



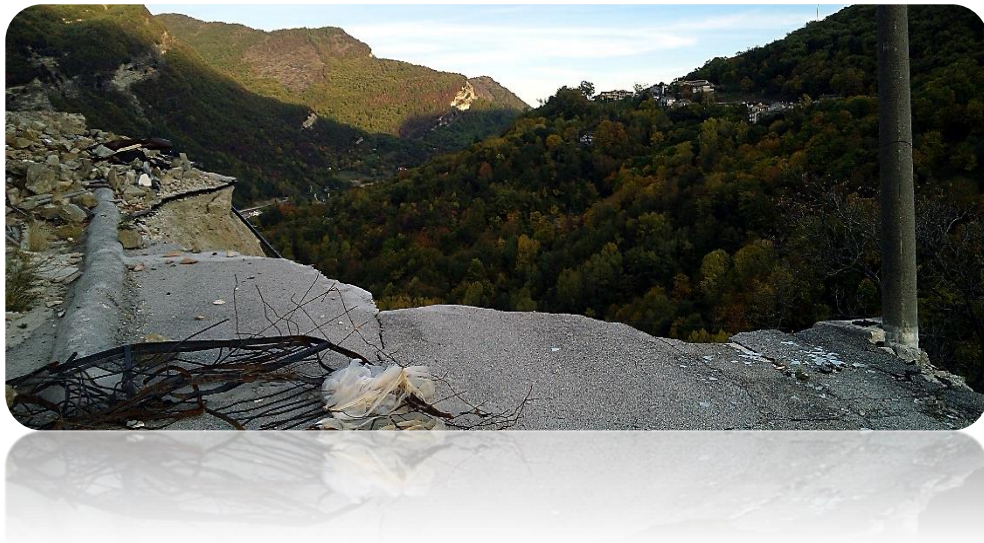
University of Camerino  
International School of Advanced Studies  
School of Biosciences and Veterinary Medicine – School of Architecture and Design  
Curriculum in Ecosystems and biodiversity management – Area: Life and Health Sciences  
XXXII cycle

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# **Regional development of inland areas through disaster risk reduction and new connections with the coast**

Ph.D. Dissertation

**Flavio Stimilli**



Advisor:

**Prof. Massimo Sargolini**

Co-Advisor and Curriculum Coordinator:

**Prof. Roberto Canullo**

Area Coordinator:

**Prof. Anna Maria Eleuteri**





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University of Camerino  
International School of Advanced Studies  
Via Madonna delle Carceri 9, 62032 Camerino (MC), Italy

## To my Loved Ones

*“Not long ago, hurricanes, tornadoes, floods, drought, forest fires, even earthquakes and volcanic explosions were accepted as natural disasters or ‘acts of God’.*

*Now, we have become a force of nature, we have joined God, powerful enough to influence these events”*

(David Suzuki)

*“There are disasters that are entirely manmade, but none that are entirely natural”*

(Rebecca Solnit)

*“We cannot stop natural disasters but we can arm ourselves with knowledge: so many lives wouldn't have to be lost if there was enough disaster preparedness”*

(Petra Němcová)

*“We learn from every natural disaster. Whether it is a fire or a flood, we learn something from it so we can respond to the next one better”*

(Malcolm Turnbull)



# Acknowledgements

The present research could have not come to exist without the help of some key people who guided and supported me during the entire development of my research program.

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A grateful and sincere thank is also due to Professor Roberto Canullo for his much-appreciated co-support and advice, and to Professor Anna Maria Eleuteri for her further guidance and help.

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The final and most heartfelt thanks to my Family: my parents and sister for having given me the possibility to reach this precious goal, with their daily example and priceless support, and to Gulzhan for having shared with me these adventurous three years of intense life and happiness. With them, I wish to thank my closest and farthest relatives too. This work is for all of them, as a sign of endless gratitude, hoping it can make them proud of me.

Ancona, 22.03.2020



Flavio Stimilli

## Abstract

The planning strategies conceived and implemented in Europe in the last decades by land-management authorities to revive fragile and vulnerable inland areas have been focusing increasingly on the enhancement of their natural and cultural landscapes. However, the threats to inland areas imposed by climate change and (increasingly impactful) natural hazards have been exacerbating the now chronic depopulation of those regions, therefore increasing the decay of their natural and cultural assets, namely the decline of their landscape. Although relatively new, these threats have been affecting in many ways, and to great extent, all different types of inland areas, from the coastal hinterland, fairly close to the large and more attractive urban areas, to the most distant and least accessible mountain regions, with their peculiar landscape heritage rich of historical villages and towns. Therefore, new imperative paradigms such as *disaster risk reduction*, *adaptive management* and *building back better*, have not only drawn the attention and interest of cutting-edge research and practice, but also focused their efforts and energy towards their actual fulfilment. They are in fact some of the new ‘must’ emerged and being-established recently in spatial planning. After an extensive analysis of the conceptual framework and scientific literature backing these urgent and pressing issues, the research focuses on the case studies of three European macro-regions: the Italian Apennines (in *Marche* and *Alta Versilia*), the coastal hinterland of eastern Croatia (in *Dalmatia*), and the inland areas of northern Portugal (in the region of *Alto Minho*). In all cases, the impact of natural hazards, coupled with the ongoing process of *littoralization* and the aftermath of climate change, has significantly changed the appearance and structure of both landscape and local communities, undermining their environmental, sociocultural and economic sustainability. The dissertation develops therefore a cross-comparative analysis of the different case studies, in order to evaluate, in dialectical manner and from different angles, the strategic-planning models implemented or conceived in each case. The research outcome is a critic assessment of the outlined picture, interpreted and returned by elaborating and discussing on the potential of connecting inland areas to the coast, while reducing the risk of natural disasters, not only a prerequisite for the regional development of inland areas, but also an extraordinary opportunity to foster in fact their future regeneration.



## Sommario

La pianificazione strategica elaborata in Europa negli ultimi decenni dalle autorità di gestione territoriale per rilanciare le aree interne più fragili e vulnerabili ha puntato sempre più sulla valorizzazione delle loro risorse paesaggistiche. Tuttavia, le minacce che incombono sulle aree interne imposte dai cambiamenti climatici e dall'aggravarsi del rischio di catastrofi naturali, hanno aggravato lo spopolamento ormai cronico di quelle regioni, aumentando quindi il deterioramento dei loro beni naturali e culturali, che si riflette infine in un declino dei loro paesaggi. Per quanto relativamente nuove, queste minacce hanno un forte impatto su tutti i diversi tipi di aree interne, dall'entroterra costiero, abbastanza vicino alle grandi e più attrattive aree urbane, fino alle più remote e meno accessibili regioni montane, con il loro peculiare patrimonio paesaggistico ricco di borghi antichi e città storiche. Perciò, nuovi paradigmi quali il *disaster risk reduction*, l'*adaptive management* e il *building back better*, hanno focalizzato l'attenzione e l'interesse di ricercatori e amministratori, inducendoli a concentrare i loro sforzi ed energie verso l'effettiva realizzazione di tali metodi e obiettivi. Essi sono in effetti solo alcuni dei nuovi *must* emersi recentemente nella pianificazione territoriale, e attualmente in fase di consolidamento. Dopo un'analisi del quadro concettuale e di letteratura scientifica, che fanno da sfondo e contorno a queste urgenti problematiche, il presente lavoro si concentra su alcuni casi studio di tre macroregioni europee: l'Appennino italiano (nelle Marche e in Alta Versilia), l'entroterra costiero della Croazia orientale (in Dalmazia) e le aree interne del Portogallo settentrionale (nella regione dell'Alto Minho). In tutti i casi, l'impatto dei rischi naturali, sommato al processo di litoralizzazione ancora in corso e alle conseguenze dei cambiamenti climatici, ha cambiato in modo significativo l'aspetto e la struttura dei paesaggi e delle comunità locali, minando profondamente la loro sostenibilità economica, ambientale e socioculturale. La tesi sviluppa quindi un'analisi incrociata dei diversi casi studio, al fine di valutare, in maniera dialettica e con diverse prospettive, i modelli di pianificazione strategica attuati o concepiti in ciascun caso. Il risultato della ricerca è una valutazione critica del quadro sopra descritto, interpretato e restituito alla luce dell'alto potenziale, per lo sviluppo regionale delle aree interne, rappresentato sia da nuove connessioni con la costa, sia dalla riduzione del rischio di disastri naturali, prerequisito e straordinaria opportunità per la loro rigenerazione.

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## Abbreviations and acronyms

The use of abbreviations and acronyms is minimal. Sometimes, however, for the purpose of easing and speeding up the reading process, a few of the followings are used:

BBB: Building Back Better

DRR: Disaster Risk Reduction

DSS: Decision Support System

ELC: European Landscape Convention

ICT: Information and Communication Technology

KSDM: Knowledge Society Decision Models

SNAI: Strategia Nazionale Aree Interne (Italian Strategy for Inland Areas)

UCLG: United Cities and Local Governments

UNDRO: United Nations Disaster Relief Office

UNDRR: UN office for Disaster Risk Reduction

UNISDR: former name of the UNDRR

UNSDGs: United Nation Sustainable Development Goals

# **Introduction**





## Chapter 1.

# Background, problem statement and objectives

### 1.1 Overview

The landscape heritage of inland areas, in most of European countries and beyond, has been deteriorating to great and unprecedented extent for at least a century now, since the starting of massive metropolisation, which has been mostly coinciding and overlapping with the process of *littoralization*. This is a worldwide phenomenon indeed, still in fair progress, which has brought about a number of issues and challenges. In inland areas, the most striking are dramatic depopulation, economic depression and the consequent abandonment of traditional and rural activities. Along the coast, they are mainly increasing urbanisation, seasonal mass tourism and overall growing of human pressure on the seaside environment. In recent times, these trends have become chronic, almost irreversible, in many places; and when the applied models of strategic planning and redevelopment do not fit the context, the landscape cannot but further decay.

This research explores in fact the strategic planning models conceived and implemented by land-management authorities in Italy, Croatia and Portugal, to enhance and redevelop cultural landscapes of inland areas. It develops a comparative analysis of case studies, in order to evaluate the models in dialectical manner and from different perspectives. This approach, in addition to allowing for

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more precise recognition and assessment of the various models, shed also light on the unexplored potential of the considered landscapes. The first results show a tendency toward polycentric, integrated and synergistic models; adaptive management strategies are increasing likewise, especially when the landscape patterns consist mostly of natural and semi-natural components.

As true as it is that catastrophic events influence and change the ways and practices through which society lives and works, conversely, the ways and practices of a society determine its response to disasters, and possibly support the resilience of the communities involved, so decreasing their vulnerability. Real innovation in disaster risk reduction lies in fact in combining resilience and vulnerability to meet new needs and demands.

For this purpose, all scientific literature on disaster risk reduction, following the sad records of disastrous events, call for a cross-disciplinary and cross-sectorial effort. The goal is in fact to bring together and make dialogue computer scientists, security practitioners (e.g. first responders), economists, sociologists, science communicators, psychologists, political scientists, humanists, different experts of cultural heritage, civil society organisations, urban planners, regional and local authorities, health care managers, teachers at all levels of education, etc.

Indeed, research on this topic requires a strong effort of scientific knowledge from different fields and sectors, to propose innovative solutions that make optimal use of the new advancements of, say, construction engineering, but at the same time go beyond the bare technical solutions, defining holistic visions focused on territorial, economic and social resilience. Therefore, the concept of *building back better* brought forward by the Sendai Framework is a process in which not only technical solutions are crucial for reducing the effects of natural disasters on private and public buildings or goods, as well as on cultural and historical heritage, but also people do are. This paradigm in fact requires a complementary process in which multiple stakeholders should take action together, in a coordinated effort and consistently with their respective goals, making the best use of their economic, social and institutional assets and capacities. Coherence, convergence, and synergies between strategies and actions of stakeholders should be pivotal, and the involvement of the affected or at-risk communities should come about in accordance with the citizen-science paradigm.

## 1.2 The Italian Strategy for Inland Areas: a reference model

Great part of the Italian territory is composed of small spatial units coinciding usually with the administrative borders of municipalities, with many issues and challenges mostly related to services and accessibility. The SNAI aims to address these inland areas (“Aree Interne”), which are significantly far from the main cities where education, health service and mobility are well developed, but have important environmental (e.g. water resources, agricultural systems, woods, natural landscapes, etc.) and cultural assets (e.g. historical places, abbeys, small museums, archaeological sites, etc.).

A huge part of these areas underwent a marginalisation process, with a decrease in the number of inhabitants and a gradual increase in the number of elderlies, as well as a decline in the employment rate. This negative trend is in parallel with the reduction of public services such as healthcare, education and sustainable mobility, which are defining the quality of life in the European contemporary society.

The potential of economic development of inland areas is huge. The strategy aims at the enhancement of the demographic trend, which is in fact the *conditio sine qua non* for the economic development. The regeneration of inland areas has to pass indeed through the raise of job opportunities, leading in the end to the improvement of people’s wellbeing.

Local managing authorities need to cooperate and establish durable partnerships to scale up their development plans and improve the provision of services intended towards local communities. The low accessibility to primary services is a focal point of the Italian strategy, as well as physical mobility and virtual connectivity.

The SNAI aims to sustain and foster local specialization strategies, approaching the economic development at sub-regional level through targeted support of specific place-based activities of greatest strategic potential. Such potential is identified by developing a vision for sub-regional areas, by multi-stakeholder governance

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mechanisms, by defining strategic priorities and using smart policies to maximize the knowledge-based development potential of a sub-regional area. As such, the specialization of sub-regional areas, if strongly coordinated at regional level, aims also to reduce competition between such areas and foster synergies and collaborations.

In these regions, a quarter of the Italian population lives in four thousand municipalities (nearly the sixty percent of the national territory), located in inland areas that are often remote and hidden in relation to the large trade and production flows.

Another specific objective of SNAI is to make natural and cultural heritage a tool of community involvement for a balanced territorial development, to reach a higher level of regional sustainability, by exploiting the potential of the environmental and landscape assets in the pilot project regions.

Projects investing in natural and cultural heritage need primarily to aim at the diversification of the local economy – thus developing job opportunities and wellbeing of the population – by taking advantage of the heritage of the area in a sustainable way, protecting and enhancing it both in urban and rural contexts, particularly in areas less known or visited. This will support the shift of tourist flows from peak towards low seasons months. With regard to the valorisation policies, a systemic approach at a cross-border level is more effective, involving all the private and public actors in the adoption of local strategies and action plans supporting the cultural and landscape identity of the area.

Long-term sustainable impacts require that planned actions were part of integrated economic strategies at regional, national and international level, after having carefully benchmarked and evaluated measures and initiatives with those already funded and undertaken in the past.

Similarly, one-off and isolated projects to provide new facilities for tourism are useless if not counterproductive. Cooperation will also stimulate innovative initiatives (e.g. smart tools, services for target group carrying special needs, etc.) that are able to generate benefit in the sustainable management of natural and cultural resources of the entire territory.

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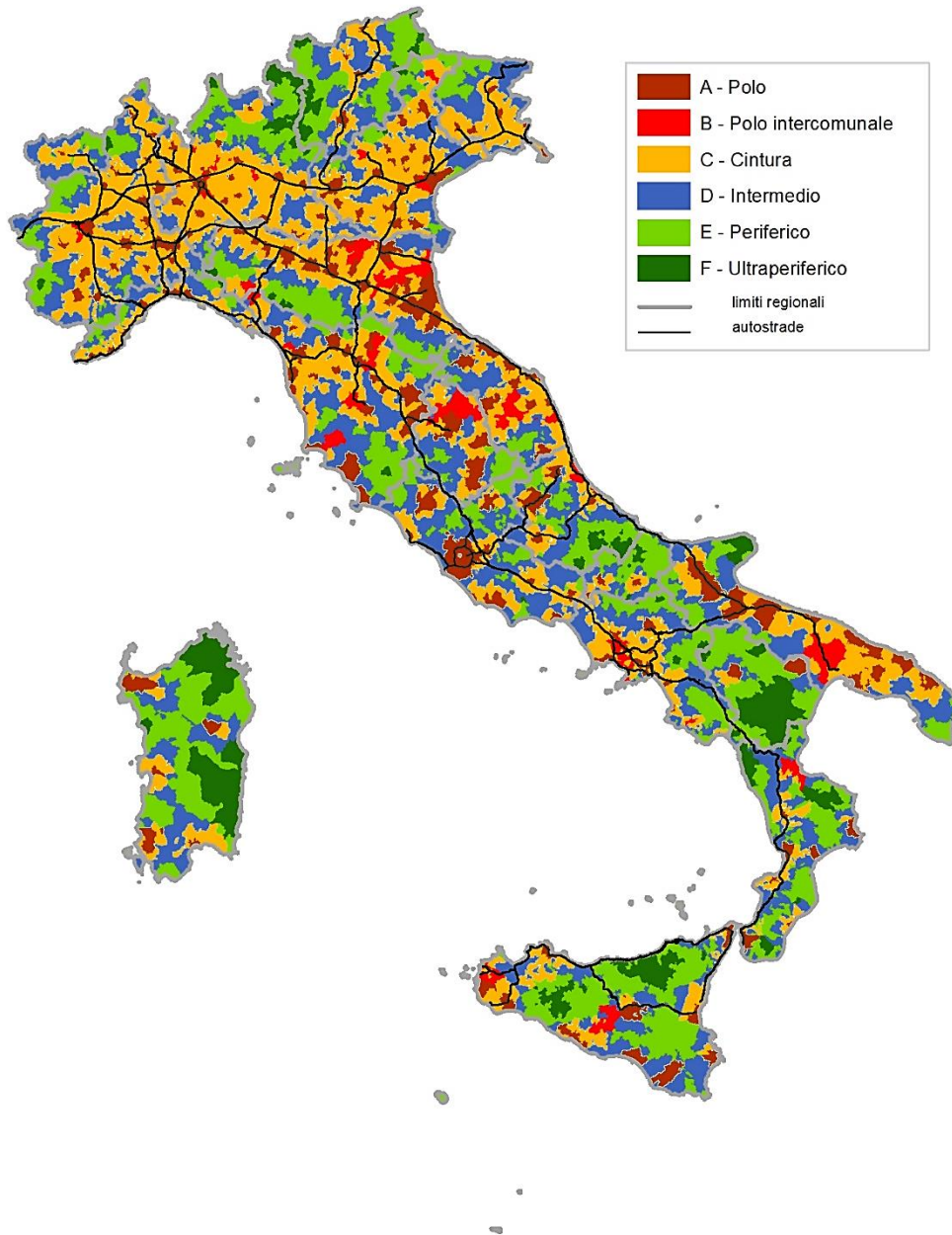


Fig. 1.1 – Map of the entire Italian territory as classified by the National Strategy for Inland Areas (elaborated by the author based on the official ministerial documents)

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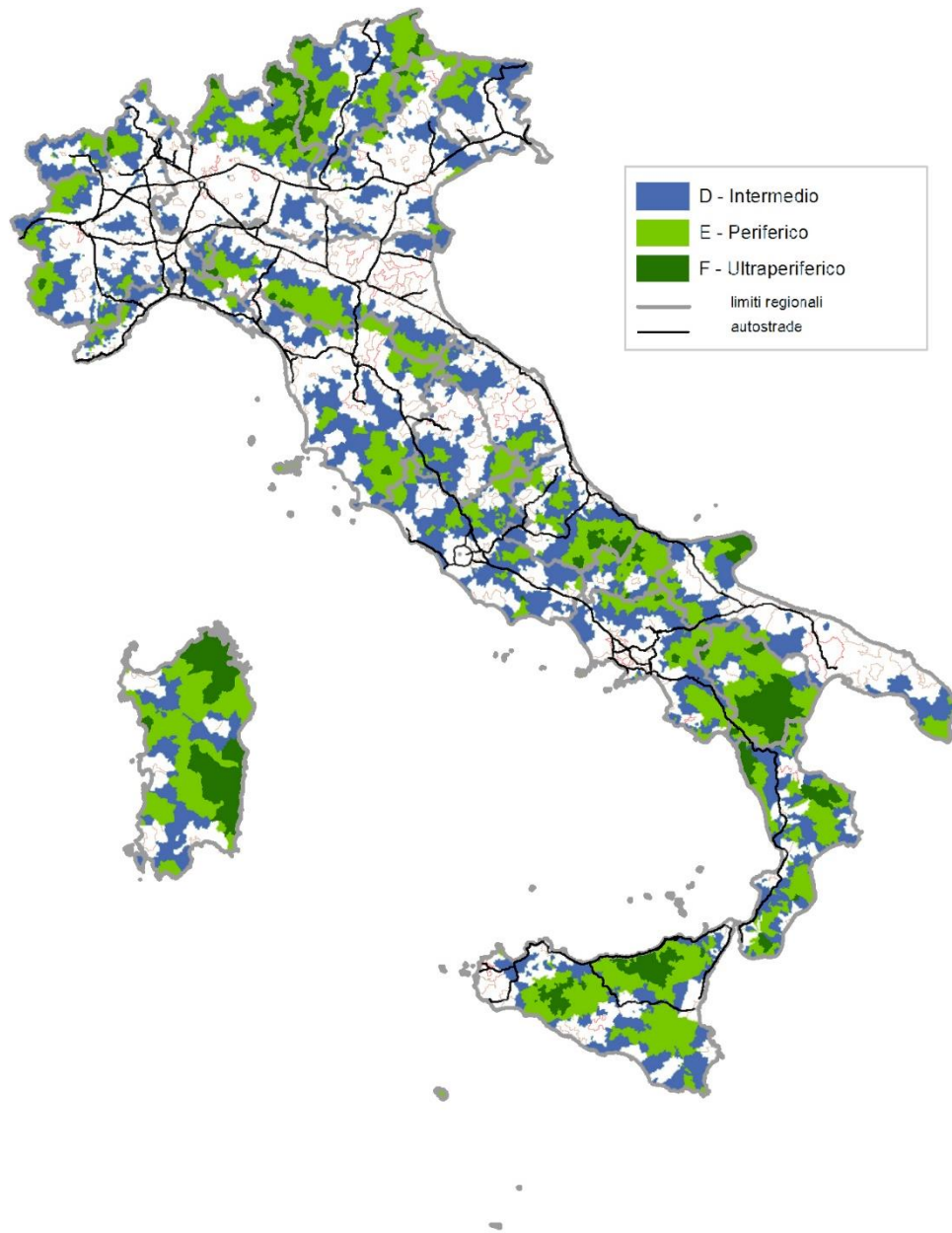


Fig. 1.2 – Map of the Italian inland areas as identified by the National Strategy for Inland Areas (elaborated by the author based on the official ministerial documents)

## Chapter 2.

### Research description and methodology

The research project unfolded in three main phases, partially overlapping each other, and made use of mainly inductive reasoning to come to general conclusions delivered at the end of the work.

The first step was a bibliographic screening of the relevant scientific literature and the remarkable projects, experiences and best practices in the field of landscape and spatial planning that aimed to address at the same time regional development and cohesion, disaster risk reduction, management of natural and cultural heritage, and development of sustainable tourism.

Upon completion of this preliminary analysis, the second phase has tackled the chosen case studies (the study area of Central Italy being the main one, while the others being approached as secondary cases), and analysed their regional planning strategies through the related documents (programs, plans, maps, etc.).

In the end, the research compared and benchmarked the three outcomes from the case studies both between each other and with reference to what previously analyzed in the bibliographic screening, assessing finally their value, coherence and consistency, also making use of SWOT analyses.

The main documents analyzed were:

- Strategic Environmental Assessments (SEA);
- Hydrogeological Management Plans (HMP);
- Regional Landscape Plans (RLP);

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- Management Plans of Natural Areas (MPNA);
- Implementation Plans for marble-Extractive Basins (IPmEB).

They were especially considered in comparison and benchmarking with:

- The European Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora), namely, with the regulations on SAC, SCI, and SPA (Special Areas of Conservation, Sites of Community Importance, and Special Protection Areas);
- The European Charter for Sustainable Tourism (ECST);
- The Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR).

In addition to the bibliographic analysis of the scientific literature and the comparative study of the documents of each case study (strategic programs, regional masterplans, maps at different scales, etc.), a good deal of the research work developed in the field, by photographic surveys and the involvement of local actors and experts through unstructured and semistructured interviews. The collection, rielaboration, assessment and final benchmarking of different opinions and perspectives coming from stakeholders with diverse needs and points of view, has provided a rich and various dataset of local knowledge and thoughts. This has positively contributed to both broaden the range of the problems and challenges tackled by the research, and at the same time enhance the understanding of the complexity inherent in the issues related to inland areas.

Finally, an overall assessment of the results, found both in the scientific literature and in the tackled case studies, has allowed to draw general conclusions, presented eventually in the form of preliminary guidelines and recommendations at the end of the thesis. The dissertation does not aim in fact to put an end to any of the many debates on the regeneration of inland areas, but represents in fact the summary of a long research work on such a complex issue. Therefore, it can only be open to further development and possible advance.



**Part 1**  
**Conceptual framework,  
literature review and  
state of art**



## Chapter 3.

# Characters, dynamics and territorial challenges of inland areas

### 3.1 *Littoralization*, historical decline and depopulation of inland areas

The case studies of eastern Croatia, central Italy and northern Portugal, are essentially composed of two very different though interrelated parts of territory: depopulated inland areas and urbanized coastline. In the latter, there is a majority of cities and great urban systems, whereas in the first there is a prevalence of small towns, villages and rural settlements, often lacking in some basic services such as, in particular, easy accessibility to the variety and number of natural and cultural resources, which are not properly recognized and valued.

As far as the mobility network and the transportation system are concerned (means and modes of transport, more or less integrated between public and private ones), striking is the difference between the two areas. Along the coast and the flat, plain valleys, slow and fast mobility complement each other properly, while in the inland areas there is often a general lack in minimum transportation services and facilities. Accessibility, at any rate, is not merely a physical matter, but has also to do with knowledge and availability of information, and with a smart promotion strategy of the natural and cultural heritage (territorial marketing, branding and networking).

From this point of view, it is evident that local resources, which are very diverse and widespread over the territory, are often isolated from each other.

Moreover, there is still no strong intention to connect them to reach that critical mass on which any possible regeneration strategy should primarily rely. So, they prove inaccessible in this sense too, namely, because they are not only physically, but also virtually far from the main tourist and commercial flows. In particular, it is important to notice that each inland area is actually unique and very dissimilar from the others: specialized, in a sense, depending on the particular setting and the specific process of local development; or, in other words, depending on the available resources and the correlated human activities.

However, they all share a number of territorial challenges. With respect to the landscape heritage of inland areas, the main issues are:

- Dispersion and lack of networking, or sometimes even complete isolation, of the natural and cultural assets;
- Underestimation of their potential;
- Lack of a proper connection between this local heritage and the fast mobility networks of the coast and the valleys;
- Difficult accessibility, both physical and virtual, to the number and variety of local resources.

To understand how and to what extent addressing these first specific issues could benefit and restart the regional development of inland areas in a consistent and cohesive way, it is necessary to draw a more comprehensive analysis and to complete the picture with other, no less important, territorial common challenges. Similar and comparable dynamics, if not symmetrical, have been occurring in fact in the three countries.

On the coastline, the seaside resorts and the variety of natural ecosystems that are still present despite the high degree of urbanization, and which are quite rich in biodiversity, beautiful sceneries and habitats, are providing crucial services and goods not only to local communities, but also to tourists and a wide part of the population. The natural environment, besides being a key factor for the quality of life, is indeed one of the primary drivers of economic development and probably the most important element of territorial brand. However, the attractiveness of

coastal areas has been leading, in the end, to counterproductive phenomena, such as mass-tourism, land take and strong urbanization, overexploitation of local resources, land use conflicts and various other threats, all due to the heavy human pressure. In particular, the seasonalization of tourist flows and the process of *littoralization*, namely the migration of people from inland areas to the coastline, and everything that follows, are two major issues to address, in order to figure out innovative ways of sustainable development for the whole regions. These phenomena have already changed the coastal landscapes to great extent, and the ongoing trends are seriously threatening the surviving natural and cultural assets (Pedroli, 2014).

On the other hand, inland areas have been witnessing for over thirty years right the opposite: a process of gradual marginalization consisting of demographic decrease and ageing of local population; abandonment and decay of local resources; negative economic trends; and reduction of both public and private services (e.g. health care, education, mobility). As in a vicious circle, if population does fall, the pro-capita costs for ensuring the collective services will increase; therefore, there will soon occur a lack of some needed services and, in turn, the quality of life will decline, finally discouraging potential newcomers from settling in those inland areas. Besides, the polarization of the economy to the advantage of largest urban areas (meaning the shifting of the most profitable activities towards the coastline), implies that the average taxable income in inland areas is much lower than in the coast: it is in fact around 18% lower, increasingly declining, and deepening the financial resources gap and the overall regional disequilibrium. In addition, managing authorities show limited capacities in conceiving innovative solutions and deep weaknesses in strategic regional planning (sometimes even incapable of cooperating or establishing fruitful, durable partnerships between each other).

Despite all these difficulties, however, inland areas do hold a good deal of endogenous resources yet, either abandoned and forgotten or still undeveloped, because not even recognized or properly valued. Some examples are: very precious know how about traditional arts and crafts, with some manufacturing districts still productive and competitive on the European market; natural environments of high ecological importance and scenic value (over 70% of Natura 2000 sites in the macro-regions falls in fact within the territory of inland areas); and strong potential in the energy and primary sector. In particular, high quality artisanship, organic

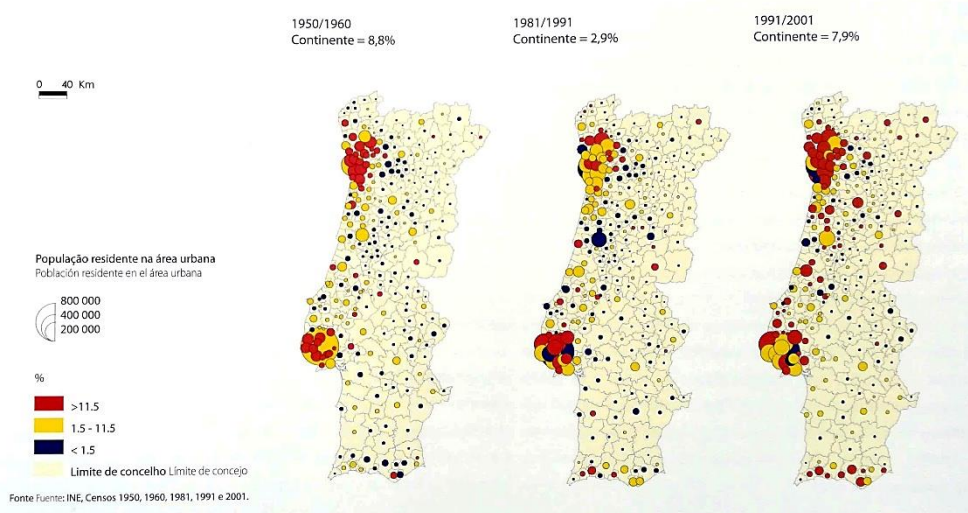
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farming, rural tourism and forestry (nearly 70% of the national wood stock falls within inland areas) represent perhaps the most evident part of the territorial undeveloped capital that could strongly contribute to the regeneration of inland areas. For this purpose, in any case, it is necessary to envisage and set up a new comprehensive strategy, which could unleash the potential of the whole of the natural and cultural assets present in inland areas. By the same token, to preserve hinterlands from a number of common threats such as hydrogeological risks, loss of biodiversity, loss of collective services, traditional know how, infrastructures, facilities and other material resources, it is needed a development strategy, shared at regional, national and possibly transnational level, which includes and reconnects coastal and inland areas, by new synergies and networks.

The ecological conditions and vulnerability of the territory requires also strategic and integrated policies for both natural and urban areas. Codified schemes and indicators for identifying a correlation and mutual impacts between sustainable and coordinated management of protected areas and regional and local policies are still missing. The challenge is to understand how to foster the integration of the management of natural resources into sectorial strategies and strengthen the connection between the authorities governing protected areas and the surrounding territories and populations (Forman, 2008).

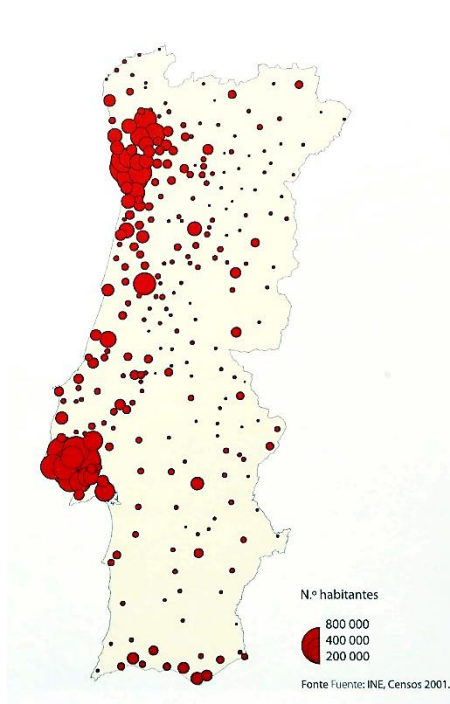
Dimensão e variação da população residente nas áreas urbanas Dimensión y variación de la población residente en las áreas urbanas



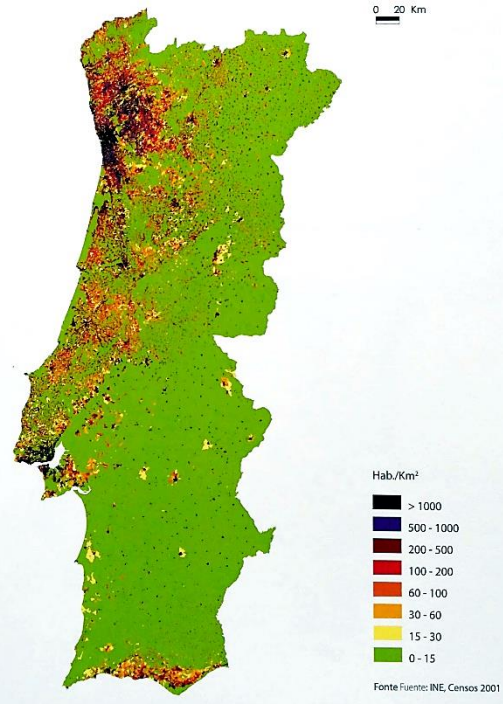
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Figura 1. População residente nas áreas urbanas, 2001  
 Figura 1. Población residente en áreas urbanas, 2001



Densidade populacional, por subsecção estatística, em 2001 Densidad de población, por subsección estadística, en 2001

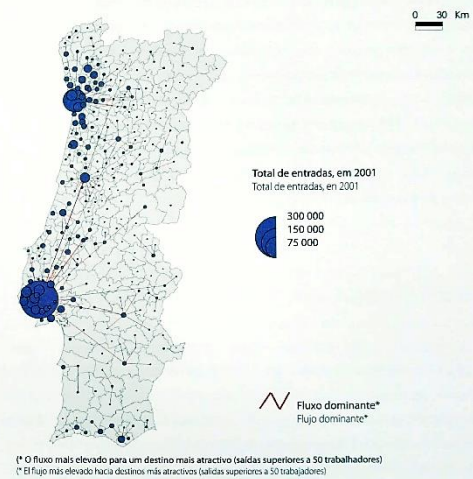


Centralidades no ensino e no emprego Centralizaciones en la enseñanza y el empleo

Redes nas opções dos cursos do ensino superior Redes en las opciones de los cursos de enseñanza superior

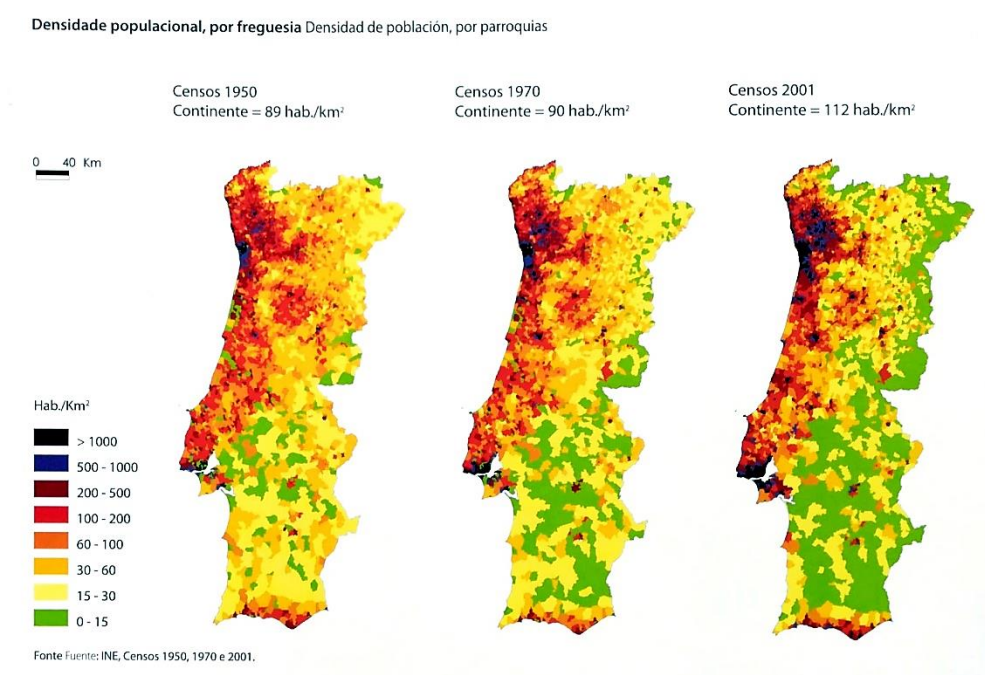
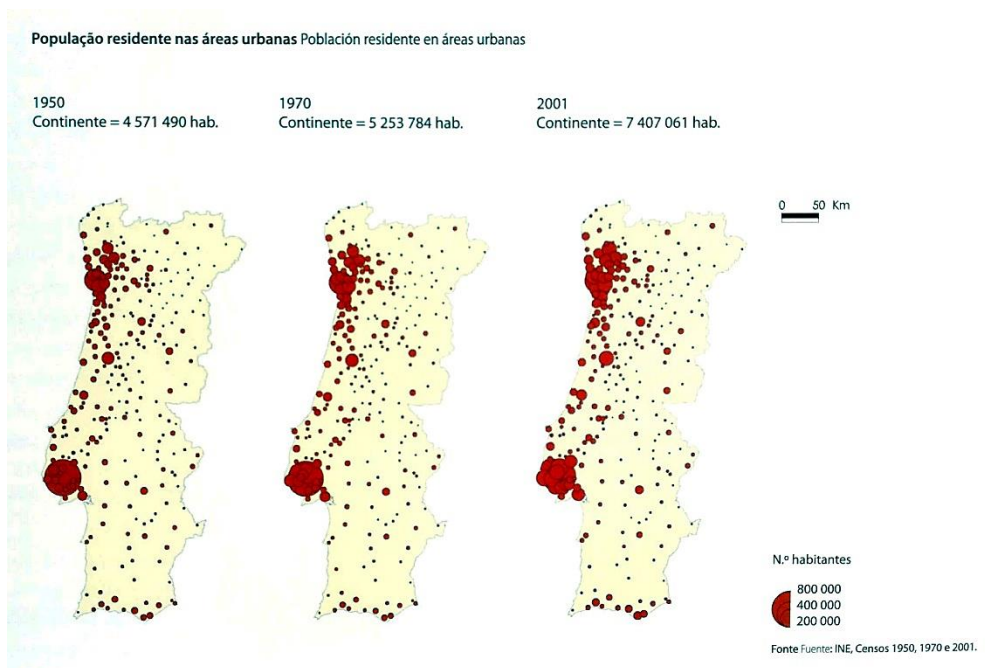


Fluxos dominantes\*, por concelho, em 2001 Flujos dominantes\*, por concejo, en 2001



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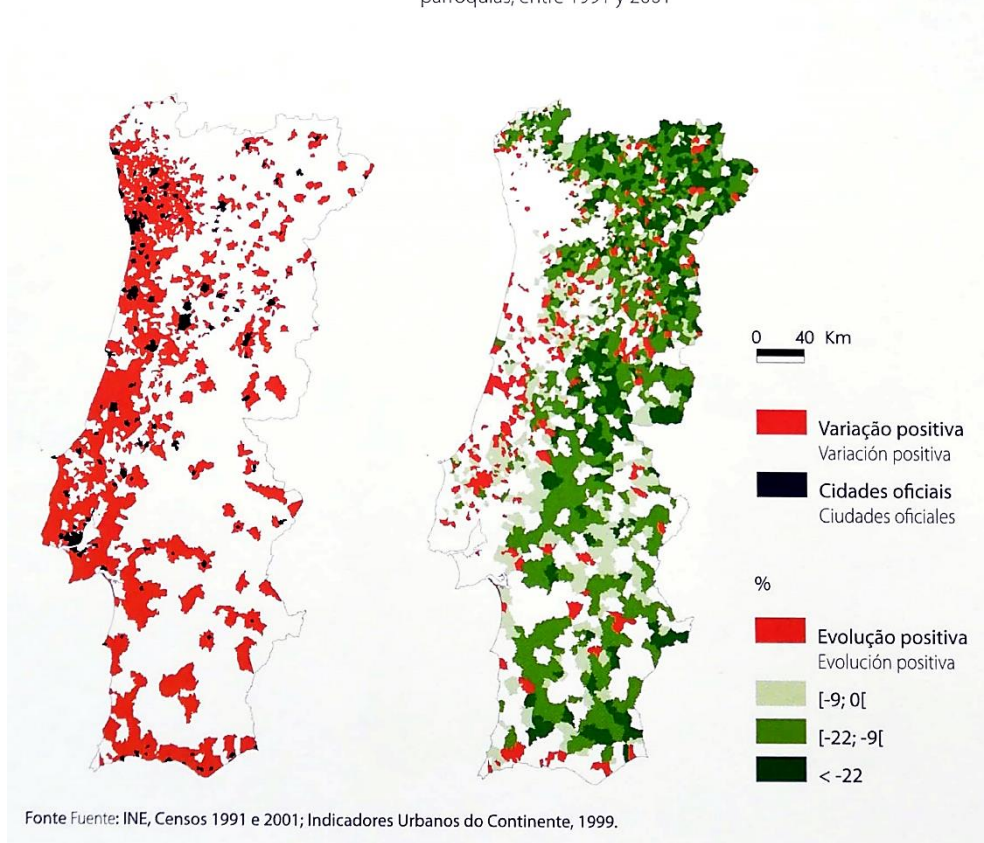
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Dinâmica populacional; áreas urbanas e rurais Dinámica de la población; áreas urbanas y rurales

Varição da população residente,  
por freguesia, entre 1991 e 2001  
Variación de la población residente,  
por parroquia, entre 1991 y 2001

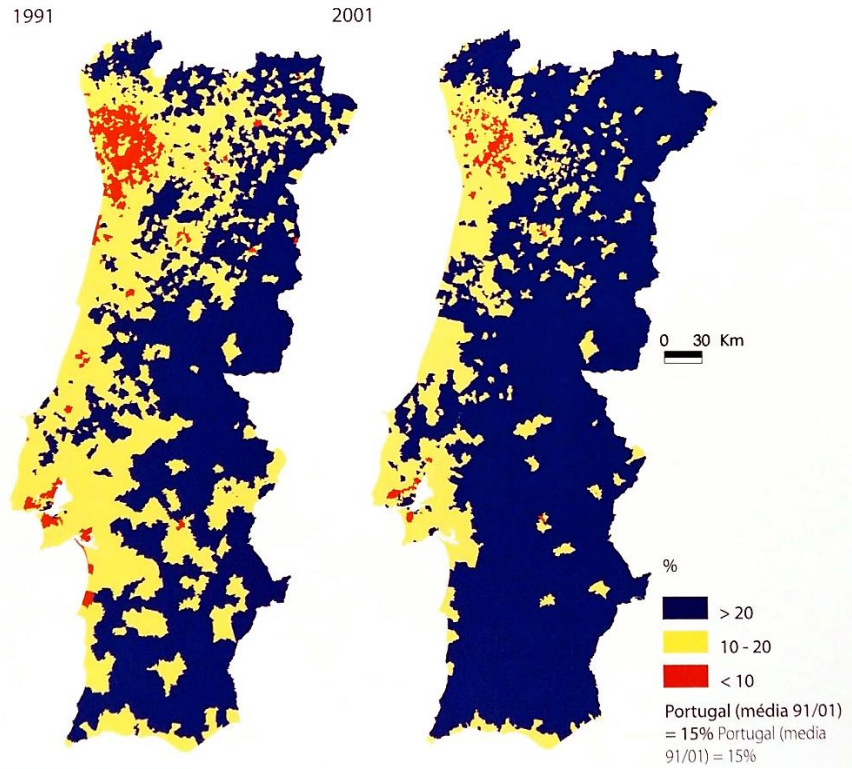
Áreas predominantemente rurais  
(APR). Varição da população residen-  
te, por freguesia, entre 1991 e 2001  
Áreas predominantemente rurales (APR).  
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parroquias, entre 1991 y 2001



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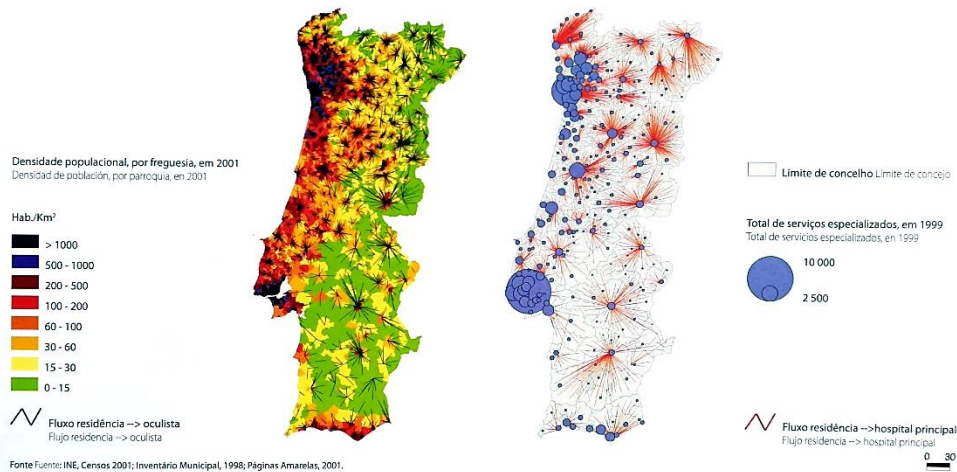
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População residente com mais de 65 anos, por freguesia Población residente con más de 65 años, por parroquia



Redes de proximidade Redes de proximidad

Redes de hierarquia superior Redes de jerarquía superior



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Infra-estrutura digital Infraestructura digital

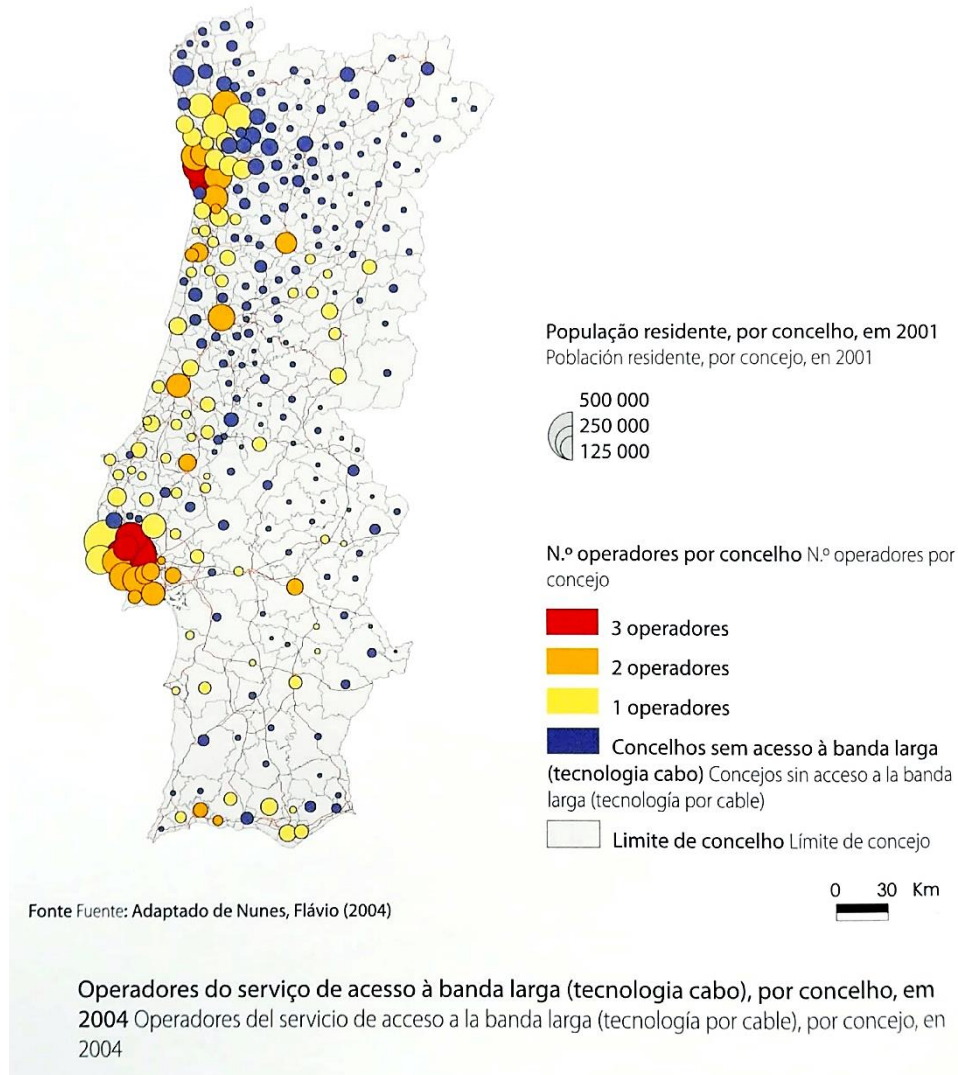


Fig. 3.1-12 – Maps of demographic distribution and other reference statistics and data in Portugal (Domingues, 2006)

### 3.2 Ecological decline and environmental challenges

Most of inland areas contain plenty of natural assets, which are often isolated and marginal with respect to infrastructures and urban settlements. However, they also feature semi-natural areas that are very close to, interpolating into and interfering with settlements and infrastructures, with particular reference to peri-urban areas. Here, the process of depopulation and abandonment of those settlements is hence affecting the adjacent areas too.

The socio-economic dynamics historically taking place in remote inland areas, more often mountainous, have led to the progressive abandonment of villages and rural dwellings, in favor of a continuous concentration of people in the urban and peri-urban areas lying on the valleys or on the coast. Such a phenomenon has a significant impact on the ecological balance of habitats and species, and on the level and quality of biodiversity. In fact, the process of extensive renaturalization triggered by the lack of care and maintenance provided by people in the past, progressively reduce the levels of biodiversity, the environmental variety and the quality of the landscape. On the other hand, in the urban and peri-urban areas of the large and densely populated cities, the consolidation of seamless forms of urban fabric produce the loss of bio-permeability.

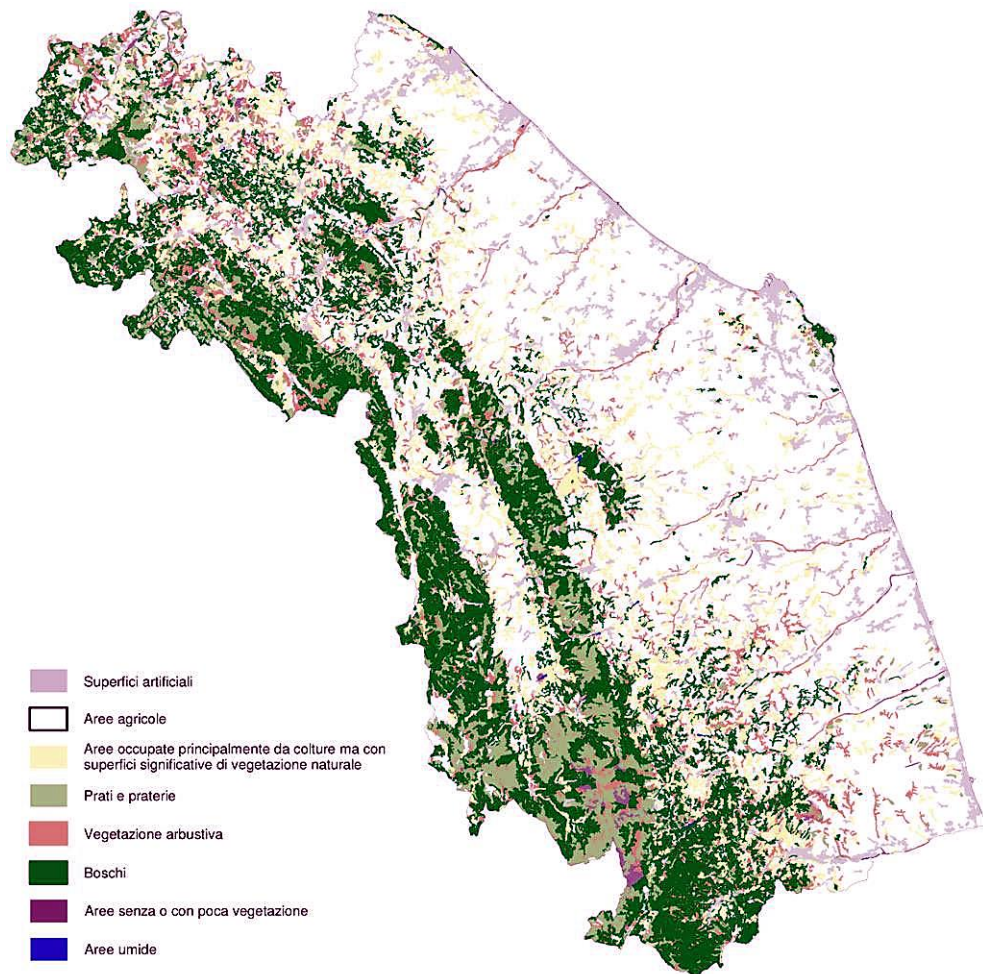
The rural and semi-natural areas adjacent to the ancient villages in the remotest regions of the Italian Apennines, for example, whose landscape is the result of the historical interaction between natural dynamics and human activities, risk losing both their ecological functions (ecosystem services) and their role in shaping the landscape identity of local communities. Many residual areas, abandoned and spontaneously renatured, interpolated into the settlement layout, between pieces of urban fabric and infrastructure, have gained therefore a great potential to play an ecological and strategic role in the urban regeneration processes (Oliva, 2015).

Fig. 3.13 – Land use map of the inland areas in Marche Region (elaborated by Terre.it based on the Regional Ecological Network of Marche Region)

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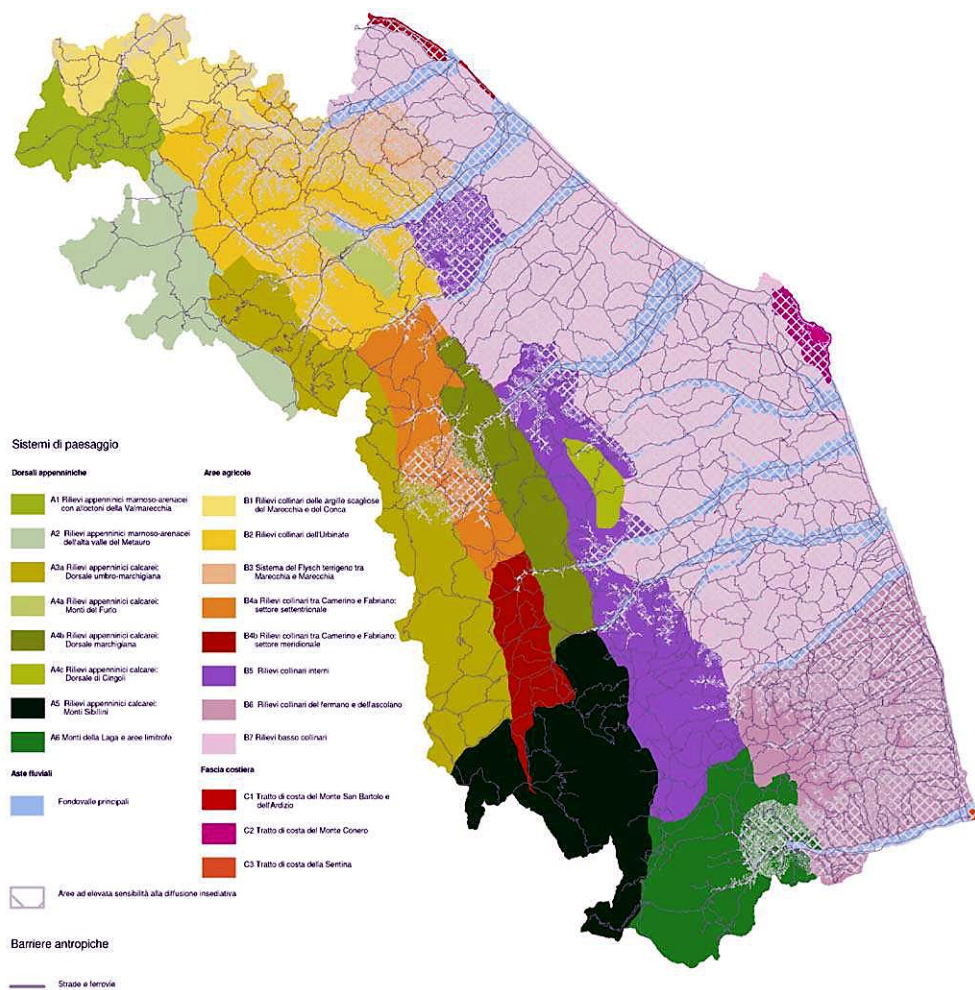
A recent research carried out in Central Italy (Perna et al., 2018), has identified a scientific method for detecting this system of peri-urban areas, former rural areas and abandoned industrial area, or brownfields, often composed of many residual spaces that form a unique *interstitial* or *third landscape* (Clément, 2006). These can play a strategic role in the recomposition of biological balances, in the enhancement of biodiversity, connectivity and in the recomposition of the urban form and the quality of the urban and peri-urban environment. The focus of the aforementioned research was in fact on the role of these residual spaces for the redesign of the peri-urban areas. At the same time, the depopulation of the rural

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villages of the most marginal and remote areas, aggravate the ecological dynamics underway. On the one hand, the entropy and disorder of peripheral areas adjacent to the city increase, with the risk of occluding important connectivities still present. On the other hand, the loss of human protection, care and maintainance in the area exacerbates the regional depopulation, the abandonment of agricultural lands, and the decrease of human regulation of the superficial-water runoff, allowing for a spontaneous renaturalization of the environment, through new forms of wilderness.

Fig. 3.14 – Map zoning of the landscape system of the inland areas in Marche Region (elaborated by Terre.it based on the Regional Ecological Network of Marche Region)



The change of landuses and the reduction of human activities in many inland areas constitutes one of the main threats to the conservation of a significant part of the regional biodiversity, and in particular to the achievement of the objectives set by the European Habitat and Birds directives.

The issue of territorial fragmentation and the consequent rarefaction of biological habitats affect particularly contexts such as the wider river valleys or the lowland areas, where the level of anthropization is still higher and has damaged the plant communities and vegetational associations, which are the natural infrastructures through which biotic flows materialize. In these environments, the recomposition of the original plant communities would assume great importance in terms of nature conservation, as they became so rare, if not already disappeared, throughout the regional context (Pedroli et al., 2002).

As far as the aquatic environments are concerned, the peculiar characteristics of the medium impose unique and more limiting conditions of existence on fauna and flora than those experienced by terrestrial organisms, either plants or animals. Rivers are essentially linear systems (watercourses or river corridors), where displacements of species occur in only one direction, given by the natural drift of the water flow towards the valley and the sea. The dispersion of fish fauna and water plants occurs indeed through the natural connections of the hydrographic basin and network: aquatic environments have to stand in fact a high degree of isolation. Waterways and wetlands constitute a heterogeneous system that performs an essential function, innervating the entire regional territory and hosting numerous flora and fauna species that are increasingly rare, threatened, and in many cases became endemic.

The main factors that limits the ecological connectivity of fish populations inside the hydrographic network are:

- Dams, which allow for the creation of often useful and potentially interesting reservoirs, from an environmental point of view, but break out at the same time the continuity of the rivercourse. Anadromous species cannot perform in fact their natural migrations upstream, and in central Italy, for instance, they became extinct after the Second World War. Even when terraced pools are set up next to the barrier, the interruption of the morpho-hydrological continuity of

the waterflow, and its replacement by the lentic environment of pools with still water, determine still negative consequences for most of those species;

- Small barriers, which constitute insuperable obstacles as well, especially when the water flow is insufficient;
- Low water quality because of pollution;
- Insufficient water flow, which is doomed to worsen due to climate change, especially in the Mediterranean area that is already vulnerable for the historical reduction of water due to agriculture and other landuses. In its turn, insufficient water flow is exacerbating pollution, because of reduced dilution;
- Presence of allochthonous fish species, which are often able to hybridize with indigenous populations, interrupting therefore their genetic exchange and leading in the end to the appearance of new populations with different levels of genetic introgression, if not of completely new species.

### 3.3 Natural and cultural assets for rural and cultural tourism

Cultural tourism based on local heritage, including creative industries of a region and typical ways of life, has proved to be successful and effective, in terms of short and long-term sustainability, both from the viewpoint of tourists and residents (Urošević, 2012). A win-win relationship between these different users of a same place can preserve the recognizable elements of identity and heritage, and at the same time reduce the negative impacts of mass-seasonal tourism, by fostering an all-year-round use and enjoyment of the region and its resources.

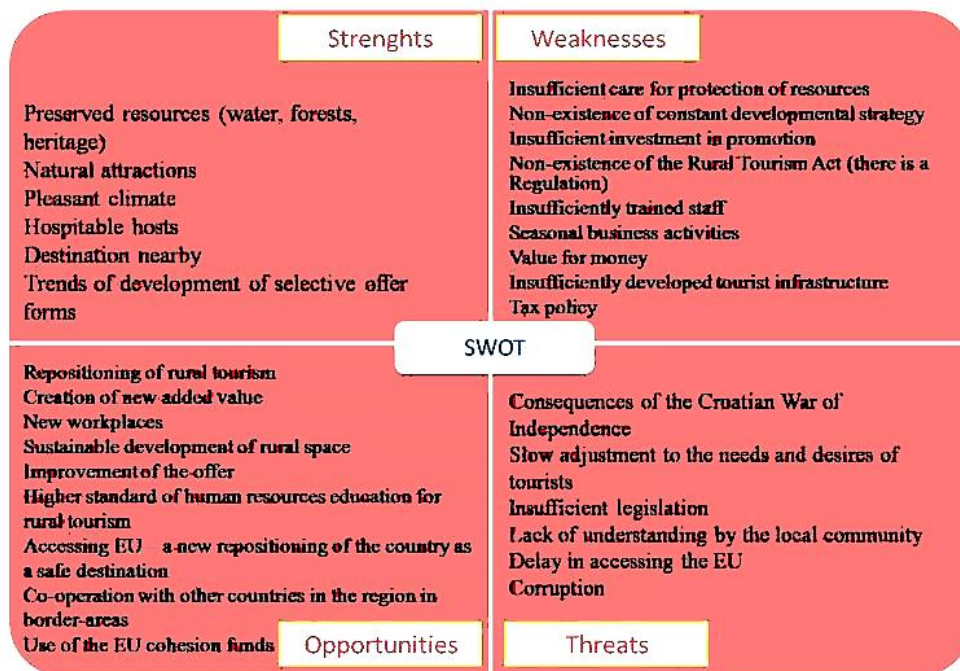
An emerging form of tourism is rural tourism, based on regional traditions, old customs, specific qualities of the country and the visited region, gastronomic-enological offer, etc. The definition of rural tourism comes from the syntagm “rural space”, used for the space outside of the city limits (Cetinski et al., 1995).



Various forms of rural tourism are farm, county, cultural, gastronomic, wine, and health tourism. Rural tourism enables people to return to nature and experience new activities, based on the following essential features (Drpić et al., 2011):

- Location in rural areas, with small villages and buildings;
- Functionality and simplicity, assured by small-sized enterprises in an open environment with direct contact with nature;
- Places rich in heritage and traditional activities;
- Effective participation in traditional activities and in the life of local residents;
- Contact between householders and guests;

Fig. 3.15 – SWOT analysis of the Croatian background conditions for the development of rural and cultural tourism based on the corresponding local assets (Urošević, 2012)



For rural development to be successful, the priority is to stimulate family farms to participate in the tourist offer. The goal must be creating and offering unique local products and services, as well as a direct involvement in various activities on a

family farm, such as caring of animals, working on land, learning how to prepare traditional food and beverages, gaining knowledge of folk customs and skills, engagement in sport and outdoor recreation, etc. The advantages are a healthy lifestyle, offering and tasting of healthy local food and active vacation in a clean and unpolluted environment, learning of ancient manufacturing techniques, acquiring knowledge on cultural-historical heritage, etc.

On the other hand, key problems in rural tourism development might be the regional underdevelopment and lack of population in rural areas, the underdeveloped infrastructure, the disrupted functions and aesthetics values of the landscapes, non-existence of a tourist product, and insufficient awareness of the population (Roberts, L., and Hall, D., 2001).

In identifying and raising the quality of the most attractive resources, a remarkable recommendation is to develop themes and stories that will help interpret the historical and cultural sites (Urošević, 2010). Likewise, developing cultural itineraries of local, regional and cross-border character, can link the dispersed cultural and historical attractions. A remarkable example in this sense is the cross-border cultural itinerary “Heart of Istria”, composed of: the Path of Istrian Castles and Cultural Landscape, the Path of Sacral Art (Istrian churches with frescoes), the path of the tradition and heritage of Istrian cities, and the path of ancient gods (Archaeological Parks of Istria).

Including the cultural sector in the offer of rural tourism could in fact increase the consumption of goods, foster longer stay, attract tourists of greater purchasing power, and extend the season of continental destinations. Besides, it could help preserve the authenticity of cultural values and identities, regenerate and revitalize the urban and rural destinations, increase the quality of life of local inhabitants, bring new sources of income for cultural institutions, increase the number of visitors, and the employment rate, especially in the so-called cultural and creative industries.

## Chapter 4.

# Climate change and natural hazards

### 4.1 Old and new environmental threats

According to new scientific evidence (Kulp and Strauss, 2019), research in recent years has underestimated population exposure to higher coastal flood resulting from sea-level rise due to human-induced Climate Change, i.e. Global Warming. This provides support to previous studies sustaining that large-scale migration from unprotected coastlines towards inland areas will occur indeed in this century, redistributing population density to the point of putting great pressure on landlocked regions (Hauer, 2017).

However, we are still witnessing, nowadays, the abandonment of inland areas, also due to the threats imposed by increasing natural hazards, and to the unpreparedness to cope with possible disasters. Indeed, natural and man-made disasters, which are often connected and overlapping (O'Keefe et al. 1976), still today cause losses in terms of human lives, and the destruction of property and livelihoods. Such events can destroy territorial and social assets to the point of wiping out social networks, place-based traditions, and local communities with their peculiar culture. To recover from such harmful impacts, and to restore the territorial, environmental and social balance, it is evident that it might take huge efforts, very high costs, and long time. In particular, major consequences of natural disasters that we can recognize on territories and societies are:

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- Damage to or destruction of the hard infrastructure (buildings, hospitals, schools, transportation and communication networks, etc.), and of the soft infrastructure (economic and social networks, local culture and tradition, etc.);
- Impact on cultural heritage and the potential loss of collective memory and identity;
- Impact on the labour market, with job losses and difficult business relocation, especially when there is a local peculiarity (e.g. networks of competences and skills, tourist services, site-specific breeding farms, etc.);
- Uprooting of communities as a result of both the abandonment of homelands, and the disruption of place-based social practices;
- Breakdown of social and cultural ties, resulting in lower individual, inter-personal, collective and institutional trust.

Water-related disasters account for 90% of all the natural catastrophes (this percentage is even doomed to increase due to climate change), and they are mostly rapid onset disasters. Thus, to reduce the impact of this kind of calamities, proper strategies and measures to improve the emergency management and preparedness to cope with them should gain the priority.

Within the phase of emergency, the first-response actions are the core part. The success of these operations depend mainly on the timely reaction of the civil protection system, the population awareness and readiness to take action, the coordination of different organizations (e.g. medical emergency services, law enforcement team, civil protection professionals, firefighters, etc.), and the ability of institutions react promptly to face the disaster.

A multi-level governance effort and a holistic approach are to be drawn up to deal with such a complex issue by using a co-creation procedure, where all relevant actors develop new knowledge in the fields of ICT, science, social science, economy and adapt the knowledge already developed in past events or other situations (Puerari et al., 2018).

It is clear today that damages caused by an earthquake or another natural event, or by the explosion of a factory, a terrorist attack or any other man made event, vary not only because of their intrinsic difference, but also due to the different context in which they occur. So it is not only a matter of the magnitude of the calamity (stronger the earthquake, larger material damages), but it is actually a matter of the

geographical, historical, cultural, social and economic context in which the disaster takes place. One can evaluate well and fairly the true damages of a disastrous event, only if she/he considers all the social, political and economic effects. In other words, one can come up with an exhaustive evaluation of the damages produced by a disaster only after knowing thoroughly the social groups and communities who inhabit that specific region, the typology and characteristics of their activities, and the types of local institutions and governance.

## 4.2 The ‘disaster management cycle’

The post-disaster reconstruction is a part of the so-called disaster management cycle, which is composed of several phases that periodically recur: a calamitous event, the emergency time, the recovery and reconstruction, the normality, the awareness raising and forecast, the preparation and mitigation for the next event, and then, again, a new disaster. When the competent authorities manage to address all these various stages without gaps, the resilience of the affected or at-risk territories and communities will grow and improve, and the following recovery phase might enhance in fact the pre-existing situation, increasing the overall sustainability (Berke and Campanella 2006). However, still in the practice of many cases, the reconstruction is actually a step on its own, without containing the conditions to prepare better for the next event and, therefore, without paving the ground for the enhancement of resilience. In particular, in inland areas that are often already fragile and vulnerable from many points of view, the efforts or plans to guide and orient new possible forms of regional development, before a disastrous event would occur, are very few indeed.

Fig. 4.1 – Diagram of the disaster management cycle (elaborated by the author)

**DISASTER MANAGEMENT CYCLE**



The assessment and management of risks in view of an effective reconstruction (in cyclical perspective), should become therefore an integral part of the governance and planning process of the territory, which is never managed and regulated by a single level of government and therefore by a single tool, but is tackled with a multi-level approach and multi-stakeholder participation (Hisschemöller, Cuppen, 2015). The first level for the implementation of risk-sensitive planning should be actually the level of the local government, as stated by the Incheon Declaration (UCLG and UNDRR, 2009). Local governments in fact respond to disasters since the very beginning of the cycle, at the first emergency phase, and play a key role in designing the disaster mitigation policy during the phases of prevention and preparation, by virtue of the place-based knowledge of the local conditions and the possibility of involving the communities at risk. However, during the shock-

reaction phase, there is a transformation in the response system, which implies an evolutionary resilience (Kaplan, 1999). The system in fact changes, bounces forward and reaches a new equilibrium stage. As urban settlements are complex ecosystems interacting with the surrounding environment, they cannot be alone or entirely autonomous in taking decisions, but need to establish relationships and connections at various geographical scales, considering a multifunctional perspective and the different responsibilities of decision-making, since there are manifold levels of benchmarking and comparison that go beyond the very local one.

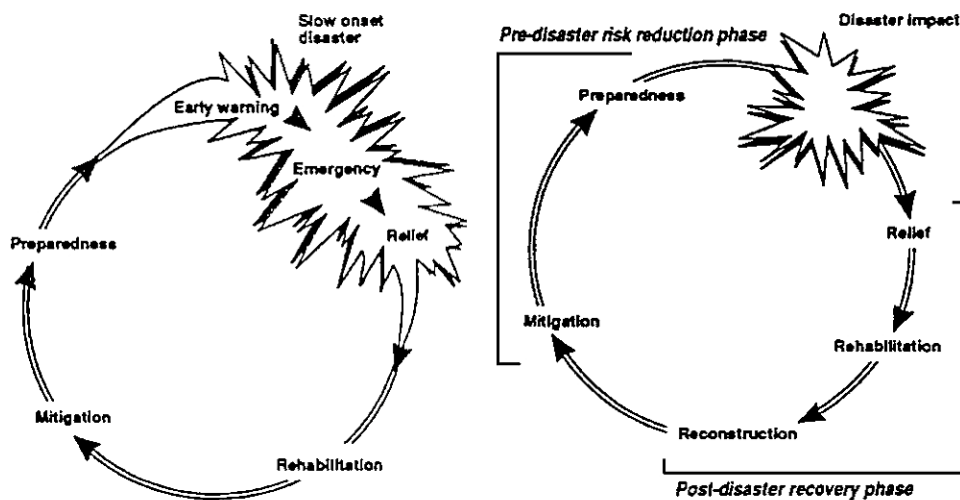


Fig. 4.2 – Diagrams of the slow onset and rapid onset disaster management cycles (UNDRO, 1992)

Unfortunately, inland areas have painfully recorded the unpreparedness of governments at different levels, and therefore of communities themselves, in the face of disasters (Sargolini, 2017a). In this sense, emergency management has often proved a rough path, despite the availability of large amounts of public money and the generosity of associations and volunteers. Many times, it is only composed of a plan of actions for security, quite disconnected from the social, economic and urban dynamics that orient the behavior of governments and communities in the areas at risk. Instead, emergency management should not remain a strictly technical-engineering activity, should come out beforehand, and

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should establish a deep interaction with the urban and spatial management and planning processes, at each level. In line with this, alongside with the Sendai Framework for Disaster Risk Reduction, several programs and plans, such as the United Nations Framework Program or the Hyogo Framework for Action, aim to reduce the 2030 mortality rate in countries threatened by disasters through the extraordinary role that spatial planning can play. In particular, these programs highlight that spatial planning, by envisioning and orienting the process of creation and transformation of land use patterns could have the power to correlate the spatial dimension of land use with the geographical spread of each potential risk (Frelich et al., 2018). In this sense, the spatial character of a hazard can correspond to the effects on the soil that might occur when it turns into a disaster, and thus to the spatial measures for an adequate response provided by regional and landscape planning. In addition, the interaction with the community, in real time and based on rapidly changing input, is essential for at least three reasons:

- The advantage of informing and warning people in real time;
- The advantage of acquiring in turn essential information from people as territorial keepers and guardians, in real time;
- The possibility of making adequate choices for the emergency management in accordance with local communities.

Many international experiences are focusing on the issue of multiple-scenario development, and consequent adequate responses (cf. e.g. Anagnos et al., 2016). There are many experiences of technological platforms in close connection with local communities, which are developing internationally for the complex management of data and information with interoperability requirements (Bela et al., 2016). Through platforms capable of managing big data in real-time, the interaction with the first responders can and must take place throughout all phases of the disaster management cycle (and not only at the emergency-management stage), supporting the choices of the emergency plans (Mancebo, 2010).



### 4.3 Disaster risk reduction: precondition and opportunity for the regional development of inland areas

From the historical records, it is evident that natural disasters have periodically caused significant upheaval in at-risk areas. Today, however, natural hazards have increased due to climate change, rapid growing of large urban areas, and depopulation of inland areas, where adequate territorial planning is often absent or meaningless (Spanicciati, 2017), causing a depletion of services and a reduction in the quality of spatial care and maintenance. This has created weaknesses in both cases, leading to higher impacts of disasters and making the necessary interventions more and more costly and difficult to organize (Simoncini, 2006).

The growing number of disasters that occurred in Italy and in the world over the past few decades has been affecting people on a large scale, challenging them with a complex array of issues and threats to address. The right answers can only emerge by taking an integrated approach and considering problems and their solutions in relation to each other, in virtuous circle. The ability to cope with a natural catastrophe depends essentially on resilience and adaptation capacity, concepts used primarily in the fields of physics and biology, but also applicable in other disciplines, including spatial planning and law (Frisch, 2009).

The correct management of a catastrophic event presupposes the knowledge of the hazards to which the area is exposed, its vulnerability and the expected impact of the natural disaster. This knowledge enables a fair assessment of the risks at which a community is exposed, and makes it possible to establish a certain degree of 'acceptability', and to increase at the same time people's awareness of how to cope or cohabit with certain phenomena, reducing therefore their possible impact and lifting in fact the very level of acceptable impact (Smith, 2009).

As recommended by the Sendai Framework for Disaster Risk Reduction (UNDRR, 2015), the increasing number of human losses and socio-economic damages, owing to the great vulnerability of population living in areas prone to natural hazards,

requires urgent and effective countermeasures. UNDRR provides a broad assessment scheme to support local governments in monitoring and reviewing “progress and challenges in the implementation of the Sendai Framework 2015-2030, and assess their disaster resilience”. In the guidelines for the improvement of community resilience, UNDRR places a strong emphasis on the capacity of building back better, the relationship between communities and governmental agencies, and the central role of planning cities and territories (UNDRR, 2017).

#### 4.4 Resilient landscapes and community engagement

Resilience and landscape are indissolubly linked in the fact that the state of the single elements that combine and shape the joint concept of resilient landscape are not connected to the state of the landscape as a whole, and that single changes might be absorbed by its broader structures (Van Eetvelde and Antrop, 2004). Resilience integrates the better-known concept of community and landscape vulnerability (Lyle, 1985; Kozłowski, 1986; Klausmeyer et al., 2011), highlighting the relational and systemic components, and responding in integrated and trans-sectorial manner to the transformation processes that touch the various physical-morphological, environmental, eco-systemic, socio-cultural, economic and perceptive aspects of the landscape.

Moving away from an idea of resilience exclusively focused on adaptation to changes and new catastrophes, and on disaster risk reduction (UNDRR, 2014), resilience is a driver of wider and more comprehensive territorial and landscape policies (Gambino and Peano, 2015). It has fostered in fact an innovative perspective for developing a more integrated, multi-disciplinary and open planning system, involving community stakeholders in the decision-making process, and basing planning strategies on innovative, creative and holistic framework of multi-disciplinarity and multi-functionality (Collier et al., 2013). Therefore, effective landscape planning and governance become necessary for resilience, to promote multifunctional development, as well as conservation and maintenance of the

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environment and biodiversity, with the final aim of increasing the people's quality of life (Pagliacci and Russo, 2018).

Landscape resilience is a topic of utmost importance and urgency for Europe nowadays, combining dimensions such as socio-economic dynamics, natural and manmade hazards and climate change, and concerns with all the UN Sustainable Development Goals (Calwell et al., 2015). The following aspects are necessary to achieve and implement resilient landscapes:

- Interdisciplinarity and cooperation between different expertise and domains at academic and scientific level (collaboration among scientists from across a variety of research fields);
- Intersectoriality and collaboration between stakeholders, including academia, governments (local, regional national), communities and industry, who are all contributing to landscape structure, dynamics and function;
- Interaction, besides engagement and commitment, between decision makers, local communities and scientists over landscape management and planning;
- Internationalization and exchange of perspectives and practices: if limited within regional or even national boundaries, not only universities, but also local authorities cannot cover and understand the variety and connections of their cultural and socio-economic contexts, and the full scope of issues related to the challenge of landscape resilience, especially now with the global change advancing.

To improve the attitude, the approach, and the effectiveness of strategic planning when tackling world societal challenges at all governmental levels, decision taking should be based, much more than today, on data and scientific evidence, and implemented through a new generation of politicians and active citizens aware of the importance of a scientific approach to problem solving.

In order to create a knowledge society capable of implementing informed planning and decision making, Academia and research centers should enhance their outreach and connections with other groups and institutions of the society, boosting a continuous multi-directional flow of communication on identified problems, research activities and possible solutions. Citizens, communities, governments and research institutions, should each intervene and take active part at each stage of the research action and decision-making process.

Landscape resilience is an area of multi-disciplinary and multi-sectorial research perfectly suitable for developing and implementing this vision. Citizens, communities and local governments, besides the environment, which they live in, are in fact the very subjects of landscape planning research, studied in their multiple roles of components, creators and end users of the landscape social-ecological system (Pinto-Correia and Kristensen, 2013). Actually, an active and continuous collaboration between all stakeholders in academic and applied research is more easily achievable right in this domain, because the research questions of landscape management target exactly the ‘homeland’ of people and the everyday challenges of communities and local governments.

Adaptive co-management models between private and public partners and decisional models of self-community planning in various socio-cultural and ecological settings need to join with the concept of the research-innovation-education triangle, to achieve the goal of a knowledge society as above outlined (Haraguchi, 2019). Such knowledge-society decision models are highly sensitive to socio-cultural, economic, ecological, and governance factors, and perfectly fit, therefore, the local and regional determinants and needs.

#### 4.5 Risk-sensitive planning

In Italy, the 2018 civil protection code provides new procedures for the exceptional regulation of the state of emergency at national level, and provisions for determining and monitoring the corresponding extraordinary powers. Attention has moved in fact from emergency management to prevention, in the belief that the ability to cope with disasters relies essentially on the preparedness for effective response, recovery, rehabilitation, and reconstruction by building back better (UNIDRR, Sendai Framework for disaster risks reduction 2015-2030). UNIDRR places a strong accent on community preparedness and resilience to effectively respond to disasters and mitigate their impacts. With a robust preparedness and not overwhelmed by damages, the affected population could and should sustain essential functions even in the worst-case scenario (Olivieri, 2004). Several studies

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have focused on the analysis, evaluation, and reduction of vulnerability and exposure of urban settlements in inland areas, by implementing system modeling and recommendations for durable recovery and reconstruction (Erbeyoğlu and Bilge, 2020). Others highlighted that investments in prevention are needed to reduce the costs of emergency (Porter, 2003), and others developed models and strategies for effective prevention and response, showing that recovery is based not only on the ex-post intervention of the central government, but also on land-use and preventive planning that minimize negative effects (Fabietti, 2001). The gap between the emergency-management and the planning system is one of the main limits to the adoption of a strategic preparedness approach. A meaningful advance would be to establish a close relationship between preventive and ordinary planning, through the new concept and practice of risk-sensitive planning, and to foster the participation of community stakeholders in decision making through a close interaction between communities, scientists and government representatives.

As planning involves the process of forming, sizing, and harmonizing the territory for multifunctional purposes (Moroni, 2010a), possible roles of risk-sensitive planning in disaster risk reduction are: classifying different land-use settings for disaster-prone areas; regulating and differentiating land-use plans with legally binding status related to a certain hazard-vulnerability combination; providing evidence-based and detailed dataset of information (Greiving, 2013). Besides that, community awareness builds up also territorial resilience, which relates in fact to the capacity of adaptation, a concept applicable in many fields, from physics and biology to urbanism, sociology, economy and law. Taking into account the vulnerabilities and capacities of local communities is essential for an effective risk-sensitive planning (Esposito, 2017). A parallel advance to pursue is defining innovative, creative and sustainable methodologies for engaging communities in the decision-making process, and empowering local governments, and both private and public organizations and associations, by a direct involvement in disaster planning and preparedness activities. An interesting experimentation in this sense is the one carried out as part of the project “New paths of development for the Apennines of Marche Region after the 2016 earthquakes – Nuovi sentieri di sviluppo per l’Appennino marchigiano dopo il sisma” (Pierantoni et al., 2019; cf. also section 7.2). A further development of these first participatory experiences and the optimization of their applicability in similar fragile contexts, taking the

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example of Camerino as one of the possible reference cases (Stimilli and Sargolini, 2019), would have a significant impact on the way planning could reorient towards disaster risk reduction.

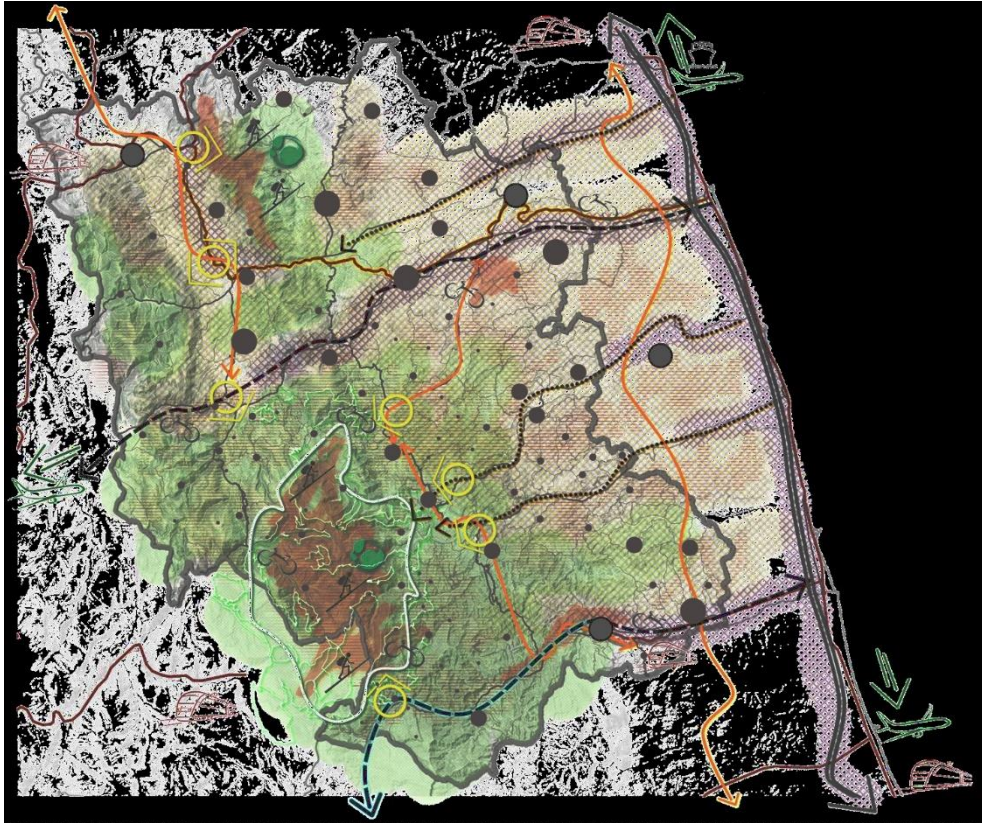


Fig. 4.3 – Map of the second path of development for the inland areas of Marche Region: “Borghi in rete: sustainable mobility and connectivity” (Pierantoni et al., 2019)

Unexpected hazards and unpreparedness to risks have shown that a huge amount of investments and expenses are required for compensation and post-disaster reconstruction. These costs may be reduced ex-ante through investments in prevention and preparedness, in particular by establishing specific planning and settlement rules, dedicated infrastructure investments, civil protection education and self-insurance, new economies and production modes, and other structural and

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non-structural measures that reduce the likelihood of events, or of the related damages. Moreover, to ensure long-term sustainability, investments are also necessary in awareness and capacity building for risk reduction and in prevention activities in non-emergency periods (Loorbach, 2010; Esposito et al., 2017). There is significant evidence, in fact, of strong linkages between the quality of the emergency response to disasters, and the existence of community participation in co-creating the knowledge and information on risks, the planning processes and the decision-making (Sargolini, 2017b). Therefore, a change of approach to risk prevention and preparedness is urgent, considered the number of events that may reduce the capacity to face natural shocks:

- The increasing frequency of natural/man-made disasters;
- A significant public budget commitment to cover ex-post costs of emergencies, reparations and reconstructions;
- Strict limits of public finance;
- Development programmes unable to incorporate risks into planning;
- A reduction in public investments in infrastructure, which also includes those directly and indirectly relevant to prevention and mitigation;
- A growing distorted knowledge of people about risks, which could lead to unappropriated choices.

Limiting the use of emergency instruments can ensure greater respect for the principle of legality and legitimate expectations. The preventive definition of a shared planning system and the applicable legal regime in case of a disaster is important also to train the community to the potential consequences that will derive from it.

Awareness and integrated planning are therefore key concepts in preparedness and risk prevention in spatial planning, which is the process of shaping, sizing, and harmonizing the territory for multifunction uses. Besides that, the spatial dimension of territorial planning relates also to the spatial dimension of every potential hazard. In its turn, the spatial character of a hazard may correspond to the spatial effects that might occur if it turns into a disaster, and can suggest therefore which choices and possibilities are the most appropriate for a proper territorial planning response.

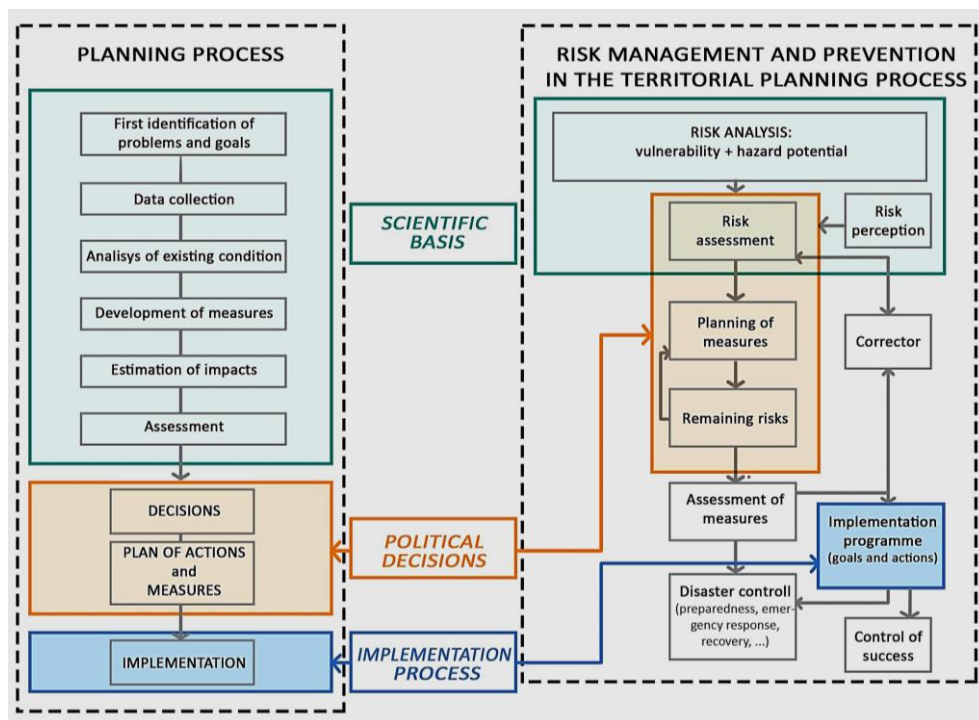


Fig. 4.4 – Risk reduction in the planning process (Greiving and Fleischhauer, 2007)

The nature of risk-sensitive planning requires a multi-risk approach that considers all relevant hazards that threaten a certain area as well as its vulnerability. In this sense, also risk assessment and management are an integrated part of the planning and governmental process (Moroni, 2010b). At any rate, risk reduction is beyond the capacity of governments alone, because risks are not only at the local level, and a multi-level and multi-stakeholder participation approach would be most effective (UNDRR, 2015). Possible roles of risk-sensitive planning in disaster risk reduction (as identified by Greiving et al., 2007), are:

- Classifying different land use settings for disaster prone areas (every disaster has its own acceptable risk on different land use classes);
- Regulating and differentiating land use plans with legally binding status related to a certain hazard-vulnerability combination (prohibiting future development



- in certain areas; changing land use or adapting landscape patterns to hazards; promoting soft-engineering methods to reduce or adapt to risks, etc.);
- Providing evidence bases, such as hazard and risk maps, and detailed dataset of information about the frequency and magnitude curves, risk alerts, emergency plans, etc.

For examples, in an area highly prone to natural hazards, especially with a history of disaster occurrences, urban development should stop, and those areas required for emergency response and retention do need to stay free and secure.

From what outlined, the integration of disaster-risk-reduction strategies into the planning process requires therefore simulating the future impacts of disasters and the related scenarios. Territorial plans would then rely primarily on integrated risk maps, to understand the possible consequences of disasters on the land uses and landscape patterns.

The process proposed by Greiving and Fleischhauer also strengthens the motivation to get involved. An important lesson learnt in emergency response-related research in recent times has been the advantage to take into account the vulnerabilities and capacities of local communities as essential ingredient for an effective disaster risk reduction by sensitive planning. In line with this, new and creative methodologies of engaging communities in the dialogue with scientists, experts and authorities, and hence in the decision making process, are the way to build awareness among the population, by involving people in fact in disaster planning and preparedness activities (Johnson et al., 2005).

## 4.6 Disaster preparedness

Disaster preparedness has been widely studied in scientific literature about humanitarian logistics (Powell, 2016; Alsaadi, 2018; Battarra, 2018; Ha, 2018; Kwesi-Buor, 2019; Santos 2019; Erbeyoğlu, 2020). Preparing in advance to cope with a disaster is in fact a necessary process, since one cannot tie a possible upcoming disaster to any fixed event, at any particular time and space. Disaster

preparedness ensures that the governance has complied with preventive measures and allows containing the effects of a disastrous event in order to minimise the number of casualties, injuries, and damages to property, also by providing rescue, relief, rehabilitation and other humanitarian services in the aftermath of a disaster. With a robust preparedness, the affected population has the capability and resources to continue sustaining essential functions, avoid irreparable damages, and foster the recovery process in a virtuous way that will finally enhance the community resilience in view of the next natural hazard. The causal-loop mapping shown in Fig. 4.5 outlines these basic ideas. It describes in fact the various influences and relationships that exist between resilience, disaster preparedness and other endogenous variables.

Increasing resilience can enhance disaster preparedness, which subsequently reduces the reaction time, in case of disaster; with a consequent growth of the resilience itself. This is an outcome of the overall positive polarity (cf. +) of the loop involving disaster preparedness, which provides a reinforcing or self-perpetuating feedback loop, indicating that an action can produce results that influence back the same action, both in terms of its qualities and quantity.

On the contrary, the loop involving the 'amounts of resources for emergency measures' has an overall negative polarity (-), which implies that this is not a good strategy for increasing resilience.

With the aim of improving disaster-risk preparedness, the interaction between scientists, communities and decision-makers, is essential for many reasons and opportunities:

- Exchanging knowledge and supporting cooperation between scientists of different fields;
- Making adequate choices for emergency management;
- Informing the population and increasing risk awareness;
- Acquiring place-based knowledge and information from local people, who are in fact the first and true territorial keepers and guardians;
- Orienting policies, ordinances, and executive programs;
- Identifying methods of collection and comparison between similar case studies from other contexts, at the national and international levels.

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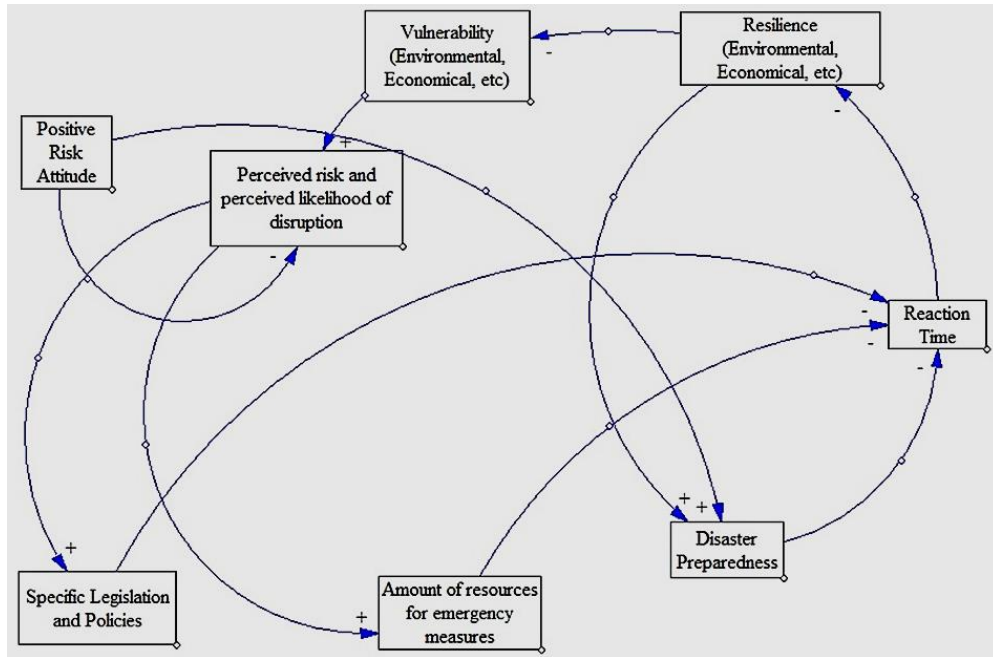


Fig. 4.5 – Resilience Causal Loop Mapping indicating interdependencies between variables involved in natural disasters (Powell et al., 2016)



## Chapter 5.

### Best practices

#### 5.1 Scenario making and rapid reconnaissance for open-data collection

Natural disasters are periodical events that involve the entire society; therefore scientists, decision-makers, and communities should constantly interact in order to prepare to future emergencies. Preparing for a disaster requires gathering, analyzing, sharing and using a massive quantity and variety of potentially relevant data. Among the various types of information, a huge and still quite unexplored potential for disaster risk reduction comes from the science of the so-called Big Data Management. However, the communication process among stakeholders might face a problem of slow transfer from theory to practice because of linguistic, technical, perceptual, and cultural barriers. This also means that risk acquires different meanings and features depending on the source of information used to assess it. Therefore, it is necessary to develop and implement an effective multidisciplinary dialog, to achieve through different tools, including maps. One of the main promising outcomes of such a huge effort would be a multi-risk map, constantly updated with information collected from different perspectives (i.e. from both physical and social sciences).

Recent progress in crowd-sourced information systems has clearly proved that the availability of the public to participate in information collection activities generates

highly valuable datasets that, though initially experimental, become quickly essential information structures, which are complementary to the public spatial monitoring systems (Skarlatidou et al., 2018). Likewise, social networks have demonstrated that open information exchange amongst the public has enormous potential, although may generate, sometimes, a certain degree of confusion.

In specific emergencies, when standard communication lines have been either unavailable or failed completely, social networks have worked as life-saving platforms. Social media and crowd-sourced data in association with citizens' local engagement promoted through ad hoc participatory processes, are going to be the key for kick starting a mind-set change for an innovative culture of risk awareness and disaster preparedness.

A great emphasis is going in fact on the emerging usage of recently available technologies (e.g. drones and satellites for *Earth observation*, social networks and communication technologies, etc.), which are fundamentally changing social behaviour and opening up important new possibilities. How do we can leverage this to get and elaborate, and then communicate and disseminate information, culture and training, as well as to provide individual support in disaster situations and sustain disaster management?

By means of multidisciplinary and applied research, analytical frameworks can address vulnerability and exposure, characterize the potential risks in different areas and hazard conditions, and provide effective solutions for community resilience. Comparative analyses can then combine already existing and structured data on socioeconomic conditions with new sources of information (e.g. designed, action-research, as well as experiment participatory processes involving citizens, private organizations, volunteers' associations, educational institutions, public agencies and private-public partnerships). The implementation of multi-sectorial actions and cross-regional involvements of agencies in same areas of interventions, and of communities experiencing similar natural hazard and exposure, but with different vulnerability, can foster mutual learning and result in an advantage for enhancing processes of resilience at organizational and community level.

ICTs, social media and innovative communication tools are crucial in fact to raise disaster risk awareness, improve citizens' understanding of risks, build up a culture of risk in the society, enable effective responses, improve functional organization

in most fragile and vulnerable environments, and increase the resilience of multi-level or multi-agency governance and of social infrastructures (health services, social services, education).

The potential of state-of-the-art communication tools can and should in fact:

- Support adequate monitoring and evaluation of risk;
- Allow better and quicker first-responder reaction to emergencies;
- Collect more and better information during disasters (by drones, satellites etc.);
- Design stronger (disaster resistant) urban organisations;
- Involve the general public in planning and governance;
- Generate resilient societies by promoting self-generating resilient communities;
- Integrate communication technologies in emergency management;
- Build recovery cultures in post-disaster situations.

A strategic challenge in ICTs is building up a systematic background knowledge, continuously updated, of the methodologies and technologies necessary for designing suitable solutions in territorial planning, governance, risk perception and resilience, current emergency practices, population structure and social needs, social network opportunities, crowd sourcing platforms, technology developments, etc.

## 5.2 Decision support systems

A Decision Support System (DSS) is an interactive knowledge-based system and a software-based system aimed at helping decision makers in evaluating useful information from raw data, documents, and personal knowledge, to identify and solve problems. DSSs have been successfully used in various domains, including business, engineering, military, and medicine. Their use is especially valuable when the amount of information is prohibitive for the perception of an unaided human decision maker and when decision timing is of particular relevance.

DSS, ICT and operations research techniques are especially useful in natural disaster management and detection of threats and natural hazards. These tools can be applied in solving facility location, inventory management and network flows problems (Spanicciati, 2017) during the emergency phase following a disaster (Latini, 2018), in the reconstruction and restoration phase (Bartolomei, 1979), and most important, in disaster preparedness (Simoncini, 2006; Fioritto, 2008).

The optimal allocation of resources and the optimal network configuration belong to the first-stage of the disaster management cycle (prevention and preparedness), when the degree of damage is still uncertain and to some extent unknown, namely, not fully predictable (Mancebo, 2009). At the second stage, in the immediate aftermath of a disaster (emergency), new quick decisions have to consider the real impacts produced by the event, say, for instance, destroyed roads, once the uncertainty is over. Actually, stochastic optimization models allow to consider these two stages as a single problem, and determine therefore the best first-stage solution based on different scenarios of the second stage. Likewise, as far as the second and third phases are concerned (emergency and recovery), two-stage stochastic programming models allow for dealing with uncertainties and time-dependent decisions in a comprehensive manner (Grass, 2016).

A main objective of DSSs is to help decision makers find which types of private and public actions might support the process of enhancing the resilience of communities in fragile areas. For this purpose, they require the use of open algorithms for dynamic decision making that takes advantage of computer simulations of real-life situations.

The decision-making process usually takes place in an environment that changes over time either due to previous actions taken by the governance of decision makers, or to events that are out of control. Owing to that, decision-making process is a complex system indeed, and to better understand and model the nonlinear behaviour of its complexity over time, a system-dynamics approach is of great help. This is a methodology and mathematical modeling technique to frame, understand, and discuss complex issues and problems, based on the recognition that, in the structure of any system, the complex (time-dependent) relationships among its components are often just as important in determining its behaviour as each individual component. System-dynamics models can solve the problem of simultaneity (mutual causation) by updating all variables in short time increments



based on positive and negative feedback cycles (Barlas, 2007; Sterman, 2000). Originally developed to help managers understand industrial processes, system dynamics is a tool currently underway in many public and private sectors, for policy analysis and design, conflict analysis and resolution, and for modeling social dynamics. In fact, various graphical user interfaces for system-dynamics softwares are now in place through user-friendly versions, and therefore applied to very diverse systems.

### 5.3 Best practices from the U.S.A.

In the United States of America, the National Science Foundation funds data collection and sharing to enhance learning from disasters, to reduce risks, and to decrease the burden of local emergency response. Within the INCLUDES program (Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science<sup>1</sup>), which addresses underrepresentation in Academia, the SURGE project (Minority Scholars from Under-Represented Groups in Engineering and the Social Sciences Capacity in Disasters<sup>2</sup>) contributes to that by sponsoring minority scholars in field surveys on poor communities and marginalized groups after natural disasters. In collaboration with the University of the U.S. Virgin Islands, for instance, a first reconnaissance mission surveyed the islands in March 2018, and another group of selected students returned soon after. The objectives are building a professional development network, providing a boots-on-the-ground research experience and practicing teamwork, besides collecting people's needs and empowering local communities.

Another example of rapid earthquake reconnaissance in Mexico, where the EERI's LFE program (Earthquake Engineering Research Institute<sup>3</sup> – Learning From

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<sup>1</sup> [https://www.nsf.gov/news/special\\_reports/nsfincludes/index.jsp](https://www.nsf.gov/news/special_reports/nsfincludes/index.jsp)

<sup>2</sup> <https://www.surgedisasters.com/>

<sup>3</sup> <https://www.eeri.org/about-eeri/our-mission/>

Earthquakes<sup>4</sup>) coordinated more than 100 researchers surveying and sharing real-time data. They used a friendly-use basic form and a desktop tool for mobile data collection, and shared data through the LFE reconnaissance archive<sup>5</sup>.

Furthermore, the RAPID facility<sup>6</sup> (for rapid reconnaissance of natural hazards), from September 2018 is supporting rapid reconnaissance with brand-new facility and equipment, providing researchers in short-term mission (already awarded with rapid investigation grants), with advanced instrumentation. A custom mobile application will help them plan the mission, while the RAPID headquarters will ensure data visualization, post-processing and computing. Anyone could use RAPID and deploy the equipment throughout the world, to improve and standardize workflow, data collection and real-time upload.

To close ideally this circle, DesignSafe<sup>7</sup> (part of NHERI<sup>8</sup>, the Natural Hazards Engineering Research Infrastructure), is a supercomputer-based platform designed for data curation and publishing, integrated with Dropbox, Google Drive and others, and featuring online support and tutoring. It is composed of Data Depot, where to publish disaster-related datasets; Discovery Space, where to model data (not fully developed yet); and Reconnaissance Portal, where to search data stored in Data Depot and beyond.

Finally, the data collected during the 1906 disaster in San Francisco, beginning of reconnaissance science, are still a reference<sup>9</sup>. The Grand Challenges in EER's (Earthquake Engineering Research) report<sup>10</sup> investigates the complexity of data collection, sharing and management, discussing the unexplored potential of reusing existing datasets, to be ideally stored in a unique publicly available place, such as the ICPSR's (Inter-university Consortium for Political and Social Research) project 'Sharing data to advance science'<sup>11</sup>.

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<sup>4</sup> <https://www.eeri.org/projects/learning-from-earthquakes-lfe/>

<sup>5</sup> <https://www.eeri.org/projects/learning-from-earthquakes-lfe/lfe-reconnaissance-archive/>

<sup>6</sup> <https://rapid.designsafe-ci.org/>

<sup>7</sup> <https://www.designsafe-ci.org/>

<sup>8</sup> [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=503259](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503259)

<sup>9</sup> <https://bancroft.berkeley.edu/collections/earthquakeandfire/index2.html>

<sup>10</sup> <https://www.nap.edu/catalog/13167/grand-challenges-in-earthquake-engineering-research-a-community-workshop-report>

<sup>11</sup> <https://www.icpsr.umich.edu/icpsrweb/>

## 5.4 Best practices from Europe

Although the European framework for research projects does not include any specific programme dedicated in particular to inland areas, public and private institutions located in inland areas can apply to nearly all the programmes available, within which specific calls and research opportunities come out with regularity. Some of the most suitable programmes for inland areas are H2020, ESPON, Interreg, Med, JPI Urban Europe, Erasmus plus, Life, etc.

Within the ESPON programme, two relevant projects for the revival of inland areas are GEOSPECS, for its economic, social and environmental analysis of mountain areas, and GREECO, for demonstrating that strategic visions are a major driver for greening the regional economy. On the governance issues, relevant results are in SMART-IST, which shows that the ability to internalise the environmental sustainability dimension plays an important role in policy integration, and in TANGO (case study on transboundary management of a natural park), which highlights that cooperation in preserving natural and cultural values makes territories more cohesive. These are just few of many remarkable projects in this field. In particular, however, the research has focused on three reference projects, described in more details below, and developed within three different European programmes, very meaningful for the possible regeneration of inland areas. They are:

- MADE IN-LAND, Management and Development of IN-LANDs (European Interreg funding programme);
- Smart-U-Green, Smart Urban Green – Governing conflicting perspectives on transformation in the urban-rural continuum;
- LinkPAs, Linking Networks of Protected Areas to Territorial Development (ESPON programme).

#### 5.4.1 MADE IN-LAND

The three-year project MADE IN-LAND (Management and Development of IN-LANDS – Interreg Italy-Croatia<sup>12</sup>), currently in its final year of implementation, aims to draw an innovative and common strategy for the development and revival of Italian and Croatian hinterlands. It moves from the awareness that the Adriatic inland areas have great problems of depopulation, economic bloom and lack of services, but are very rich in natural and cultural resources of high value. All this, together with other factors such as Climate Change, is deteriorating the quality of landscape and life in these areas, and poverty and decay are still increasing there. With the involvement of local stakeholders and communities, the project is trying to help innovate the spatial planning in the programme area, by drawing a new joint territorial strategy, with a corresponding action plan, aimed at networking the local heritage, diverting part of the tourist flow from the coast to the hinterland, and counteracting its strong seasonality. Within this conceptual framework, junctions between slow and fast infrastructures are key elements, to consider and plan not merely in physical terms.

The Programme area is composed of two very different though interrelated parts of territory: the hinterlands and the coast. Marginalization processes affect the inland areas, leading to an abandonment and decay of the local resources. Natural and cultural assets of inland areas, in urgent need of care and maintenance, have actually the potential to revitalise local communities and preserve hinterlands from a number of threats, such as hydrogeological risks, loss or depletion of

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<sup>12</sup> The partnership of the project is a mix of different public institutions, from regional and municipal authorities to universities and non-governmental organizations. The Marche regional government is the lead partner. The University of Camerino, the Municipality of San Leo, the Municipality of Riccia, the regional Authority for the management of parks and biodiversity of Romagna, and the local NGO “Molise towards 2000”, are the rest of the Italian partners. On the Croatian side: the University of Zadar, the Zadar County Development Agency (Zadra Nova), and the Agency for rural development of Istria in Pazin (AZRRI). The Superintendence for archeology, fine arts and landscape of Marche region is associated partner.

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biodiversity, collective services, traditional know how, infrastructures and facilities. On the other hand, the ecosystems of the coastline, which are primary drivers of economic development and the most important elements of territorial brand, are still in overexploitation, and threatened by strong human pressures such as mass tourism, urbanization, and land use conflicts. Natural environments of high ecological importance and scenic value, traditional arts and crafts, rural tourism, forestry and organic farming represent the most evident part of the unexploited capital that might contribute to the redevelopment of inland areas. As opposed to them, counterproductive phenomena such as *littoralization* processes and seasonal massive tourist flows have already changed the coastal landscapes, and are threatening the survival of their natural and cultural assets. MADE IN-LAND focuses therefore on the natural and cultural heritage of inland areas that, rich of endogenous resources whether abandoned or still unexploited, have a high development potential for the whole programme area. It develops a strategy of win-win cooperation between coastal areas and their hinterlands, to decrease human pressure on the first while unleashing the potential of natural and cultural assets of the second. The project main objective is to enhance the protection and valorisation of the natural and cultural unexploited capital of inland areas, by means of tourism development and improved accessibility. MADE IN-LAND aims to set up a new cross-border strategy that unleashes the potential of inland assets through their inclusion in wider networks and markets. The cooperation with coastal areas, considered as mass-tourism destinations, through the common and innovative means of integrated management, marketing and promotion designed by the project, gives such opportunity to the inland areas of the project. Such a cooperation scales up the development plans drawn up by the managing authorities, while coordinating and improving the provision of new services intended for the inland communities. The diversification of local economy, development of job opportunities and services, social inclusion and containment of ageing phenomena, plus further required support to citizenship is following, enhancing population's wellbeing, which is a precondition for the conservation of natural and cultural heritage in the long term, given the role played by local communities in their effective management.

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Fig. 5.1 – Study areas of the Dalmatian hinterland, Zadar County (elaborated by the author)

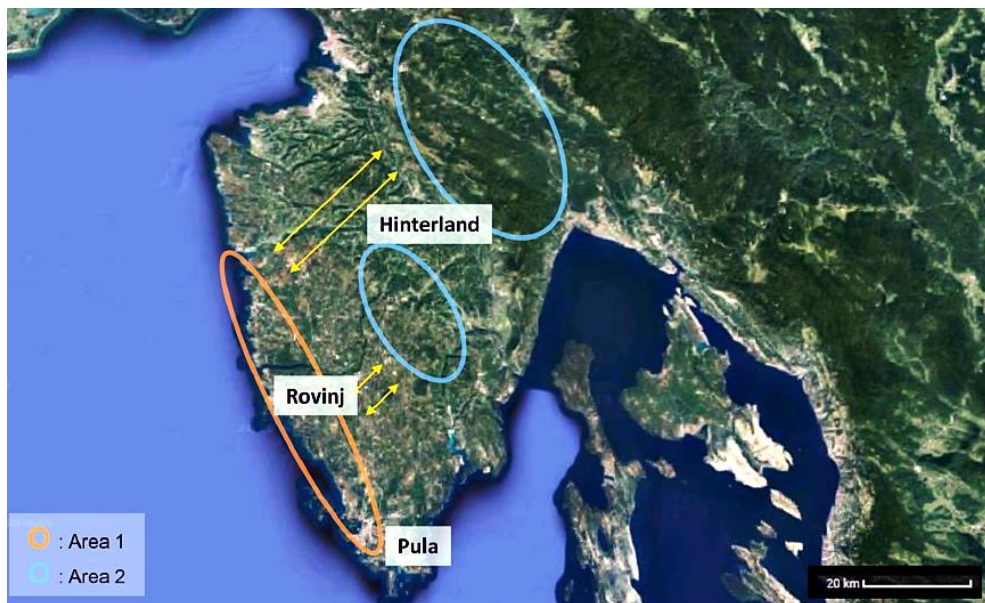


Fig. 5.2 – Case study of Isthria, Croatia (elaborated by the author)

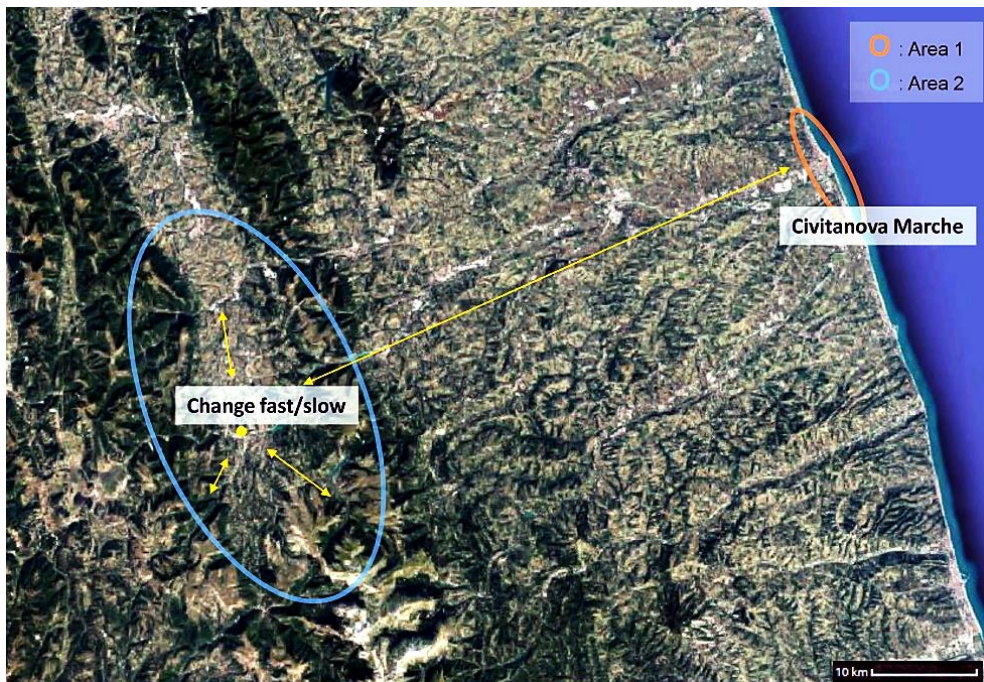


Fig. 5.3 – Case study of Marche, Italy (elaborated by the author)

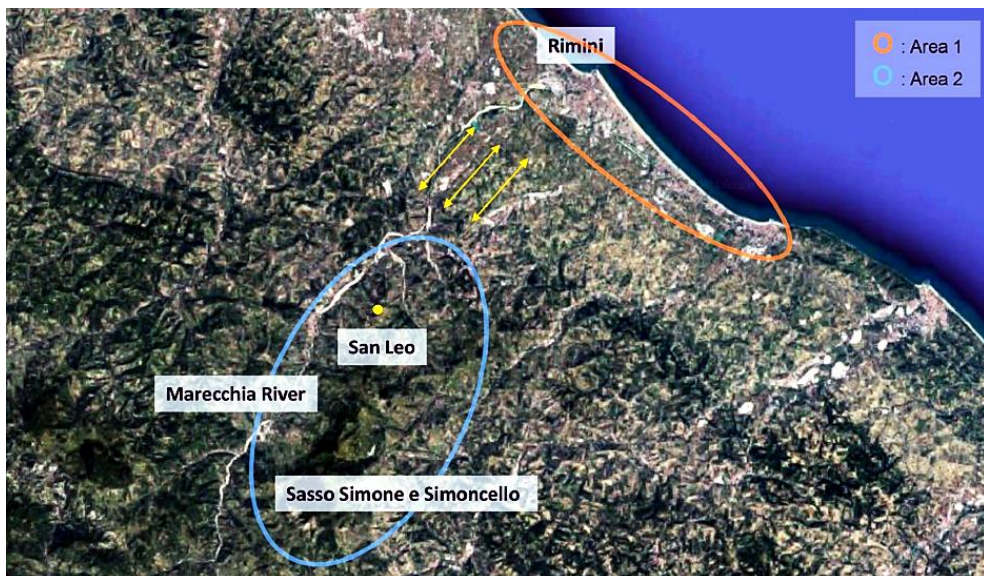


Fig. 5.4 – Case study of Emilia Romagna, Italy (elaborated by the author)

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Fig. 5.5 – Case study of Molise, Italy (elaborated by the author)



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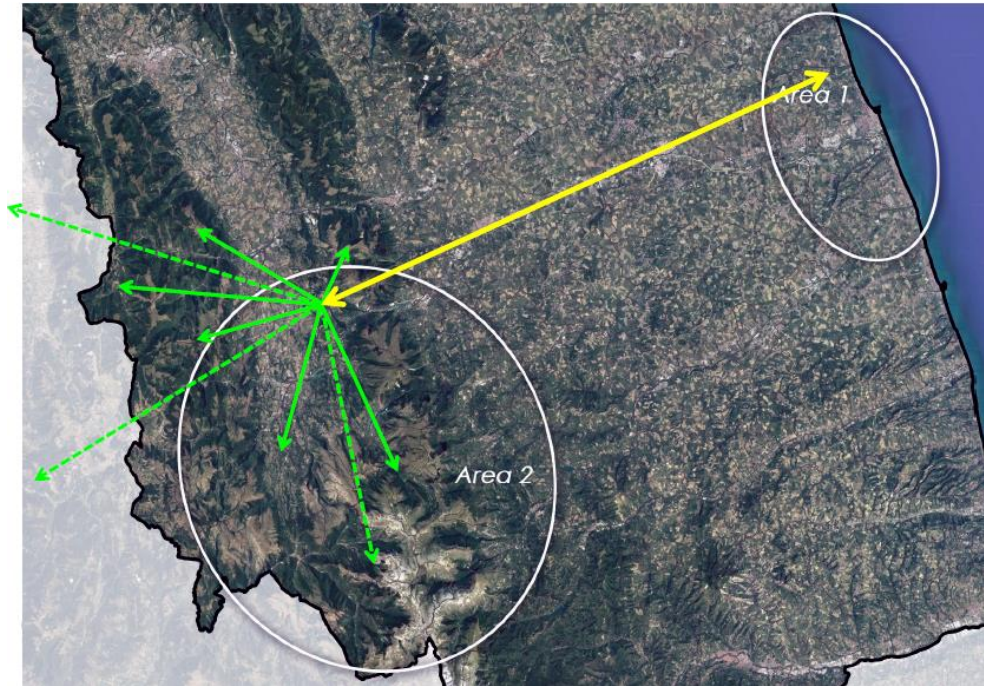
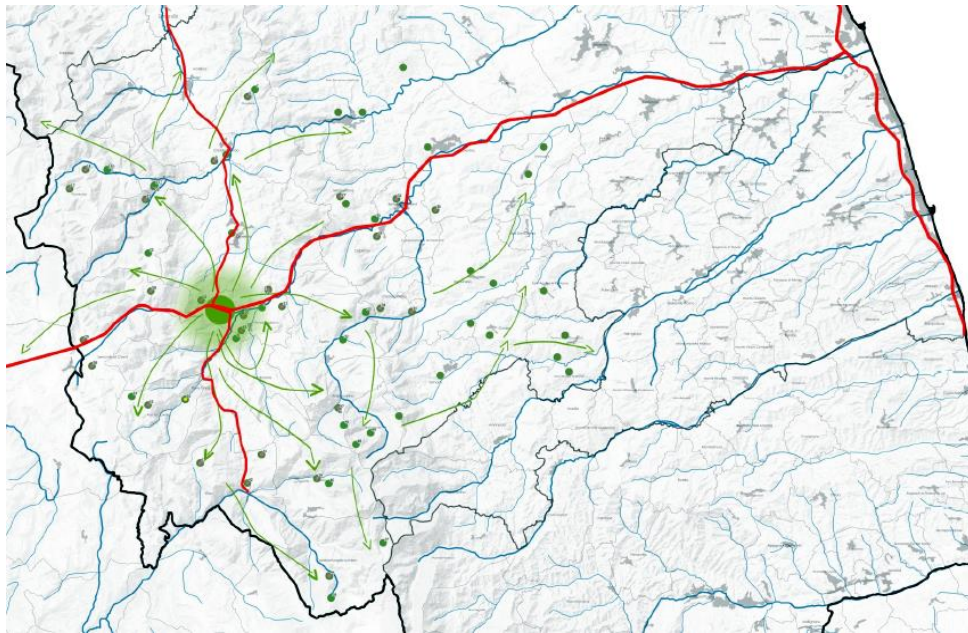


Fig. 5.6-7 – Intersection between fast & slow mobility in Marche (elaborated by the author)



#### 5.4.2 Smart-U-Green

Not infrequently, parallelisms and analogies between different cases at different scales help understand better the current state of affairs and the issues to address in only one of them. This is the sense behind the parallel presented below between inland areas on the one hand, and peri-urban areas on the other. Inland areas are in fact sometimes also referred to as inner peripheries (especially in the Espon programme, cf. the following project ‘LinkPAs’), for they are indeed the ‘*suburbs*’ of huge urbanized coastlines, megalopolises and other large conurbations, from the regional perspective of a broader scale. Interestingly, they share in fact with the outskirts of cities a number of issues and common features. The project ‘Smart-U-Green’ (Smart-Urban-Green: governing conflicting perspectives on transformations of the urban-rural continuum), can provide therefore a useful insight for the purpose of this research.

Transformations in urban landscapes go hand in hand with transformations in the regimes of urban planning. As these transformations come with multi-faceted conflicts and rapidly changing advocacy coalitions, Smart-U-Green aims to contribute developing and practicing new forms of governance that take into account transdisciplinary knowledge development as well as conflicting perspectives among the users of the urban landscape and within planning regimes. New options for governance have been developed and operationalised in experimental area-development strategies, with a focus on the allocation and use of green peri-urban areas. In line with the European Landscape Convention, this may enable a sustainability transition in the urban rural continuum that allows for transformations, which are desirable or inevitable without sacrificing landscape features that preserve individual and social well-being (Tacoli 2004).

The concept of ‘landscape’ not only refers to the physical characteristics of an area but also to the culture of its inhabitants and its economic and administrative features. As such, landscape is part of the collective identity and history of people (Harold et al., 1983; Kianicka et al., 2006; Sargolini, 2013; Stobbelaar and Pedroli,

2011). The European Landscape Convention (Florence, 2000) has recognized this multifaceted meaning, aiming therefore at the protection, management and planning of ordinary landscapes, both rural and urban, and the enhancement of European co-operation on landscape issues.

Through social, economic, technical and cultural transformations of the last decades, societies have faced deep changes related to space. Today, urban areas have either no boundaries or fuzzy ones. Therefore, it is difficult today to classify the “urban dimension” in Europe, as the current urban structures do not only include urban centres and peripheries, but also a cloud of urban fringes, an increasingly dense and continuous conurbation, shaping residual ‘empty’ urban spaces. This fuzzy urban dimension, whether called *Città Diffusa* (Secchi, 2002a-b; Grosjean, 2010), *Zwischenstadt* (Sieverts, 1997), *Ville Emergente* (Dubois-Taine, 1998), or *Scattered City* (Basilico, 2008), implies a profound difference with the historical city, which had a strong relationship with its own “area of reference”, deriving not only material conditions, but also very important cultural and aesthetic features from it.

Smart-U-Green has used the notion of urban-rural continuum (Mancebo, 2016) to understand the dual impact of urbanization processes on urban landscapes and the “area of reference” of the people living there. When the traditional urban area expands into the former hinterland, becoming connected to and clustering with ‘other’ urban areas, the ‘rural’ areas become on the one hand remote for many urban residents, but on the other hand, the urban area (re)introduces ‘rural’ areas within urban boundaries. The urban-rural continuum is by definition not in equilibrium, as societal changes in a variety of domains produce landscape transformations. Shifts in the economy lead to the phasing out of traditional industries and the emergence of new (economic) activities at different spots; changing consumer behavior leads to the disappearance of traditional downtown shopping centers; and the energy transition shows an explosive increase of solar and wind, creating urban landscapes that have never existed before (Shkaruba et al., 2016).

Turning desolated places within urban boundaries into green areas and disclosure of rural areas nearby expanding urban centers is a necessary ingredient of the transition to urban sustainability. Urban areas tend to externalize the costs of their sustainability, which leads to a phenomenon known as imported sustainability

(Pearce, Markandya and Barbier, 1989). A major challenge for urban sustainability is that investments in red (building and construction) and grey (infrastructure) pay off rather quickly, whereas investments in green (nature and landscape) and blue (water) often require public funding. Yet, there is widespread agreement that green peri-urban areas have many benefits, including physical and mental health, decrease of mortality rates, attraction of investments, increase of employment rate, local environmental quality and real estate value. There is a worldwide lobby in favor of binding standards of urban green per inhabitant or household. At the same time, because of climate change, urban areas are under severe pressure to provide a variety of important ecosystem services and resilience in order to avoid troubles and calamities such as flooding and urban heat islands (Geilen, N. et al., 2004; Normandin et al., 2019).

Smart-U-Green has been focusing on sustainability transformations that include the greening of urban space or, in case of urban extension a balance or rather integration between red, grey, green and blue. Green urban space relates to both small and large spaces, ranging from trees or green walls to landscape parks, community gardens and urban farms from different seize.

The urban sustainability transition raises critical issues for governance, as the governance of urban landscapes faces contradictory requirements. On the one hand, there is a need for protecting ordinary landscapes that people perceive as secure and healthy. On the other hand, (major) landscape transformations are either needed or inevitable. A first challenge for governance in facilitating the greening of urban landscapes is to understand the multidimensional character of the societal demands and conflicts that emerge and, in consequence, complex and unstable stakeholder configurations. Whereas the typical local planning controversy shows a predictable stakeholder configuration pro and con either red/grey or green/blue, present day citizens' concerns are less easily categorizable. Research findings are ambivalent with respect to gender differences in the appreciation of green urban spaces (eg. Nelson and Loewen, 1993; Tyrväinen et al., 2013). Citizen initiatives for community gardens may face opposition by other citizens, claiming that these projects undermine the identity of their neighbourhood. Controversies may arise as regards the public access to green urban landscapes and the kind of activities allowed, in which case local environmental organizations may stand opposite to one another. For local governments, recognizing the urgency of greening urban

spaces is one thing, the design and implementation of policies is a different, more complicated matter.

A second challenge for governance relates to the question as to whether current regulatory frameworks and spatial policy instrumentation allow for an integrated approach as stipulated by the European Landscape Convention. An integrated approach takes into account ecological, aesthetic, social, and economic values (Sargolini, 2005). However, decision-making in urban planning often leads to a separation of functions (zoning) rather than integration. Participation and local resistance have been increasingly framed as NIMBY (Not-In-My-Back-Yard). Hence, and strengthened by the recent economic crisis, opportunities for public participation have been restricted over the last decades. An unintended effect thereof is that local knowledge is underrepresented in final decisions. This tendency is amplified by more recent practices in which urban planners tend to consider the dialogue with the attentive public in terms of procedural fairness, i.e. as an issue of process management, rather than as a necessary conversation on the contents of local problems and solutions. Therefore, the current urban planning regimes face the need for more organic, collaborative and sustainability oriented forms of governance.

### 5.4.3 LinkPAs

LinkPAs, linking protected areas to territorial development, tackled the role played by networks of areas with high biodiversity in the elaboration and implementation of sustainable territorial strategies and policies. It studied the territorial benefits of coordinated management of protected areas in mountain regions, and of similar existing frameworks such as in the case of transboundary natural areas, UNESCO sites, etc.

Government bodies are increasingly making use of networks of protected areas as tools for coordinating nature-conservation policies. Starting with mapping existing experiences (in the Alps, Apennines, Carpathians, Balkans, Mediterranean), the targeted analysis carried out by the project aimed to clarify the territorial effects

perceivable in different policy sectors, and especially in the fields of natural capital conservation, and sustainable use of natural resources for a greener economy.

It addressed mountain territories with a high degree of biodiversity and a high number of natural capital hotspots, where the experiences on their preservation, management and monitoring were numerous as well. It turned out that endogenous natural capital could contribute to sustainable regional economic cycles and provide inputs for a green economy that networks of protected areas should be able to promote.

Mountains cover 28.7% of the European territory and are home to 16.9% of the European population, but in the considered macro-regions, these numbers rise up to 41.3% and 25.4% respectively. Mountains represent in fact a good deal of inland areas, are often marginal from a socio-economic perspective, and there the problem of accessibility regards not only education, healthcare and the like, but also other public and ecosystemic services (Jögiste, 2017). Mountain issues assume relevance in key themes for sustainable territorial development such as ecological connectivity and the management of natural resources (e.g. water, forests, soil, etc.). The UN sustainable development goals mention mountains with reference to water management (n. 6.6), efficient use of natural resources (n. 12.2), ecosystem and biodiversity (n. 15.1) ensuring mountain ecosystems conservation and enhancing their ability to provide benefits that are essential for sustainable development (n. 15.4). Therefore, the mountain challenges require a wider territorial and spatial planning perspective, embracing core natural areas along with the relative buffer zones and urban areas. At the European level, valuable experiences are the specific Protocols of the Alpine and Carpathian Conventions recalling the necessity to establish networks of protected areas and to integrate the objective of conservation and sustainable use of natural assets into sectoral policies.

In particular, LinkPAs collected territorial data and produced knowledge on territorial dynamics as a basis for mountain stakeholders to identify indicators, develop tools and decision support systems for policy makers. This allowed setting up site-based policies built on environmental potential and opportunity and developing actions that may have a future impact at the global scale, especially in the provision of public goods (e.g. policies for nature conservation, adaptation to climate change, green jobs, and quality of life policies).

Key policy questions the project aimed to answer were:

- Which landscape patterns are deriving from actions undertaken in cooperation by protected areas and competent territorial authorities?
- To what extent and how do networks of protected areas contribute to develop and implement territorial strategies? Which policy sectors do they mainly impact on (sustainable tourism, environmental protection, adaptation to climate change, urban and spatial planning)? What kind of actions and policies are necessary to ensure a sustainable and integrated management of natural resources in mountain areas?
- Are networks of protected areas able to support local business development? Which are the main economic sectors affected and which schemes (financial and legal framework, policy dialogue and cross-sectorial approaches, stakeholder engagement methods, policy cycle assessment) could help involve local actors (particularly small and medium-sized enterprises), foster the set-up of voluntary schemes and mobilize private sector investment? Do networks of protected areas support green jobs and business creation at the local level?
- How would be possible to create certain conditions in mountain and marginal areas for strengthening the relationship between high-biodiversity areas and dwellers of those areas and the surroundings? Which opportunities do citizens benefit from cross-sectorial strategies for a sustainable use of natural resources, increasing awareness, resource-efficiency, improvement of quality of life to the civil society?

The project has delivered new territorial evidence for networks of protected areas, to contribute reshaping territorial development strategies, especially in areas rich in natural capital.

Its main results are in fact:

- The identification and collection of experiences and models of cooperation in mountain regions, addressing therefore the limits and potential for networks of protected areas;
- The identification of the main relevant policy sectors on which networks of protected areas have a significant impact;
- A data collection at regional scale, and per relevant sectors, addressed by networks of protected areas; in particular: territorial data on population, natural

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resources, and the business sectors, plus experiences and local strategies for managing natural and cultural assets;

- The identification of indicators for monitoring the outcomes of actions undertaken by networks of protected areas and their effects on policy sectors, especially on the green economy.

The project ended in 2019, envisioning for the upcoming years an operational use of its results by each stakeholder. In particular:

- Implementation of national strategies on green economy at regional and local scale;
- Measurement of territorial impacts of existing strategies for mountain areas (e.g. the Italian Strategy for Inland Areas);
- Development of pilot actions at the pan-Alpine level in the Apennine area;
- Foster cross-border cooperation, especially for the creation of green jobs;
- Sharing experiences among protected areas and regional and local authorities in charge of environmental policies.
- Development of territorial strategies based on good practices (e.g. tourism sector and management of biodiversity);
- Strengthening the involvement of specific protected areas into wider international networks of mountain areas (e.g. the Network of Emblematic Mediterranean Mountains).



# **Part 2**

## **Case studies**



# **The Italian Apennines**



## Chapter 6.

# The central Apennines

### 6.1 Overview

The hinterland of central Italy is a hilly and mountainous area with an outstanding heritage, featuring many natural and cultural resources of extraordinary value. Nonetheless, it has been declining for decades, due to increasing metropolization and *littoralization*, ongoing phenomena and great challenges for planners and policy makers worldwide.

Urbanization, seasonal mass tourism and overall growing of human pressure are just few issues affecting the littoral. Dramatic depopulation, economic depression and abandonment of rural activities are just few affecting the hinterland. In many places, all that has completely changed the landscape, overexposing both regions, overcrowded and underpopulated, to higher risks of natural disasters. Meanwhile, historical hamlets, villages and towns so peculiar and precious in Italian inland areas, are further decaying, along with the surrounding rural and cultural landscapes (Pagliacci and Russo 2019).

## 6.2 The 2016-2017 earthquakes in central Italy

In 2016 and 2017, a series of disruptive earthquakes occurred in this mountain context, marking the landscape and the destiny of the Italian central Apennines. The occurrence of disasters is a persistent and complex problem in this area due to interconnected causes such as poor planning, low citizens' awareness, low quality of governance approaches, territorial fragilities. Such problems, deeply embedded in current societal structures, cultures and practices, are context-dependent, involve numerous actors with different interests and do not have straightforward solutions.

During the last decades, the area of central Italy hit by the earthquake has witnessed an increase of the exposure to risks, caused by rapid urbanization in areas where adequate territorial planning was absent (especially on the coast and river valleys), and the depopulation of inland urban areas. This has caused a degeneration of services and reduction in territorial care and maintenance, has increased the fragility of the territorial system and led to higher impacts (mortality and disruption) of the events, making interventions more expensive and difficult to organize. In fact, following the seismic sequence, the national government enacted a number of special regulations (law decrees, later converted into full laws), and entrusted the Civil Protection and a team of experts to support the Extraordinary Commissioner for the reconstruction in providing new ordinances. This normative set, characterized by a plurality of uncoordinated sources and by the use of derogation, is actually difficult to apply in the practice. The emergent regulation shows its limits and incompleteness both in terms of territorial differentiation and adequacy to local needs, and in terms of administrative simplification.

The settlement system of the Apennine region is composed of historical villages and town, connected by the network of driveways and pedestrian routes. The possibility to live and enjoy these places in full safety is one of the elements that can increase the attractiveness of the area, currently doomed to decay and degradation, after the earthquake accentuated the abandonment of the inhabitants.

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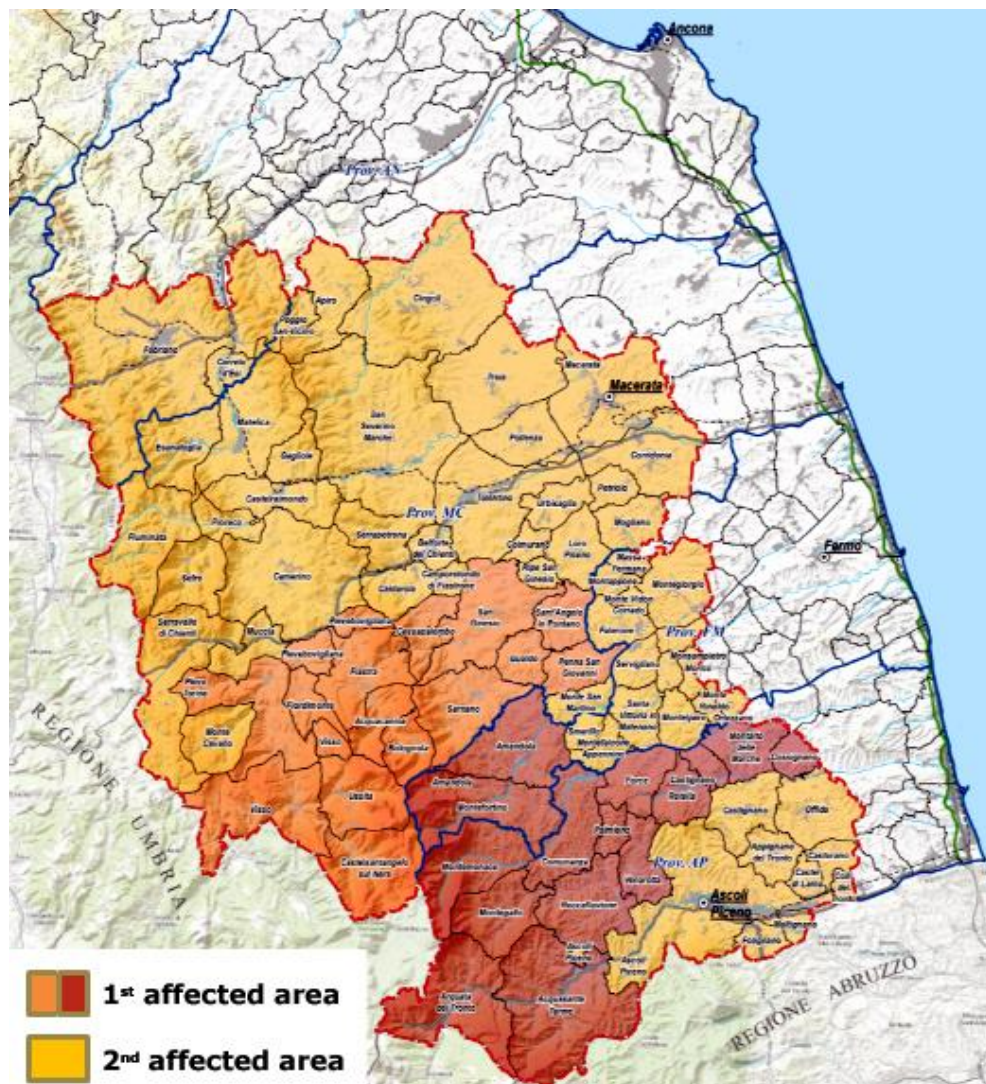


Fig. 6.1 – The inland areas of Marche Region affected by the earthquakes of 2016-2017 (elaborated by the author)

It is important therefore to survey this system of historical villages, small hamlets and infrastructures, highlighting their interference and overlapping with seismic faults and with the geomorphological dynamics, both in progress and in potential, in connection with landslides and other phenomena of hydraulic origin. Such a monitoring will return in fact the picture of critical issues in diachronic way,

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detecting how over time those problems and risks can compromise the activities of living and enjoying these places, also for tourism purposes.

A priority study is the selection, among the numerous villages and settlements and the dense network of routes, of all the elements that are essential to ensure safe forms of daily life and recreation in these places. In this sense, particular attention should go to the plans of transformation envisioned by the town planning tools currently in force, regarding both residential expansion and the strengthening of the connection system, to highlight critical issues and inconsistencies. A decision support system that relies on this knowledge, could ensure that each new plan, program or project drawn up by the local governance will not incur any potential hydrogeological and seismic risks. Moreover, also in the light of climate change and related vulnerabilities, it becomes imperative to figure out the possible impacts of potential hydrogeological and seismic risks on the new temporary settlements implemented during the emergency phase, for the management and planning of these areas in the medium-long term, as their temporariness is actually supposed to last much longer than expected.

From the field surveys and after the earthquakes of 2016-17, carried out by academic researchers, as well as by professionals and technicians, the surface effects produced by the seismic sequences emerged numerous and widespread. A group of researchers gathered under the name EMERGEO has made known the first results of these surveys carried out for essentially research purposes, presented during conferences and workshops and recently published (Civico et al., 2017). Along the main communication routes, they have recorded phenomena of collapse from the rocky walls, although just for limited portions, the most evident ones. In fact, a systematic monitoring of all existing walls that did not collapse, but that could present actual situations of high risk, is still missing. This aspect is almost completely unexplored, and represent therefore a serious weakness and gap in the network of knowledge useful and actually necessary for a good prevention. The urgent need to know in detail the state of the geomorphological evolution of the natural and built landscape, hardly hit by the seismic sequence, arises just from these considerations.

With regard to the built environment, field surveys have shown the types of damage on both historic and more recent buildings, and the response differences in relation to the type of building and the propagation of the seismic wave. Some



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preliminary studies were the subject of a few thematic workshops. However, a systematic survey and an organic study highlighting the connection between the different elements, in particular the relationships between the subsoil structure and the constructions on the surface, are still lagging behind, and the corresponding database is still quite weak and poor. A seismic micro-zoning study 'of third level' is actually underway, in view of the reconstruction of the 140 most damaged municipalities, for which detailed geological surveys, as well as geophysical and geotechnical studies will be available in the next future for the characterization of the soil (in)stability and the study of the amplification effects of the seismic waves. Microzonation cannot however replace a more comprehensive knowledge of the evolution of larger areas than those required by law. Such a lack would constitute a major weakness for the possibility of planning the future path of reconstruction and growth of the territories hit by the earthquake.

Finally, a good amount of geological, geophysical and hydrogeological data is available, both for the 2016 sequence and for other seismic events, whether recent (e.g. Umbria-Marche 1997-1998), or not (e.g. Norcia 1703). Again, anyway, even in this case there is no easy-to-read, organic and articulated database, which provides previous data together with new ones, using modern formats.

Fig. 6.2 – Damages to the built environment in the inland areas of Marche Region after the earthquakes of 2016-2017 (photos by Stimilli, 2017)

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### 6.3 The impact of the earthquakes on the Natura 2000 protected areas

In the last few years, the earthquakes of 2016-2017 have dramatically accentuated the above-described dynamics, causing significant levels of abandonment, with the need to study and plan new forms of residential and production settlements, considered the devastation suffered by some provinces, with the need to displace dwellings in more suitable areas from a hydrogeological and seismic point of view. These phenomena have had significant effects on the conservation of biodiversity, in particular in the Natura 2000 sites, and this is largely due to the fact that many of the habitats and species of greatest conservation interest are closely linked to man-made landscapes and man-made environments. In particular, two ecologically very different contexts are still strictly connected and highly dependent on socio-economic dynamics: the ecosystems produced by zootechnical activities, and those resulting from agricultural practices.

The first consequences regard the mountain environments where a millennial use and exploitation of the pastures and meadows for the wild grazing of cattle have created secondary-herbaceous formations highly rich in biodiversity and with a particular ecologic, historical and landscape-identity value. In general, these habitats feature a high floristic diversity and are home to particularly important types of fauna.

The traditional rural landscapes, both in mountain and hilly areas, characterized by both tree (vines and olive trees in particular) and herbaceous cultivation, perform an equally important function. In addition to hosting some of very important and protected species, they allow them to expand their spatial habitat even outside the specific but limited natural areas, thus contributing to secure their state of conservation. They are the habitat of numerous taxa that depend on the heterogeneity of these environments, in which alongside open areas there are also hedges, rows, dry stone walls, buildings, small streams, etc., heterogeneity determined by the persistence of a correct anthropic use (Pedroli et al., 2007).

## 6.4 The reconstruction process and strategy in Marche Region

Awareness and preparedness to cope with natural disasters are *sine qua non* for both community and territorial resilience (Brand and Jax, 2007). In Italy, unfortunately, the level of public engagement in this sense is very low. Preventive planning measures, mitigation actions to lower the risk, and pre-event recovery planning are insufficient as well (Moccia, Sargolini, 2016). After more three years from the earthquakes of 2016, an analysis of the recovery process in Marche Region can provide planners with useful hints on how to improve the prevention of natural hazards and the future planning and management of post-event recovery phases.

In particular, factors contributing to enhance the resilience of communities in inland areas are proving to be:

- Population size, meaning, a critical minimal number of active individuals within the local communities;
- Balanced age-structure, with a sufficiently high proportion of economically active individuals;
- Diversified economic structure of the primary, secondary and tertiary sectors, with place-based networks (e.g. production chains, food industry, etc.), though reaching out to other communities and regions far beyond their own territories;
- Availability of an appropriate level of infrastructure and services, able to retain and attract young people;
- Governmental and private assets interested in and capable of giving additional value to the local natural and cultural resources;
- High and diversified educational and professional levels of citizens in productive age;
- Social groups and norms proficient to self-aid actions and to participation in decision-making processes at local level;
- Governmental structures, legislations and regulations that allow for community participation in disaster management and socio-economic reconstruction.

## 6.5 Community, communication, information, and governance: first experiences with Apennine farmers

Owing to their quite isolated working environment in a rural area, farmers are a social group in which traditional norms and values have persisted more than in other social groups with more interaction with the globalized world. Regarding disaster management, reconstruction and solidarity, the readiness to help each other during emergency is strongly present, as a generally shared norm and value (in Central Italy, for instance, breeders who did not have their animal sheds damaged by the earthquake hosted animals from farmer colleagues in need). On the other hand, as regarding the possibility of tying up entrepreneurial links with other farmers or actors along the food processing chain, most farmers are quite reluctant. Trust when related to money and business rarely exceeds the circle of family members. In addition, they grant little trust to governmental authorities (regional or municipal governments) and professional associations.

Due to the small dimension of the farmers' community, reciprocal acquaintance is very much diffused (everybody knows who is whom). The mostly used communication channels nowadays, even used by elderly farmers are mobile phones, and information flows through face-to-face meeting between each other and by word to mouth. Only the young farmers' generation uses social media. The use of internet is more often restricted to administrative fulfilments on the governmental on-line systems.

## 6.6 Community resilience and recovery after natural disasters. Lessons learned and insight on the case study of Camerino

The reconstruction process of the villages and towns of central Italy affected by the 2016-17 earthquakes poses important challenges to urban and territorial planning (Barra et al., 2017). The historical settlements, whether partially damaged or fully destroyed, have lost in any case their integrity, which is the most important aspect to restore, by making a smart use of the Implementation Plans indicated and suggested in the ordinances n. 25 and n. 39 of the Extraordinary Commissioner for the Reconstruction. Figures n. 6.3-5 (Andrea Di Bonaventura, 2018), present the case of Castelluccio di Norcia in Umbria, almost completely razed to the ground by the earthquake, in an attempt to reconstruct the ancient village.

Figure n. 6.6 (Flavio Stimilli, 2017), shows the case of Camerino (town heavily damaged, though only partially destroyed), in a broad vision that comprehends the entire urban area (historical center inside the city walls, and modern expansions, scattered outside), within a new urban and territorial structure. Such a new layout would rejoin the different parts of the city, also leveraging the new infrastructural works planned by the regional development strategy (cf. in particular the so-called “Pedemontana”, a new highway connecting Fabriano to Muccia). The “Documento Direttore” described in ordinance n. 39 of the Extraordinary Commissioner for the reconstruction provides the necessary guidelines to apply such a broader vision.

Figures 6.7-8 (Alice Tamagnini, 2018) present another example of a possible broad reorganization of the urban settlement of Camerino. In particular, it is here imagined a new road system that restores the broken relationships between the different parts of the city, promoting public transport, the use of new smart technologies, the use of renewable energy sources and the reuse of residual voids.

As for the empty spaces within the compact urban fabric of the historical town, strategic demolitions of problematic and out-of-place buildings could well address the problem of safety, creating in particular new escaping routes and spaces for gathering people. Figures 6.9-11 (Valeria Colocci, 2018) are an attempt in this

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sense: a new outdoor public space of high urban quality, in front of the ancient San Francesco complex, replaces the former court of Camerino, a structure significantly damaged and previously disliked from the inhabitants themselves.

Finally, as regards the issue of accessibility to historical centers, often perched on hilltops and surrounded by high walls with few entries and so hardly permeable, fig. 6.12 (Daniela Colocci, 2018) suggests, once again in the case of Camerino, the possible use of new access modes, with underground and basement routes, and partially mechanized ascents, with lifts and escalators.

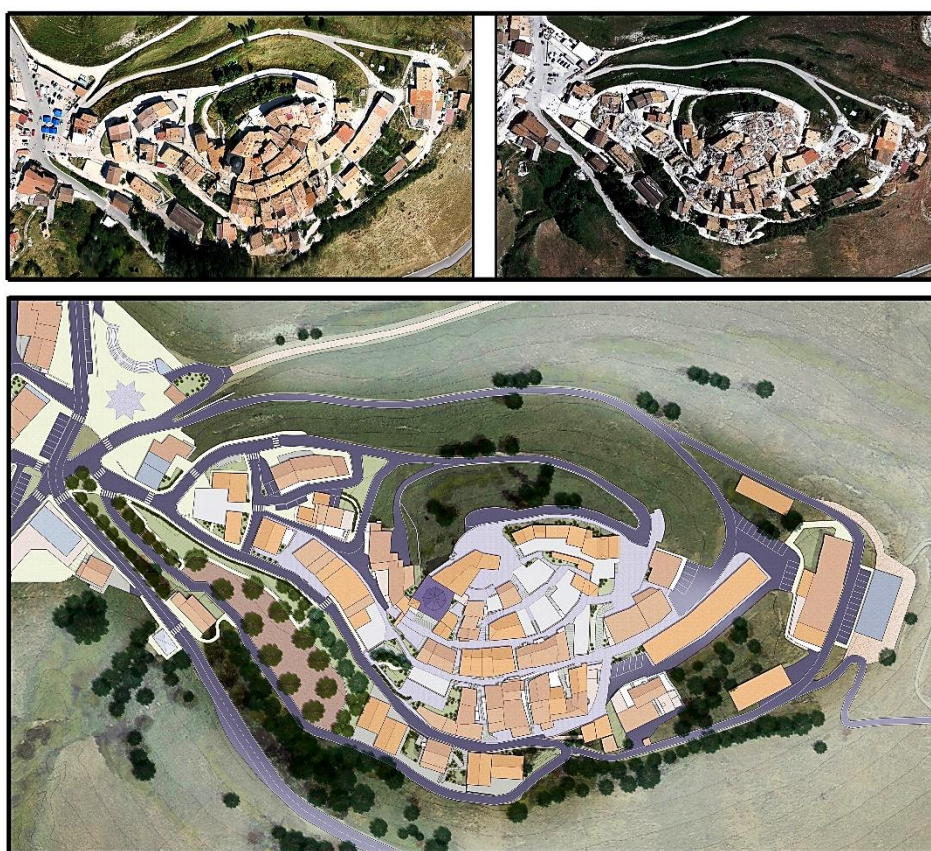


Fig. 6.3-5 – The case of Castelluccio di Norcia in Umbria Region (Andrea Di Bonaventura, 2018)

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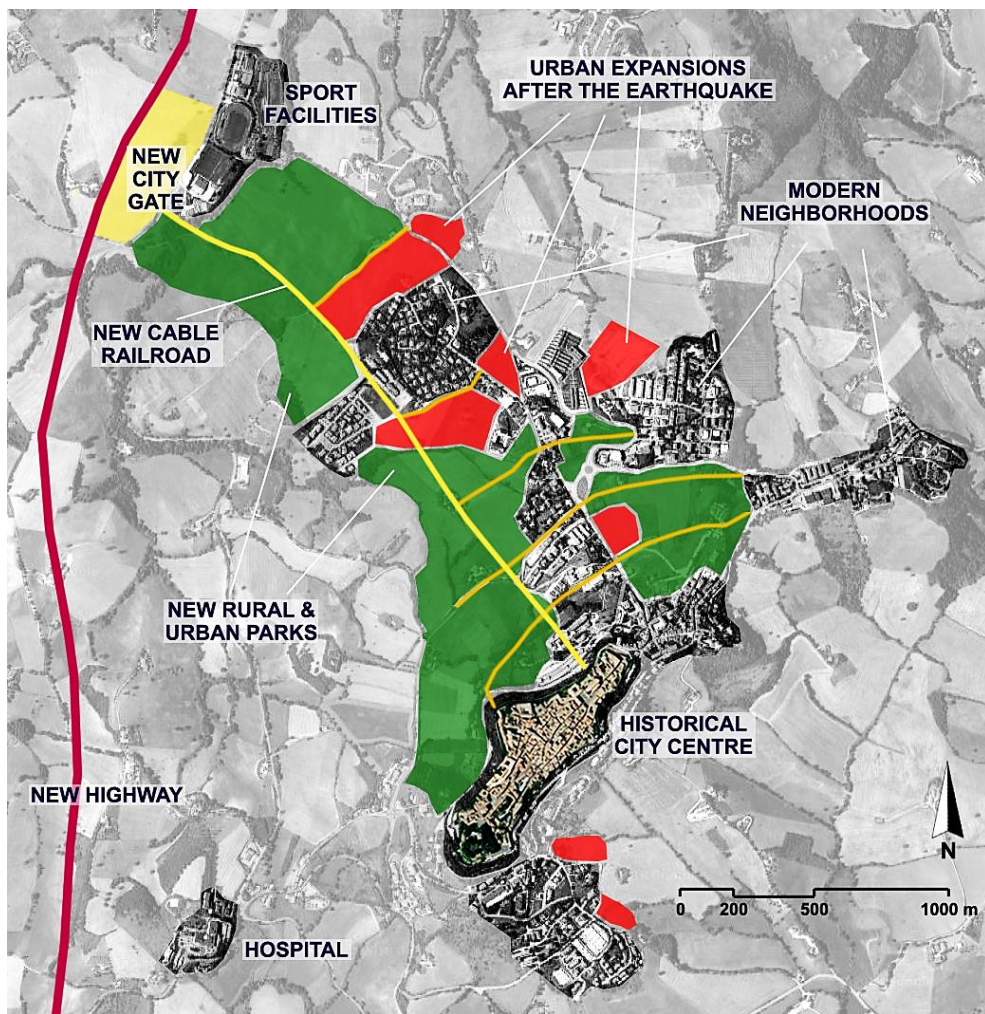


Fig. 6.6 – Masterplan of a new spatial arrangement for the case study of Camerino in Marche Region (Flavio Stimilli, 2017)





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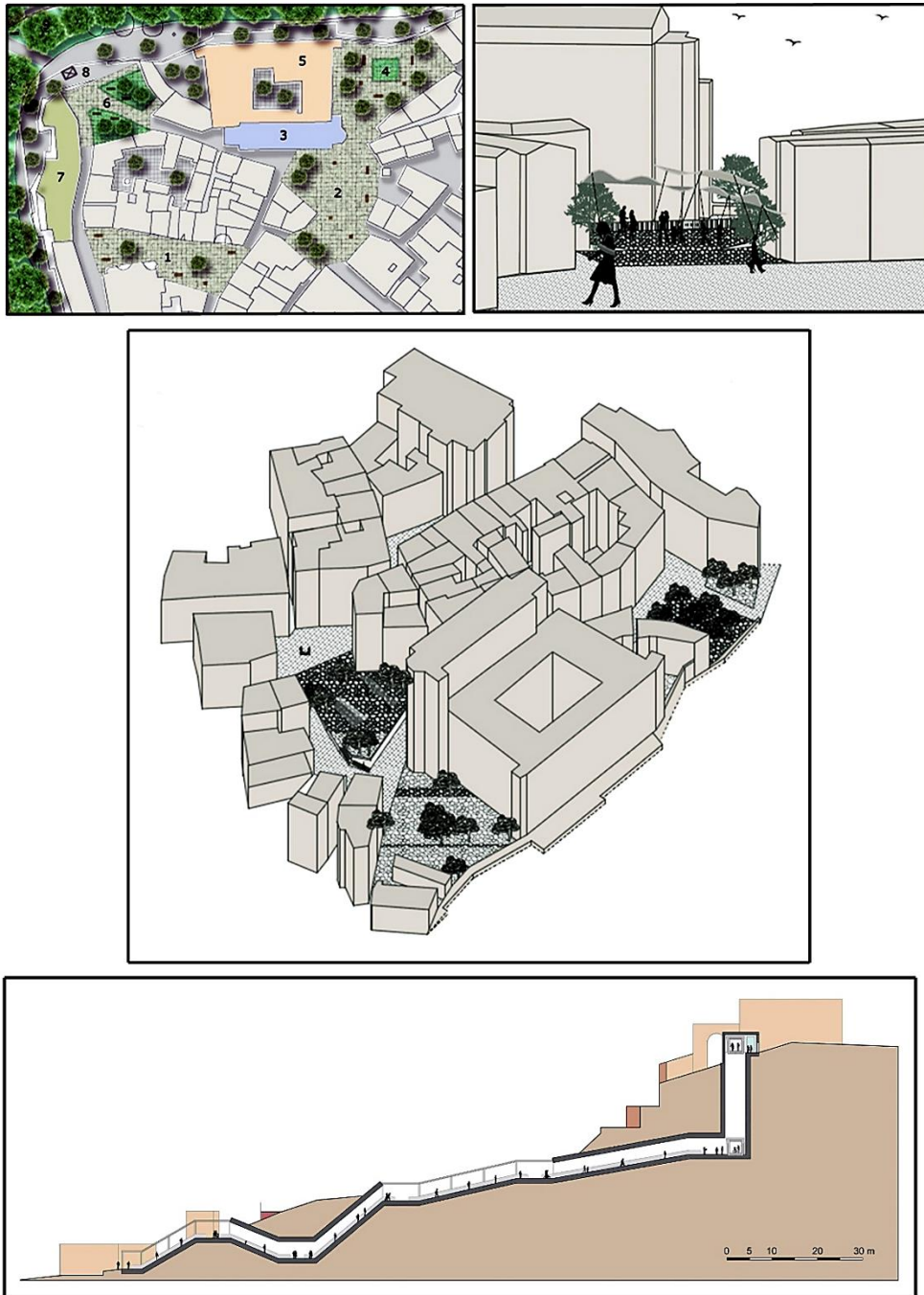
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Fig. 6.9-12 (next page) – New escaping routes and spaces for gathering people, and new access modes to the historical town of Camerino (Colocci, 2018)

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## Chapter 7.

# The northern Apennines

### 7.1 Overview

In Alta Versilia, the abandonment of mountainous areas has affected the coastal hinterland in many ways, especially with regard to mountain villages, towns and their surroundings in terms of demographic, economic, social and ecological sustainability. There, anyway, a complex of six marble quarries have been recently under redevelopment, through new planning tools with a long-term view to the next 10-30 years. Could these new plans support effectively a sustainable development strategy for the region of Alta Versilia? Which are their strengths and weaknesses, threats and opportunities? How could they be improved and supported? The relevance of private actors in spatial planning is often neglected or underestimated. A series of spatial analyses and planning activities undertaken recently in the south part of the Apuan Alps (Alpi Apuane, in the northern Tuscany), by a private company that extracts marble from the mountains, is an interesting case in this sense.

## 7.2 The case of Alta Versilia in the Apuan Alps

On May 24, 2017, the city Council of Seravezza, a town at the bottom of the mountains where the marble quarries are located, has issued a municipal ordinance approving and regulating the private initiative of spatial analyses and plans proposed by the company. In summary, the City Hall has agreed to collaborate with and support the company, promoter and funder of the initiative, in the drafting of a long-term plan of landscape management and transformation. It was indeed the necessary updating and extension, for further ten years, of the previous ten-year plan that was regulating the extraction activities and was about to expire. The plan in fact does not only determine and limit the extraction activities themselves, but also frames and directs the overall spatial management and planning of the entire area, being the company responsible of six quarries across the mountains.

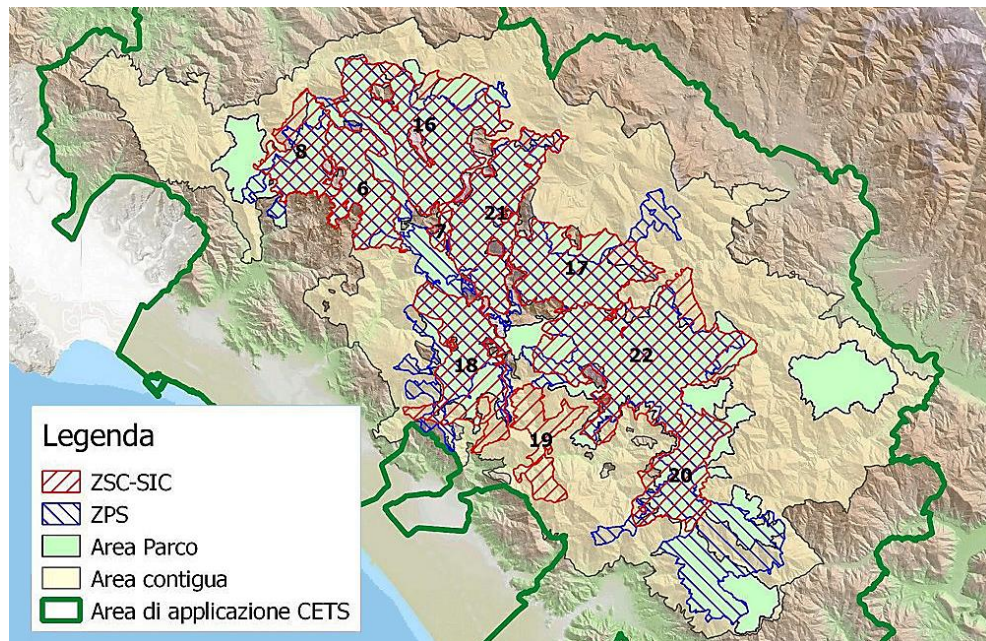


Fig. 7.1 – Zoning map of the Natural Park of the Apuan Alps ([parcapuane.it](http://parcapuane.it))

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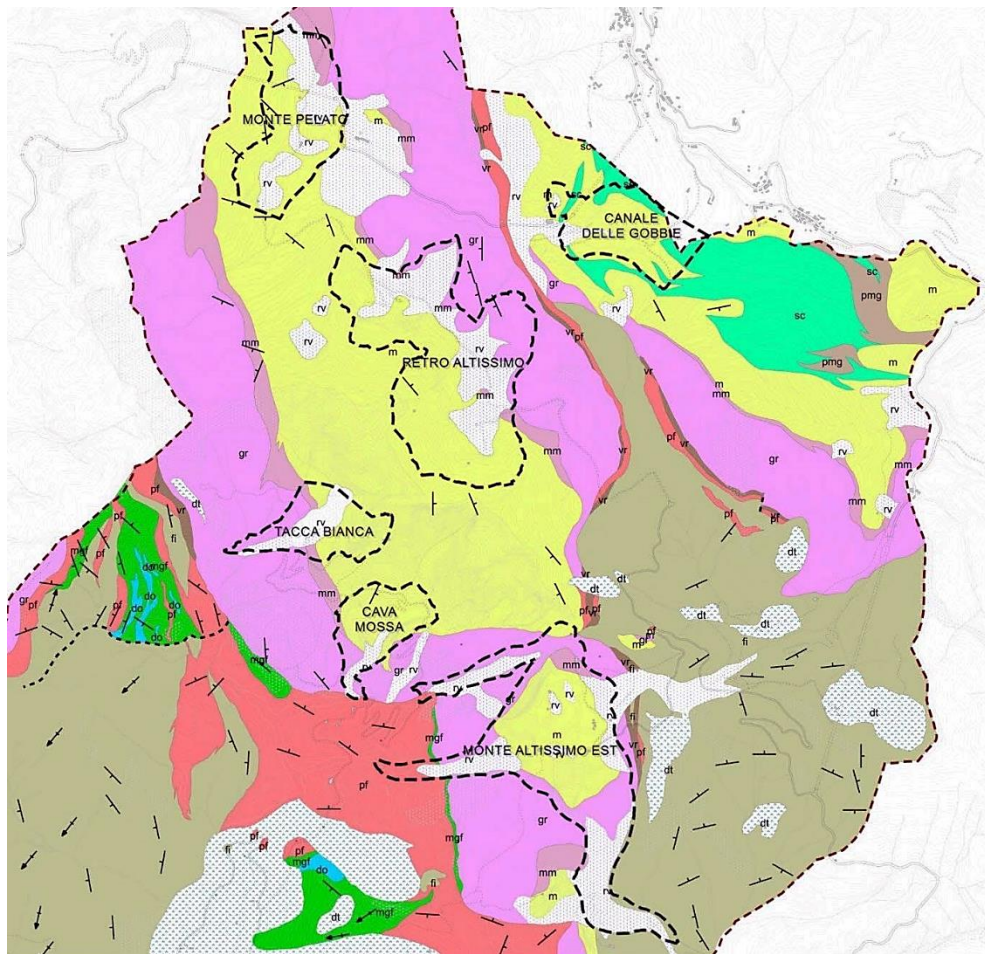


Fig. 7.2 – The system of 6 quarries for marble extraction in the Municipality of Seravezza (Terre.it, 2019)

The municipal ordinance defines in details the types of activities, steps and responsibilities necessary to draw up first the analyses about the landscape condition, and then the forecast brought in by the new plan. In particular, through a series of environmental (geological, geomorphological, hydrological and ecological) analyses, scientific reconnaissance in the field, photographic surveys and mappings aimed at evaluating the current state of the landscape, a preliminary Strategic Environmental Assessment examined and pre-checked the draft version of the new ten-year plan, according to the methodologies and guidelines defined by the relative EU directive.

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Remarkably, this activity of spatial and landscape analyses included the organization of several meetings and public hearings with local citizens and stakeholders, for the purpose of informing the community and receiving a feedback.

Among the actors, bodies and public authorities that expressed their views and suggestions, setting certain limitations at the same time, the Regional Park of the Apuan Alps (which features quarries both inside its boundaries and outside, in the contiguous zone), and the Tuscany Regional Government (through the Landscape Plan for Spatial Guidance ), were certainly the two most important ones. Besides them, environmental, cultural and trade union associations, along with independent private citizens, took also part in the discussion.

The main requests claimed by the civil society were:

- Shortening the production chain of the marble, supporting local entrepreneurial activities related to the transformation of the natural resource;
- Reducing the negative effects of the extraction activities in terms of pollution and visual impact on the landscape;
- Enhancing the landscape quality by means of environmental reclamation works.

Through different steps, the planning documents analyzed in the research were:

- Strategic Environmental Assessment for the areas under survey;
- Implementation Plans for the marble-Extractive Basins;
- Hydrogeological Management Plans for the region;
- Plan of the Apuan Alps Park;

They were considered in comparison and benchmarking with:

- The Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora), namely, with regulations on Special Areas of Conservation, Sites of Community Importance, and Special Protection Areas (SAC, SCI, and SPA);
- CETS (Carta Europea del Turismo Sostenibile – ECST, European Charter for Sustainable Tourism);
- The principles of the SFDRR (Sendai Framework for Disaster Risk Reduction).



### 7.3 Marble extraction and the role of private initiative

The assessment of the adherence, coherence and consistency of the preliminary SEA (Strategic Environmental Assessment) with the Implementation Plans for marble-Extractive Basins, allowed understanding and highlighting the impact of the extraction activity on the local identity, the local economy and the community resilience.

The main outcome is that mountainous cultural landscapes shaped by human activities such as marble extraction, have the potential to be driver of regional development, by supporting and fostering local identity, local economy and sustainable tourism. In particular, the new Implementation Plans for marble-Extractive Basins (IPmEBs) can promote the attractiveness of mountainous areas in many respects, also by preserving and further enhancing the ecological network, which has the potential of better connecting the coast to its hinterland, favouring tourism and local economy.

Through a SWOT analysis of the preliminary SEA (Strategic Environmental Assessment) for the drafting of IPmEBs, and an assessment of their consistency with respect to other guidance plans, the preliminary SEA has proved to be in line and in compliance with most of higher-level plans. However, it has under evaluated and almost not taken into account altogether the ECST (EU Charter for Sustainable Tourism) and the principles of the SFDRR (Sendai Framework for Disaster Risk Reduction). Therefore, it is already possible to outline the first planning guidelines and recommendations on how to improve and support the other new upcoming IPmEBs, in particular by:

- Including natural hazards through risk-assessment studies and pre-event recovery plans, thus fostering community resilience in the case of a catastrophic event;
- Developing actions aimed at creating new cultural and tourism opportunities (especially thematic tourism, e.g. marble-related, scientific, naturalistic ...).



# **The coastal hinterland of eastern Croatia**



## Chapter 8.

# The Dalmatian hinterland

### 8.1 Overview

The Dalmatian hinterland is one of the historical regions of Croatia, now witnessing a strong depopulation process, mainly due to negative economic trends. A strategic goal for a significant part of this territory is to improve the relationship between the river Krka, the cities of Šibenik and Knin, and the rest of the region, by providing a new touristic offer that could foster the functional and cultural relation between the different areas, leveraging the environmental continuity and promoting health (Lacković, 2011).

In the counties of Šibenik-Knin and Split, the spatial and landscape problems of the Dalmatian hinterland are exemplary, as well as the strategies and models for possible interventions on the territory, which can ensure sustainable living conditions in the internal areas. Many authors have analyzed in detail, in recent publications, the territorial dynamics of the Dalmatian coast and hinterland. Among others: the *littoralization* process that led to an excessive concentration of inhabitants and economic functions along the coast, and to huge land take (industrialization of urban areas, new buildings and road infrastructure); mass tourism along the coast; and socio-economic decay of the hinterland, with depopulation and abandonment of rural activities and sheep farming. In turn, this abandonment of the agricultural fields and other arable land has accelerated the processes of spontaneous and somewhat wild reforestation, which are a risk factor

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for forest fires, increasingly frequent indeed (as in the case of inland Portugal). In addition, in the Dalmatian hinterland there are problems related to high rate of unemployment, land ownership (very fragmented), insufficient tourism development and the lack of accommodation facilities of proper quality.

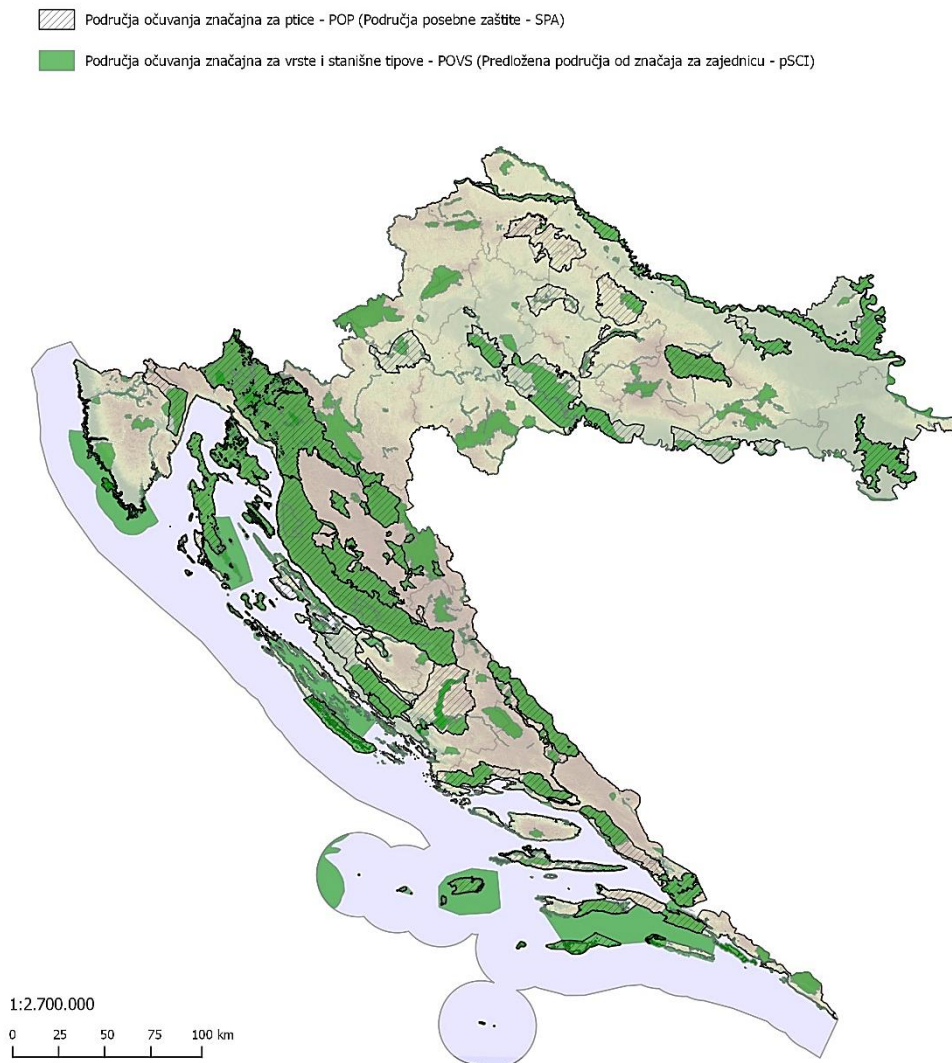


Fig. 8.1 – Natura 2000 Network in Croatia (natura2000.hr)

## 8.2 Land uses and landscape patterns

The research has analyzed the development process of the Dalmatian hinterland, approached and fostered in various ways. In recent times, polycentric models based on business diversification have led these attempts. Depending on the context, they differ significantly in relation to the type of relationship existing with the coast – continuity vs discontinuity (ecological, natural, cultural, historical and landscape) – as well as in relation to the level of specialization of the proposed activities – monofunctionality vs multifunctionality, or restricted/limited approach vs integrated and multisectoral approach (both at local and regional level). In most cases, the most favorable example is that one represented by the ‘composite model’, with an integrated approach, which aims to enhance the territory as a resource, leveraging the variety and beauty of its landscapes, the diversity of traditional agricultural activities and all possible types of economic and tourism activities.

In terms of landscape patterns, there is a huge diversity despite the harsh conditions of the soil and the climate of the Dalmatian hinterland. The main types of land cover and use are (cf. Fig. 8.2):

- Grazing lands
  - Enclosed pastures (a)
  - Open pastures (b)
- Managed forests
  - Open and enclosed forests (c)
  - Organic and geometric patterns (d)
- Rural landscapes
  - Karst fields and river valleys (e)
  - Wet and dry valleys (f)
  - Karst plateau (g)
  - Large karst sinkholes (h)

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- Small karst sinkholes (i)
- Terraced landscapes
  - Parallel and straight terraces (l)
  - Parallel and curved terraces (m)
  - Irregular terraces (n)
  - Combinations of terraces and dry stone retain walls (o)
- Enclosed and uncultivated karst lands
  - Drystone walls (p)
  - Cultivated patchy karst fields (q)
- Salterns (r)

Fig. 8.2 – Land uses and landscape patterns in the Dalmatian hinterland (elaborated by the author, based on Andlar and Aničić, 2015)



(a)



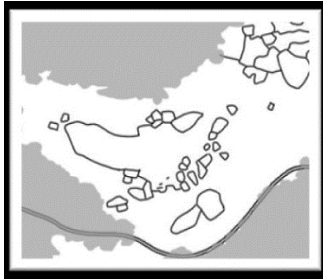
(b)



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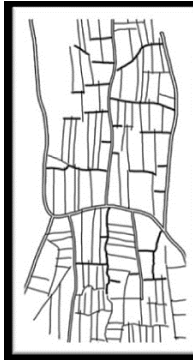
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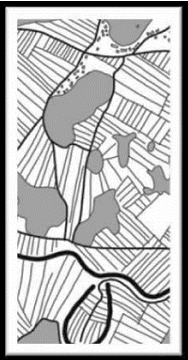
(c)



(d)



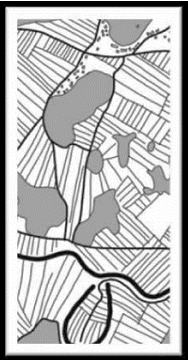
(e)



(f)



(g)



(h)



(i)

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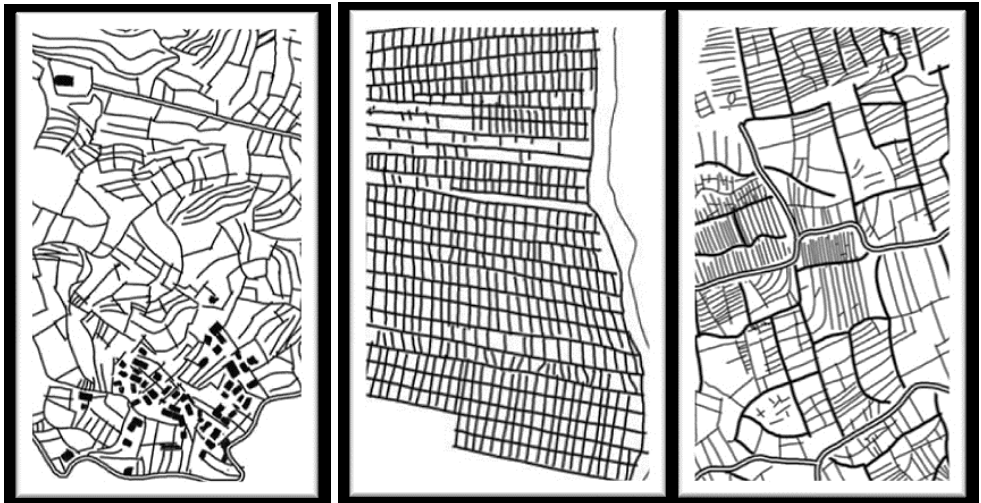
Regional development of inland areas through disaster risk reduction  
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(l)

(m)



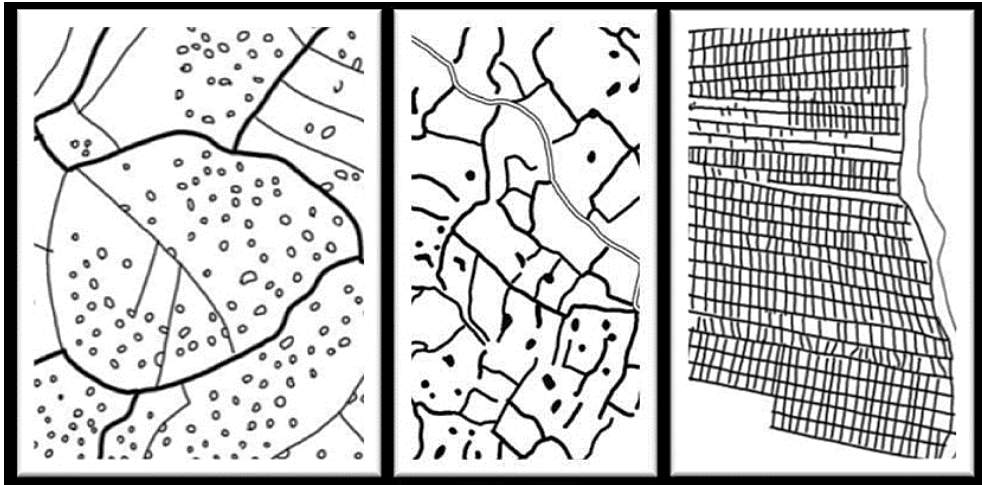
(n)

(o)

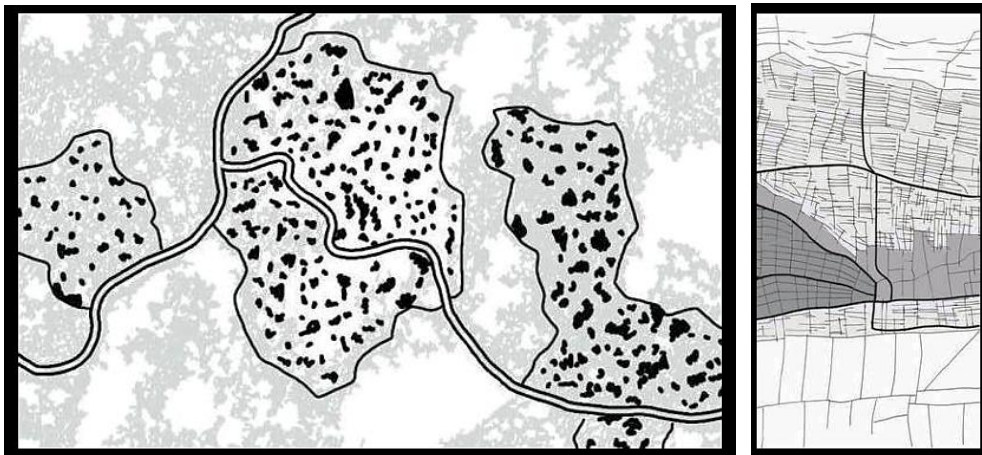
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Regional development of inland areas through disaster risk reduction  
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(p)



(q)

(r)

### 8.3 Strategy for the development of rural tourism in the County of Split

Considering that rural areas cover about 90% of the Croatian territory, that over 40% of the national population lives there, and that therefore these areas are spacious and sparsely populated, with local residents in constant decrease, the development of the Dalmatian hinterland is one of the priorities for the economic, labor, entrepreneurship, and tourism regeneration of the Croatian inland areas. The research has identified and analyzed the existing strategic frameworks for territorial development currently underway to guide the future development of rural areas.

The main strategy now in force is the result of the initiative of the Tourist Board of the Dalmatian County of Split to implement the key steps defined in the Tourism Master Plan of the County, which defines tourism as one of the key new products in this area. This rural tourism strategy is indeed a framework for implementing the development of this form of tourism, with great potential in the County of Split, but actually not well developed.

The main goals of the rural tourism strategy of the Dalmatian County of Split are twofold:

- to achieve more sustainable and balanced tourism in the County through a specific action plan for the enhancement of rural tourism, with an emphasis on both the Dalmatian hinterland and the continental parts of the islands;
- to encourage the development of rural tourism as part of the overall tourism offer of the County, by shaping the competitiveness, recognizability and authenticity of the rural tourism products, in full integration with the other tourism options.

The rural tourism strategy of the Dalmatia County of Split is therefore a piece in a broader framework set up for the development of the rural area of the County, and for the enhancement of the quality of life of its population.

# **The inland areas of northern Portugal**



## Chapter 9.

# The region of Alto Minho

### 9.1 Overview

The region of Alto Minho has unique characteristics associated to a natural landscape of enormous beauty and biodiversity, marked by an intense green of the fields and vineyards. It is a historical district rich of cities and characteristic places. The city of Braga is a tourist reference point in the region and was European capital of youth in 2012. Guimarães is the birthplace of Portugal and European capital of culture in 2012 too. The Portuguese way to Santiago, made by the pilgrims who flocked to Santiago de Compostela since the 9th century through Minho, is a relevant feature of great historic value to consider carefully while planning an environmental and development strategy.

Rivers are important components that define the different regional districts. The river Minho, main watercourse located on the north west of the Iberian Peninsula, is the only navigable waterway in the region, and represents therefore an important connection between the inland area near the national mountain park of Peneda-Gerês and the coastline.

Fostering cooperation between inland and coastal areas, through sustainable tourism activities, could reduce the human pressure on the coast, where some activities and sports, such as kitesurfing and golf, are taking place in excellent sceneries and facilities that compete with the best of the world. This approach

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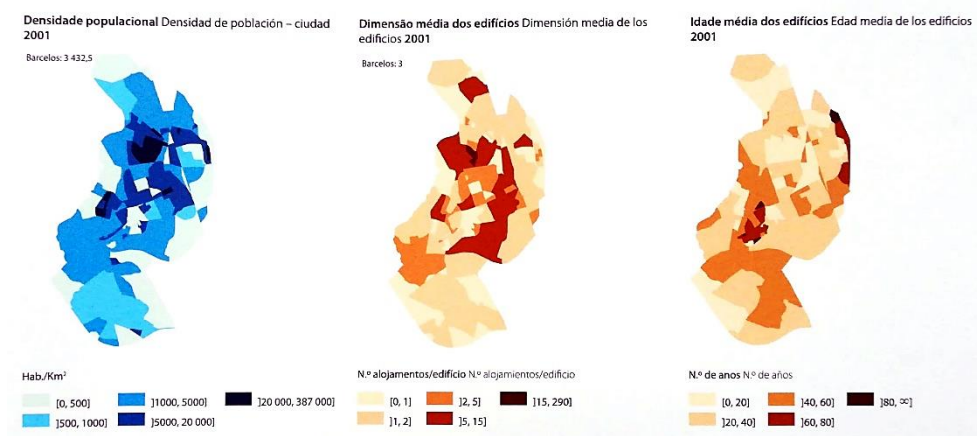
Regional development of inland areas through disaster risk reduction  
and new connections with the coast.

could also unleash the potential of inland natural assets in terms of economic development, contributing at the same time to their conservation, while local communities are the first and most important custodians of the territory and a strategical resource for its development.

In between inland and coastal areas, besides the riversides of Minho River, there are many other fragments of environmental continuity of significant ecological value, not well integrated in the wider network of tourist flows. The landscape undergoes continuous processes of identity transformation, along with communities in constant change, with a lack of local relations and with a high risk of territorial uprooting.

In synthesis, the need is a new strategy for territorial development that unleashes the potential of the natural assets and cultural heritage in terms of economic development, while contributing to their conservation and protection. The strategy would represent a key element both for the development of inland areas, as previously described, and for the diversification of local economy, the reduction of human pressure on coastal areas and against the seasonalisation of the related tourism. It could lead therefore to a deseasonalisation of the related touristic flows, opening to new touristic offers that can foster the functional and cultural relation and the environmental continuity between the two areas.

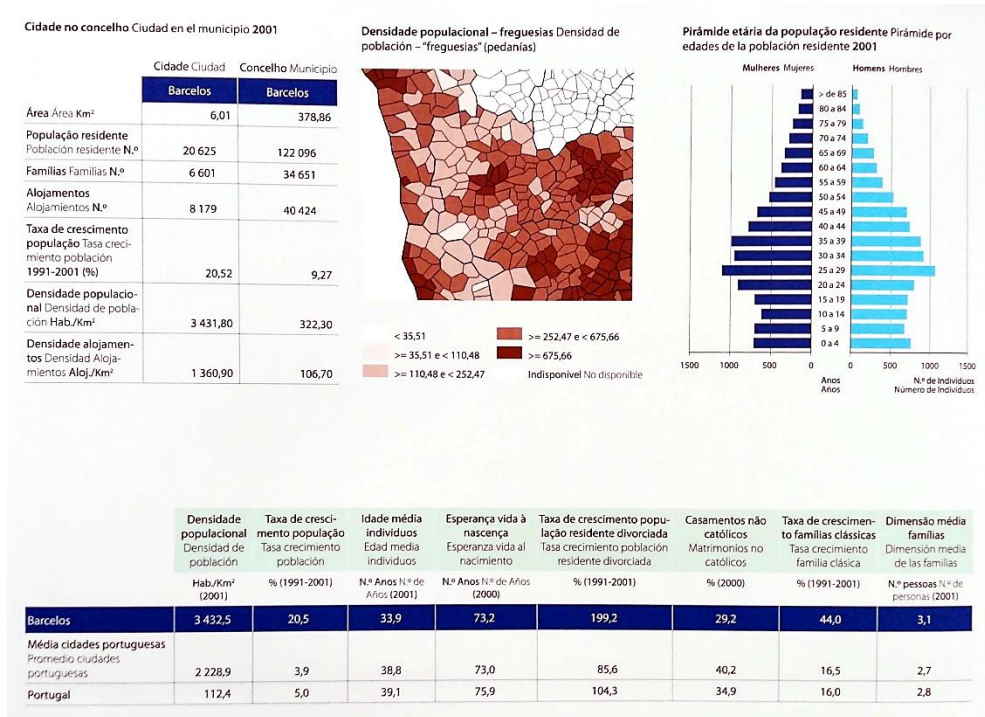
Fig. 9.1-3 – Demographic distribution and other reference statistics and data in the town of Barcelos, Portugal (Domingues, 2006)



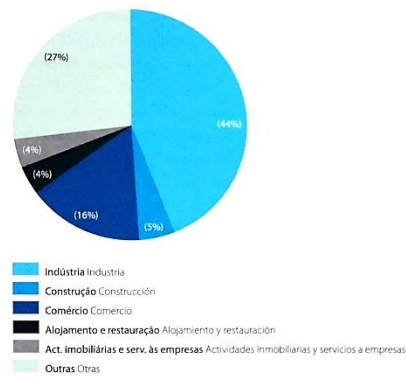


## Part 2 Chapter 9. The region of Alto Minho

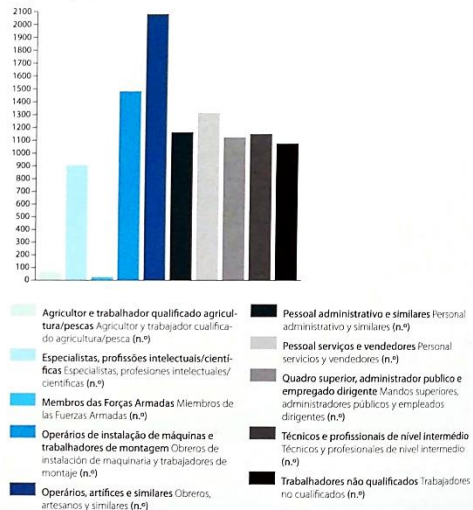
### Regional development of inland areas through disaster risk reduction and new connections with the coast.



**População residente empregada por CAE Población residente empleada por CAE (Clasificación Portuguesa de las Actividades Económicas) 2001**



**Distribuição da população empregada, por profissões Distribución de la población empleada, por profesiones 2001**



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Regional development of inland areas through disaster risk reduction  
and new connections with the coast.

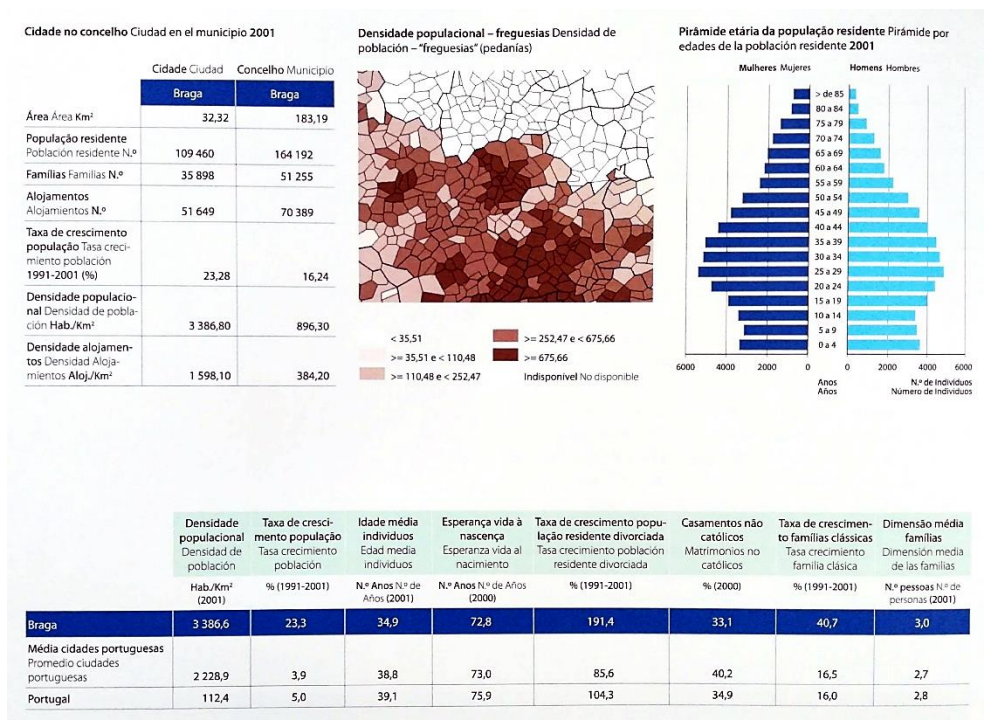
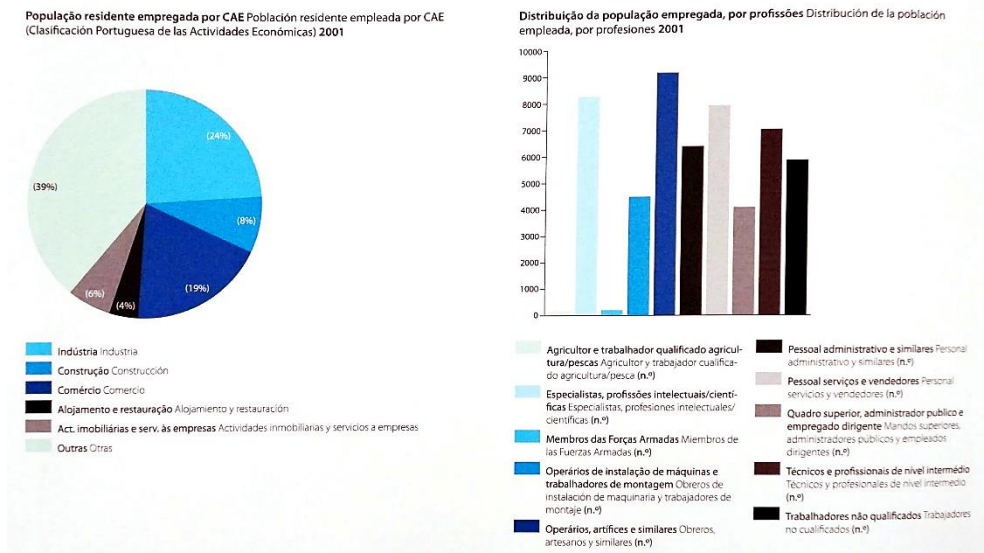


Fig. 9.4-6 – Demographic distribution and other reference statistics and data in the town of Braga, Portugal (Domingues, 2006)



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Regional development of inland areas through disaster risk reduction  
and new connections with the coast.

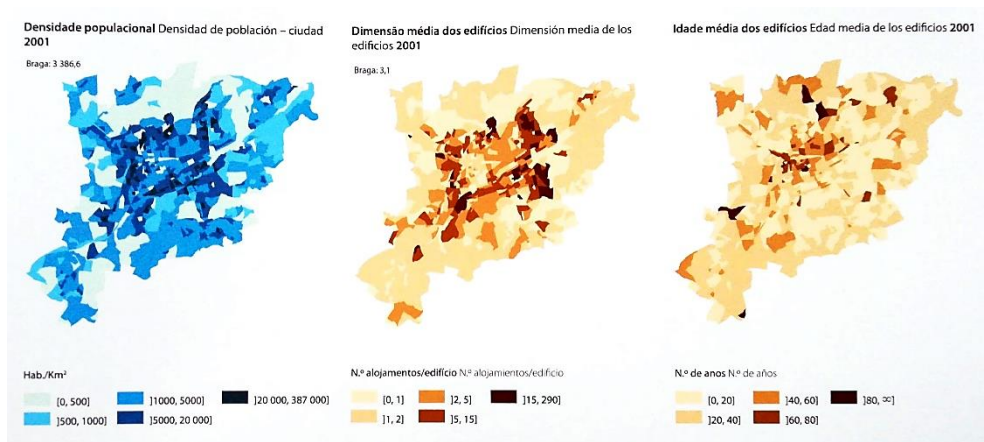
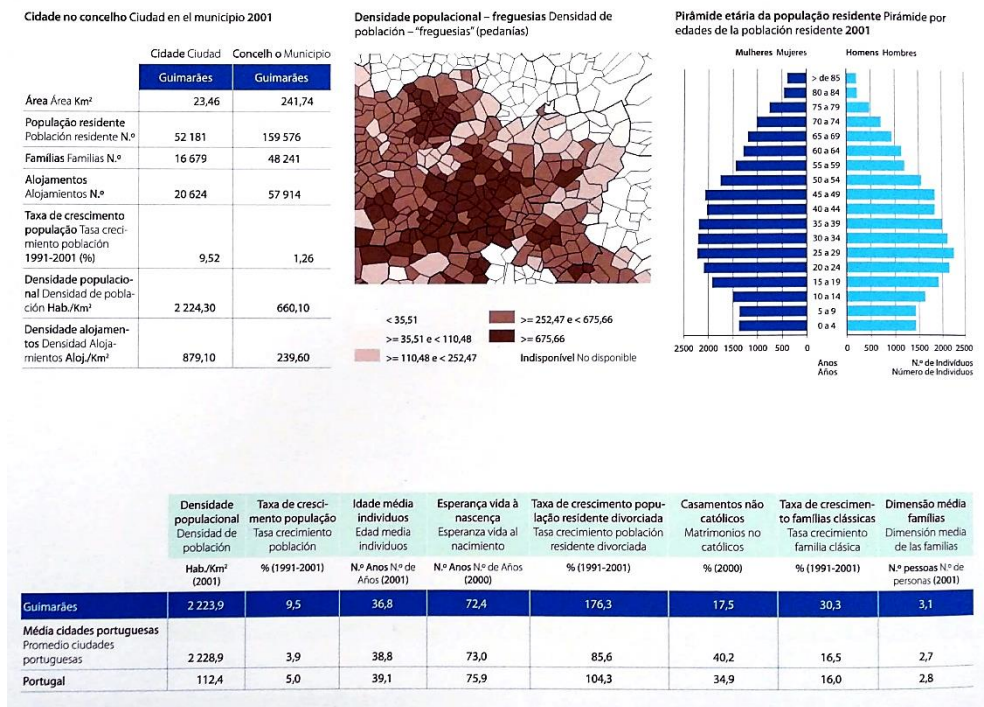


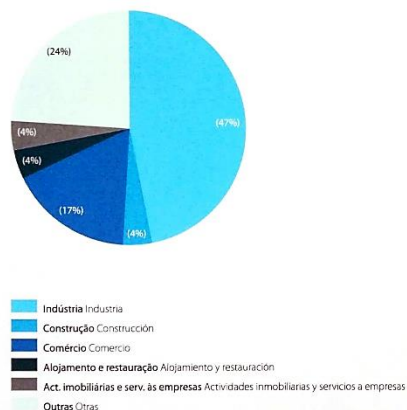
Fig. 9.7-9 (below) – Demographic distribution and other reference statistics and data in the town of Guimarães, Portugal (Domingues, 2006)



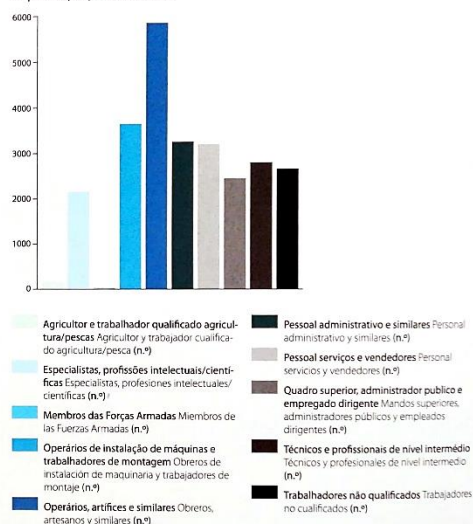
## Part 2 Chapter 9. The region of Alto Minho

### Regional development of inland areas through disaster risk reduction and new connections with the coast.

**População residente empregada por CAE** Población residente empleada por CAE  
(Clasificación Portuguesa de las Actividades Económicas) 2001



**Distribuição da população empregue, por profissões** Distribución de la población empleada, por profesiones 2001

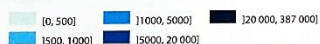


**Densidade populacional** Densidad de población – ciudad  
2001

Guimarães: 2.223,9



Hab./Km²



**Dimensão média dos edifícios** Dimensión media de los edificios  
2001

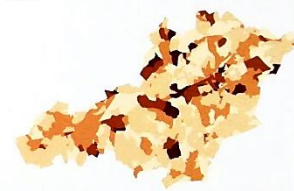
Guimarães: 1,9



N.º alojamentos/edificio



**Idade média dos edifícios** Edad media de los edificios  
2001



N.º de anos



## Part 2 Chapter 9. The region of Alto Minho

### Regional development of inland areas through disaster risk reduction and new connections with the coast.

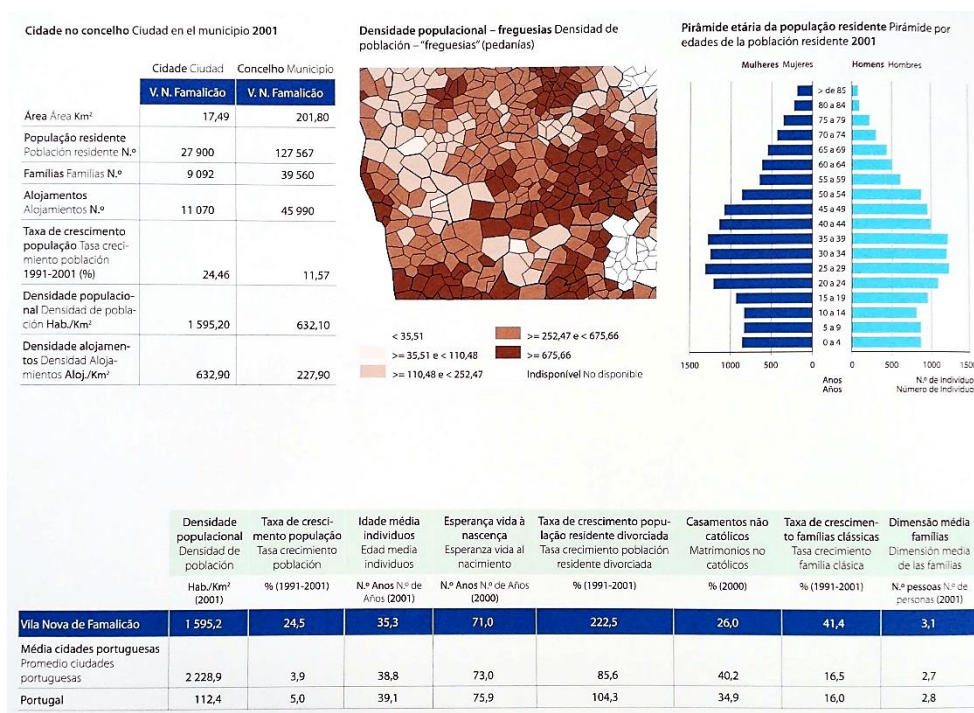
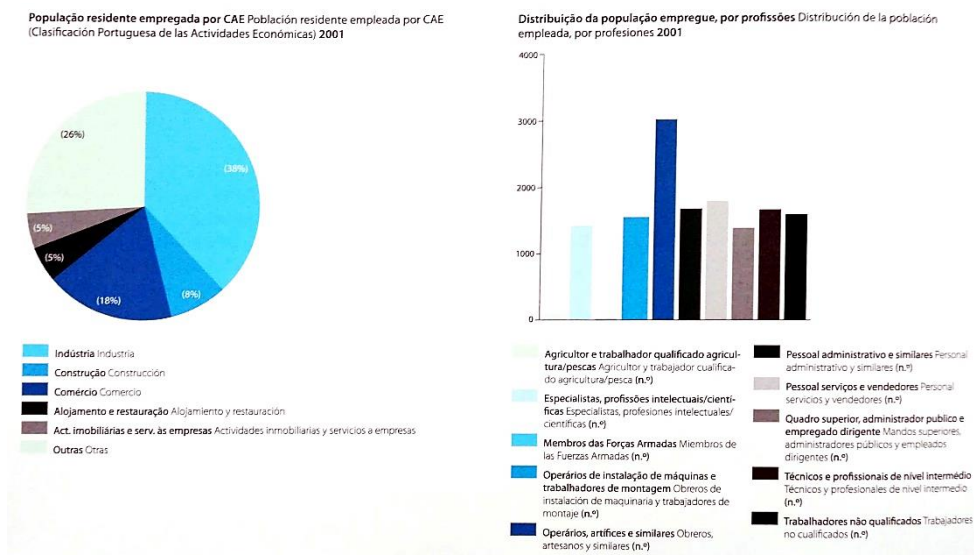
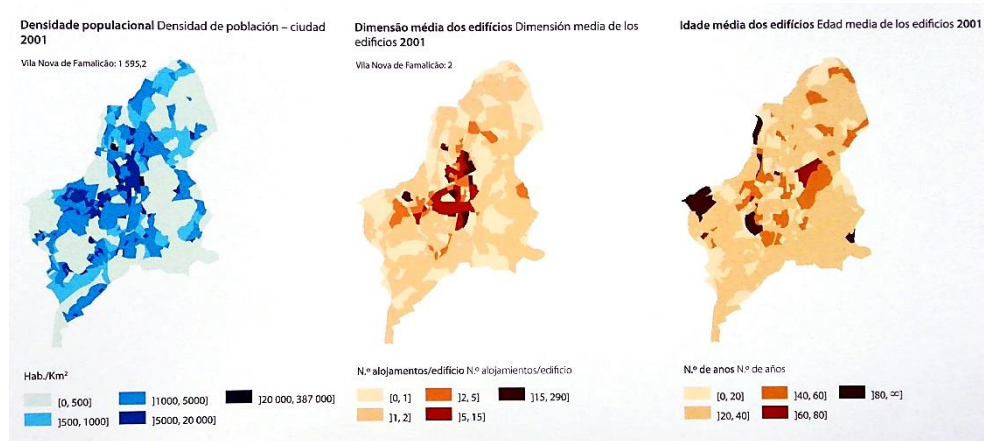


Fig. 9.10-12 – Demographic distribution and other reference statistics and data in the town of Vila Nova de Famalicão, Portugal (Domingues, 2006)



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## 9.2 Visit Rio Minho

The three-year interreg project Visit Rio Minho, completed in 2019, aimed at the capitalization of the “Rio Minho” brand through cross-border activities for the preservation, requalification and environmental enhancement of the endogenous resources associated with the promotion and communication of the Rio Minho as an ecotourist destination (as already envisaged by: Oliveira, 2015).

Transboundary cooperation between Spain and Portugal unfolded through shared operational objectives and joint activities by:

- Structuring and designing the Rio Minho brand at national and international level;
- Preserving and making fully readable, understandable and enjoyable the natural heritage along the watercourse;
- Enhancing the endogenous and economic resources of the river;
- Improving the cross-border network of green routes.

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Regional development of inland areas through disaster risk reduction  
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The results of the project have been:

- Development of the “Rio Minho” brand by involving agents with skills and interest in the field of ecotourism, thus reinforcing the importance of the local rural communities and their relationship with the river;
- Promotion of interventions that activated the structuring of the *Transboundary Minho Green Road Network*, and the enhancement of the related ecotourism routes;
- Commercial benefits for the “Rio Minho products” and local markets (short circuits and quality certifications);
- Implementation of innovative mechanisms and models for measuring the flow of visitors and tourists to natural areas.

In particular, a new ecovia along both riversides has enabled locals and visitors to move and communicate through a route intended primarily for the transit of cycles and pedestrians, which connects all the municipalities that border the Rio Minho (from Caminha to Vila Nova de Cerveira, Valença, Monção and all the way inward, up to Melgaço). This long facility and infrastructure, conceived and implemented in fact at a regional scale, is not only an opportunity to ensure sustainable mobility and tourism as well as cross-border interconnection, but also foster low carbon economy, healthy lifestyles and a much broader and soft transition towards sustainability in very different domains (Baltazar et al., 2018).

### 9.3 Rio Minho: um destino navegável (Minho river: a navigable destination)

Partially overlapping with the project “Visit Rio Minho”, partially moving from it as one of its first follow-ups, the second interreg project “Rio Minho: A Navigable Destination”, currently underway and expected to end by the end of 2021, aims in particular at the tourism enhancement between the municipalities of Monção, Salvaterra, Valença and Tui, helping to cement the transborder relationship. Like the other interreg, however, it moves first by implementating a set of measures and activities focused on the attractiveness and sustainability of the Minho River:

- Improving the navigability of the Minho River (e.g. boat trips, etc.);
- Creating small floating piers in each municipality to enhance leisure activities and outdoor recreation;
- Promoting walking routes and sport activities along the riverbanks;
- Developing fishing grounds;
- Organizing scheduled visits to the fortresses, historic centers, the Alvarinho wine cellars, and other cultural facilities;
- Establishing an environmental interpretation and information center (open air ecomuseum) on an island of the river;
- Developing workshops, conferences and scientific activities related to the river;
- Encouraging the practice of river and water sports.



# **Conclusion**



## Chapter 10.

# Benchmarking results and concluding remarks

A rapid process of change is taking place currently in European inland areas, challenging seriously their resilience. They are not only changing because of new processes and dynamics occurring in the field that for centuries has been shaping the landscape, namely, agriculture, food production and forestry (e.g. supraregional phenomena of intensification, marginalisation, specialisation, concentration, etc.). They are also changing because of continuous urbanization at global scale, which means outmigration from rural areas, where the shift to land uses such as rural residence, nature conservation, outdoor recreation and tourism, are increasingly affecting the dynamics and patterns of landscape use, and the slow but constant transformation of the landscape. Such novel trajectories, not completely understood yet, are pushing in fact to enhance the levels of territorial resilience. However, there are concerns on how to improve the landscape quality while at the same time safeguarding and revive the characteristic diversity of areas used, for instance, for niche and specialised farming, where food production is of decreasing importance, and where there is high pressure of a range of potentially conflicting new functions. These concerns entail new challenges in assessing and trying to enhance the resilience of European landscapes, although the UN Sustainable Development Goals have already taken them fully into account.

The environmental characters of inland areas, the organization of settlements and infrastructures, the economic trends, territorial policies, phenomena of climate, economic and social transition, and the attitude to listening to local communities

(with their different and conflicting perspectives and expectations) are all topics to tackle and address. These countless views and facets of a region could fall at best into the comprehensive vision and interpretation of the landscape as defined by the European Landscape Convention.

As the functional relationships and activities that shape the landscape have changed virtually everywhere in Europe over the past fifty years, the landscape patterns, though lagging behind, will inevitably follow the new uses and trends. While intensive food production of the lowlands has become more globalised and market-oriented, agriculture and zootechnics in inland and mountainous areas have become increasingly weak and disconnected from the rural communities. In peri-urban areas and other residual or marginal environments, similar changes in the landscape patterns are occurring likewise (Nilsson et. al., 2013). Functions related to rural residence and recreation, as well as conservation of historical farmlands, water resources, natural habitats, and cultural heritage, are gaining prevalence, and tensions emerge because of conflicting land use interests between multiple functions and multiple actors (both locals and newcomers, insiders and outsiders).

The dramatic changes of the European landscapes of inland areas are in fact side effects of wider socio-economic developments. Policy interventions at all levels and in very different domains have tried to reorient some trends, but their impact has been limited. The lack of sufficient policy measures to guide sustainable landscape development, not only in rural and inland areas, was the reason why the European Landscape Convention was born in 2000. A major aim of the Convention is to overcome the unintended side effects of general socio-economic developments and of many national and EU policies, by allowing all those concerned with the landscape to participate in its protection, management and planning.

Resilience, in this sense, can go far beyond the objectives of risk mitigation of disaster damages and adaptation to changes, being potentially an innovative principle in regional development and landscape policy that could inspire a more integrated, multi-disciplinary and open planning system, with a broad view and purposes. Among these, two of the most important are involving community stakeholders in the planning process, and grounding planning strategies on an innovative, creative and holistic framework of multi-disciplinarity and multi-functionality.

Effective landscape planning and governance are necessary to safeguard resilient landscapes, to promote multifunctional development and enhance the numerous ecological, social and cultural values of the territory. A variety, mix and balance of activities and uses should aim to regulate the conservation of biodiversity, and the sound management of the environment and culture, as well as the quality of the soil, water, microclimate, etc. Finally, all this should aspire to guarantee and safeguard the highest possible standards in the people's quality of life.

In so doing, this may encourage and support sustainable, adaptive and resilient land use development, with environmental and landscape issues in close relationship and on the same level of socio-economic ones. The role of landscape is in fact crucial in providing ecosystem services, good soil for producing food, water and vegetation, extensive storage of carbon dioxide, spaces and opportunities for recreational and cultural activities, in the end contributing directly and indirectly to human well-being (Costanza et al., 1997; Ehrlich, 2005, Egoh et al., 2008; Granek et al., 2010). This conception has been discussed and consolidated in the context of rural landscape planning and management for sustaining rural livelihoods and nature conservation, but such debates are instead still poorly developed in more populated urban and peri-urban landscape, where major challenges are placed (Pinto-Correia et al., 2018).

The way to make landscape resilient is by developing adaptive co-management in which a long-term management structure engages stakeholders and allows them to share management responsibility within a specific community-based system and to learn finally from their own actions and results. Therefore, a key challenge for achieving landscape resilience is the development of decision models for the integration between self-community behaviours and planned actions, namely, the integration of community-based processes and guided governance actions, inspired by equity and sustainability.

Such decision-making models should be capable of creating interaction between the strategic view of policies, plans and projects conceived by sectoral governance authorities on different scales, with the bottom-up initiatives and actions defined or implemented by the local communities, to maximize the benefits deriving from spontaneous and formalized co-management models and synergies between public and private resources. Therefore, it should be also essential to integrate self-community regulation and locally planned evolutionary policies and processes. By

integrating these different perspectives, it would be possible to imprint structural flexibility (self-regulating, dynamic instruments in continual evolution), retroactivity (multi-scale, incremental, cumulative instruments), and the transition to environmental sustainability.

As opposed to the past, when planners used to programme periods in the order of five to ten years, such processes should now drastically accelerate, to keep pace with rapid changes and to cope effectively with novel and different challenges. This requires new methods and innovative approaches in various disciplinary areas dealing with landscape resilience. In particular, comprehensive data monitoring systems and new models of complex data elaboration should continuously provide updates for big databases set up to identify possible technical solutions and allow for the consequent adaption of decision making. In addition, new governance approaches are required, allowing for prompt decision taking and ensuring at the same time the involvement of all stakeholders. Last but not least, with regard to the important issue of human resources development, new professional figures of ‘experts in resilient landscape management’ are necessary: planners who are equipped with a solid multi-disciplinary background and can be employed for technical, administrative, research or political functions at community, regional and national levels, in the public and private sector.

The best strategies proved those based on a win-win cooperation that focuses on the potential landscape and environmental continuity between the coastline and the inland areas (e.g. cultural landscapes, natural parks, ecological networks along riversides, etc.), as well as on other cultural, productive and functional interdependencies. They aimed primarily to foster sustainable tourism activities, such as de-seasonal tourism, scientific and thematic tourism, widespread and rural tourism. They also addressed diversification of local economy, development of job opportunities, services and other possible supports to citizenship, providing a substantial contribute to the regeneration of inland areas especially in terms of employment rate, social inclusion and containment of ageing phenomena. This is indeed a feasible way to reduce the human pressure on the coast, while unleashing the potential of natural assets and cultural heritage in inland areas. One of the main common challenges is in fact to link the valorisation of the inland resources with the development of job and citizenship opportunities, which is essential for the regeneration of a local community.

Finally, as ascertained by the research, farmers are a relevant component of inland areas, a social and professional group to involve in the recovery and reconstruction process following a natural disaster, and engage in decision making with governmental agencies at local and regional level, to build up community resilience. The major socio-economic roles that farmers and breeders play in building up resilient communities are:

- Guardians of the landscape as a natural resource, namely, maintainers of its ecological diversity, of the richness of flora and fauna through smallholder farming and family-based rural systems, with a traditionally circular local economy. Traditional management practices of using pastures, cultivatable land and forests favour and maintain ecological diversity and balance;
- Production of primary alimentary goods for human and animal consumption such as cereals, feedingstuff and fodder for animals, meat (e.g. lamb and beef) and milk (e.g. from sheep and dairy cow);
- Delivery of primary alimentary goods for further local processing by people working in the food sector (e.g. butcher's shop and cheese factory) or processing and commercializing by themselves. Farmers and breeders constitute the base for the food chains and food industry of the local and regional territory of mountain inland areas. Any local development of this sector depends on the farmers' community as primary producers;
- Provide support to various services of the tertiary sector, in particular in the domain of tourism (e.g., agri-tourism through bed&breakfast and other forms of tourist accomodations, provision of hunting products, etc.), school children teaching.

Additional roles of farmers and breeders are:

- Additive, off-farm income generating activities;
- Part-time engagements with municipalities and other governmental agencies in the ordinary maintenance of infrastructures (e.g. repair of roads, preserve accessibility to remote areas, etc.);
- Forestry activities;
- Other services (e.g. post office, caretaker in schools, etc.).

Part 3  
Chapter 10. Benchmarking results and concluding remarks

Regional development of inland areas through disaster risk reduction  
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In conclusion, as evidence is consistently accumulating that not only climate change is a fact, but that the very process of global warming is undergoing an unprecedented acceleration with unpredictable results, the potential, frequency and dimension of natural disasters are expected to certainly increasing. In this scenario of a rapidly changing world, the landscape meaning of resilience becomes of utmost importance for the society. A resilient landscape is indeed a social and ecological system where disaster prevention and preparedness develop in proactive measures to prevent or mitigate not only the most catastrophic consequences of calamities, but also less serious damages and losses. Territorial balance and cohesion make this possible, because reducing the impact of an adverse event and overcoming difficulties require solidarity and mutual help between regions and people with different levels of income and development, different levels of vulnerability and exposure to risks, and different levels of response capacity.







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