

## URBAN REGENERATION AND SUSTAINABLE BUILDING TRANSFORMATION: WOOD AS A BUILDING MATERIAL

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Volume: 4  
Number: 2  
Page: 339 - 344

### Article History:

Received: 2022-11-14

Revised: 2023-01-25

Accepted: 2023-03-16

### Abstract:

The current cultural debate in urban and architectural fields - but not only - sees the emergence of increasing attention to environmental sustainability and related issues, which inevitably condition all the different phases of the project. Reducing land consumption, coping with climate change, improving the energy efficiency of buildings, as well as increasing their level of living comfort, are just some of the goals to be pursued to achieve a generalized improvement of the built environment through application of the typical principles of the so-called urban regeneration. Looking at the internal areas of the Italian territory, concepts are evoked such as the reuse of materials, the reconversion of buildings and sometimes the renaturalization, which is a less usual choice for a highly man-made territory like the Italian one. In this case, therefore, the use of wood as a preferential material for the aforementioned operations, a material which, over the last few decades, has greatly improved from a structural and performance point of view. Finally, a proposal will be made, carried out with the Municipality of Resia, moved precisely by these principles and aimed at being a sort of "model" - and also a stimulus - for the future of planning in these areas.

**Keywords:** Urban Regeneration, Sustainability, Abandoned Buildings, Reuse, Renaturalization.

Cite this as: CERVESATO, A. (2023). "Urban Regeneration and Sustainable Building Transformation: Wood as a Building Material". *International Journal of Environmental, Sustainability, and Social Sciences*, 4 (2), 339 - 344.



## INTRODUCTION

In the broader contemporary debate on inland areas [**Error! Reference source not found.**], we want to focus on the marginal territories of Friuli-Venezia Giulia, to analyze the built environment, with the aim of understanding its criticalities and then proposing new protection, promotion and enhancement strategies. Territorial fragility is an essential starting point for trying to understand the dynamics that have led to the current configuration of these villages over time, the result of a constant and unstoppable phenomenon of abandonment. More generally, we want to try to offer a picture of the environmental and territorial typical characteristics of the Italian North-East to provide a broader vision of the context within which the small villages and hamlets are located.

Is recovering and trying to repopulate the constellation of small internal villages scattered throughout the Italian territory the only way to go? But above all, does it authentically represent the concept of sustainability, today more than ever sought after in multiple disciplinary contexts? Starting from these questions, a broader reflection begins, trying to understand in which portions of the territory it is correct to intervene with the safety and recovery, supporting the political pressures and in which areas to opt for different choices.

## METHODS

The environmental crisis, understood as a direct consequence of the climate change in progress - the great, common underlying theme of today's debates, which affects all disciplinary areas -, has

led to a strong generalized degradation, further accelerated by the lower anthropogenic presence that sees the disappearing of a whole series of interventions, such as the maintenance of the slopes and banks of rivers, as well as of the forest fronts in mountain areas, causing as a direct consequence of real catastrophes - upon the occurrence of significant rainfall -, increasingly sudden and violent, after long periods of drought. In a future perspective, moreover, the rise in sea level will push towards a revaluation of these high-altitude places, trying to compensate for the upcoming uninhabitability of large flat areas. In a certain sense, if we look at climate change not only to try to apply strategies to reduce its effects, but also from the point of view of adaptation to change, in the last ten years the world has gone in the direction of the so-called inland areas. Once again, as has already happened in the past, humanity is called to adapt to a change that can be mitigated but at the same time unstoppable and difficult to reverse.

A further crisis, of demographic and economic nature, increases the criticalities caused by the environmental crisis. In Italy we are experiencing a period of negative sign both from a demographic and economic point of view, and by analyzing the data provided by the main Italian statistical institutes, it is clear that we are witnessing the worst demographic decline in the last hundred years [Error! Reference source not found.], a phenomenon that is amplified precisely in the internal areas.

Demographic changes are characterized by a sharp decline in births, an aging population and a loss of residents. The population of the last twenty years has grown only thanks to the number of foreigners. Without the implementation of the appropriate intervention measures to counter this negative trend, the repercussions on economic growth will be severe.

From the economic point of view, the forecasts are equally negative. The gross domestic product (GDP) is expected to grow by +0.3% in real terms, a decisive slowdown compared to the previous year. Meanwhile, a deceleration of production rates is expected, which would negatively affect the labour market, leading to an increase in the unemployment rate. The political situation both nationally and internationally contributes to all of this, creating uncertainty within the financial markets with negative consequences for the global economy. A negative economic situation makes its weight felt more in disadvantaged or poor areas, among which we find the smaller city centers. Due to the lack of services, infrastructures and job offers, some parts of the Italian territory suffer a continuous phenomenon of abandonment in favor of large metropolitan cities where we find greater opportunities for the new generations. In addition to the migration of new generations to foreign countries, the phenomenon of migration within the national territory should not be underestimated, because it is constantly growing as confirmed by the forecasts for future years. A shift in the weight of the population from the South to the Center-North of the country is expected in the years to come. According to ISTAT (National Institute of Statistics), in 2065 the Center-North would welcome 71% of residents against 66% today; on the other hand, the South would come to welcome 29% against the current 34% [Error! Reference source not found.].

The analysis of these data leads to a reflection on the Italy's future in the coming years. A drastic demographic decline underlines the extreme need for interventions in favor of births, effective and concrete political actions for the life of future generations. The lack of confidence in the future is a factor that should not be underestimated, because, as emerges from the ISTAT data, it is recorded in the year 2018 at already very low levels. A direct consequence of the lack of trust is the choice of a precautionary attitude, which pushes young couples to postpone the choice of having a child. In this direction, a parallel discourse on inland areas could start, trying to unite two problems that at the moment travel on different tracks.

The abandoned villages would need new inhabitants, large public and private investments for the recovery of buildings and new infrastructures. They could become the concrete answer to the

need to offer housing and work to young people. A policy for families that is at the same time a policy for the repopulation of inland areas.

Starting from these premises, we want to try to focus on the analysis and study of the materials that make up the buildings and infrastructures of these villages or hamlets (especially in the near future), mainly characterized by stone and wood constructions, in many cases still in fair or good condition. The study of building materials was found to be a premise of fundamental importance to arrive at a correct and thoughtful formulation of possible future urban regeneration scenarios for these territories, which include the involvement of the different areas of the project, from the urban to the architectural scale, possibly up to the detail of the single building, which becomes the object of transformation, reconversion, reuse and in some cases recycling.

This research path has led to hypothesize wood as the main material: we want to produce a series of works that can be created to enhance the public space and encourage repopulation phenomena of these territories. Therefore, starting from the study of the wood material, to better understand its characteristics and methods of use, in particular as a building material for the consolidation of existing buildings and for the construction of new architectures. At the base of the choice of wood as the main building material there is certainly the experience of Friuli, where, after the terrible earthquake of 1976, a different philosophy of consolidation of buildings began, with a great use of wood especially for some fundamental architectural elements such as roofs and horizontals in general.

The wood sector is an important sector of the economy of the Friuli-Venezia Giulia region, it is enough to consider that the companies operating in the wood industry are currently more than eight hundred and over three hundred are the companies active in forestry and forestry activities nowadays. The forest area in Friuli-Venezia Giulia is estimated at three hundred thousand hectares - equal to 38% of the regional territory -, and its distribution sees over 90% of the forest located in the mountain areas, where the abandoned or near-to-be villages and hamlets are located - which are the main object of this study [**Error! Reference source not found.**].

The multiple functions of production, protection, social well-being, and conservation of biodiversity that the woods or forest is called upon to perform, must be preserved through a correct management of resources, which regulates the withdrawals of wood mass in a way that is commensurate and sustainable to what the forest is able to produce. The link between man and the use of natural and forest resources was in the past an essential element for the life of the populations of rural areas. The etymology of the Italian word "bosco" itself refers to the wood: in fact it is supposed to derive from the ancient Germanic word *buwisc* (lit.: "wood", precisely) or, in a further hypothesis, from the French word *bois* (lit.: "wood"). With the passage of time, as the anthropogenic presence within the mountain areas decreases, these dynamics of forest and timber management have changed. Today, the functions of the woods that go beyond the purely productive aspect are of greater importance, or social functions that have been more developed over time. It is therefore essential to mediate between the various interests: production, environmental, social and tourism, to strive for a balance between the different needs that characterize the forest and the management of wood: economic management for a correct supply of raw materials and forest products for the industrial chains, the socio-economic development of local populations, the conservation of ecosystems, their state of health and their tourist usability. Moving on to the technological aspects, wood has innate anti-seismic qualities - as it can be counted among the lightest structural materials -, a very low radioactivity, absorbs carbon dioxide, is recyclable and reusable. It has a duration equivalent to other materials considered more robust, and thanks to the autoclave treatment today its combustion time is way longer than the past and there is no risk of fires. It allows an extraordinary rapidity of assembly which reduces a lot the times of a traditional construction site; it is a flexible,

light and modular material, which with its great plasticity can be used to create an entire structure or just a roof, a wing, a portion of the building.

Wood construction is therefore seen as a primary tool for triggering urban regeneration and building transformation in a sustainable key. Sustainability – first of all, understood as environmental and therefore economic and management of the construction site – is in fact increasingly at the center of the architectural debate, in compliance with the indications provided by the UN 2030 Agenda for Sustainable Development, which in particular with the Goal number 11 promotes the creation of sustainable cities and communities. The next one therefore looks like an architecture that designs and builds buildings to limit the environmental impact, placing itself as design goals energy efficiency, the improvement of health, comfort and quality of use of its inhabitants, reachable through the integration of innovative structures and technologies into the building.

Making sustainable architecture means knowing how to build and manage a building that can best meet the needs and requests of clients, taking into account, from the embryonic stage of the project, the rhythms and natural resources, without causing damage or inconvenience to others and to the environment, trying to fit harmoniously into the context, thus also thinking about a total – or at least partial – reuse of space and, perhaps even more importantly, of materials. In fact, in a general vision of improving the built environment, it is not possible to ignore the social, environmental and, above all, energy aspects, while thinking about the recent upheavals that have hit the markets. This condition leads to reconsidering all the aspects that characterize the architectural process, from the design phase to the execution of the works. In addition to the choice of materials, there are other aspects, sometimes underestimated, which now more than ever need an urgent overall reassessment. Just think of the costs related to the construction of a building, which in inland and mountain areas affects more than elsewhere, precisely because of the more uncomfortable conformation of the territory. A rapid modernization of these aspects is desirable to achieve the realization of works that are not only efficient because of the materials used, but that can be completely sustainable in all aspects that characterize architecture today. This process of technical and design innovation will be able to create the right conditions for the formulation of a new approach to the project, with the ultimate aim of giving a second life to abandoned buildings: from obsolete and unused artifacts, to protagonists of new forms of living, territorial and architectural sign and symbols of inclusiveness and living comfort.

## RESULT AND DISCUSSION

Transform the current conformation of inland areas to promote a technological and design modernization of buildings. Choose sustainable materials, first of all wood, which due to its physical and technical characteristics becomes the symbol of a regenerative process in a sustainable key, environment-friendly. Sustainability at the center of a process of conversion, reuse and recovery of existing buildings that can be modified and improved from the point of view of seismic, thermal and living comfort in general, thanks to the use of wood as a structural raw material. Here, then, not necessarily only single and small buildings will be created from scratch, but also building blocks of greater dimensions or that draw the perimeter of large public spaces will be able to hope for the creation of wooden artifacts as connecting elements between their different constituent parts. All this to favor the use of the open space, creating a correspondence and a promiscuity between inside and outside, between public and private spaces, an aspect that in the past characterized the daily life in the community, typical of these areas and to which a return is desirable, always in an updated and updated way. Going into a specific case, this research project has led to the design of a space with tourist-information purposes to be built in a small village in the internal areas of Friuli [Error!

**Reference source not found.**], specifically in the hamlet of Prato in the Municipality of Resia, in the province of Udine.

The need of the municipal administration was to create an info-point in the area adjacent to the headquarters of the Julian Prealps Park, a place not far from the town hall. It was decided to opt for a wooden small building, to be made with prefabricated modules produced by a company that operates in the region according to environmental sustainability criteria. A small structure that can be easily built, made up of light panels that can be transported on site with modest-sized vehicles to minimize the environmental impact and installation costs, thanks also to the very short construction times. A sustainable building characterized by a high level of comfort. A first building, a sort of zero-case, which, once built and used, can become a model that can be easily replicated in other similar areas within and outside the territory of the municipality of Resia.

## CONCLUSION

The identification of inland areas is clear, if we evaluate the roughness of these territories as the distance from basic services. On the other hand, the explanation of the method to be followed to implement the proposed strategies is more complex, where participation becomes a condition of priority importance: trying to combine local knowledge with political processes, starting from the basic idea that the participatory process, in democracy of this century, and the way in which advanced technological and engineering knowledge of the highest profile meet with local and sectoral knowledge that know about territorial dynamics, problems, needs and local aspirations. In this process we find the pivotal role of mayors, cooperatives and federations as a *trait d'union* between the many different knowledges involved within the regeneration processes.

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which are: “Alta Carnia”, “Friulian Dolomites” and “Canal del Ferro-Val Canale” (which includes the Municipality of Resia). Link: <https://www.regione.fvg.it/rafvig/cms/RAFVG/economy-impres/montagna/FOGLIA14/#id3> (URL last consultation: July 2022).