposed areas to the different natural hazards presented, we obtained the following results:

- **Floods:** High exposure along the Po River and riparian municipalities such as Torre Beretti e Castellaro, Candia Lomellina, Breme, Gambarana, Pieve del Cairo, Mezzana Bigli, and Sartirana Lomellina. Some respondents noted that all areas are affected by the river, either directly or indirectly through irrigation systems. A few considered the risk only marginal.
- **Drought:** Widespread exposure across Lomellina, particularly in agricultural areas like Mezzana Bigli. Some respondents linked this to climate change or observed increased drought conditions in the last 5–6 years.
- **Earthquakes:** Generally perceived as low risk across Lomellina. Most respondents indicated no significant exposure, though one mentioned that the entire area could be affected with a minimal likelihood.

The following Figure 14 shows the comparison between observed impacts and expected impacts in the next 15 years in Lomellina due to the presented natural hazards. Generally, respondents perceive **water-related issues (drought, scarcity)** as the most critical and enduring challenge. Future projections highlight **soil degradation, agricultural production decline, and disruptions to energy distribution as emerging risks,** while some currently observed impacts (such as infrastructure damage and landscape degradation) are expected to be less severe going forward. Additionally, respondents anticipate that more climate-related and systemic impacts will intensify in the future, particularly those affecting water resources, soil, and agricultural productivity.

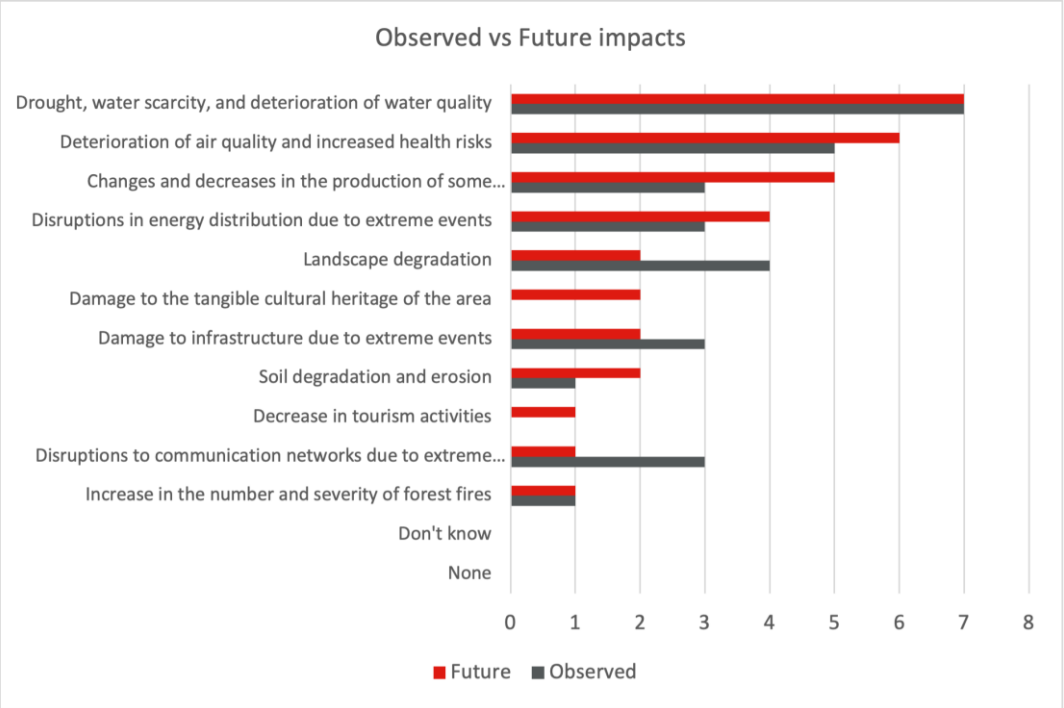


Figure 14 – Comparison between observed impacts and expected impacts in the next 15 years in Lomellina

Agriculture and food production emerged as the most vulnerable sectors in Lomellina, followed by urban settlements and water resources, which also show high exposure to natural hazards. Energy presents moderate vulnerability, while telecommunications and cultural heritage are somewhat affected. Transportation infrastructure and hazardous industries rank lower, and tourism appears least at risk. Overall, the results highlight agriculture, water, and urban areas as the most critical sectors for resilience planning.

Behavioral dimension

Management of natural risks: The actions most frequently implemented by institutions to support the management of natural hazards focus on monitoring and data collection, and Civil Protection exercises, each reported by 6 respondents. Close behind are population information and awareness-raising activities and the development or updating of civil protection plans (5 responses each), highlighting a strong emphasis on preparedness and community engagement. Maintenance and management of prevention infrastructure, and participation in interinstitutional coordination groups, are followed by 4 responses, indicating collaborative and preventive efforts. Operational measures such as logistical support during emergencies and internal staff training were mentioned 3 times, while collaboration with research institutions appeared twice. Only isolated actions like organizing a water festival or having no specific measures were reported once. Overall, the

responses suggest that institutions prioritize monitoring, planning, and awareness over structural or sector-specific interventions, with relatively limited engagement in innovative or research-based actions.

Most respondents (8 out of 9) indicated that their organizations were involved in managing emergencies related to natural hazards, while only one reported no involvement. This suggests a strong institutional engagement in emergency management across the entities surveyed. Some of the examples of emergencies they intervened in were floods and droughts in Pieve del Cairo, Po River until Valenza, Mezzana Bigli and Sannazzaro de' Burgondi. The way they were involved varied from managing, monitoring and information distribution, volunteering, administrative roles, Civil Protection and regional entities, support and damage mapping.

When asked how prepared they believe their organization is, the average preparedness score is 2.67, indicating respondents lean slightly below moderate preparedness. Responses are polarized, with most participants either feeling low preparedness or prepared, and none reporting very high or moderate preparedness (Figure 15).

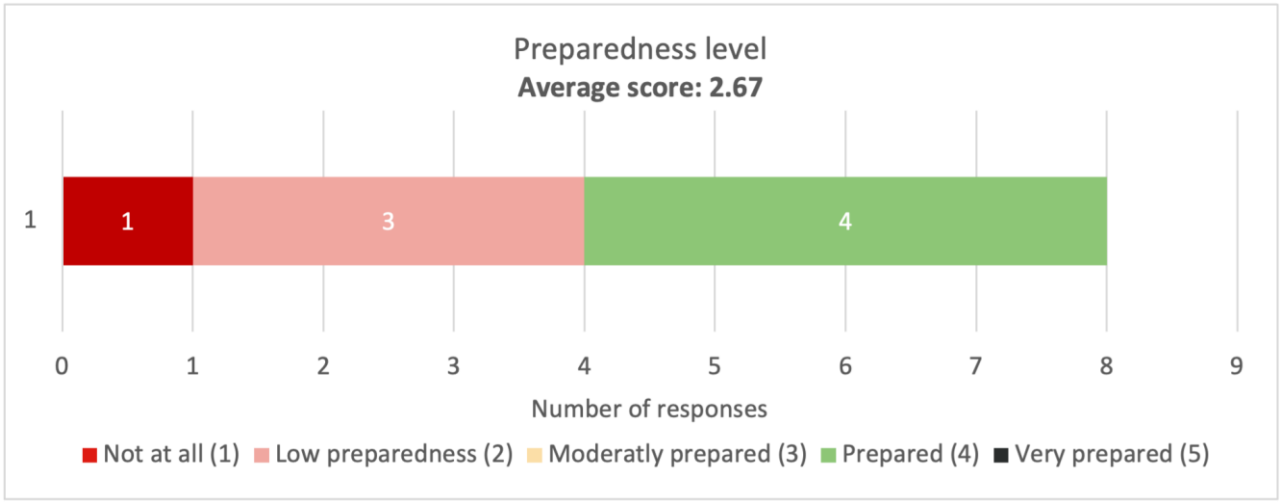


Fig. 15 – Preparedness level diagram

Finally, the key obstacles identified by respondents were mainly limited public availability of financial resources, and poor inter-agency collaboration, alongside data-sharing and planning challenges. No respondents indicated “No obstacles,” meaning all participants perceive barriers (Figure 16).

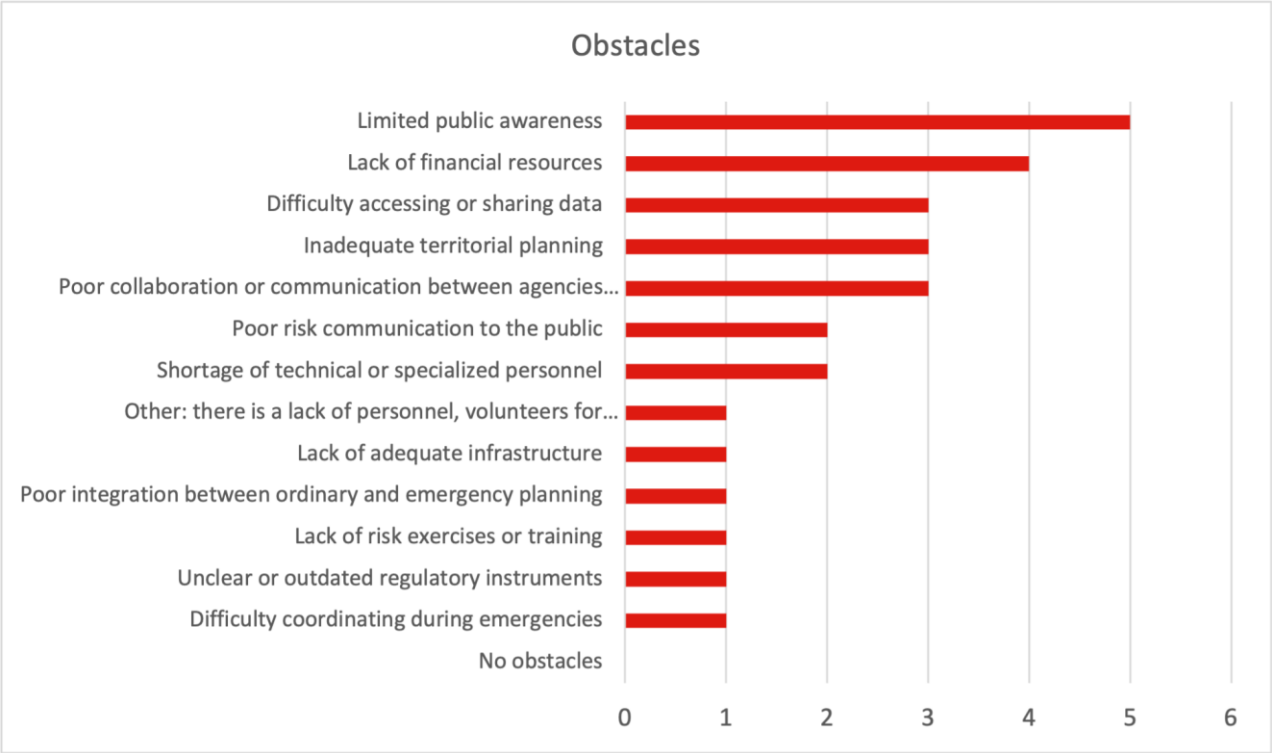


Figure 16 – Diagram of participants perceive barriers

Civil protection planning: According to the responses, most municipalities' respondents working with/in (7 out of 8 responses) have a Civil Protection Plan, showing good preparedness, though one lacks a plan and may need support. Additionally, Civil Protection Plans are mostly in the process of being updated (3 responses), with a few fully updated (1 response) and some partially updated (2 responses), highlighting ongoing efforts. None was completely outdated, which is good, but 1 respondent didn't know, showing some uncertainty.

Regarding safe areas, awareness may be limited: only 4 respondents knew them, while 3 did not, indicating a need for better communication and training. When asked about the list of municipalities and types of safe places (answered by only 4 people), safe areas mainly included schools, municipal buildings, agricultural fields, theatres, and sports facilities, within some municipalities (e.g., Mezzana Bigli, Sannazzaro de' Burgondi). Most respondents (3) consider the safe places adequate, with one noting only partial safety, indicating minor concerns to address. Lastly, some respondents proposed additional safe places such as piazzas, former schools, municipal buildings, and sports fields – often in Castellaro fraction or Sannazzaro de' Burgondi – while others indicated no alternatives.

General comments and conclusion

The administration of the questionnaire highlighted a general difficulty in data collection, as evidenced by the relatively low response rate. While the contributions of the nine responses are still very valuable, the limited involvement of a broader range of stakeholders and the low response represent a limit.

The low response rate may be related to different factors. First, it might reflect a highly fragmented system of local governance, where responsibilities for risk management are dispersed across multiple actors with limited coordination. Second, many municipalities and organizations face chronic shortages of personnel and lack the time and resources needed to engage fully with activities that fall outside their immediate operational priorities. Third, this situation may be further compounded by a generally low level of awareness regarding the importance of risk knowledge and emergency planning, as well as by a degree of stakeholder fatigue, given the increasing number of engagement initiatives that local actors are asked to participate in. Together, these factors might help explain the difficulty of mobilising a broader, more diverse group of respondents and underscore the need for more targeted, sustainable engagement strategies.

Despite this limitation, the questionnaire is a transferable and adaptable tool for gathering information on risk awareness and risk management in other multi-risk contexts. Its structure allows for consistent data collection across diverse territorial settings while remaining flexible enough to accommodate site-specific characteristics. This makes it a promising instrument for supporting comparative analyses and for informing local and regional decision-making processes in similar hazard-prone areas.

IV. Phase Two: Co-Design Activities and Participation

Action 4 – Spatial education through common shared languages

GOAL:

Developing a shared language among the various actors involved in the participatory project – specialists, customers, users, the general public (Jankins and Forsyth, 2010) – through the development of a communication project that combines graphics and information. The critical issues to which answers are sought emerged during collective moments – primarily in semi-structured interviews and focus groups – and concern, above all, problems of shared spatial thinking. The effectiveness of a communication project is measured at similar moments: this project is indeed preliminary to the adaptation of language in the operational and co-design phases (e.g., exercises on survey forms and co-design workshops, see subsequent sections) and is linked to the stimulation of a common spatial education for risk awareness.

ACTIVITIES:

- Photographic survey;
- List of inappropriate behaviours and best practices from community meetings;
- Illustrations design;
- Illustration diffusion and sharing.

TOOLS:

- Focus group;
- Photographic survey.

OUTCOME:

- Educational illustrations (see **Annex 4**).

PoC APPLICATION:

A critical dimension that emerged during the analysis concerns the communication, readability, and comprehensibility of the graphic codes adopted in municipal **PPC** and **PEC**. The examined plans revealed significant inconsistencies and divergences in their representational languages: hand-added annotations, maps of the same locations produced at different metric scales, the absence of north arrows, and limited or no reference to the broader territorial context. Although updated **PPCs** nominally rely on shared linguistic and graphical standards and can be uploaded to a dedicated national digital platform, a substantial **knowledge-**

transfer problem persists: the platform itself remains inaccessible to ordinary citizens, thereby undermining the potential for dissemination, transparency, and greater community participation in risk prevention. This lack of accessible and coherent representational systems constitutes a **major limitation in fostering widespread understanding of spatial risk conditions** and, consequently, in enabling informed public engagement in **DRR** processes.

The research subsequently deepened its investigation into residents' spatial awareness and collective education through graphic representations designed to convey notions of danger, safety, and appropriate behaviour in the event of disasters or emergencies. These visual materials sought to translate complex risk scenarios into accessible, universally comprehensible images that convey instructions and foster preparedness among non-specialist audiences. Their development stemmed from a systematic inquiry into the semiotics of visual language and the processes of shared meaning-making across diverse cultural and educational contexts.

Adopting a place-based, bottom-up approach, the study emphasised the significance of local knowledge and collective participation in shaping strategies for spatial communication and risk mitigation. By focusing on the ex-ante temporalities of risk, named the period preceding the manifestation of crises, the research aimed to embed awareness and preparedness within everyday spatial practices. This orientation resonates with the participatory ethos advanced by Giancarlo De Carlo and Lucien Kroll, who challenged technocratic and top-down paradigms of architectural production by foregrounding dialogue, negotiation, and the empowerment of users as co-authors of the built environment.

In parallel, the research group drew conceptual and methodological parallels with the work of Yasmeen Lari, Atelier Bow-Wow, and Shigeru Ban, whose practices exemplify a similar commitment to community engagement and social responsibility in architecture. These precedents collectively informed the study’s understanding of the built environment not merely as a static physical framework but as a dynamic and pedagogical *medium* through which communities can learn, adapt, and transform their surroundings. Within this framework, the project’s graphic experiments functioned both as communicative tools and as catalysts for collective reflection, enabling residents to visualise and co-construct safe spaces as integral components of a resilient urban ecology.

Figure 17 – Spatial education activities

Action 5 – Co-mapping vulnerable and safe places

GOAL:

Addressing the gap between planning tools and local knowledge on risk and cultural heritage. Collecting data from **PEC**, **PPC**, and **PGT**, the cross-analysis aims to identify which aspects of risk and safety differ between official planning and people's common sense. Co-mapping is based on the mapping by the actors involved of vulnerable areas, safe buildings, and places of identity, carried out for different risk typologies. The work reflects a spatial and social complexity closer to reality, due to the coexistence of multiple hazards within the same territory and the different perceptions of risk among the people involved. The output of this activity can be interpreted as the identification of critical issues and potential in risk planning and communication: it is preparatory to the subsequent phases of formulating the survey forms **(Action 6)** and for the co-design workshop **(Action 7)**, as well as for orienting the communication project of the previous phase **(Action 4)**.

ACTIVITIES:

- Open discussion with the community during focus groups and semi-structured interviews;
- Overview and graphic synthesis of planning tools (**PEC**, **PPC**, **PGT**);
- On-field survey to understand the characteristics of safe-considered places;
- Participatory mapping by drawing.

TOOLS:

- Focus group;
- Semi-structured interviews;
- Satellite imaginary, comparative analysis map (see **Action 1**).

OUTCOME:

- Integrated Map of vulnerable and safe places (see **Annex 5**).

POC APPLICATION:

In the municipality of Breme, investigations revealed a discrepancy between "safe" or "vulnerable" buildings and open spaces identified in planning documents and those acknowledged in the focus group.

The analysis of ordinary and emergency planning tools resulted in a correspondence between locations classified as safe and those identified in the 2017 **PEC**. Additionally, a comparative analysis of the 2017 **PEC** and the 2013 **PGT** revealed that all sites designated for emergency functions in the **PEC** aligned with locations listed in the "Piano dei Servizi" of the **PGT**. These sites were planned as 'urban standard' areas, which are required to provide public services and facilities for inhabitants, resulting in a high level of nomenclature

alignment. However, the outcomes of focus group results revealed several discrepancies with urban and Civil Protection Plans. Despite the strong alignment in official planning documents, most of the sites classified as safe in the **PEC** were never mentioned during stakeholder interviews. This mismatch suggests a gap between technical assessments and community perceptions of safety and cultural significance, highlighting the need for a more integrated approach to planning and design strategies.

Action 6 – Adequacy of places: survey and evaluation

GOAL:

The final goal of the survey form is to assess the adequacy of buildings and open spaces as safe and strategic areas in emergency scenarios. The tool supports prevention and preparedness by integrating desk-based data and on-site surveys to identify strengths and critical issues, aiding Civil Protection decision-making in multi-risk contexts.

ACTIVITIES:

- Drafting the survey forms;
- Testing the survey form on site;
- Revising the survey forms after on-field tests.

TOOLS:

- Case studies on survey form;
- On-site surveys.

OUTCOME:

- Survey form A: buildings (identity, use, risk, accessibility, maintenance). (see **Annex 6**);
- Survey form B: open spaces (surfaces, escape routes, accessibility, context). (see **Annex 6).**

PoC APPLICATION:

In order to address the discrepancies between the planning tools, the inhabitants' perceptions and the maintenance and usage conditions of the sites, the research project began developing a set of survey sheets to assess the *suitability* of the locations, which is defined as the ability of buildings and open spaces to function effectively as safe areas in the event of a disaster.

In stage 1, the main references used for defining the structure and the contents of the tool were the "*AEDES*" post-earthquake damage and habitability assessment forms and the Operational guidelines for identifying Operational Coordination Centres **(COC)** and Emergency Areas (DPC, 2015), both realized by the Civil Protection Department, together with "*Rilievo speditivo del danno sul patrimonio culturale in caso di calamità naturali*" sheets realized by the Ministry of Culture (MiC). The analysis of existing survey forms, as elaborated by the Civil Protection Department and the Ministry of Culture, in conjunction with other tools developed and adopted on the international level, facilitated the identification of a gap in tools in the prevention and preventive phases, given that existing survey sheets are preliminary concentrated on the recovery phase.

As delineated in Task 7.4.4, the survey forms under consideration do not constitute guidelines per se; instead, they serve as tools to assess the suitability of buildings and open spaces for prevention and preparedness. The tools are designed to be implemented before a disaster occurs.

The chosen method for developing the tool consists of the following steps:

(1) drafting the survey forms;

(2) the authors conducting field testing;

(3) revising the survey forms;

(4) municipal technicians and Civil Protection groups conducting field testing;

(5) structure the final versions of the survey forms.

The tool is primarily intended for technicians, municipal officers, and Civil Protection groups, but a simplified version could be developed for general users in the future.

Considering the contents of Civil Protection and Emergency Plans, two survey forms were developed: one for buildings (named A) and one for open spaces (named B). The survey sheets (A and B) present a first common identification (ID) section, which includes the header and the surveyor information, requiring the information as follows:

1. Header

Title: "Survey Form – Adequacy of Places – Form A – Buildings"

Date field to indicate the day of the survey.

2. Surveyor Information

Surveyor identity: name, surname, contacts (e-mail, phone).

Reference organization: organization name, type (public, private, association, etc.), role of the surveyor in the organization.

The common ID section is then followed by a request to provide information about the building. The first section contains general information (**3. Building information**); the second section concerns the building's risk exposure (**4. Risk exposure**); the third section requests information regarding the accessibility of the building (**5. Accessibility**); and the fourth and final section is intended for assessing the state of maintenance and conservation of the building (**6. Condition and Maintenance**).

The aforementioned sections are structured in subsections, as follows:

3. Building Information

- Context and location: type of area (urban centre, outskirts, agricultural area, etc.), position (isolated, adjoining), address or coordinates.
- Dating: construction period, any modifications and corresponding dates.
- Use and occupancy status: current use, previous use, presence of open spaces.
- Ownership status: public or private.
- Dimensional data: floor plan shape, number of floors, basement floors, presence of arcades/loggias.

4. Risk Exposure

- Type of risk (flood, landslide, earthquake, industrial), source of information (urban plans or civil protection plans).
- Classification in the Civil Protection Plan: any strategic function (**COM**, **COC**, assembly area, shelter).

5. Accessibility

Organized into two subsections:

- Architectural barriers: assessment of exterior and interior (ramps, tactile paths, elevators, accessible restrooms).
- Accessibility for rescue vehicles: adequacy of access network, roadway width, signage, lighting, fixed/mobile obstacles.

6. Condition and Maintenance

Survey feasibility and accessibility.

- Overall condition: good or poor.
- Survey decay phenomena: exterior (vertical structures and roof); interior (vertical structures).
- Presence and functionality of utilities: plumbing, electricity, gas, and restrooms.

In **stage 2**, the research group conducted a first field test to identify any missing information and verify the form-filling process. The evaluation process identified the initial critical issues in completing the forms, which can be summarised as follows:

- It was evident that the various sections contained requests for information that were either overlapping or, in some cases, presented without logical sequence;
- It was observed that the completion of the forms was a protracted process, with each form requiring more than an hour and a half to be completed;
- The language employed in the various sections was overly technical and specialized, requiring specific competences and skills.

The test was useful for **stage 3**, during which the structure of the forms was revised first by establishing that the initial sections could be completed *on-desk*, while also integrating the previously missing data.

This approach was adopted to define the data sources and thereby accelerate the compilation of the form, while ensuring the accuracy and completeness of the collected information.

A comprehensive revision of the forms was undertaken, with modifications to both their structure and the information requested, including the division of the survey sheets into two sub-forms. The updated survey form consists of two complementary sections – Section A1 (completed prior to the site visit) and Section A2 (completed during the site visit). The decision to divide the form into two separate sheets stems from two main factors. Firstly, there is a need to simplify and guide the surveyor in gathering information. Secondly, there is a need to improve the systematization of the data collected after the site visit.

The first form – A1 – requires the compilation, during the on-desk phase, of information from open-access databases, cadaster, and ordinary and emergency planning documents (**PGT, PPC, PEC**). Form A1 incorporates two distinct sets of information. Firstly, it comprises the ID section that includes the compiler's details, including their name and the role they fulfil within the organization they represent, as presented in the first draft of the survey sheets, together with the date of the survey and a code assigned to the building or open

space examined. Secondly, it contains preliminary information concerning the building that is the subject of the survey.

The preliminary building information to be compiled in A1 form, revised in more detail, and organised in a more logical order, as requested in the first draft of the suitability survey form.

The A1 form is structured in the following 6 sections:

- **Use and Occupancy:** current use, previous use, presence of open spaces.
- **Context and Location:** urban/suburban/agricultural area, isolated or adjacent position, address or coordinates.
- **Dating:** construction period.
- **Ownership Status:** public or private.
- **Risk Exposure:** flood, landslide, earthquake, industrial; Data sources (**PGT**, **PAI**, **PPC**).
- **Civil Protection Plan Classification:** possible strategic function (**COM**, **COC**, assembly point, shelter).

The second form – A2 – must be compiled on site with information that can be retrieved through a direct survey. To facilitate the use and systematisation of the data collected during the desk and fieldwork phases, sheet A2 requires the summary of the ID section information, as in A1, relating to the surveyor's identity, the survey date, and the form code associated with the surveyed building or open space.

The A2 form is structured in the following 5 sections:

- **Dimensions:** floor plan, number of floors, presence of basements and their use, porticoes/loggias.
- **Open spaces:** courtyard, car park, garden, other.
- **Accessibility - Architectural barriers**:
  - external and internal assessment (ramps, tactile paths, lifts, passage dimensions, fixed furnishings, accessible toilets).
- **Accessibility: emergency and transport vehicles**; adequacy of access roads; any risks; presence of obstacles; critical slopes/curves; signage and lighting.
- **State of conservation and maintenance**:
  - Accessibility (internal/external).
  - General state of conservation (excellent, good, mediocre).
  - Structural conditions (damage, collapse) on vertical structures and roofing.
  - Presence of volumetric transformations.
  - Presence and functioning of systems (plumbing, electrical, gas) and toilets.

Finally, a section was added for reporting additional notes (e.g., any critical issues observed) and for attaching documents (e.g., photographic surveys and on-site drawings).

Stage four consisted of a field test conducted by the research group, with the participation of a local Civil Protection Group – Gruppo Lomellino di Primo Intervento (GLPI). GLPI activities of Civil Protection focus on prevention, preparedness and response to different risks, including seismic, floods, and fires; the Group covers four municipalities of the Proof of Concept (Sannazzaro de' Burgondi, Mezzana Bigli, Ferrera Erbognone, Pieve Albignola). GLPI serves as the Sala **COM** for eight municipalities. The association's operational base is in Sannazzaro de' Burgondi, where the on-field test was conducted. The assessment of revised suitability survey sheets, as elaborated in phase three, was crucial for identifying missing information and gaps, assessing the tool's efficiency, and verifying the form-filling process.

Six volunteers from the GLPI took part in the test. The first part of the training day consisted of a briefing on the structure, content, and objectives of the forms. After the briefing, the volunteers conducted a field test involving three buildings and two open spaces identified as strategic for civil protection activities in the Municipal Emergency Plan.

The following site adequacy forms were completed:

- **Teatro Sociale** (formerly the Teatro della Società Operaia di Mutuo Soccorso);
- **The headquarters of the Gruppo Lomellino di Primo Intervento** (including the building and open space);
- **Palazzetto dello Sport Campanini** (an indoor sports arena);
- **Municipal Sports Field**.

Several issues emerged from the field exercise, which served as the basis for subsequent revisions to the forms. These aspects emerged in a debriefing session held after the test. Firstly, satellite mapping of the surveyed area was requested to mark the site perimeter and access points directly on the aerial image. The volunteers also noted the need to revise the order of the requested information across the form's sections. Additionally, the questions were called upon to be simplified, and, in some cases, the technical language was asked to be made more accessible. Lastly, it was suggested to include graphic diagrams in some sections of A2 form, or to organize the required information in tables. Furthermore, volunteers underlined the need for a training session on the survey forms and the compilation procedure, to be held before the on-site survey, to optimise the time required for the survey and its completion on-site.

Based on the on-field test and GLPI's feedback, the survey forms were further revised in the **fifth phase**.

In **A1 form,** the main changes are outlined as follows:

- **Satellite Image:** New field to insert an image showing access routes and associated open spaces;
- In the **Context and Location** section was added the information regarding the floor plan shape**;**
- Information on **construction date and ownership status** were merged in one section;
- **A section concerning the presence of Constraints (according to the** Cultural Heritage Code - Legislative Decree 42/2004) and to the identification of the place as having historical-cultural value in the Municipal Land Use Plan **(PGT)** was added;
- A section covering **accessibility of the building,** in terms of **days and hours of public access**, with contacts for extraordinary access, was added;
- **The Risk exposure was detailed,** with distinction between municipal and local risks;
- Concerning the **Civil Protection Plan Classification,** more detailed **strategic functions** (e.g. vehicle and people gathering, sheltering) were added;
- A section identifying the **Infrastructure Access Network risk assessment** was added.

A2 form was profoundly revised not only in the contents of sections and subsections, but also by integrating diagrams and tables useful to facilitate the compilation of the form, as follows:

- **Surveyability and Accessibility section:** It was revised the condition of external/internal access was revised, and added the presence of ongoing maintenance works (e.g. presence of scaffoldings);
- **Dimensional Data:** A diagram to count the number of floors identifiable was added, together with a question on the presence and function of basements;
- **The section on Associated Open Spaces:** was structured in more detailed categories (e.g. permeable/impermeable courtyards, garden, playground, sports areas);
- **Accessibility – Architectural Barriers** section was detailed, adding specificity regarding obstacles, fixed furnishings, and accessible restrooms for people with disabilities;
- **Accessibility – Emergency Vehicles** section: structured with a more extended assessment (e.g. road width, slopes, critical curves, signage, obstacles for vehicles and pedestrians, parking);
- **State of Conservation** section was simplified in a 4-level scale (excellent, good, fair, poor) with precise definitions;
- **Volumetric Transformations** section was integrated with **a** more detailed definition of elements to be considered.

The most important element added to the form is an **Adequacy Assessment Matrix:** a brand-new feature that allows evaluation of the site's suitability for emergency scenarios (e.g., vehicle staging, shelter) based on different types of risks (seismic, flood, industrial).

MATRICE DI VALUTAZIONE DI ADEGUATEZZA DELL'EDIFICIO

A scheda conclusa, valutare attraverso la matrice per ogni scenario SE lo spazio è utilizzabile in caso d'emergenza e in che modo:

	Per ammassamento mezzi	**Per ammassamento persone**	**Altro utilizzo (specifica):**	**Note:**
Alluvione	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	
Frana	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	
Sisma	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	
Industriale	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	
Altro scenario(specificare)	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	
Edificio non esposto a rischi*	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	❑ Adatto ❑ Modifiche necessarie ❑ Non adatto	

Figure 18 – Adequacy Assessment Matrix at the end of the two forms

Finally, the tool was tested in the revised form as described. Specifically, the availability of information as required in the A1 form and the feasibility of compiling the on-desk data from the survey sheets were assessed with the Chief of the Municipal Technical Office; the A2 form was tested again on-field with GLPI volunteers.

The evaluation of **A1 form** with the Head of the Municipal Technical Office revealed 1) the availability of the requested information in the form; 2) the accessibility of this information to the technical office staff; 3) the technical language used in the form was found to be adequate in relation to the compiler's expertise. The final field test of Form A2 resulted in feedback reporting a significant improvement of the structure of the suitability survey forms, making it more comprehensive.

The participants pointed out the usefulness of the integration of a final decision matrix and of images and diagrams. The final version of the tool (see **Annex 6**) was considered appropriate and suitable for both technical applications (such as surveying) and management purposes (including ordinary and civil protection planning).

Action 7 – Co-Design Workshop

GOAL:

Developing design proposal to address **DRR** community's objectives. The aim of the work is to integrate the community into risk adaptation processes through a structured, participatory design process that draws on issues that emerged across all previous phases and actions. The co-design workshop is the central moment of the process, where the transformative key of participation becomes an element of shared spatial thinking development among all actors involved, specialists and non-specialists alike. It is designed to actively engage residents, technicians, and stakeholders in defining project proposals for two case studies: the SOMS Theatre and the public spaces of Via San Francesco in Sannazzaro de' Burgondi. The overall objective is to build shared solutions that improve the suitability of buildings and open spaces in all phases of risk – before, during, and after an emergency (Lari et al., 2013, p. 5) – by strengthening territorial awareness and the community's ability to contribute to collective safety. The case studies were taken from the survey form exercises, in order to use the potential and critical issues of the places that emerged from the collective testing moments as design materials and questions.

ACTIVITIES:

- Definition of types of safe spaces;
- Definition of analysis criteria for the preparation of survey reports;
- Planning co-design interventions;
- Co-design workshop.

TOOLS:

- Participatory surveys, narrative mapping, and co-design activities.

OUTCOME:

- Co-design proposal plan (see **Annex 7**).

PoC APPLICATION:

The Co-design workshop constitutes the core activity within the process of integrating the community into **DRR** policies and instruments. This approach enhances and makes more effective the measures and guidelines provided by planning tools. In fact, **DRR** planning tools such as **PPC** or **PEC** identify vulnerable or safe areas without considering spatial conditions or patterns of use. So, often, sites or buildings with a strategic role are not really appropriate for the function assigned to them.

The co-design workshop aims to engage stakeholders to develop design proposals in a safe, secure place defined by the territorial and context analysis, in order to address the gap between the functions assigned by

plans and the adequacy of place. Handbooks and manuals like the CityRAP Tool (UN-Habitat, 2005) highlight the possibility of involving the community in activities that can collect new data from historical and morphological perspectives, and to understand the social implications of use, perception, and sense of place.

The next phase of the work took the form of a co-design workshop with the community, an event planned to follow the exercises on the suitability of spaces and safe places. In this case, the critical issues and potential identified through the completion of the forms were translated into opportunities for participatory transformation. At the same time, the workshop enabled the community to test its spatial awareness of risk issues, filling any gaps among both residents and professionals.

Specifically, the research group chose to test the co-design workshop tool on two case studies: the SOMS Theatre and the open spaces in Via San Francesco in Sannazzaro de' Burgondi (which include a park and public parking lot, a sports centre, and the GLPI headquarters). These areas of transformation were subject to preliminary analysis by both the research group and the data sheet compilers during the exercises.

Dividing the day into two working tables, the objectives of the workshop were summarized in the following abstracts:

Table 1 - SOMS workers' mutual aid Theater

- The first working table focuses on the theme of adapting the built environment in contexts subject to risk. It will investigate the possibilities for transforming the SOMS Theatre in Sannazzaro de' Burgondi, based on reflections from the site inspection and the survey forms compiled on the adequacy of safe places. The building, which is part of the Municipal Emergency Plan **(PEC)** of Sannazzaro de' Burgondi as a gathering point for citizens in the event of evacuation, currently has characteristics that lend themselves to a rethinking in terms of the suitability of the building for accommodating any evacuated citizens and the greater flexibility of its interior spaces. In this case, the co-design activity concerns the built space as a safe place and a resource for mitigating and adapting to the risks faced by the community and the location.
- Materials provided before starting: floor plan and photographs of the building; orthophoto with insertion into the context; summary of participatory mapping (**PEC** + Focus Group); previously completed survey forms; sheets of paper; sketch paper; pencils; pens; cardboard; post-it notes.
- Elements to be co-designed: Functions, Shapes, Materials.

Table 2 - Public spaces in via San Francesco, the "Ghislieri" sports field, and the GLPI headquarters

- The second working table concerns a reflection on open spaces in fragile contexts, understood both as places of welcome and safety and as devices for risk prevention and mitigation. The community is invited to reflect on the transformative possibilities of the public open spaces in Via San Francesco, the capabilities of the "Ghislieri" sports field complex, and the role of the nearby headquarters of the Lomellino Emergency Response Group (GLPI). Through a co-design exercise in these places – defined as strategic points in case of emergency by the Municipal Emergency Plan **(PEC)** of Sannazzaro de' Burgondi – the aim is to define new spatial configurations for securing the area and accommodating any evacuated citizens, which constitute a synergistic system with the functions of public space in the different stages of risk – before, during, and after.
- Materials provided before starting: Floor plan and photographs of the building; orthophoto with insertion into the context; summary of participatory mapping (**PEC** + Focus Group); previously completed survey forms; sheets of paper; sketch paper; pencils; pens; cardboard; post-it notes.
- Elements to be co-designed: Functions, Shapes, Materials.

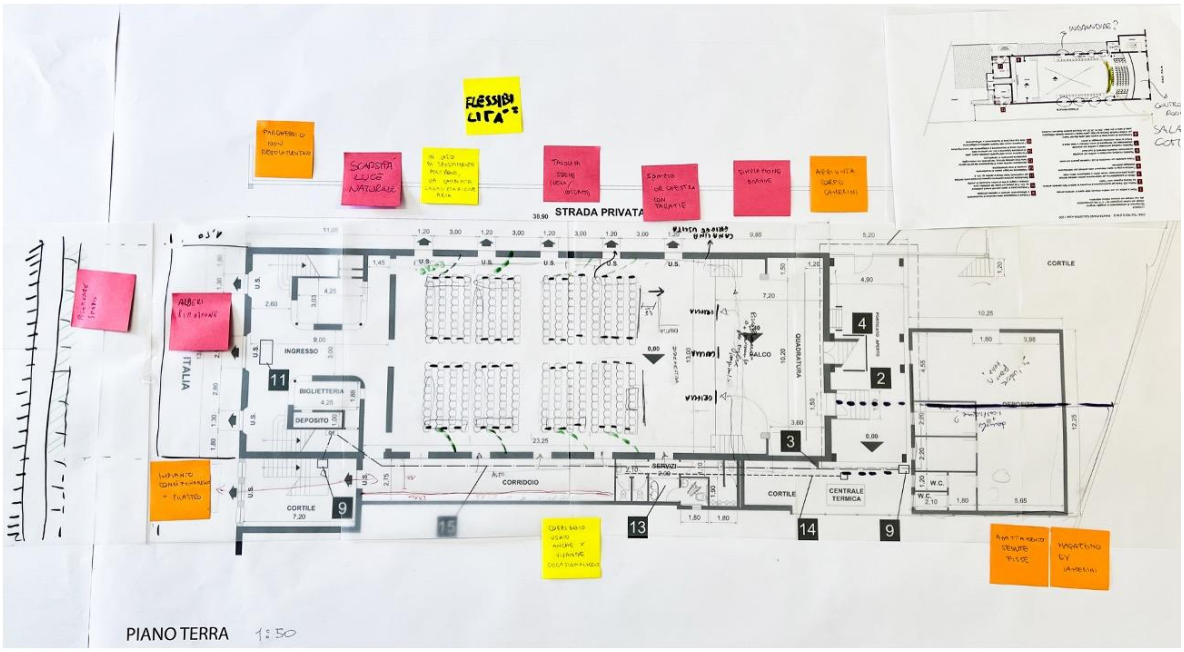


Figure 19 – Co-design workshop: SOMS workers' mutual aid Theater

Figure 20 – Co-design workshop: Public spaces in via San Francesco, the "Ghislieri" sports field, and the GLPI headquarters

V. Phase three: Research output

Methodology framework based on co-design for DRR

The research activities conducted in Lomellina have contributed to the development of a methodology based on co-design approaches for **DRR.** The methodological framework is structured around five phases: (1) Territorial context and stakeholder mapping; (2) Community engagement in the definition of **DRR** priorities; (3) Co-design and risk reduction; (4) Education and dissemination; and (5) Monitoring and evaluation.
The phases are based on actions and tools developed in **PoC** (see chapter IV. **Phase 2**) and represent a guide to develop a co-design process for **DRR** in a specific context.

01. Territorial context and stakeholder mapping.

Step 01 represents the starting point of the co-design process. It aims to understand the relationship between territory and community, to find stakeholders and key actors to involve, and to define weaknesses and critical issues.

This phase is supported by the tools developed in **Action 1** and **Action 2**:

- Comparative analysis map (see **Annex 1**);
- Stakeholders network diagrams (see **Annex 2**).

02. Community engagement in the definition of DRR priorities.

Step 02 runs in parallel with Step 02. It aims to involve stakeholders in initial participatory activities to collect data and define **DRR** priorities based on community needs. In this phase, it is useful to define the perception of risk.
This phase is supported by the tools developed in **Action 3**, **Action 4** and **Action 5**:

- Online questionnaire (see **Annex 3**);
- Educational illustrations (see **Annex 4**);
- Integrated map of vulnerable and safe places (see **Annex 5**).

03. Co-design and risk reduction.

Step 03 aims to involve stakeholders in co-design activities for **DDR** and **CCA**. The objective is to identify critical issues of vulnerable and safe places and develop proposals for transformation based on community needs.
This phase is supported by the tools developed in **Action 6** and **Action 7**:

- Survey form A: buildings (see **Annex 6**);
- Survey form B: open spaces (see **Annex 6**);
- Co-design workshop (see **Annex 7**).

04. Education and dissemination.

Step 04 includes all activities related to education and dissemination on **DRR** and **CCA**, as well as information on the co-design process and the notions useful for implementing the co-design tools. In terms of activities and tools, Step 04 must be adapted to the specific needs of the context and of the people involved in the process. In general, it may include seminars, workshops, focus groups, public lectures, and events that can be organised throughout the entire process.

05. Monitoring and evaluation.

Phase 05 runs in parallel with **Phase 03** and aims to check the effectiveness of the activities, as well as to collect feedback from participants and their expectations for the future implementation of the co-design proposals. In general, it may include interviews, forms, and discussions that can be conducted at the end of each activity.

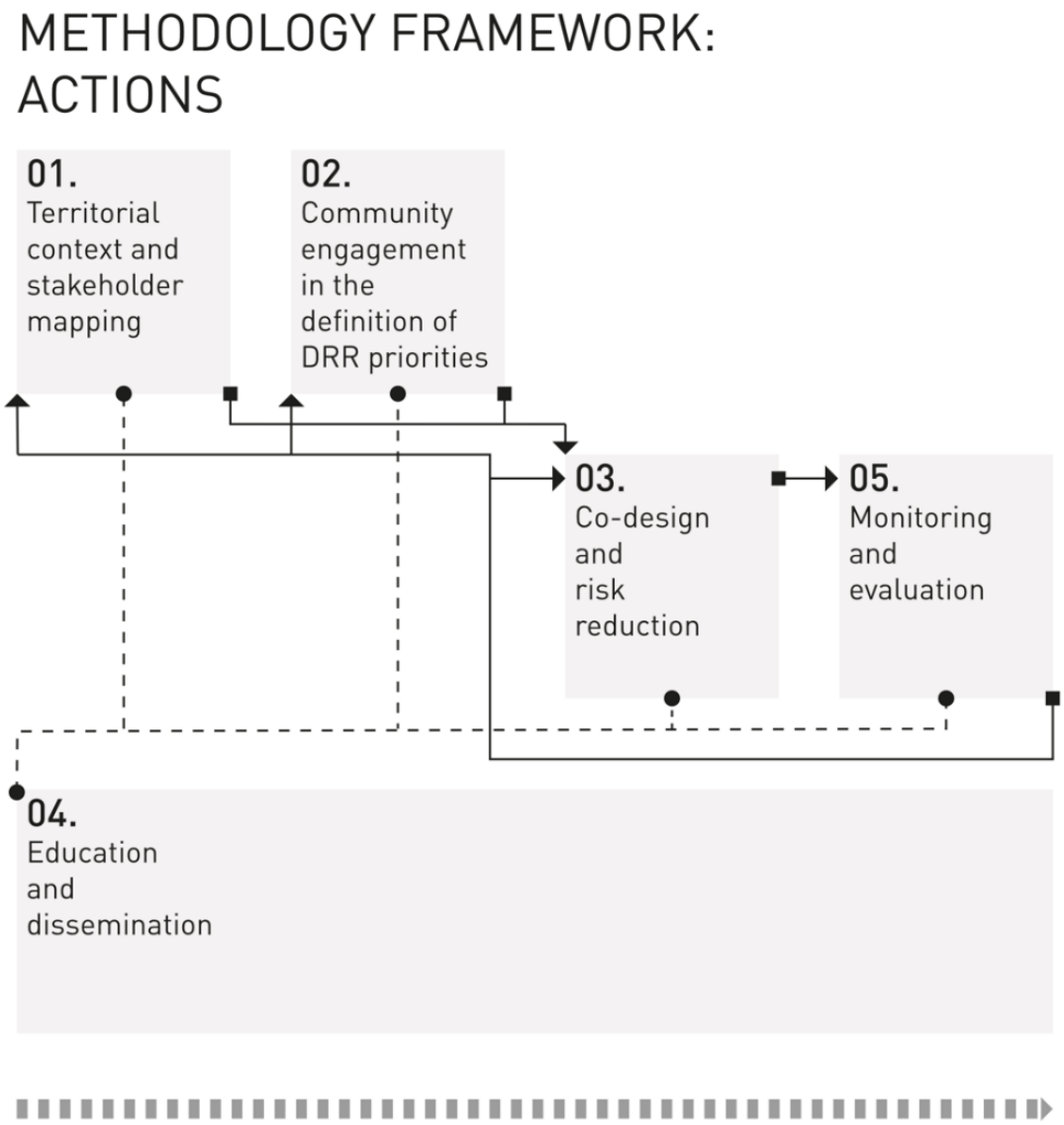


Figure 21 – Methodological framework and key actions

Operational Guidelines

In summary, the research process is divided into three main phases, the last of which constitutes the output. Each phase is divided into actions designed to integrate technical knowledge, local perceptions, and participatory tools.

The **Phase 1** is dedicated to constructing the knowledge framework. It begins with a comparative analysis between ordinary and emergency planning (**Action 1**) to identify correspondences, gaps, and consistencies between urban planning tools. It continues with the mapping of local stakeholders (**Action 2**), an activity that reconstructs networks, roles, and relationships between institutions, associations, and groups active during emergencies, highlighting critical issues and potential strengths. A further action (**3**) is the development of an online questionnaire, aimed at technical and operational figures, that investigates knowledge, perceptions, preparedness levels, and institutional obstacles to risk management.

The **Phase 2** focuses on active community engagement through collaborative practices. It includes spatial education activities, in which shared languages and visual materials are developed to improve understanding of risks (**Action 4**). This is followed by co-mapping exercises to compare places officially designated as safe or vulnerable with those recognised by the population (**Action 5**). At the same time, survey forms are designed and tested to assess the adequacy of buildings and open spaces considered safe (**Action 6**). The process culminates in a co-design workshop (**Action 7**), in which people, technicians, and volunteers develop project proposals to improve the quality and functionality of places at different stages of risk.

Below are operational guidelines that attempt to translate the methodology used in the PoC into a general system, reviewing aspects and criteria that can be extended to similar risk contexts.

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HOW TO SET A COMPARATIVE ANALYSIS MAP?

Reference: **Action 1**

The first action – a comparative analysis between ordinary and emergency planning – can be an essential moment in any multi-risk scenario. Its main purpose is to verify consistency between the various urban planning tools that regulate land use and emergency management. In many cases, urban plans (**PGT**, **PRG**) contain relevant information on hazards, vulnerabilities, infrastructure, and services, but this data does not always coincide with that adopted in *Protezione Civile*'s planning (**PPC**, **PEC**).

The action aims to identify discrepancies in risk classifications, the location and adequacy of safe places, the presence of geomorphological constraints or critical issues, and the capacity of existing services to support emergency functions. At the same time, it allows for the identification of strategic areas or buildings that are absent from the plans or have been considered inconsistently. This activity is essential to prevent design choices, **DRM** interventions, or participatory processes from being developed on the wrong questions.

The expected output is an integrated and concise overview – usually in the form of comparative maps and/or interpretive panels – that brings together risks, strategic buildings, infrastructure networks, and safe spaces from various sources.

Steps to follow:

- Collection of all ordinary planning documents (**PGT**, **PRG**, sector plans, restrictions, etc.);
- Obtaining available emergency plans (**PEC**, **PPC**, any inter-municipal plans, industrial plans, etc.);
- Acquisition of georeferenced data from regional and national databases;
- Alignment of place names, coordinates, and boundaries to avoid discrepancies;
- Comparison of functions, risk classifications, and destinations between ordinary and emergency plans;
- Verification of the presence and suitability of safe spaces and vulnerable areas;
- Identification of inconsistencies, duplications, or information gaps;
- Production of integrated maps with risks, strategic areas, and safe spaces;
- Validation of the product with local technicians and stakeholders.

HOW TO SET A STAKEHOLDER ANALYSIS DIAGRAM?

Reference: **Action 2**

The Stakeholders' analysis is a preliminary action that helps identify who is more involved in a possible co-design activity within the process of integrating the community into **DRR** policies and instruments. This action makes the procedure for people's involvement more effective, activating a selected number of people across multiple networks.

The following action of the co-design workshop is meant to engage the identified stakeholders in developing design proposals for a safe place, helping to address the gap between the functions assigned by plans and the adequacy of the place.

Steps to follow:

- Collection of stakeholders listed in formal documentation (e.g.: *Registro regionale e provinciale delle ODV)* and further possible stakeholders from the local network;
- Localisation of selected stakeholders on a map to assess distribution across the territory;
- Realisation of a table indicating the specificity of each stakeholder (in case of an emergency scenario, social activities, cultural associations, etc.);
- Formulation of the network through a relational map showing the entangled roles of each stakeholder within the emergency scenario (Supra-local entity, municipality roles, emergency scenario entity, etc.), highlighting who is the actor in common and whether they are present.

HOW TO SET AN ONLINE QUESTIONNAIRE?

Reference: **Action 3**

The questionnaire is structured as a tool to collect data and information from relevant local stakeholders in territories affected by multirisk scenarios. The questionnaire investigates knowledge of impacts and risk vulnerability; furthermore, it explores the behavioural dimensions related to preparedness and emergency management. Furthermore, the tool analyses the institutional adaptive capacity, barriers to risk governance, and the effectiveness of Civil Protection Plans. The questionnaire is administered online, aiming for efficient data collection that can be standardised and replicated. The tool supports a comparative analysis across different territorial contexts through targeted, filtered questions. The results provide a critical overview of vulnerabilities and institutional capacities and inform the development of participatory planning tools for resilience and disaster risk reduction.

Steps to follow:

- Objects definition and setting of thematic scope. Identification of relevant hazards to the Proof of Concept (e.g. flood, seismic, drought, industrial); identification of target dimensions; identification of relevant policy documents (e.g. Civil Protection Plans, Municipal Emergency Plans);
- Questionnaire structure and technical setup. Definition of closed-typology questions; Likert scale; open;. integration of maps and filter logic; testing with research teams; implementation on the SurveyMonkey platform;
- Stakeholders' identification and engagement. Sampling of local administrations, organizations and relevant stakeholders; formal invitation of respondents in their official roles; activation of the survey through direct email communication;
- Data collection and ethical compliance. Administration of the online questionnaire and anonymous data collection; verification of compliance with data protection regulations; approval by the Ethics Review Board, and collaboration with legal and statistical offices;
- Data analysis and results dissemination. Qualitative and quantitative elaboration of collected data; systematization of responses; identification of patterns and critical issues; restitution of results to support decision-making and resilience strategies.

HOW TO SET SPATIAL EDUCATION ILLUSTRATIONS?

Reference: **Action 4**

Developing a shared language among the actors involved in the participatory project through the development of a communication project that combines univocal graphics and information. The effectiveness of a communication project is measured at similar moments: this project is indeed preliminary to the adaptation of language in the operational and co-design phases and is linked to the stimulation of a common spatial education for risk awareness.

Steps to follow:

- Photographic survey to show actual places / photographic search of the place in an emergency scenario;
- Organisation of community meetings sharing opinions, gathering important documents about emergency and ordinary planning;
- Set a common ground: scale representation, colour gradients, legends, and the languages of the gathered document. It is important to establish a comparable documentation database;
- Validation of outputs with residents, technicians, and stakeholders, and updating documents as needed.

HOW TO SET A CO-MAPPING OF VULNERABLE AND SAFE PLACES?

Reference: **Action 5**

The co-mapping of vulnerable places and safe spaces is a key step in any research or design process conducted in multi-risk contexts, because it links technical knowledge with common sense. Official plans identify exposed areas, strategic buildings, and safe spaces based on regulatory or technical criteria, but these representations often do not align with communities' perceptions, daily practices, or collective memories of places. Co-mapping, therefore, arises from the need to reduce this gap by integrating the physical, social, and cultural dimensions of risk.

Through discussions, interviews, drawing activities, and shared site visits, the action allows critical points that do not appear in the plans to emerge and, at the same time, identifies perceived safe or identity-forming places that planning does not consider. In multi-risk contexts, this integration is particularly relevant because different risks can overlap, generating multiple vulnerabilities that only a collective reading can highlight.

The output is a series of integrated maps that overlay information from different sources, providing a more complex and realistic representation of the territory. This tool becomes the basis for defining priorities for action, guiding subsequent assessments of the adequacy of places, and feeding into co-design processes, ensuring that **CCA** and **DRM** strategies consider the widespread knowledge and community's experience.

Steps to follow:

- Consultation of the documents produced by the comparative analysis (**Action 1**) as a summary of ordinary and emergency planning;
- Organization of focus groups, interviews, or public meetings to gather local perceptions, memories, and experiences;
- Conducting shared site visits to observe critical locations and spaces perceived as safe in the field;
- Invitation for participants to draw maps on paper or digital media that indicate vulnerability, identity, and safety;
- Comparison of results with technical information, highlighting convergences and discrepancies;
- Development of integrated maps combining official data and community perceptions;
- Validation of outputs with residents, technicians, and stakeholders, and updating documents as needed.

HOW TO SET A SURVEY ON THE ADEQUACY OF PLACES?

Reference: **Action 6**

Description:

The aim is to develop a structured survey tool to assess the adequacy of buildings and open spaces for use as safe and strategic areas in emergency scenarios. The tool is intended to support prevention and preparedness by evaluating the built environment and open spaces conditions (e.g. accessibility, adaptability) in relation to multiple risk types. The forms are structured to be compiled before disaster events, helping to identify strengths and critical issues in selected buildings and open spaces. The tool aims to integrate desk-based data with on-site surveys, ensuring both efficiency and accuracy in data collection. The survey forms final objective is to support technicians and Civil Protection operators in decision-making processes related to emergency planning and risk reduction, while also being adaptable to different contexts.

Steps to follow:

- Drafting of the survey forms related to buildings and open spaces, starting with the ones identified as safe or strategic in **PPCs**;
- First field test by the research group;
- Revising of the first draft of survey forms;
- Field testing of updated survey forms by municipal technicians and Civil Protection groups;
- Revising and structure of the final versions of the survey forms;
- Validation of the final version of the survey forms through field testing with municipal technicians and Civil Protection groups.

HOW TO SET A CO-DESIGN WORKSHOP?

Reference: **Action 7**

The Co-design workshop constitutes the core activity within the process of integrating the community into **DRR** policies and instruments. This approach enhances and makes more effective the measures and guidelines provided by planning tools. In fact, **DRR** planning tools such as **PPC** or **PEC** identify vulnerable or safe areas without considering spatial conditions or patterns of use. So, often, sites or buildings with a strategic role are not really appropriate for the function assigned to them.

The co-design workshop aims to engage stakeholders in developing design proposals in a safe, secure place defined by the territorial and context analysis, to address the gap between the functions assigned by plans and the adequacy of the place.

Steps to follow:

- Stakeholders' engagement and event planning;
- Site(s) selection (area, building, infrastructure, etc.);
- Collection of documentation and information on the site (aerial views, plans, photos, etc.);
- Presentation of the topic and of case studies on spatial transformation;
- Hands-on discussion and development of design proposals;
- Feedback and follow-up proposal.

The first step uses the outcomes of stakeholder mapping (see **Action 2**) and the relationships established with local municipalities to schedule the workshop to have maximum participation. Site(s) selection is made considering priorities emerging from the co-mapping of vulnerable and safe places (see **Action 4**). The documentation collection involves local administration requesting helpful documentation for the design activities. Before starting the design, it is important to give participants some notions of how similar buildings or spaces can be transformed to show possibilities and approaches that go beyond the local state of the art. The hands-on discussion starts from the critical issues found by the "Adequacy of places survey forms" (see **Action 6**) to develop project proposals for the transformation. At the end of the workshop, it is useful to collect feedback on the co-design process and on expectations for the future implementation of the project proposals.

VI. Annex

1 – Comparison analysis of ordinary planning and emergency planning

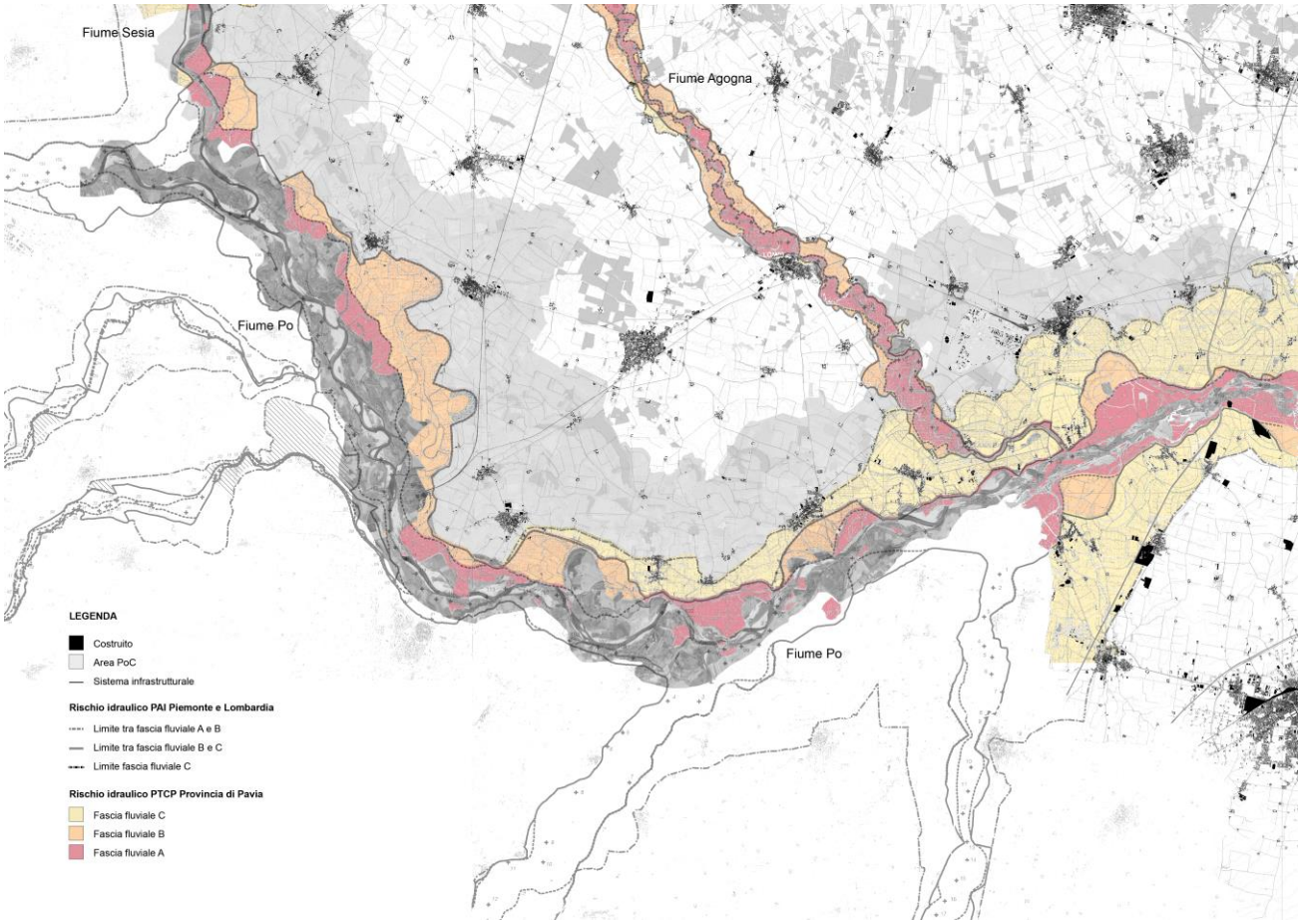


Figure 22 – Synthesis panel of the Action 1: comparison analysis of ordinary planning and emergency planning

2 – Stakeholders mapping

1. **Analysis of stakeholders, survey form.**

Scheda di rilevamento partecipato

STAKEHOLDER

DATA ____/____/_____

INFORMAZIONI GENERALI

Organizzazione

Nome: _____

Tipo di ente: _____

(ente pubblico / fondazione / associazione / impresa / altro)

Rappresentante o referente dell'organizzazione

Nome: _____

Cognome: _____

e-mail: _____

telefono: _____

RELAZIONI TERRITORIALI

Sede dell'organizzazione

Indirizzo: _____

(via o località / n. civico / c.a.p. / comune / provincia)

Coordinate: LAT. _____ LONG. _____

Territorio di competenza o interesse

Comune/i: _____

Provincia/e: _____

Area geografica: _____

(es. bacino idrografico, parco, litorale, comunità montana, ecc.)

ATTIVITÀ DELL'ORGANIZZAZIONE

Ambito delle attività: _____

(es. protezione civile, cultura, educazione, sanità, ricerca, ecc.)

Target di utenza: _____

(es. bambini, anziani, lavoratori, sportivi, cittadini, immigrati, ecc.)

Descrizione sintetica delle attività dell'organizzazione:

_____
_____
_____
_____

_____

_____

COINVOLGIMENTO NEL PROGETTO

Livello di coinvolgimento *(segnare una o più caselle)*

Diretto:

[ ] strategico: attore con capacità di indirizzo / decisione politica;

[ ] operativo: attore che verrà consultato / coinvolto nella realizzazione delle attività.

Indiretto:

[ ] osservatore: attore rilevante per la reputazione, l'appropriazione e la sostenibilità del progetto;

[ ] beneficiario: beneficiari diretti e indiretti del risultato del progetto.

Capacità di coinvolgimento nelle attività

Personale interno: _____

(n° persone)

Capacità di divulgazione delle attività

Bacino di utenza: _____

(n° persone)

Mezzi di comunicazione: _____

(riviste, pagine social, radio, tv, ecc.)

Edifici o spazi disponibili ad accogliere le attività del progetto:

[ ] _____ capienza stimata _____

(n° persone)

[ ] _____ capienza stimata _____

(n° persone)

[ ] _____ capienza stimata _____

(n° persone)

[ ] _____ capienza stimata _____

(n° persone)

[ ] _____ capienza stimata _____

(n° persone)

Capacità di integrazione nelle attività di Protezione Civile già in essere

Registrazione profilo nel portale Piani di Protezione Civile online:

[ ] si [ ] no.

(Verificare tipologia di attività possibili attraverso il portale)

Attività pregresse di consultazione e partecipazione alla formazione del PPC:

[ ] si [ ] no.

Altro:

_____

_____

_____

_____

_____

_____

FEEDBACK

Quanto tempo è stato necessario per la compilazione della scheda? _____

Quante persone hanno contribuito alla compilazione? _____

Quale modalità di lavoro è stata utilizzata?

_____

(es. lavoro individuale, riunioni, colloquio etc.)

Ulteriori considerazioni / suggerimenti:

_____

_____

_____

2. Analysis of stakeholders, key actors distribution in the territory

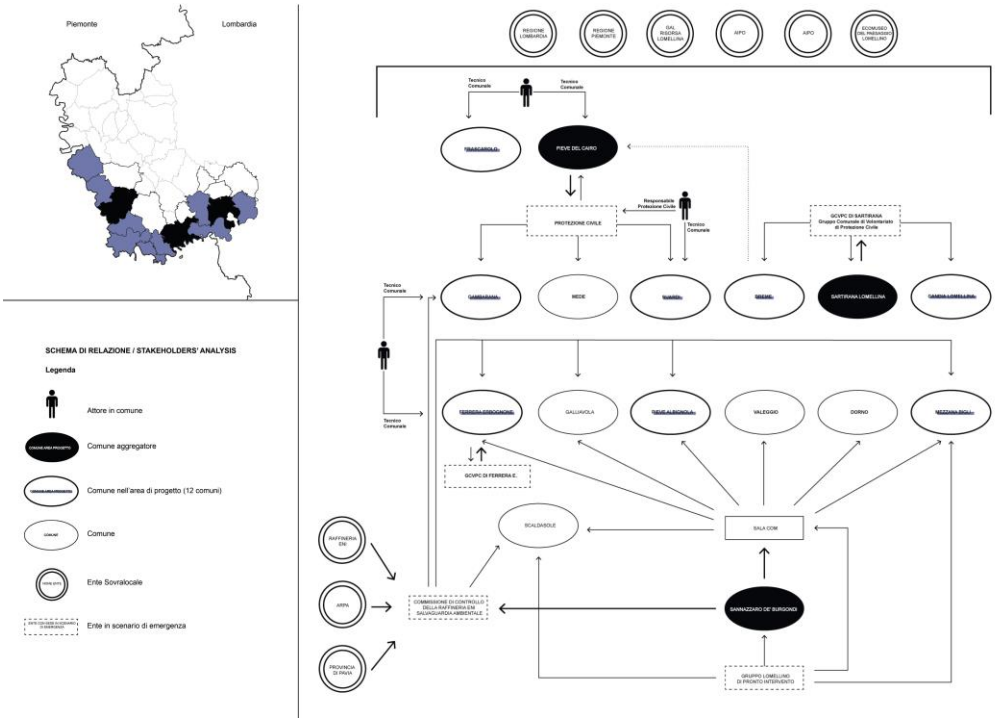


Figure 23 – Synthesis panel of the Action 2: stakeholder mapping

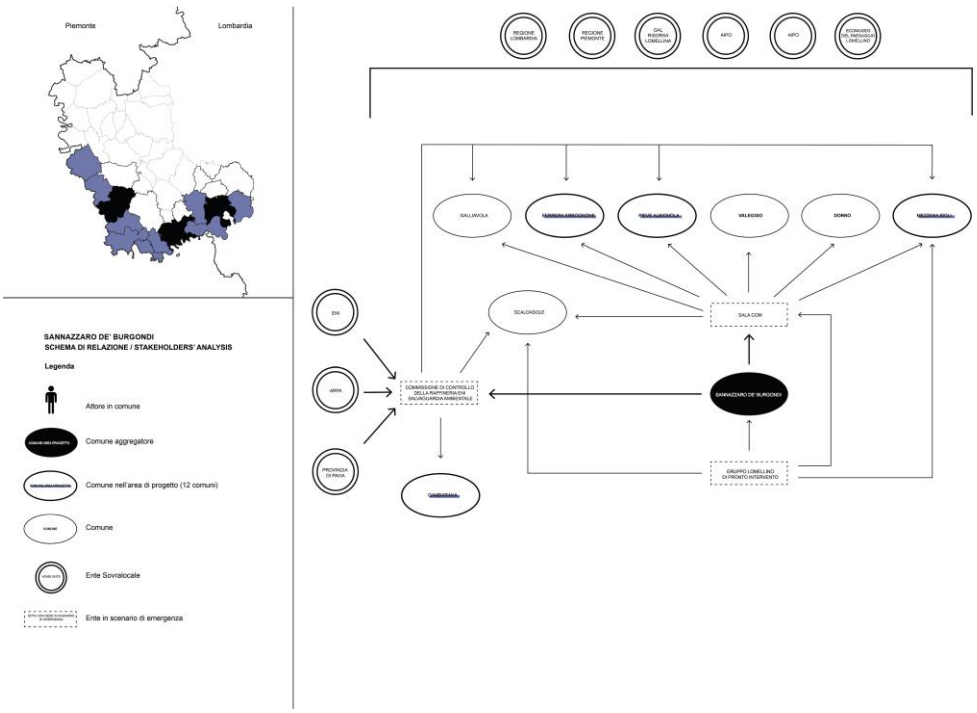


Figure 24 – Stakeholder mapping in Sannazzaro de' Burgondi

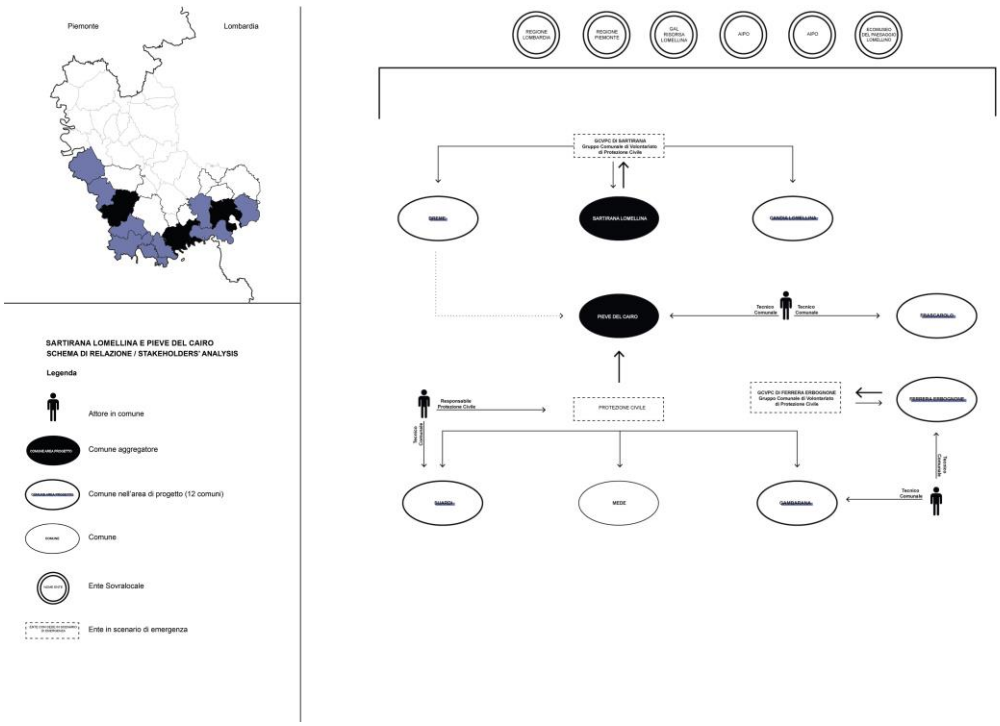


Figure 25 – Stakeholder mapping in Srtirana Lomellina and Pieve del Cairo

3 – Online questionnaire structure

Dear participant,

We invite you to take part in an investigation of the natural risks in the territory of Lomellina. By "natural risks" we mean the likelihood of natural hazards, such as floods, earthquakes, landslides or droughts, causing damage to people, buildings or the environment.

The objective of this questionnaire is to gather the opinions of experts, assessing both the capacity of organizations to deal with emergencies and the effectiveness of planning tools, such as municipal Civil Protection Plans. Participation is restricted to adults.

The questionnaire was developed by the Center for Climate Change and Transformation at Eurac Research, a research institution based in Bolzano, in collaboration with the Department of Architecture and Urban Studies of the Politecnico di Milano, as part of the RETURN project (multi-risk sciEnce for resilienT commUnitis underR a changiNg climate), funded by the National Recovery and Resilience Plan (PNRR). The project aims to identify strategies for reducing the impact of natural disasters, such as floods, droughts, and heatwaves, on people, infrastructure, cities, and the environment in Italy.

Completing the questionnaire takes about 15 minutes. Participation is entirely voluntary. You can stop the compilation at any time without having to give an explanation. By agreeing to continue, you consent to the statistical processing of data, which will be collected anonymously and in aggregate form, in full compliance with privacy regulations, and used exclusively for scientific purposes.

For best display, we recommend completing the questionnaire on a computer. Since no one knows the territory better than the organizations, associations, and entities that live and work in it every day, your contribution is essential for us.

For more information, please contact:

Elisa Ravazzoli (Institute for Regional Development - Eurac Research): elisa.ravazzoli@eurac.edu

Francesca Vigotti (Department of Architecture and Urban Studies - Politecnico di Milano): francesca.vigotti@polimi.it

Link: Privacy Policy

I DECLARE that I have understood the content and objectives of the above project and voluntarily participate in the project.

I CONFIRM that I have read and understood the privacy policy drafted pursuant to EU Regulation 2016/679 and national legislation and **I CONSENT** to the processing of my personal data, particularly the processing of special categories of personal data pursuant to Article 9 GDPR (political opinions) for the purposes indicated in the privacy policy.

GLOSSARY

Natural risk: the probability of the occurrence of hazardous events caused by nature, such as floods, earthquakes, landslides, or droughts, which may cause damage to people, buildings, or the environment.

Exposure: the presence of people, buildings, infrastructure, or economic/environmental activities in an area that may be affected by a natural event.

Vulnerability: the degree of fragility or weakness of people, buildings, or activities in the face of a natural event, that is, how easily they can be damaged.

Impacts: the effects or consequences caused by a natural event on population, environment, economy, infrastructure and services.

Municipal Civil Protection Plan (PPCC): the operational instrument prepared by a municipality to prevent, manage, and address emergency situations in the territory, whether of natural origin (e.g., earthquakes, floods, landslides) or man-made (e.g., industrial accidents, fires).

Safe areas: areas of the territory that are not or only slightly exposed to natural hazards, used for evacuations, temporary shelters, or stable settlements, including in the reconstruction phase.

SECTION – KNOWLEDGE AND MANAGEMENT OF NATURAL RISKS

This section of the questionnaire aims to gather information on the impacts of natural hazards in the Lomellina area and to assess the preparedness of the main actors involved in risk management.

Q2. In the Lomellina territory where your entity (municipality, association, organization) operates, the main natural hazards are floods, droughts, and earthquakes. For each of these hazards, please indicate the areas that in your opinion are most exposed.

(3 maps – one for each natural hazard, divided into numbered zones. The respondent selects the corresponding number)

Q3. What impacts related to floods, droughts, and earthquakes do you think you have observed most in recent years (indicatively between 2015 and 2025) within the Lomellina territory? (Select a maximum of four options)

- Drought, water scarcity, decrease in water quantity and worsening water quality
- Variation and decrease in agricultural or agri-food production
- Degradation and erosion of soils
- Deterioration of air quality and increase in health risks
- Increase in the number and severity of forest fires
- Interruptions in energy distribution (electricity, gas) due to extreme events or consumption peaks
- Disruption of communication networks (telephone, cabling, wi-fi) due to extreme events
- Infrastructure damage: disruptions in transportation and distribution networks and services due to extreme events
- Damage to the tangible cultural heritage of the area
- Landscape degradation
- Decreased tourism activities
- Other: _____
- None
- I don’t know

Q4. What impacts do you think will become most critical in the future (2025 onwards) within the Lomellina area? (Select a maximum of four options)

- Drought, water scarcity, decrease in water quantity and worsening water quality
- Variation and decrease in agricultural or agri-food production
- Degradation and erosion of soils
- Deterioration of air quality and increase in health risks
- Increase in the number and severity of forest fires
- Interruptions in energy distribution (electricity, gas) due to extreme events or consumption peaks
- Disruption of communication networks (telephone, cabling, wi-fi) due to extreme events
- Infrastructure damage: disruptions in transportation and distribution networks and services due to extreme events
- Damage to the tangible cultural heritage of the area
- Landscape degradation
- Decreased tourism activities
- Other: _____
- None
- I don't know

Q5. Based on your knowledge of the Lomellina territory, which sectors do you believe are most vulnerable to the impacts of floods, droughts, and earthquakes? (Draw the following sectors by ordering them from most vulnerable to least vulnerable. 1 = most vulnerable; 9=least vulnerable)

- Agriculture and food production
- Urban settlements
- Cultural heritage
- Energy
- Water resources (quantity and quality)
- Telecommunication infrastructure
- Transport infrastructure
- Hazardous industries and infrastructure
- Tourism

Q6. Which actions does your entity (municipality, association, organization) put in place to support the management of natural risks (flood, drought and earthquake risk) in the Lomellina territory? (Multiple answer)

- Monitoring and data collection on risk phenomena
- Information and awareness-raising activities for the population
- Elaboration or updating of civil protection plans
- Participation in inter-institutional coordination meetings
- Internal staff training on natural hazards
- Organization or participation in civil protection exercises
- Maintenance and management of prevention infrastructure (e.g. levees, canals, fire-fighting networks)
- Logistical or operational support during emergencies
- Collaboration with research organizations or universities
- No specific action currently in place
- Other (please specify): _____

Q7. Has your entity (municipality, association, organization) ever been directly involved in the management of an emergency related to one of the natural hazards mentioned (flood, drought, and earthquake risk) in the Lomellina area? (Filter question)

- Yes
- No

Q8. If you answered yes, indicate two emergency events and the affected areas (List two emergency events and write the area of the territory affected, 2 separate boxes)

Q9. What was the role of your entity (municipality, association, organization) during this/these emergency(s)? (Open question)

Q10. How well do you think your entity is prepared to handle emergencies related to floods, droughts, and earthquakes? (Scale from 1 = not at all prepared to 5 = very prepared, evaluated for each risk type)

Q11. What are the main obstacles your entity (municipality, association, organization) encounters in effectively managing natural risks (floods, droughts, and earthquakes) in the Lomellina area? (Multiple choice)

- Lack of financial resources
- Shortage of technical or specialized personnel
- Poor collaboration or communication between institutions
- Limited public awareness
- Coordination difficulties during emergencies
- Inadequate territorial planning
- Unclear or outdated regulatory plans
- Difficulty accessing or sharing data
- Lack of training or emergency drills
- Poor integration between ordinary and emergency planning
- Inadequate infrastructure
- Poor risk communication to the public
- No obstacles
- Other (please specify): _____

SECTION – CIVIL PROTECTION PLANNING

The purpose of this section is to collect information to evaluate the effectiveness of Municipal Civil Protection Plans (PPCC), which are operational tools developed by municipalities to prevent, manage, and handle emergency situations, either natural (earthquakes, floods, landslides) or human-made (industrial accidents, fires).

Q12. Does the municipality (s) in which you operate, have a Municipal Civil Protection Plan (PPCC)? (Filter question)

- Yes
- Some
- No
- I don’t know
- Other (please specify): _____

Q13. The Municipal Civil Protection Plan of the municipality(s) where you operate is:

- Recently updated (in all municipalities)
- In the process of being updated (in all municipalities)
- Not updated (in any of the municipalities)
- Updated only in some municipalities
- I don’t know

Q14. Are you aware of the areas identified as safe in the Municipal Civil Protection Plan? (Filter question)

- Yes
- No

Q15. Could you please indicate the safe areas on the map or, alternatively, list them below? (We divide the map into numbered zones; the respondent should indicate the zone by selecting the corresponding number)

Q16. Do you believe these areas are actually safe? (Filter question)

- Yes
- No
- Some
- I don’t know

Q17. If you answered no, can you explain why by giving some examples? (Open question)

Q18. Do you believe there are other areas that, based on your local knowledge, could be considered safer? If so, which ones? (Open question)

SECTION – YOUR ORGANIZATION AND PERSONAL DATA

Q19. Name of the entity (municipality, association, organization) you represent (Open question)

Q20. Your role in the entity

- Director / Deputy Director
- Technical staff
- Association coordinator
- Mayor
- Delegate of one of the above roles
- Other (please specify): _____

Q21. Gender

- Female
- Male
- Other
- Prefer not to say

Q22. Age group

- < 25
- 26–35
- 36–45
- 46–55
- 56–65
- 66
- Prefer not to say

Q23. Highest level of education completed

- Primary school
- Middle school
- Three-year vocational qualification
- High school diploma (general, technical, or vocational)
- University degree (bachelor's and/or master's; old system)
- Postgraduate qualification (master's/PhD)
- Prefer not to say

CONCLUSIONS

Thank you for taking the time to complete this questionnaire.

Your responses are a valuable contribution to better understanding the needs, perceptions, and ideas of those who live and work in the Lomellina area.

Click on "Finish" to save your responses.

4 – Spatial education through common shared languages

1. **Narrative Maps:** Representation of the memory of the disaster, good and bad practices (correct/incorrect behaviours), a map of the local built and intangible heritage community.

Figure 26 a, b, c, d, e, f – Narrative maps based on the local knowledge aimed at showing the bad and good practices for enhancing preparedness

5 – Co-mapping vulnerable and safe places

1. Focus group form.

Scheda di restituzione

FOCUS GROUP

DATA ____/____/_____

PARTE I – Dati del compilatore e dati generali del Focus Group

INFORMAZIONI COMPILATORE

Identità del compilatore

Nome: _____

Cognome: _____

e-mail: _____

telefono: _____

Organizzazione di riferimento

Nome: _____

Tipo di ente: _____

(ente pubblico / fondazione / associazione / impresa / altro)

Se "altro" specificare il tipo di ente: _____

Ruolo: _____

(tecnico / sindaco / volontario / socio / altro)

Se "altro" specificare il ruolo nell'ente: _____

INFORMAZIONI FOCUS GROUP

Luogo e data di svolgimento: _____

Ente promotore: _____

(GAL / Comunità Montana / Comune / Associazione / Università / altro)

Se "altro" specificare il tipo di ente: _____

Numero di partecipanti: _____

Compilare l'elenco con i nominativi, l'ente di appartenenza e il contatto dei partecipanti nella tabella sottostante:

NOME E COGNOME	ENTE DI APPARTENENZA	RUOLO	E-MAIL

PARTE IIa – Dati a livello comunale da compilare per ciascuno dei Comuni partecipanti

PIANO DI EMERGENZA COMUNALE

Il Comune dispone di un Piano di Emergenza Comunale? sì ( ) no ( )

Se sì, indicare l'anno di redazione e gli eventuali aggiornamenti: _____

Se sì, il Piano è accessibile per la consultazione? _____

LUOGHI SICURI

Sono stati identificati dai partecipanti del focus group luoghi "sicuri" nel territorio di competenza? sì ( ) no ( )

Se sì, elencarli di seguito:

LUOGO 1

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è identificato nel Piano di Emergenza Comunale? sì ( ) no ( )

Se sì, come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

LUOGO 2

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è identificato nel Piano di Emergenza Comunale? sì ( ) no ( )

Se sì, come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

LUOGO 3

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è identificato nel Piano di Emergenza Comunale? sì ( ) no ( )

Se sì, come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

LUOGO 4

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è identificato nel Piano di Emergenza Comunale? sì ( ) no ( )

Se sì, come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

LUOGHI VULNERABILI

Sono stati identificati dai partecipanti del focus group luoghi "vulnerabili" nel territorio di competenza? sì ( ) no ( )

Se sì, elencarli di seguito:

LUOGO 1

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Quali sono i rischi a cui è esposto il luogo identificato? _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

LUOGO 2

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Quali sono i rischi a cui è esposto il luogo identificato? _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

LUOGO 3

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Quali sono i rischi a cui è esposto il luogo identificato? _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

LUOGO 4

Tipologia di luogo ed eventuale denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Quali sono i rischi a cui è esposto il luogo identificato? _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

LUOGHI IDENTITARI

Sono stati identificati dai partecipanti del focus group luoghi "identitari" nel territorio di competenza? sì ( ) no ( )

Se sì, elencarli di seguito:

LUOGO 1

Tipologia di luogo e denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è stato indicato come **vulnerabile** nel Focus Group? sì ( ) no ( )

Se sì, specificare il tipo di rischio: _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

Il luogo è stato indicato come **sicuro** nel Focus Group? sì ( ) no ( )

Se sì, è identificato nel Piano di Emergenza Comunale? Come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

LUOGO 2

Tipologia di luogo e denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è stato indicato come **vulnerabile** nel Focus Group? sì ( ) no ( )

Se sì, specificare il tipo di rischio: _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

Il luogo è stato indicato come **sicuro** nel Focus Group? sì ( ) no ( )

Se sì, è identificato nel Piano di Emergenza Comunale? Come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

LUOGO 3

Tipologia di luogo e denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è stato indicato come **vulnerabile** nel Focus Group? sì ( ) no ( )

Se sì, specificare il tipo di rischio: _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

Il luogo è stato indicato come **sicuro** nel Focus Group? sì ( ) no ( )

Se sì, è identificato nel Piano di Emergenza Comunale? Come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

LUOGO 4

Tipologia di luogo e denominazione: _____

_____

(indicare se edificio o spazio aperto e la destinazione d'uso)

Indirizzo: _____

(via o località - n. civico - c.a.p. - comune e/o frazione - provincia)

Coordinate: LAT._____ LONG. _____

Il luogo è stato indicato come **vulnerabile** nel Focus Group? sì ( ) no ( )

Se sì, specificare il tipo di rischio: _____

(idraulico / idrogeologico / sismico / incendi / altro)

Se "altro" specificare il tipo di rischio: _____

Il luogo è stato indicato come **sicuro** nel Focus Group? sì ( ) no ( )

Se sì, è identificato nel Piano di Emergenza Comunale? Come è classificato? _____

(luogo di ammassamento / luogo di ricovero e accoglienza / ecc.)

PARTE IIb – Dati a livello comunale da compilare per ciascuno dei Comuni partecipanti

PROTEZIONE CIVILE

Nel Comune è attiva un'unità di Protezione Civile? sì ( ) no ( )

Se sì, indicare il numero di operatori e volontari: _____

Se no, il Comune si appoggia ad unità di Protezione Civile di altri Comuni?

sì ( ) no ( )

Indicare il Comune o i Comuni di riferimento: _____

PROCESSI PARTECIPATIVI

Nel Comune si svolgono o sono state svolte attività di coinvolgimento, sensibilizzazione e creazione di consapevolezza delle comunità rispetto ai rischi?

sì ( ) no ( )

Se sì, indicare quale tipo di attività è stata svolta, quando e quale è l'utenza coinvolta:

(presentazione al pubblico del Piano di Emergenza Comunale, esercitazioni, laboratori con le scuole, incontri, assemblee, laboratori…)

_____
_____
_____
_____
_____
_____
_____

Se sì, quali enti e associazioni hanno promosso e partecipato alle attività?

_____

_____

_____

_____

_____

2. **Atlas of Intervention Areas:** Mapping of vulnerable and strategic areas.

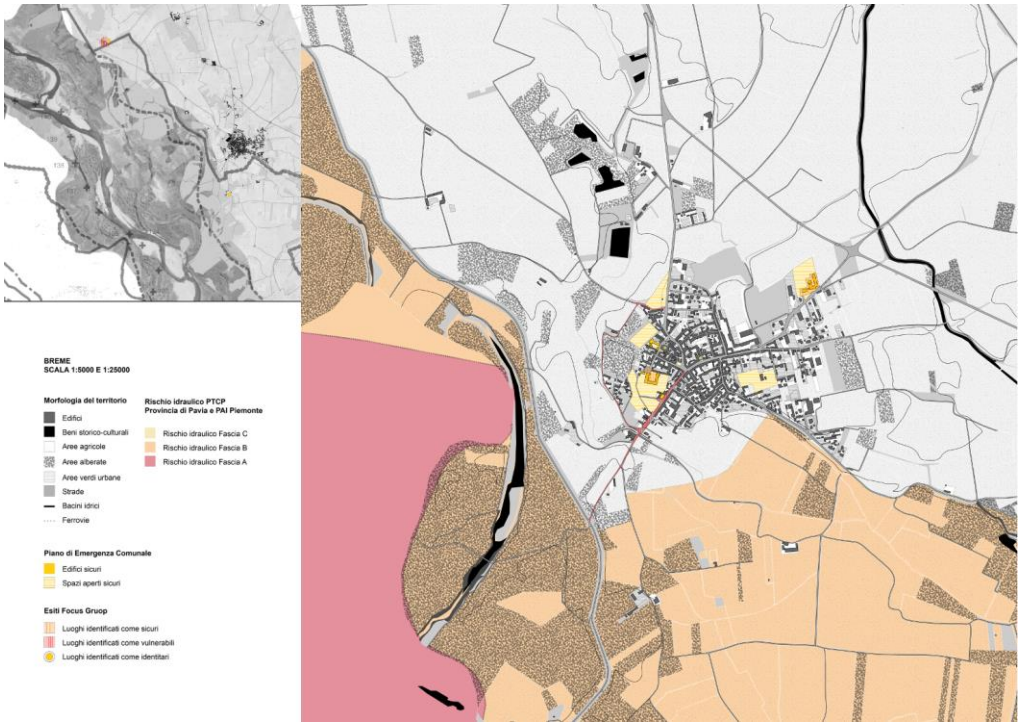


Figure 27 – Co-mapping output for Breme

Figure 28 – Co-mapping output for Candia Lomellina

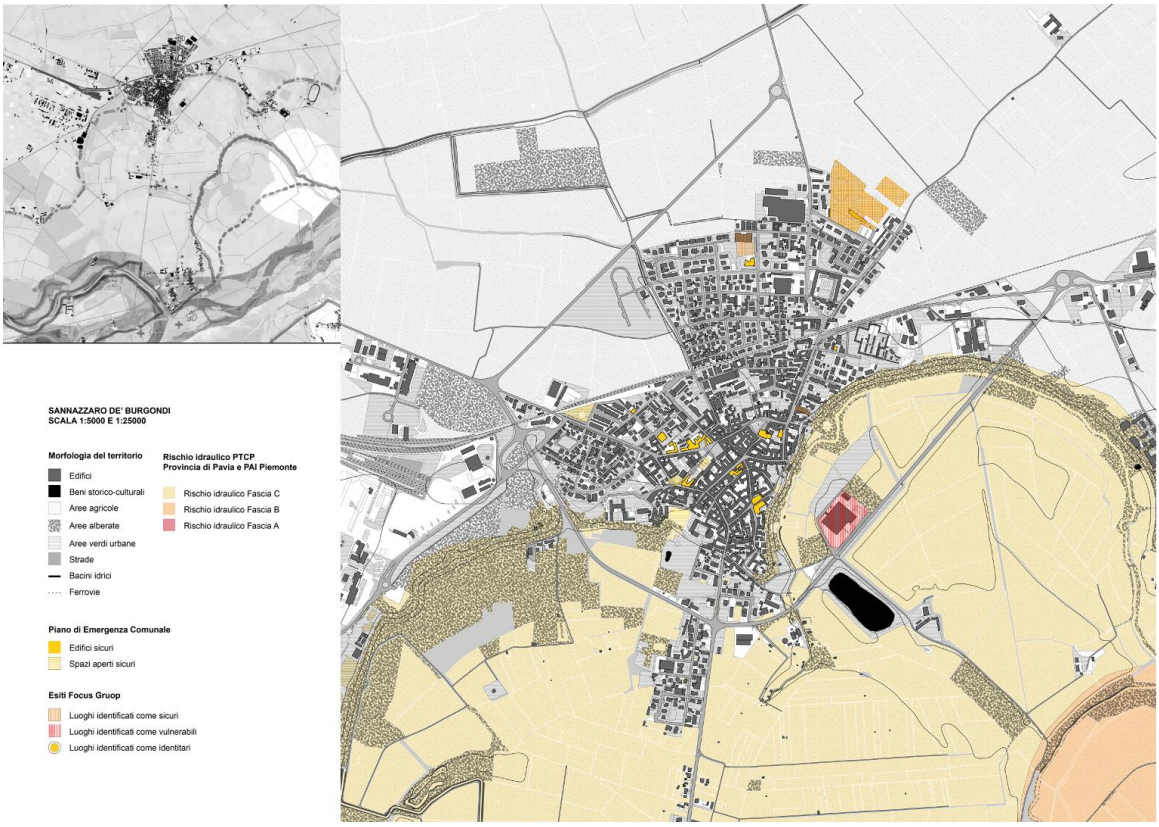


Figure 29 – Co-mapping output for Sannazzaro de' Burgondi

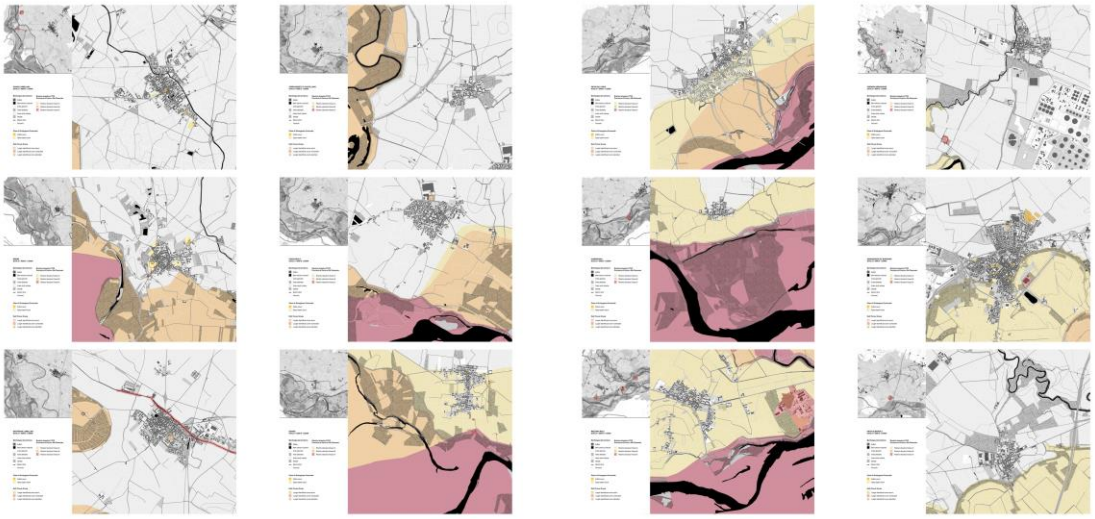


Figure 30 – Co-mapping outputs of other municipalities (without PPC or PEC)

6 – Adequacy of places: survey and evaluation

Scheda di rilievo

ADEGUATEZZA DEI LUOGHI

Scheda A1 – Edifici

Istruzioni di compilazione

Le schede di rilievo sono composte da due tracciati.

La scheda A1 deve essere compilata prima del rilievo sul campo (scheda A2) con informazioni desumibili da documenti e banche dati comunali e/o regionali (es. Catasto, PGT e Piano di Protezione Civile)

La scheda A2 completa le informazioni della scheda A1 con dati desumibili direttamente dal rilievo sul campo.

CODICE SCHEDA _____

DATA DI COMPILAZIONE____/____/_____

INFORMAZIONI RILEVATORE

Dati del rilevatore

Nome:_____
Cognome: _____
e-mail: _____
telefono: _____

Organizzazione di riferimento e ruolo

Nome: _____
Tipo di ente: _____
(ente pubblico / fondazione / associazione / impresa / altro)
Ruolo: _____

INFORMAZIONI RELATIVE ALL'EDIFICIO

IMMAGINE SATELLITARE DELL'EDIFICIO

Inserire in questo riquadro l'immagine satellitare dell'edificio rilevato, avendo cura di comprendere anche le vie di accesso e gli spazi di pertinenza.

CONTESTO E LOCALIZZAZIONE DELL'EDIFICIO

Indirizzo: _____

(via o località / n. civico / c.a.p. / comune / provincia)

Se l'indirizzo non è disponibile, indicare le coordinate di localizzazione:

Coordinate: LAT. _____

LONG. _____

Indicare il contesto di localizzazione dell'edificio nel territorio comunale:

☐ Centro urbano

☐ Periferia urbana

☐ Area industriale o commerciale

☐ Area agricola

Indicare la posizione dell'edificio:

☐ Isolato
☐ Confinante con altri edifici
☐ Altro

Indicare la forma in pianta dell'edificio:

☐ Rettangolare
☐ A corte
☐ A "C"
☐ A "L"
☐ Altro (Specificare: _____)

DESTINAZIONE E STATO D'USO

Edificio in uso:

☐ Sì
☐ Parzialmente
☐ No

Se SÌ – destinazione d'uso attuale dell'edificio:

_____

(es. Municipio, sala convegni, palestra, scuola, abitazione ecc.)

Se NO - destinazione d'uso precedente dell'edificio, se nota:

_____

DATAZIONE DELL'EDIFICIO

Epoca di costruzione: _____

(dove disponibile e/o desumibile: indicare anno, o decennio, o secolo)

CONDIZIONE PROPRIETARIA DELL'EDIFICIO

L'edificio è di proprietà:

☐ Pubblica
☐ Privata

L'EDIFICIO È SOTTOPOSTO A VINCOLO (D.Lgs. 42/2004)?

☐ Sì
☐ No

L'EDIFICIO È INDIVIDUATO COME DI VALORE STORICO-CULTURALE NEL PGT?

☐ Sì
☐ No

ACCESSIBILITA' ALL'EDIFICIO (GIORNI/ORARI DI APERTURA)

L'edificio è aperto e accessibile:

☐ Aperto 24 ore su 24, tutti i giorni
☐ Solo alcuni giorni a orari prestabiliti
Indicare i giorni e gli orari di apertura: _____

☐ Se l'edificio è accessibile solo in giorni e orari definiti, il responsabile / i responsabili da contattare per l'accesso fuori orario è:

RECAPITO 1)
Nome e cognome _____
Contatto telefonico _____
Indirizzo di recapito_____

RECAPITO 2)
Nome e cognome _____
Contatto telefonico _____
Indirizzo di recapito_____

ESPOSIZIONE E TIPO DI RISCHIO

A quali tipi di rischi è esposto l'edificio?
(è possibile barrare più caselle se necessario)

☐ Alluvione
☐ Frana
☐ Sisma
☐ Industriale (barrare in caso di presenza di rischio a livello comunale)
☐ L'edificio non è esposto a rischi

Se l'edificio è esposto a rischi, indicare la fonte di indicazione del tipo di rischio:
(è possibile barrare più caselle se necessario)

☐ Piano di Protezione Civile
☐ Piano di Governo del Territorio
☐ Piano per l'Assetto Idrogeologico
☐ Altro (specificare): _____

CLASSIFICAZIONE DELL'EDIFICIO NEL PIANO DI PROTEZIONE CIVILE

L'edificio è indicato come strategico nel Piano di Protezione Civile / Piano di Emergenza Comunale?

☐ Non è classificato
☐ Sala COM
☐ COC
☐ Ammassamento mezzi di emergenza e soccorso
☐ Ammassamento sicuro per persone
☐ Ammassamento oggetti
☐ Accoglienza civili
☐ Altro (specificare): _____

RETE INFRASTRUTTURALE DI ACCESSO ALL'EDIFICIO

Esposizione della strada di accesso all'edificio a rischi
(è possibile barrare più caselle se necessario)

☐ Alluvione
☐ Frana
☐ Sisma
☐ Industriale (barrare se presenza di rischio a livello comunale)
☐ La strada non è esposta a rischi

Se la strada è esposta a rischi, indicare la fonte di indicazione del tipo di rischio:
(è possibile barrare più caselle se necessario)

☐ Piano di Protezione Civile
☐ Piano di Governo del Territorio
☐ Piano per l'Assetto Idrogeologico
☐ Altro (specificare se documenti, esperienze dirette o memoria storica):

NOTE AGGIUNTIVE

ALLEGATI

☐ Planimetria

☐ Geolocalizzazione

Scheda di rilievo

ADEGUATEZZA DEI LUOGHI
Scheda A2 – Edifici

Istruzioni di compilazione
Le schede di rilievo sono composte da due tracciati.
La scheda A1 deve essere compilata prima del rilievo sul campo (scheda A2) con informazioni desumibili da documenti e banche dati comunali e/o regionali (es. Catasto, PGT e Piano di Protezione Civile)

La scheda A2 completa le informazioni della scheda A1 con dati desumibili direttamente dal rilievo sul campo.

CODICE SCHEDA _____

DATA DI COMPILAZIONE____/____/_____

INFORMAZIONI RILEVATORE

Dati del rilevatore

Nome:_____
Cognome: _____
e-mail: _____
telefono: _____

Organizzazione di riferimento e ruolo

Nome: _____
Tipo di ente: _____
(ente pubblico / fondazione / associazione / impresa / altro)
Ruolo: _____

INFORMAZIONI RELATIVE ALL'EDIFICIO

IMMAGINE SATELLITARE DELL'EDIFICIO

Inserire in questo riquadro l'immagine satellitare dell'edificio rilevato.
Segnare tutti gli accessi dell'edificio (ingressi e uscite, comprese quelle di emergenza)

L'EDIFICIO È RILEVABILE E ACCESSIBILE?

Edificio rilevabile – esterno

☐ Sì
☐ Parzialmente
☐ No

Edificio accessibile per il rilievo - interno

☐ Sì
☐ Parzialmente
☐ No

L’edificio presenta lavori in corso alla data della compilazione della scheda?

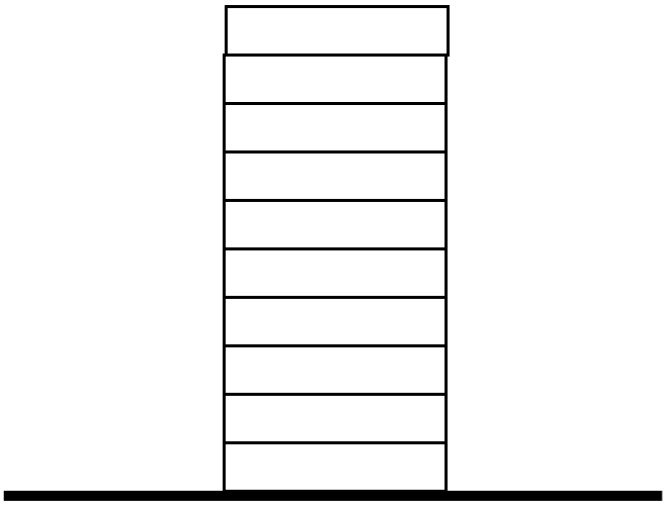
☐ Sì, all’esterno
☐ Sì, all’interno
☐ No

DATI DIMENSIONALI DELL’EDIFICIO

Numero di piani fuori terra (incluso piano terra):

☐ 1
☐ 2
☐ 3 o più

Colorare il numero di piani fuori terra visibili nello schema seguente:



Presenza di piani interrati /seminterrati

☐ Sì
☐ No
☐ Non so / non ispezionabile

Indicare la funzione dei piani interrati / seminterrati, se nota o desumibile dal rilievo:

☐ Abitazione
☐ Laboratorio
☐ Cantina / Deposito / Magazzino
☐ Garage
☐ Altro (Specificare: _____)

PRESENZA DI SPAZI APERTI DI PERTINENZA

L'edificio presenta spazi aperti di pertinenza:
(È possibile selezionare più voci)

☐ No
☐ Giardino piantumato
☐ Cortile con pavimentazione permeabile (ghiaia, terra battuta)
☐ Cortile con pavimentazione impermeabile (asfalto, autobloccanti)
☐ Parcheggio
☐ Parco con giochi di ingombro (strutture di gioco, panchine...)
☐ Area sportiva con strutture di ingombro (spalti, attrezzi, recinzioni...)
☐ Altro:_____

ACCESSIBILITÀ

BARRIERE ARCHITETTONICHE

Esterno

Accessibilità all'edificio. Sono presenti ostacoli?

☐ Sì
☐ No
☐ Parzialmente

Se Sì o Parzialmente, indicare la tipologia di ostacolo (es. Gradini, dissuasori in calcestruzzo...)

_____

Presenza di rampe di accesso all'edificio

☐ Sì
☐ No
☐ Parzialmente

Presenza di segnaletica d'emergenza e percorsi tattili (vie di fuga, punti di a assembramento, uscite d'emergenza...)

☐ Sì
☐ No
☐ Parzialmente

Accessibilità a tutti gli spazi interni dell'edificio (accessi, vie di fuga)
(compilare questa sezione se l'edificio è accessibile durante il rilievo sul campo)

Fruibilità degli spazi priva di ostacoli (gradini, pendenze)

☐ Sì
☐ No
☐ Parzialmente
Se parzialmente, specificare quali spazi non sono accessibili:
_____

Presenza di ascensori e porte di dimensioni adeguate all'accesso di persone con mobilità ridotta

☐ Non applicabile
☐ Sì
☐ No
☐ Parzialmente
Specificare: _____

Passaggi di dimensioni adeguate all'accesso di persone con disabilità

☐ Non applicabile
☐ Sì
☐ No
☐ Parzialmente
Specificare dove: _____

Presenza di ingombri fissi (es. gradini, banconi, armadi a muro...)

☐ Non applicabile
☐ Sì
☐ No
☐ Parzialmente
Specificare: _____

Presenza di servizi igienici per persone con mobilità ridotta

☐ Non applicabile
☐ Sì
☐ No

ACCESSIBILITÀ

MEZZI DI SOCCORSO E DI TRASPORTO

Accessibilità per mezzi di soccorso: dimensionamento adeguato della carreggiata

☐ Non applicabile
☐ Sì
☐ No

Accessibilità per i soccorritori all'edificio e agli spazi aperti di pertinenza: presenza di ostacoli

☐ No
☐ Non applicabile
☐ Sì per persone con disabilità motorie
☐ Sì per mezzi e vigili del fuoco
☐ Sì per barelle e soccorritori
Specificare dove:
_____

Se Sì o Parzialmente, indicare la tipologia di ostacolo (es. Dimensione ridotta del cancello di accesso, arredo urbano, dissuasori)
_____

Presenza di pendenze e curve critiche per la manovrabilità dei veicoli di soccorso

☐ Sì
☐ Parzialmente
☐ No
☐ Non applicabile

Presenza di segnaletica di emergenza

☐ Sì
☐ Parzialmente
☐ No
☐ Non applicabile

Presenza di illuminazione per interventi notturni

☐ Sì
☐ Parzialmente
☐ No
☐ Non applicabile

Presenza di altri ostacoli sullo spazio aperto in prossimità degli accessi e alle vie di fuga dell'edificio:

☐ No
☐ Sì, alberature
☐ Sì, parcheggi in linea regolamentati
☐ Sì, parcheggi in linea NON regolamentati
☐ Non applicabile
☐ Altro
Se altro, specificare la tipologia di ostacolo (es. arredi fissi, bidoni della spazzatura…):
_____

STATO DI CONSERVAZIONE E MANUTENZIONE DELL'EDIFICIO

Stato di conservazione generale dell'edificio
Indicare lo stato di conservazione dell'edificio, barrando la casella corrispondente alla descrizione:

Stato di conservazione	Descrizione
☐ **Ottimo**	L'edificio non presenta fenomeni di degrado visibili.
☐ **Buono**	Presenza di fenomeni di degrado superficiali, localizzati e non diffusi.
☐ **Mediocre**	Presenza di fenomeni di degrado sia superficiali sia strutturali, diffusi e rilevabili in più parti dell'edificio.
☐ **Pessimo**	Condizioni generali compromesse: degrado esteso e gravi danni strutturali che incidono sulla stabilità e sulla sicurezza dell'edificio.

Strutture verticali esterne: condizioni strutturali
Sono visibili crolli, lesioni, infiltrazioni d'acqua?

☐ Sì
☐ Parzialmente
☐ No

Copertura: condizioni strutturali

Sono visibili crolli o lesioni?

☐ Sì
☐ Parzialmente
☐ No

NOTE _____

Presenza di addizioni volumetriche

(Per "addizioni volumetriche" si intendono aggiunte di volumi realizzati presumibilmente a posteriori rispetto alla costruzione dell'edificio. Devono essere considerate sia le aggiunte normate, sia quelle irregolari/difformi)

☐ Sì
☐ No

Se SÌ – specificare il tipo di trasformazioni presenti e i materiali di costruzione:

(es. Aggiunta di strutture aggettanti esterne, chiusura a veranda di balconi e logge, aggiunta di corpi scala esterni anche di emergenza, creazione di edifici indipendenti nelle aree aperte di pertinenza dell'edificio rilevato)

_____
_____

Strutture verticali interne: condizioni strutturali

Sono visibili crolli, lesioni, infiltrazioni d'acqua?

☐ Sì
☐ Parzialmente
☐ No

Solai e orizzontamenti interni: condizioni strutturali

Sono visibili crolli, lesioni, infiltrazioni d'acqua?

☐ Sì
☐ Parzialmente
☐ No

<u>Presenza di impianti e servizi</u>

Esterno

Impianti tecnologici (idraulico, elettrico) presenti e funzionanti:

☐ Sì
☐ Parzialmente
☐ No

Interno

Impianti tecnologici (idraulico, elettrico, gas) presenti e funzionanti:

☐ Sì
☐ Parzialmente
☐ No

Servizi igienici presenti e funzionanti:

☐ Sì
☐ No

NOTE AGGIUNTIVE

Criticità riscontrate:

MATRICE DI VALUTAZIONE DI ADEGUATEZZA DELL'EDIFICIO

A scheda conclusa, valutare attraverso la matrice per ogni scenario SE l'edificio è utilizzabile in caso d'emergenza e in che modo:

	Per ammassamento mezzi	**Per ammassamento persone**	**Altro utilizzo (specifica):**	**Note:**
Alluvione	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Frana	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Sisma	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Industriale	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Altro scenario(specificare)	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Edificio non esposto a rischi*	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	

*nella cartografia dei piani PGT, PAI, PPC non è esposto a nessun rischio. L'edificio si presenta in buono stato di manutenzione e potrebbe ospitare funzioni in caso d'emergenza.

ALLEGATI

☐ Rilievo fotografico
☐ Elaborati grafici realizzati durante il rilievo (es. disegni, rappresentazioni schematiche delle planimetrie e dei fronti degli edifici)

ADEGUATEZZA DEI LUOGHI

Scheda B1 – SPAZI APERTI

Istruzioni di compilazione

Le schede di rilievo sono composte da due tracciati.
La scheda B1 deve essere compilata prima del rilievo sul campo (scheda A2) con informazioni desumibili da documenti e banche dati comunali e/o regionali (es. Catasto, PGT e Piano di Protezione Civile)
La scheda B2 completa le informazioni con dati desumibili dal rilievo sul campo.

CODICE SCHEDA _____

DATA ____/____/_____

INFORMAZIONI RILEVATORE

Identità del rilevatore

Nome: _____
Cognome: _____
e-mail: _____
telefono: _____

Organizzazione di riferimento e ruolo

Nome: _____
Tipo di ente: _____
(ente pubblico / fondazione / associazione / impresa / altro)
Ruolo: _____

INFORMAZIONI RELATIVE ALLO SPAZIO

IMMAGINE SATELLITARE

Inserire in questo riquadro l'immagine satellitare dello spazio rilevato, avendo cura di comprendere anche le vie di accesso e gli edifici di pertinenza.

CONTESTO E LOCALIZZAZIONE

Toponomastica: _____

(via – piazza - località / n. civico / c.a.p. / comune / provincia)

Se l'indirizzo non è disponibile, indicare le coordinate di localizzazione:

Coordinate: LAT. _____

LONG. _____

Indicare il contesto di localizzazione nel territorio comunale:

☐ Centro urbano
☐ Periferia urbana
☐ Area industriale o commerciale
☐ Area agricola

DESTINAZIONE D'USO

Classificazione – rete viaria:

☐ Autostrada;
☐ Strada extraurbana principale;
☐ Strada extraurbana secondaria;
☐ Strada urbana di scorrimento;
☐ Strada urbana di quartiere;
☐ bis - Strada urbana ciclabile;
☐ Strada locale;
☐ bis. Itinerari ciclopedonali;
☐ Ferrovia;
☐ Altro: _____

Classificazione – aree aperte:

(è possibile barrare più caselle se necessario)

☐ Piazza - largo
☐ Parcheggio
☐ Area libera per usi temporanei (fiere/sagre/eventi)
☐ Area di risulta
☐ Giardino
☐ Parco giochi
☐ Campo sportivo
☐ Altro: _____

Tipologia d'uso:

(è possibile barrare più caselle se necessario)

☐ Pedonale (es. strada interdetta al traffico)
☐ ciclabile
☐ carrabile leggera
☐ carrabile pesante

Lo spazio può essere occupato per usi temporanei?

☐ Mercato
☐ Parcheggio
☐ Altro: _____

ESPOSIZIONE E TIPO DI RISCHIO

A quali tipi di rischi è esposto lo spazio aperto?
(è possibile barrare più caselle se necessario)

☐ Alluvione
☐ Frana
☐ Sisma
☐ Industriale
☐ Lo spazio non è esposto a rischi

Se lo spazio aperto è esposto a rischi, indicare la fonte di indicazione del tipo di rischio:
(è possibile barrare più caselle se necessario)

☐ Piano di Protezione Civile
☐ Piano di Governo del Territorio
☐ Piano per l'Assetto Idrogeologico
☐ Altro (specificare): _____

CLASSIFICAZIONE DELLO SPAZIO NEL PIANO DI PROTEZIONE CIVILE

Il luogo è indicato nel PPC/PEC come:

☐ vulnerabile
☐ strategico per: _____
☐ area di emergenza (eliambulanza, accampamento...): _____
☐ altro: _____

CONDIZIONE PROPRIETARIA

Lo spazio/percorso è di proprietà:

☐ Pubblica
☐ Privata
☐ Privata ad uso pubblico

L’edificio è aperto e accessibile:

☐ Aperto 24 ore su 24, tutti i giorni

☐ Solo alcuni giorni a orari prestabiliti. specifica:_____

Se l’edificio è accessibile solo in giorni e orari definiti, il responsabile / i responsabili da contattare per l’accesso fuori orario è:

RECAPITO 1) Nome e cognome _____ Contatto telefonico _____ Indirizzo di recapito_____

RECAPITO 2) Nome e cognome _____ Contatto telefonico _____ Indirizzo di recapito_____

ADEGUATEZZA DEI LUOGHI

Scheda B2 – SPAZI APERTI

Istruzioni di compilazione

Le schede di rilievo sono composte da due tracciati.

La scheda B1 deve essere compilata prima del rilievo sul campo (scheda A2) con informazioni desumibili da documenti e banche dati comunali e/o regionali (es. Catasto, PGT e Piano di Protezione Civile)

La scheda B2 completa le informazioni con dati desumibili dal rilievo sul campo.

CODICE SCHEDA _____

DATA ____/____/_____

INFORMAZIONI RILEVATORE

Identità del rilevatore

Nome: _____
Cognome: _____
e-mail: _____
telefono: _____

Organizzazione di riferimento e ruolo

Nome: _____
Tipo di ente: _____
(ente pubblico / fondazione / associazione / impresa / altro)
Ruolo: _____

IMMAGINE SATELLITARE – ACCESSI ALLO SPAZIO APERTO

Inserire in questo riquadro l'immagine satellitare dello spazio aperto rilevato.
Segnare tutti gli accessi allo spazio aperto (ingressi e uscite, comprese quelle di emergenza)

ACCESSIBILITÀ E PERCORRIBILITÀ

Potenziali ostacoli:

(è possibile barrare più caselle se necessario)

- ☐ Rampe di accesso
- ☐ Dossi
- ☐ Dissuasori
- ☐ Passaggi a livello
- ☐ Sottopassaggi
- ☐ Pali illuminazione
- ☐ Pali segnaletica stradale e pubblicitaria
- ☐ Arredi urbani
- ☐ Muretti / recinzioni
- ☐ Alberature
- ☐ Parcheggi
- ☐ Non applicabile

ACCESSIBILITÀ A MEZZI DI SOCCORSO E DI TRASPORTO

In caso di disastro, l'accesso all'area strategica è garantito?

☐ Non applicabile
☐ Sì
☐ No
☐ Parzialmente:
da _____ a _____
Inserire le coordinate geografiche o, eventualmente, la toponomastica

Dimensionamento adeguato della carreggiata

☐ Non applicabile
☐ Sì
☐ No

Presenza di pendenze e curve critiche per la manovrabilità dei veicoli di soccorso

☐ Sì
☐ Parzialmente
☐ No
☐ Non applicabile

Presenza di segnaletica di emergenza

☐ Sì
☐ Parzialmente
☐ No
☐ Non applicabile

Presenza di illuminazione per interventi notturni

☐ Sì
☐ Parzialmente
☐ No
☐ Non applicabile

Presenza di altri ostacoli sullo spazio aperto:

☐ No
☐ Sì, alberature
☐ Sì, parcheggi in linea regolamentati
☐ Sì, parcheggi in linea NON regolamentati
☐ Altro

Se altro, specificare la tipologia di ostacolo (es. arredi fissi, bidoni della spazzatura…):
_____

Presenza di fossi o canali:

☐ Non applicabile
☐ Sì
☐ No
☐ Parzialmente:
da _____ a _____
Inserire le coordinate geografiche o, eventualmente, la toponomastica

ACCESSIBILITÀ PER PERSONE CON DISABILITA'

Presenza di segnaletica e percorsi tattili

☐ Sì
☐ No
☐ Parzialmente:
da _____ a _____
Inserire le coordinate geografiche o, eventualmente, la toponomastica

Presenza di dispositivi acustici

☐ Sì
☐ No
☐ Parzialmente:

Fruibilità degli spazi priva di ostacoli (gradini, pendenze)

☐ Sì
☐ No
☐ Parzialmente:
da _____ a _____
Inserire le coordinate geografiche o, eventualmente, la toponomastica

Passaggio di dimensione adeguata all'accesso/percorrenza di persone con disabilità

☐ Sì
☐ No
☐ Parzialmente:
da _____ a _____
Inserire le coordinate geografiche o, eventualmente, la toponomastica

Presenza di parcheggi destinati a persone con disabilità

☐ Sì

☐ No

STATO DI MANUTENZIONE

Pavimentazioni:

☐ Ottimo (pavimentazione e dotazioni nuove o di recente rifacimento)

☐ Mediocre (presenza di fenomeni di degrado superficiali e strutturali diffusi)

☐ Pessimo (presenza di degrado totale – non praticabile)

Parchi, giardini, aree verdi:

☐ Ottimo (pavimentazione e dotazioni nuove o di recente rifacimento)

☐ Mediocre (presenza di fenomeni di degrado superficiali e strutturali diffusi)

☐ Pessimo (presenza di degrado totale – non praticabile)

☐ Non applicabile

Arredo urbano:

☐ Ottimo (pavimentazione e dotazioni nuove o di recente rifacimento)

☐ Mediocre (presenza di fenomeni di degrado superficiali e strutturali diffusi)

☐ Pessimo (presenza di degrado totale – non praticabile)

☐ Non applicabile

IMPIANTI E SERVIZI

Presenza di impianti e servizi

Servizi igienici pubblici presenti e funzionanti:

☐ Sì

☐ No

Illuminazione pubblica presente e funzionante:

☐ Sì

☐ No

☐ Parzialmente:

da _____ a _____

Inserire le coordinate geografiche o, eventualmente, la toponomastica

Presenza di allacci e impianti di distribuzione:

☐ rete elettrica
☐ adduzione idrica
☐ rete fognaria
☐ distribuzione gas
☐ telecomunicazioni
☐ rete wi-fi pubblica

Presenza di reti o impianti fuori terra

☐ Sì
☐ No
☐ Parzialmente:
da _____ a _____
Inserire le coordinate geografiche o, eventualmente, la toponomastica

EDIFICI PROSPICENTI: ELEMENTI DI RISCHIO

Sono presenti lesioni evidenti delle facciate, fessurazioni o crolli?

☐ Sì
☐ No

Sono presenti strutture aggettanti (balconi, logge, porticati pensiline, cornicioni, verande)?

☐ Sì
☐ No

Sono presenti impianti aggettanti e/o sospesi (condizionatori, etc.)?

☐ Sì
☐ No
☐ Parzialmente:
da _____ a _____
Inserire le coordinate geografiche o, eventualmente, la toponomastica

È presente illuminazione pubblica sospesa (lampade su cavi, illuminazione "a braccio" illuminazione appesa in facciata etc.)

☐ Sì
☐ No

MATRICE DI VALUTAZIONE DI ADEGUATEZZA DELL'EDIFICIO

A scheda conclusa, valutare attraverso la matrice per ogni scenario SE lo spazio è utilizzabile in caso d'emergenza e in che modo:

	Per ammassamento mezzi	**Per ammassamento persone**	**Altro utilizzo (specifica):**	**Note:**
Alluvione	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Frana	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Sisma	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Industriale	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Altro scenario(specificare)	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	
Edificio non esposto a rischi*	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	• Adatto • Modifiche necessarie • Non adatto	

*nella cartografia dei piani PGT, PAI, PPC non è esposto a nessun rischio. L'edificio si presenta in buono stato di manutenzione e potrebbe ospitare funzioni in caso d'emergenza.

NOTE AGGIUNTIVE

Criticità riscontrate:

Suggerimenti per interventi di miglioramento per le criticità riscontrate

ALLEGATI

- ☐ Planimetria
- ☐ Rilievo fotografico
- ☐ Geolocalizzazione

7 – Co-design workshops

1. **Co-Design toolkit:** Practical tools to facilitate the participatory process.

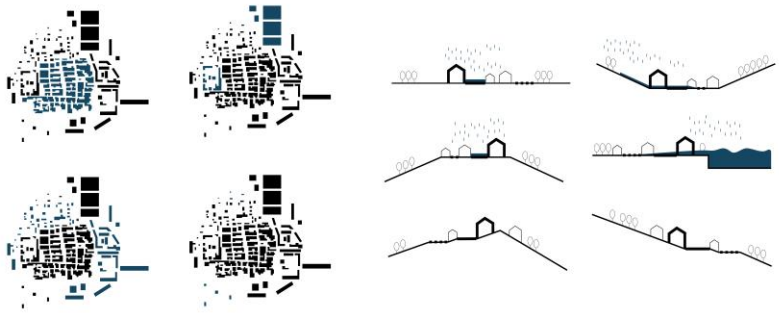


Figure 31 – Examples of graphic understandings of the spatial implications of flooding risk

2. **Spatial analysis form**: Definition of criteria for the suitability of spaces and buildings to be included in the list of safe places provided for in emergency planning.

Figure 32 – Outcomes of the Focus Group held in Sannazzaro de' Burgondi

VII.Critical Integrated References

Short research dictionary

CCA: Climate Change Adaptation

DRM: Disaster Risk Mitigation

DRMKC: Disaster Risk Management Knowledge Centre

DRR: Disaster Risk Reduction

PEC: *Piano di Emergenza Comunale* (Plan of Municipal Emergency), former institutional document, not in use anymore (see PPC).

PGT: *Piano di Governo del Territorio* (Territorial Governance Plans of Lombardy Region).

PNRR: *Piano Nazionale di Pripresa e Resilienza* (National Recovery and Resilience Plan).

PoC: Proof of Concept: the case study area adopted to set an inductive process testing the methodologies and tools investigated. In this deliverable, the PoC is set in the Lomellina area, specifically along the 12 river municipalities.

PPC: *Piano di Protezione Civile*: Plan for Civil Protection, the updated version of former PECs. the operational instrument prepared by a municipality to prevent, manage, and address emergency situations in the territory, whether of natural origin (e.g., earthquakes, floods, landslides) or man-made (e.g., industrial accidents, fires).

RETURN: *fondazione RETURN*, multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate.

UNDRR: the UN agency devoted to these domains established in 1999, it stands for the United Nations Office for Disaster Risk Reduction.

Anti-fragility: Unlike resilience, antifragility does not refer to a system's ability to absorb shocks and return to its previous state (Taleb, 2012); instead, it views the vulnerability of a territory as an opportunity to modify and get over existing conditions.

Exposure: the presence of people, buildings, infrastructure, or economic/environmental activities in an area that may be affected by a natural event.

Hazard: the component of risk linked to external phoenomena (earthquake, volcanic eruption, landslide etc.)

Impacts: the effects or consequences caused by a natural event on population, environment, economy, infrastructure and services.

Preparedness: In a risk culture, preparedness refers to the set of actions, skills, and plans developed in advance to lessen the potential impact of hazardous events. It includes emergency planning, training, resource allocation, and the creation of clear procedures that enable a rapid, coordinated, and effective response when a crisis occurs. In essence, it is the deliberate, structured readiness that helps individuals, communities, and organisations face adverse situations more confidently and efficiently.

Resilience: The ability to face, overcome, and adapt positively to traumatic events, stress, or difficulties, reorganising one's life and coming out stronger, transforming adversity into opportunities for growth. Derived from the Latin resilire (to bounce back), it originally describes the ability of materials to withstand shocks and return to their original shape, and, in general, it indicates the flexibility to "bending without breaking" in the face of challenges.

Risk: The probability of the occurrence of hazardous events caused by different nature, such as floods, earthquakes, landslides, or droughts, which may cause damage to people, buildings, or the environment.

Safe areas: areas of the territory that are not or only slightly exposed to natural hazards, used for evacuations, temporary shelters, or stable settlements, including in the reconstruction phase.

Vulnerability: the degree of fragility or weakness of people, buildings, or activities in the face of a natural event, that is, how easily they can be damaged.

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