

Journal of Alpine Research | Revue de géographie alpine

107-1 | 2019

Friches en montagne : problématiques, enjeux et opportunités

Multifaceted Fallow Lands: the Case of Lombardy

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Electronic version

URL: <http://journals.openedition.org/rga/5341>

DOI: 10.4000/rga.5341

ISSN: 1760-7426

Publisher

Association pour la diffusion de la recherche alpine

Electronic reference

Luisa Pedrazzini, « Multifaceted Fallow Lands: the Case of Lombardy », *Journal of Alpine Research | Revue de géographie alpine* [Online], 107-1 | 2019, Online since 06 April 2019, connection on 19 April 2019. URL : <http://journals.openedition.org/rga/5341> ; DOI : 10.4000/rga.5341

This text was automatically generated on 19 April 2019.



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Luisa Pedrazzini

Introduction

- 1 Marginal Alpine areas, i.e. the so-called “fallow lands” or “alpine friches”, defined as “zones of decline and gradual recession” in the study of the ETHZ group of Basel (Diener *et al.*, 2006), correspond to territories which have lost their original character, as subject to loss of attractiveness and decay due to the abandonment of typical activities. The above study mainly refers to rural areas and homogeneous geographic and spatial contexts, extended to entire mountain valleys, which are peripheral as compared to the context of Swiss urban networks; moreover, their delimitation is the result of geomorphological constraints: “The border of alpine fallow lands are largely determined by topography” (Diener *et al.*, 2006). These areas, in a nutshell, are agricultural, with weak connections in the network (physical and intangible) and poor economic relations with large cities, and are also characterized by emigration and a marginal tourist economy.
- 2 The limits of this typological generalization were later pointed out by other studies on the Swiss case, which referring to the complexity of the Alpine space, highlighted the different “nuances” characterizing these neglected territories, also with reference to their development potential (Lehmann *et al.*, 2007).
- 3 This article aims to contribute to the existing studies, supporting and integrating the thesis of the articulated mosaic of the Alpine space, with assessing further utilizations of these areas with reference to the Lombardy mountain, where the fallow lands and the relative context show different characterizations, typologies and spatial structures. The cases analyzed in this article, show that abandonment was not exclusively caused by migration or linked to the loss of agricultural activities, but also by the disuse of other “consolidated” economic functions. Moreover, the boundaries of the spatial areas involved do not always show a geomorphological homogeneity, but often these are heterogeneous and structured in different ways: they may correspond to portions of

Alpine valleys, even very vast, or may be linear or nucleated and with great territorial impact. The demographic decline and emigration that occur in these areas, the weakness of the connection networks (mobility and communications), the distance from large urban centers and the limited tourist attraction of these sites are common to the Swiss case.

- 4 Taking into account the typological and territorial differences which characterize the Lombardy region, the resulting picture can be considered as representative of a large part of the southern alpine front, especially the central western part.
- 5 The mountain space in Lombardy has always been considered marginal and weak in regional social-economic development policies supported by the EU resources, starting with the first European Regional Development Fund (ERDF) programme at the end of the 1990s, up to the definition of the National Internal Areas Strategy (SNAI-Strategia Nazionale per le Aree Interne) for Lombardy in the 2014-2020 EU planning, where the mountains were identified as the suburbs of the suburbs (RL, 2014).
- 6 Within these areas considered “weak” in Lombardy's economic planning, it is important to point out that there are different characterizations in the obsolescence of many Alpine and pre-Alpine sites. In the Alpine valleys of Lombardy there are disused areas that cause a negative environmental and socio-economic impact on the territory, but also fallow lands which have potential for recovery or are involved in relaunch projects.
- 7 With the aforementioned preambles, hereunder will be reported some hypotheses referring to the specific territorial features of the Lombard mountain, based on the different origins and characterizations.
- 8 In this frame, special attention will be also paid to a further component, of global importance but which has occurred in the last decades with particularly dramatic phenomena in the southern Alpine arc, i.e. climate change, with the different negative implications on environment, ecosystems but also on economy and society of the territories subject to such phenomena (Cipra, 2002).
- 9 Therefore, the effects linked to climatic and environmental issues will be considered, which are believed to have added a further element in contributing, in recent times, to bring about the obsolescence or loss of identity of areas that in Lombardy have characterized the Alpine platform as “the district of entertainment” and mass tourism of the city-region described by Bonomi, essentially based on second homes and with a weaker socio-economic structure as compared to other parts of the Alps (Bonomi, 2012).

Neglected territories, at risk of abandonment and seeking new identities

- 10 In the case of Lombardy, there are no structured data or historical series sufficient to develop a comprehensive analysis on the topic of declining Alpine territories, as there is no systematic information for an effective integration between territorial and socio-economic data. The analysis is therefore carried out considering cases deemed relevant which, based on their characterizations, can be compared to similar situations in the larger Alpine area and, therefore, useful for guiding and developing reflections on possible measures suitable to the different specific territorial features.

- 11 The results, albeit partial, seems to suggest the need to develop further investigations on the southern slope of the Alps, in order to compare territories belonging to the same geographical region but with different structure and history.
- 12 Based on the outcome of the cases examined and, in general, the available data, the following typologies were sketched :
- A. areas in which uses and functions that historically supported them failed and have been completely abandoned, which may correspond to land or portions of valleys, or may be nucleated or linear structures abandoned;
 - B. areas in which uses and functions that historically have distinguished them, have been neglected over time and are subject to phenomena of decline (demographic, social and economic) still ongoing. In this case, these are whole valleys or portions of valleys;
 - C. areas where the economic development and the settlements expansion were basically linked to seasonal tourism, subject to regional attraction in recent expansion (the '60s-70s), where for at least a decade there have been strong phenomena of disuse and abandonment, failing the element which determined its development (snow), due to climate change. These territories correspond to entire municipalities or large portions of secondary valleys.
- 13 With regard to the latter typology, it is possible foresee the effects of climate change as elements involving risk of future abandonment of territories, being this matter a potential source of catastrophic events or a decisive cause of environmental phenomena adverse to human settlements (serious disruption, landslides, ...), to be considered regardless of whether the functions are historically consolidated or recently established.
- 14 Overall, these are situations related to two broad types of abandonment or loss of identity: the first is referred to areas that, due to historical or economic reasons or imposed by the evolution of the market have had a functional efficiency corresponding to the evolution of the activities settled and, once these are no longer current or were transferred elsewhere, they became neglected (socio-economic anthropic factors).
- 15 The second macro category is related to areas in which abandonment or obsolescence mainly depends on exogenous environmental factors (climate), whether these are mountain areas affected by recent tourism development with second homes and winter sports facilities, or valleys and slopes characterized by consolidated functions but potentially subject to risk due to geological instability caused by environmental factors that are not always predictable (climatic-environmental factors).
- 16 In one case or another, the measures that can be implemented are significantly different and the prospects for identity recovery and improvement have different probabilities of success, as is explained in the cases described below.

Table 1 – Typologies of disuse or abandonment of Lombardy cases

Macro-typology	Typologies of disuse or abandonment	Spatial character
1. anthropic, socio-economic factors	A. areas in which historical or traditional uses and functions have been completely abandoned because of failure and obsolescence	Nucleated, linear, dispersed, portion of valley

	A. areas in which historical or traditional uses and functions are subject to phenomena of decline (demographic, social and economic) which are still ongoing	Entire secondary valleys or portions of valleys
1. climate-environmental factors	A. areas with relatively recent building and economic development linked to seasonal tourism, with phenomena of disuse and abandonment mainly related to climate change	Areas as large as municipalities or portions of secondary valleys

When territory wins, when territory loses (functional changes)

- 17 The decline or abandonment for historical or economic reasons, or imposed by market requirements, is the result of the evolution of anthropic uses and processes that may have developed over many decades and whose origin may also date back in time. The areas or settlements concerned may meet a wide range of functions: be linked to health with hospitals and sanatoriums, economic activities with steel industries, quarries, mines or hydroelectric power plants, national security and protection of ancient borders with barracks and structures from the First World War, mobility with railways and more.
- 18 In Lombardy, these are sites characterized by different structures and types of settlement. In some cases, they are large nucleated settlements, with a significant impact on the Alpine valley floors, such as the large iron and steel factories of the Bergamo and Brescia valleys, sometimes built in territories that could have very different purposes.
- 19 In this sense, the case of the Camonica valley, in the province of Brescia, is emblematic because it catalyzes different typical situations, representing obsolescence in the mountains. The valley is about 90 kilometers long and is among the largest in the central Alps. This was the first Italian site in the UNESCO list in 1979 for rock drawings, with more than 12 thousand years of history and with archaeological sites distributed over 180 locations in 24 municipalities. Furthermore, there are important and historic ski resorts such as Temù, Ponte di Legno and Tonale, all in the upper valley. These characteristics could have been the best potential to promote an off-season and widespread tourist development in the whole valley.
- 20 On the contrary, despite the decommissioning of historical steel plants and iron factories in the valley floor, which amount to about 700,000 square meters, a “doped” support policy to “productive activities” was promoted. This initiative led to the construction of large warehouses until very recent times (a generic “industrial” destination), thanks to the tax incentives from the State through the so-called “Tremonti law” (law n. 489 8/8/1994). These real estate complexes out of scale with respect to the territorial context remained largely empty or underutilized, becoming obsolete even before they fulfilled their function. Moreover, it is also difficult to reconvert them, so they add up to the “historical” neglected areas, leaving a negative legacy on the territory.

- 21 The abandoned sites with a linear feature or spatially extended along the Alpine arc have a different nature, now being historical, related to national security functions and protection of borders such as trenches and high-altitude fortifications of the First World War in Lombardy, Trento and Bolzano (area of the “White War”, the ancient military linear infrastructure of the same historical period, distributed along most of the southern front of the Alps (“Cadorna Line”). After years of neglect and obsolescence, close attention was paid to the recovery of local finds and to the reconstruction of historical routes and sites of the First World War, also following the most recent findings that emerged from the glacier retreat in Adamello, enhancing these assets as historical memory and interest for cultural tourism (ERSAF *et al.*, 2013). In fact, the White War Museum in Temù in the Camonica valley, the Forts of Colico, Montecchio Nord and Fuentes (between the high lake of Como and Valtellina), had more than 24 thousand visitors overall in 2017. (<https://www.corrieredicomo.it/boom-visitatori-nei-forti-colico/>).
- 22 Investments and initiatives for the revitalization of abandoned assets that for a long time were considered obsolete and a cost to the community, but which in reality constituted an important historical and identity heritage, removed but not lost, promoted tourism and the knowledge of territories which today are fully experienced during the year, offering opportunities for sustainable development to the local economy. All this also helps overcoming the extemporaneous fruition of seasonal tourism “hit and run” or of short stays, which characterizes the practice of day skiing in those valleys.
- 23 Other typologies of abandoned areas typical of Lombardy regard transport infrastructures, such as mountain railways and other connected buildings such as stations, toll booths or customs, no longer useful or outdated by other faster and more efficient infrastructures (there are 1244 ANAS – National Roads and Highways Authority “roadman’s houses” in Italy, only half of which are still used). The abandoned railway lines in the pre-Alpine and Alpine areas between Varese and the Ticino Canton in Switzerland and in the Bergamo valleys amount to almost 200 kilometers, with the addition of an extensive heritage of bridges, viaducts and tunnels (<https://www.ferrovieabbandonate.it/>).
- 24 In some cases, the potential for tourism of these obsolete infrastructures has contributed to their relaunch, as is the case of the “Lake Railway” from Palazzolo sull'Oglio to Paratico Sarnico on Lake Iseo, recovered for tourist use since 2014, also in light of the great event for the installation of the artist Christo on the same lake in 2016, which attracted more than one million visitors in two weeks. This trend was also confirmed later, with a considerable increase in tourism in the area, bringing benefits to part of the Camonica Valley.
- 25 These obsolete historical sites may have very different natures and structures, as well as potential for recovery equally complex, so that many of the assets take on a large scale and the places assume prospects for development of cultural tourism, as an Italian historical-identity memory of an important period of the past and life in the Alps.
- 26 The Italian cultural heritage code establishes that every public building over 70 year old should be automatically recognized as a historically important monumental asset and protected by law. But the fate of many of these assets and sites is, at best, to be sold to private individuals or destined to tourism enhancement, as in the case of the sites of the

First World War mentioned above or the abandoned railways and the ANAS toll booths, given on free loan for tourist activities.

- 27 Another case of particular interest concerns Ecomuseums. This institution, which according to the shared definition of De Varine is based on the “entire heritage of its community and its territory” (De Varine, 2003), may also represent a successful solution for the recovery of declining territories.
- 28 According to the regional law of Lombardy, these are “cultural institutions” (Law n. 25 of 7/10/2016) operating in a defined territorial area and with the active participation of the population, local authorities, cultural, scientific and educational institutions.
- 29 In the case of Lombardy, the Ecomuseum is an “institution” on a voluntary basis and promoted “from below” that operates on fragile territories, aiming to keep alive the identity and integrity of increasingly smaller communities which risk becoming ghost towns; they represent a particular environment, ways of life and related transformations and are dedicated to ensuring the care, management, enhancement and recovery of the cultural tangible, intangible and landscape heritage.
- 30 In Lombardy there are 47 Ecomuseums (just under a quarter of all Italian ones), 32 of which are located in the mountains (most in the Alpine valleys of Bergamo, Brescia Lecco and Sondrio) and some involve large areas, such as entire villages or valleys. These are places characterized by constant demographic decline, abandonment and extreme fractioning of the estate properties, which often makes it difficult to carry out joint recovery interventions.
- 31 In this case, the cultural objectives, such as the enhancement of local knowledge, ancient crafts, the passing down of the historical memory of productive activities no longer existing (such as quarries or mines) and the promotion of typical artisanal productions and agriculture are the lever for the maintenance or recovery of inhabitants in site and for economic and social activities, as well as a conscious tourism development, slow and attentive to the local characteristics, and for the re-launch of a long-lasting, inclusive and resilient economy.
- 32 Among the mountain Ecomuseums, a positive story of recovery and exploitation of territory regards the Ecomuseum of Ornica (BG) in the Regional Park of the Orobie, in the Brembana valley, a village of 150 inhabitants where the “Mountain Women’s Cooperative” was founded. The inhabitants of the area created the first “albergo diffuso” a specific Italian concept of “scattered hotels” in Lombardy and the first community cooperative, thus saving the village from abandonment, enhancing the local culture and building a sustainable tourism perspective. The initiatives mainly regard the relaunch of slow tourism and attentive to the culture of the tangible and intangible traditions of mountain agricultural work and food, hiking activities which do not require any specific physical infrastructures (<http://www.ecomuseodiornica.com/>).
- 33 Another significant activity in progress, which has similar characteristics to the Ecomuseum, regards the recovery of the Alpe Predoria and Alpe Madrera mountain pastures on the Orobie Valtellinesi in the municipality of Talamona, in the province of Sondrio, donate by the owner as a testament to the FAI (Fondo Ambiente Italiano). It is about 200 hectares of land, 70 of which are woods and 20 are pastures where, with the management of the FAI, pastoral activity has returned after years of decline, the original economy has been reconstituted starting from the mountain pasture system and the huts. In this case, thanks to an entity outside the territory (the FAI), it was possible to promote

the recovery of an abandoned place, enhancing it and developing its original purpose and potential with further functions regarding education, tourism, protection of the landscape and the environment, tangible and intangible heritage.

- 34 These experiences are characterized by the recognition of a new *status* in places where functions now obsolete, but which for centuries have ensured the permanence of the community and its identity, are recovered and enhanced by updating them, giving a new role to the community of “multifunctional” territories which today can also satisfy a demand outside the same community.
- 35 The improvement of local identity consciousness, allows promoting weak territories but with unique quality, meeting an increasing demand for “leisure” based on the search for genuine and “typical” products which is gaining strength on a global scale in developed countries.
- 36 These places provide “services”, produce goods and carry out functions which, starting from the particular agricultural purpose, take place not only through a conscious tourism and consolidation of the local identity, but also the protection of biodiversity, the supervision of the territory and the safety of slopes, as well as the production of ecosystem services, which together represent different aspects of the same function: mountain care.
- 37 With reference to these positive experiences of recovery of declining areas, the Lombardy pattern presents a dualism that includes situations where mountain development options are emerging successfully, in line with other Italian Alpine sites (Corrado *et al.*, 2014; Pedrazzini, 2010; FAI, 2018), also with the contribution of actors outside the local economy such as the National Trust or banking foundations. On the other hand, initiatives promoted mainly thanks to the awareness of local actors (this is the case of Ecomuseums), at present do not seem to sustain the long-term relaunch and attractiveness of the places. The mountain settlements sprawl characterizing Lombardy, where most municipalities have less than one thousand inhabitants, even the most interesting experiences are not enough to change the negative demographic trend and the decline of the local socio-economic system.
- 38 For now, the increasing demand for “authenticity” and environmental quality does not ensure a new role to these marginal territories compared to that as “service providers” and leisure for the inhabitants of the metropolitan region (Perlik, 2015).
- 39 Projects to recover abandoned lands require considerable local tenacity, realistic proposals for enhancement and a long-term management perspective, supported by systematic and highly targeted public policies. Investing on the widespread quality of the territory, in contrast to the monocultural economy typical of winter tourism, which concentrates functions and development in a few places with deserted periphery, is a good way to encourage the critical mass useful to enhance wider territorial areas in an integrated development project, involving several fronts of the local economy and society. An important contribution may come from the development of local networks, innovative activities versus traditional ones, but which ensure the preservation of the mountain landscape, territorial capital and natural resources, are useful to enhance the distinctive characteristics with a “proactive safeguard”, assigning to mountain residents the role of “custodians” of the territory, also bringing benefits to citizens.

The irreversible loss of a recent identity (climate change)

- 40 If most of the obsolescence of the mountain territory depends on economic and social transformations or the evolution of market demand, another type of disuse is also increasingly taking place, affecting settlements, buildings and areas that have lost their original status, mainly due to factors linked to climate change. Very often these are sites recently built, with characteristics very different from those described in the previous paragraph in terms of functionality, quality of settlements, impact on the territory and local identity.
- 41 Between the seventies and nineties, second homes or tourist resorts were mainly built in the Lombardy mountains, so that some towns in the upper Alpine valleys are mostly composed of secondary residences, which corresponded to a predominantly intra-regional demand and the metropolitan region.
- 42 In the most recent decades, there was a phenomenon of dismantling ski facilities and, consequently, the abandonment of settlements closely linked to winter tourism, especially in the middle mountain. This situation generally affects large sectors in the entire Alpine arc, but strongly characterizes the southern front, with approximately 180 disused facilities in northern Italy alone (Rumiz, 2009, Tessadri, 2011). The main cause of abandonment is the persistent and dramatic decrease or lack of snow, this being the main natural resource that has determined the economic prosperity of many ski resorts and second home sites in northern Italy.
- 43 In Lombardy, the main focus was on tourism based on winter sports, developing the monocultural character of these areas, so much so that in recent decades, where the negative effects of global warming have been more evident, these resorts have suffered from serious economic difficulties.
- 44 In the high alpine valleys of Brescia, Bergamo and Lecco there are tourist facilities and ski trails that have been disused for decades, with entire phantom tourist settlement areas mainly composed of second homes. The most important abandoned areas concern the provinces of Lecco, Como, Bergamo and Sondrio, for a total of 22 ski resorts (Mountain Wilderness *et al.*, 2007).
- 45 This phenomenon does not show a trend reversal and is particularly significant for its negative legacy on the territory; the critical events of many ski resort management companies in places like Monte Campione, at the beginning of Camonica valley and also in the valleys of Bergamo, were a sign of more recent disuses, such as the ski resort of San Simone (Foppolo) in Brembana valley, following the bankruptcy of Brembo Super Ski in 2017, after 40 years of activity. Different reasons are combined with the economic difficulties of managing systems that are perpetually at a loss.
- 46 In the province of Lecco, at least 5 ski resorts have been abandoned since the late 90s, but the building structures and the facilities are still present to be a blot on the landscape. In general, the tourism sector linked to skiing is not well off and is not a healthy economy. The financial statement of ski resorts in Lombardy shows a dramatic deficit of about € 350 million. In general, cableways are operational because they are declared “Local Public Transportation” (TPL-Trasporto Pubblico Locale) and therefore are subsidized with public grants, as is the whole regional ski sector.

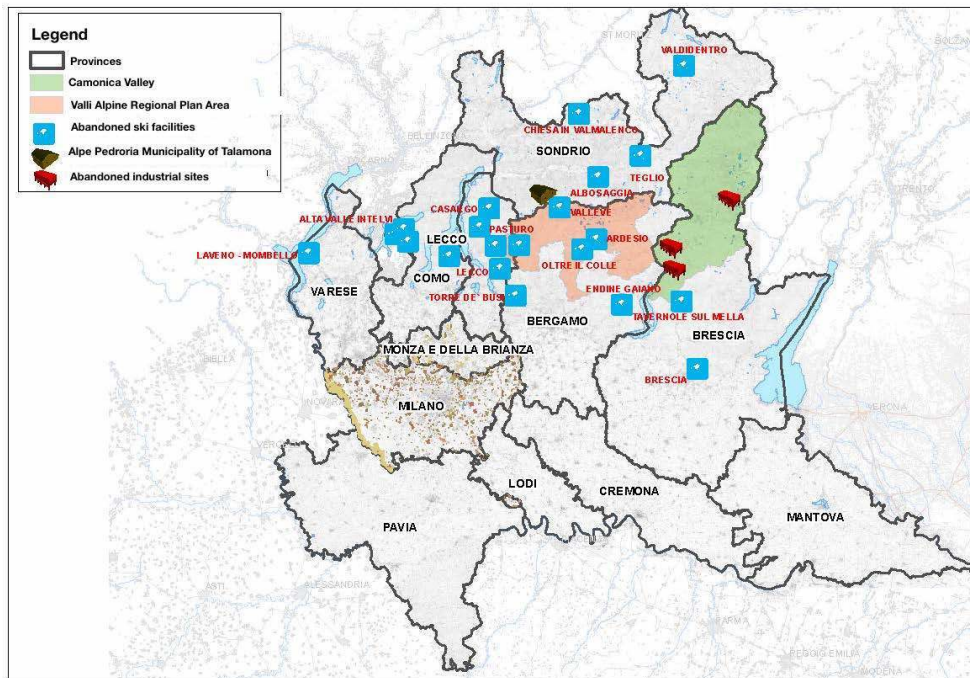
- 47 If the issue of disused facilities remains an open question and not yet fully addressed, that of the dramatically underused build-up areas of the Lombardy mountains has been submitted to political attention in the last few years. The great impact in terms of “wasted” space and land degradation has become a priority in regional territorial policies, so that in 2015 the Regional Area Territorial Plan (Piano Territoriale Regionale d’Area-PTRA) “Alpine Valleys” was approved as an operational instrument of the regional territorial plan, for a mountain area which includes part of the provinces of Bergamo and Lecco, for a total of 45 municipalities.
- 48 The PTRAs were designed to address the negative territorial effects of sprawl deriving from second homes and the social and economic consequences of underutilized settlements. Municipalities have been identified according to two main parameters: they belong to “disadvantaged areas”, based on regional indicators, and show a high stock of unoccupied dwellings. The Plan establishes three general objectives: “Enhancing local identity”, “Promoting a new development model based on qualified tourism” and “Promoting new settlement models to avoid land taking”.
- 49 Half of the municipalities included in the plan have less than 500 inhabitants, the smallest has 99 and the largest slightly more than 8,000. The population structure is characterized by an old-age index of 155, versus a regional average of 141 (Regione Lombardia, 2015).
- 50 With regard to statistical data on “unoccupied” dwellings, which include second homes or holiday homes, the data show a very critical situation. In the district of Foppolo (BG), mentioned above for the bankruptcy of the San Simone ski area, unoccupied houses amounted to 93.75% of the total. Also in Oltre il Colle (BG), another of the abandoned ski resorts, secondary houses amount to 82.8% of the total. At Castione della Presolana, an important center of the Val Seriana comparable to other Alpine tourist centers of international standing, the unoccupied dwellings stock amounts to 82.6% of the total. Despite this, the urban plan approved in 2010 provided for a settlement area of 227,029 square meters, 160,000 square meters of which in addition to the former urban plan (Lega Ambiente, 2010; Cipra, 2008).
- 51 In general, the building stock of unoccupied houses in the PTRAs prevails clearly over the occupied one, with an average of 72%, versus the regional average of 11.3% (ISTAT 2011 data).
- 52 In these areas, the key elements determining the crisis and the obsolescence of the territory depend on exogenous factors, such as the effects of globalization (tourism and low cost transportation) and the consequences of climate change in the Alpine region.
- 53 It is possible easily estimate how high the land taking of land and environment has been in the last decades and what problems are now posed in terms of environmental costs, service management and revitalization of the municipalities. The PTRAs formulate addresses mainly referring to local planning with non-mandatory nature, delegating their application to the municipalities, without referring to economic resources, tax measures or time planning.
- 54 The analysis on the use of second homes shows that their degree of use is inversely proportional to their age. When the assets correspond to a fairly old real estate investment - the majority of the existing building stock - and therefore the owners are families with adult children, the use of these properties is much more limited than those where the investment was made more recently by younger families, which “justifies” the

real estate investment with a more assiduous use (Osservatorio Turistico Provincia di Bergamo, 2010).

- 55 The recovery of such extensive settlements decay is very complex, because their functional crisis, although strongly related to environmental reasons (exogenous), has a mainly local (endogenous) relapse, because it affects land uses, the existing heritage and a seasonal monofunctional tourism economy, determining a landscape-environmental degradation, the decrease in property values, the loss of territorial quality and high urban management costs, which are charged to the municipalities.
- 56 The extreme dispersion of property, the fact that these are mainly second homes and, therefore, not inhabited throughout the year but only for a few days or periods, the financial and the building sector crisis of the last decade, the costs of services and facilities affecting the local economy based on winter tourism, are conditions which make the conversion of these areas almost impossible.
- 57 These phenomena, which produce chain effects not yet fully identified and assessed in their actual extent for long-lasting effects on the environment, society and local economy, are followed by an even more significant and not yet clearly perceived potential risk, which may be the deterrent of next and future alpine “fallow lands”.
- 58 Special reference is made to the effects of climate change on the Alps, which is immediately manifested by the lack of snow and the melting of glaciers that put the local economy in crisis, causing decline and recession, but which are also the origin of great environmental disasters (Harris *et al.* 2009; Kohler *et al.*, 2014; Alpine Convention, 2018). Each one remembers the great landslide of Thurwieser in upper Valtellina in 2004, with over 2 million cubic meters of rock involved, or more recently the one that took place in August 2017 in Val Bregaglia, between Switzerland and Italy, with a collapse of 4 million meters rock cubes from 3000 meters above sea level, with phenomena located along the river bed which unfortunately involved people, inhabitants and infrastructures. A similar disaster occurred in Camonica valley in 2012, with a large landslide of 250,000 cubic meters of material that affected the territory of Sonico and some villages, causing serious damage to settlements and infrastructure.
- 59 In all these cases, when determining the causes of the events, reference was made to the fact that the subsidence of the permafrost at higher altitudes collapsed.
- 60 There are some assessments on the landslide of 1987 in Valtellina that consider the instability of the permafrost as the reason for that dramatic and sudden collapse of the mountain, which caused deaths and terrible consequences throughout the valley. It is well known that the instability of permafrost, as well as the retreat of glaciers and the lack of stable snow due to the increase in temperatures, are phenomena deriving from the effects of climate change. These events suggest that close attention should be paid to what happens at high altitudes, as permafrost degradation influences the evolution of the landscape and ecosystems and can cause negative effects on infrastructures and the safety of human activities.
- 61 In Lombardy, the total surface of glaciers has decreased by 24% in the last 50 years (Smiraglia *et al.*, 2015) and the progressive melting of the ice contained in the permafrost causes an increase in natural hazard linked mainly to the instability of the slopes. In terms of the structure and management of the territory, at present no sufficient attention is paid to the indirect effects of these phenomena, which in the short term may lead to a

radical change in the “consolidated” lifestyle of the inhabitants of many alpine valleys and on land uses.

Figure 1. Map of Lombardy with the different types analyzed



Source: Geoportale Regione Lombardia, Mountain Wilderness Italia *et al.*, 2007- Edited by: Pedrazzini, Cicala.

Figure 2. Incoherent Architectures – Foppolo



Picture by Francesco Secchi.

Figure 3. Out-of-scale Buildings – Valsassina



Picture Luisa Pedrazzini.

Change the model and integrate skills: towards tailor-made solutions

- 62 Global commitments and European climate change policies focus on increasing risks for the environment by encouraging public decision-makers to monitor the large metropolitan regions where the causes have arisen and the most impactful effects of climate change due to human activities (floods, air pollution, health impact, etc.) occur. The European Union has implemented policies and programs dedicated to the same areas (urban mitigation, initiatives to promote resilience, climate plans, etc.) also following the climate agreements from Kyoto to COP21 in Paris in 2016 and sequels.
- 63 Climate change has important and not always predictable consequences also in the mountains, which is essentially a passive subject of the climate deterioration, as it is affected the most by the consequences without being the environment from where the causes originated. Despite the increasing frequency of landslides, floods and other extreme events, the potential negative effects of global warming and climate change on land use, territory, society and economy, as well as on the consolidated life of the inhabitants of the Alps, appear less evident to the political decision-makers than those which occur in urban areas, and so it seems that no adequate attention has been paid nor specific policies dedicated to them so far.
- 64 In addition to creating abandoned lands and settlements for direct cause, such as the lack of snow, in the near future there is the possibility of a forced or preventive abandonment of the territory due to indirect environmental risks, with possible creation of “fallow lands” in which the effects and the related measures would be much more difficult to predict and complex to deal with.
- 65 It is possible to mention multiple cases, such as that of the municipality of Pontresina, in the Grisons, a few kilometers as the crow flies from the Lombardy border, which is protected by a dam 13 meters high and 460 meters long. This artifact was costed seven million Swiss Francs and was designed to avoid the risk that major water and mud flows resulting from permafrost degradation could flood the village. Nevertheless, if the origin of the territorial crisis is determined by global environmental reasons such as climate change, it is necessary to intervene with structural mitigation measures, as well as resilience and adjustment policies. If the environmental dynamics affect the territorial structure, planning instruments cannot only consider the possible uses of the land or the mitigations, but also the conditions that may influence their future uses, now that environmental climate conditions take over.
- 66 In this case, however, the possible repercussions can be much more relevant and long lasting than those originating from the abandonment due to “anthropic” reasons. The difference between socio-economic and environmental reasons also determines a different potential in terms of development prospects and reconversion of critical areas, due to the costs and risk of uncertainty of policies and initiatives which must take into account a lot more variables, that may not be managed locally.
- 67 This leads to the conclusion that it should be adequately assessed through specific scenarios the potential effects on the organization of the territorial functions and land uses of the “fallow lands” that may occur due to climate change at high altitude (Einhorn, 2015), as well as on the landscape and ecological quality and the availability of natural

resources, including the effects on the economy and the life of mountain inhabitants, also consolidated over the centuries. The analysis of these phenomena and their effects implies different perspectives on the future uses of the Alpine territory, requesting for an effective alliance between disciplines and competencies in order to formulate tailor-made solutions to support public decision-makers, which include diversified, innovative purposes or choices “relieving” from anthropic uses, strictly related to the environmental cause of territorial crisis, even planning their preventive “rest” with scheduled “fallow lands”.

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ABSTRACTS

The phenomenon of territories affected by obsolescence and under abandonment involves the Alpine region as a whole in several respects such as social, economic and environmental. The article aims to contribute to current studies, supporting and integrating the thesis of the complex mosaic of the Alpine space, focusing the attention in particular to the Lombardy’s

mountain, where fallow lands show different characterizations, typologies and spatial structures. Taking into account the typological and territorial differences of Lombardy, the resulting picture can be considered as representative of a large part of the southern alpine face. The main typologies emerging refer to obsolete or derelict spaces because of economic or historical reasons and the relative functions were de-committed or moved elsewhere. Other cases are referred to winter resorts having lost their status due to “environmental” factors. This drives to reflect on the effects of climate change in shaping future Alpine fallow lands. The lack of snow and dramatic ice melting put in crisis local economy, with decline and recession and is the origin of great natural disasters too, causing a radical change in the way of life of the Alps’ inhabitants. This leads to the need to assess through specific scenarios the potential effects on territorial organization of the “fallow lands” that may occur due to climate change, as well as the availability of natural resources, including the effects on the economy and the consolidated life of inhabitants. This can drive to different perspectives on the use of the Alpine territory, with an alliance between disciplines to formulate tailor-made solutions including diversified, innovative purposes as well as planning preventive “rest” with scheduled “fallow lands”.

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Keywords: Fallow lands, climate change, territorial scenarios, Lombardy

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