

Transference of the “Albergo Diffuso” Model to Spain: Regeneration of Uninhabited Rural Areas

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Abstract: In recent years, human health and user wellbeing have become more important in contemporary society and urban quality. This has been highlighted by the outbreak of the COVID-19 pandemic in the world. Generating open-air urban spaces constitutes an opportunity to design walkable areas and paths that can produce direct positive effects on environmental health and indirect consequences on “lifestyles”. This design vision can be implemented within small localities where there are still important continuities and long-term relationships between the human scale of public spaces and the sense of place related to historic/traditional infrastructural pathways. The interest of various international research and of the WHO (World Health Organization) itself extends the subject of public health to the relationship of the individual with the environment, and with the rest of the social interactions, considering the latter a factor that can affect the reduction of illnesses. In order to act in the direction of improving people’s health, to determine the conditions for a life free of diseases and disabilities, and to generate cities and common spaces of use capable of encouraging the adoption of healthy and active lifestyles by people of all ages, the research makes a comparison between possible interventions in Italy and Spain.

Key words: Health, COVID-19, pandemic, public spaces, infrastructure, lifestyle, albergo diffuso, BIM (building information modelling).

1. Introduction

People’s well-being, health and quality of life are aspects that have taken on particular importance since the outbreak of the COVID-19 pandemic in the world. Well-being and health safety are directly influenced by the morphological-typological characteristics of the places in which we reside, thus negatively or positively affecting the health of the population and the adoption of lifestyles appropriate to situations such as the current one [1].

On the one side, COVID-19 highlighted some problems related to overpopulation in urban areas, among them, the most important ones detected are:

- problems of remoteness and isolation, especially in large population centers.

- difficulties caused by physical isolation and a decline in the level of socialization of people, especially older people.

On the other hand, the pandemic has highlighted the possibilities offered by new technologies for working from home and being able to live further away from large population centers. This offers a higher quality of life and the possibility of living in contact with nature [2].

Therefore, since the beginning of the COVID-19 pandemic, an increase in the number of residents in smaller population entities (towns, villages, etc.) has been observed and several initiatives (at national and European level) have been activated to facilitate this.

An international impulse comes from the European Green Deal, a strategy that promotes the efficient use of resources to achieve climate neutrality by 2050, which could find in the “green” regeneration of villages an efficient use of resources, an enhancement

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of the natural and cultural heritage, supported by new digital technologies, with the aim of attracting inhabitants who are increasingly aware of (and informed about) environmental protection issues and the habitability of places [3, 4].

There is therefore a demand for greater availability of residential space in towns and villages to meet these new needs. Before the emergence of COVID-19, rural tourism, and the “AD (Albergo Diffuso)” model, although part of the national and international debate on new forms of sustainable tourism, has contributed to the regeneration of villages, often by enhancing the specific characteristics of the host territories [5]. The definition “Albergo Diffuso” identifies a hotel model, typically Italian, that not only includes accommodation functions, but also the possibility for users to experience the village lifestyle, staying in networked housing units, located between residents’ homes [6]. The experiences of AD in Italy have demonstrated the effectiveness of this model in terms of depopulation of villages and the valorization of public (history, culture, natural resources, infrastructures) and private (housing, businesses, and local producers) assets [7].

Now, however, this model of rural implantation can offer a methodology for the regeneration of villages and significant advantages in the face of these new trends [8].

At the basis of this model, besides the priority issue of recovery and reuse of the existing building heritage for tourism purposes, there are also strategies for sustainable development through reduced land consumption and resource savings, while maintaining sufficient opportunities for local communities to live and work overtime, enhancing the social and economic capital of the contexts. Specifically, the characteristics of the AD model can be summarized in the following points:

- its social character, encouraging community involvement in the projects.
- its creation from spaces with already existing buildings, giving value to their architectural heritage.

The analysis and systematization of the Italian AD case studies has made it possible to identify the main characteristics of the villages necessary for the application of the DP model and the design strategies for its enhancement at the urban, building and economic/social levels.

The applications of the Italian DP model to the regeneration of small/medium-sized towns in Spain that are pursued with this study are the following:

- the enhancement of half-abandoned rural areas and spaces, but with privileged geographical situations from the point of view of health, far from usual tourist areas and which allow their field study without limitations of access and movement.
- the development of a tool to help administrations, planners, and investors to assess the level of suitability of the municipality for the implementation of a DP and to evaluate intervention strategies by comparing possible project scenarios (BIM (building information modelling) model).

2. Method

The proposed methodology is based on the analysis, using BIM and TLS (terrestrial laser scanning) point clouds, for the verification of existing spaces and buildings designed to meet the characteristics and requirements of this type of rural character and to deal with pandemics such as COVID-19, which allow optimized models to be obtained a priori to ensure their use by users in the event of health restrictions.

The strategies for implementing the model in both localities are then analyzed, as well as their social and economic repercussions. The aim is to define models for the recovery and revitalization of minor historical centers and hamlets, focusing on the tourist destination and the AD which, in the functional elements of the model, include solutions to solve the problems of progressive degradation and depopulation that characterize these contexts, enhancing the tangible and intangible resources of the region in which the model is implemented.

The phases of the experimental process are as follows:

- a preliminary phase of knowledge of the basic criteria, on the scale of the building and the public space, for the adaptability of the interior and exterior space to the AD model.
- a review and verification phase of existing public spaces and buildings by 3D laser scanning of the case study.
- a strategic phase in which the requirements and design strategies for the implementation of the AD model in the village are identified, identifying strategies at the scale of the public space, the building, and the social scale.
- a design phase, in which, based on the definition of requirements and strategies, a project for the regeneration/reclassification of a sample village in Spain is proposed.

2.1 Basic Characteristics of the Village and Main Strategies for the Implementation of the DP Model

The possibility of implementing the AD model depends on the presence of certain characteristics of the town or village that express its compatibility to accommodate it. Once this compatibility has been verified, it is possible to identify design strategies at the scale of the building, the scale of the public space and social scale of the community (Fig. 1).

The village or hamlet should have the following characteristics:

- municipalities or population centers of less than 5,000 inhabitants.
- dwellings located in several separate, pre-existing buildings within the inhabited historic center, offering habitable structural features for reception and accommodation.
- identity, achieved through a defined and homogeneous building identity.

At this scale, the actions to be implemented concern:

- the recovery of the use of pre-existing buildings in a state of ruin in small population centers (it is

estimated that at least seven habitable units should be available), with characteristics of historical and cultural value.

- the improvement of energy and environmental performance (plant equipment, underfloor radiant panels, rainwater recovery pipes and remote controls) and the use of local materials.
- the use of non-invasive technologies with little (or no) impact on the overall appearance of the building and its context.
- the search for typological solutions, considering the difficulties of morphological adaptation of the environments to the new functions (traditional living spaces have been rethought to improve their management and, where possible, their usability).
- the adaptation to the new social functions (achieving, through the distribution system of spaces, a sense of sharing and dynamism).
- the high level of quality of spaces and furnishings in balance with the authenticity of local traditions.
- the promotion of actions of recovery, restoration, rehabilitation of constructive elements (wooden floors, roofs, terracotta floors, etc.).
- the provision of community services, with environmental units intended for community activity.

In terms of public space, the hamlet should have the following characteristics:

- limited distance between dwellings and common spaces, quantified at a maximum of 200 m.
- the presence of environmental, cultural and landscape qualities.
- the presence of a basic infrastructure network that facilitates the circulation of users and products from the village to the nearest urban centers and vice versa.
- the presence of a compact building fabric, easily accessible to users with different degrees of capacity.

At this scale, implementable actions relate to:

- reducing transit spaces, allowing housing units and other uses to be closer to the main building (less than 200 or 300 m).

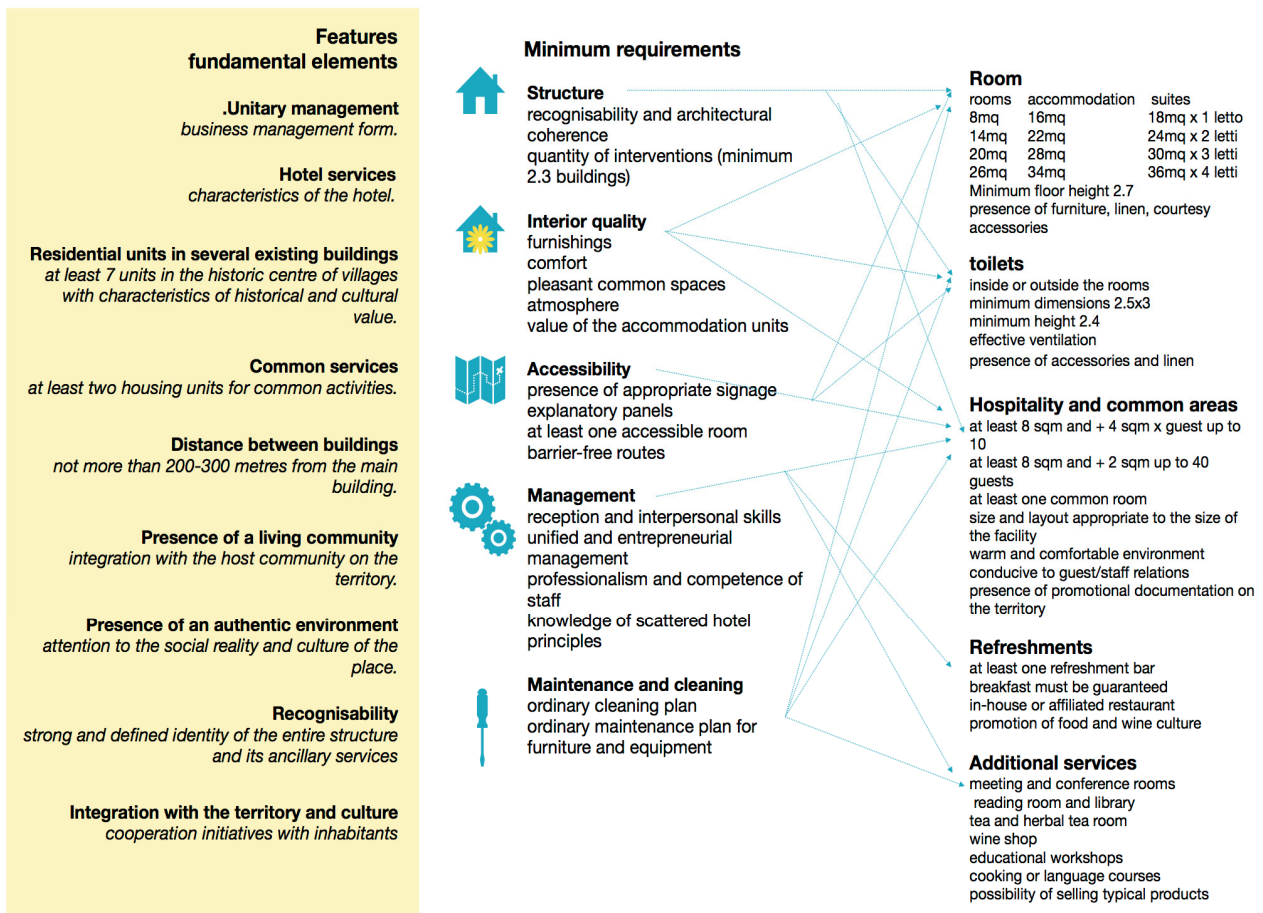


Fig. 1 Objectives and requirements.

• public administration can contribute by facilitating common spaces (typically non-productive spaces) and new services, which can increase demand (such as improving accessibility to the area or recovering new services such as libraries, event spaces, sports facilities, etc.).

- creation of gardens and micro-parks.
- generation of accessible pedestrian paths interspersed with rest areas and playgrounds.
- providing adequate lighting and free Wi-Fi in public spaces.

On the social scale of the community, the village should have the following characteristics:

- presence of a welcoming community that guarantees users a relationship with residents.
- presence of an authentic environment, characterized by integration with the social reality and local culture.

At this scale, implementable actions include:

- fostering integration with the community of the territory.
- promoting cooperation and identification with the place.
- offering advantages in terms of image, social life, economic income, and preservation of resources.
- generating local associations that can increase their activities by organizing new events and assistance services.

The main advantages of the AD, compared to traditional hotels, are the following:

- it generates a high-quality tourist product, expression of localities and territories without generating negative environmental impacts (nothing new to build, existing houses must be restored and valorized).
- it strengthens the development and networking of

the local tourist offer.

- it increases sustainable tourism development in peripheral areas: villages, rural settlements, and historic centers in less frequented areas, thereby increasing the supply on the tourism market.
- it contributes to stopping the abandonment of historic centers.
- local entrepreneurs, in the agri-food, wine and craft services sector. They will participate because they see the AD to increase their own profits due to the induced increase in demand.
- the owners of the houses start to look at their heritage in a different way. Through the eyes of the tourists, they identify common problems and solutions to solve them [9].

2.2 Functional Needs Program

The needs program to be completed by the project must meet the following minimum requirements:

- structure: the object of study bases its intervention on the recovery and enhancement of the original construction techniques of the buildings on the site and must provide coherence and technological research in the construction systems.
- the scope of action in structural recovery must be in at least two or three buildings.
- respect for universal accessibility is promoted, eliminating architectural barriers, with appropriate signposting both on pedestrian routes and in the housing unit (at least one will be accessible).
- unitary and independent management, promoting the professionalism and competence of the staff, the knowledge of the principles of the AD and promoting training, responsibility and personal growth and the planning of the maintenance of furniture and buildings.

3. Case Study

In the present work, we propose, as a case study, an analysis of the possible implementation of the Italian model of “AD” in Spain, in scattered rural localities with a low population that have characteristics such as

their current depopulation, the need for architectural and structural recovery, as well as the need for social revitalization.

After the analysis of several possible locations, we concluded that it is important to select a location that presents appropriate characteristics, so that, although it presents a high degree of depopulation, it has existing buildings, in disuse and far from large population centers, but at the same time offers an attractive environment for the visitor, with a certain tourist, environmental and heritage interest.

In Spain, therefore, the locality of Los Madroñeros has been chosen, a village belonging to the municipality of Alájar, located about 2.5 km from it, in the province of Huelva. This village is located within the Sierra de Aracena y Picos de Aroche Natural Park, offering natural landscapes with fields of chestnut, cork oak and holm oak forests. In the municipality of Alájar is the Peña de Arias Montano. This craggy spot was home to caves where hermits and anchorites withdrew for centuries to contemplation and inner life. Today it is still a place of worship, dominated by the Hermitage of Nuestra Señora de los Ángeles, whose pilgrimage (the Romería de la Reina de los Ángeles) around 8 September attracts worshippers from all over the region.

The municipality of Alájar is in the north of the province of Huelva, in the Sierra de Aracena (Fig. 2). It has a surface area of 41.34 km² in which 7 entities of population are distributed: Alájar, El Cabezuelo, El Calabacino, El Collado, la Peña de Arias Montano, San Bartolomé and Los Madroñeros, Alájar being the most important nucleus, with 564 inhabitants out of a total of 814, so that 250 inhabitants are distributed among the smaller entities of population (Fig. 3). Among these villages belonging to the municipality of Alájar is the village of Los Madroñeros, currently in a state of semi-ruin, with a very low permanent population and only registering average occupancy on certain dates, such as the celebration of the Romería de la Virgen de la Salud on August 29th.



Fig. 2 Location map of the village of Los Madroñeros (Spain) and delimitation of the area to be analyzed for the intervention.

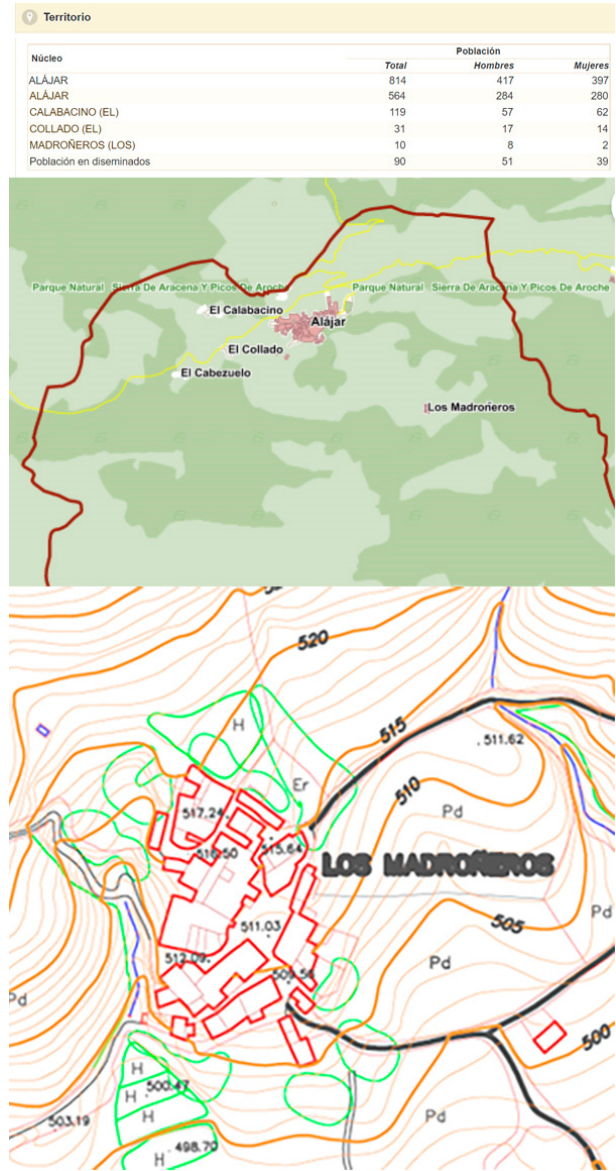
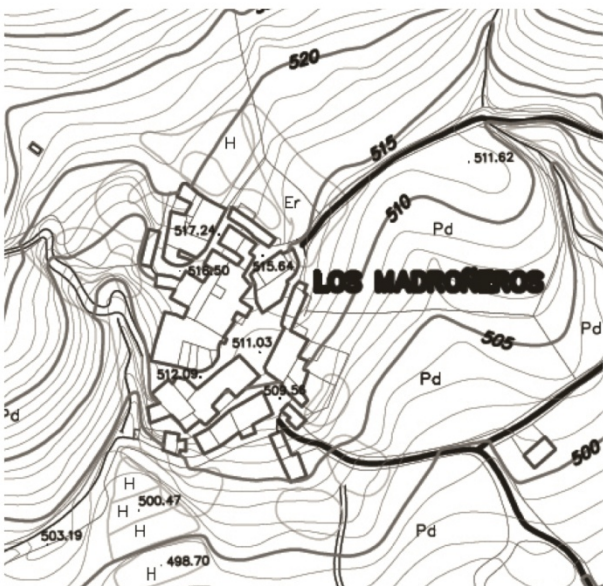


Fig. 3 Existing population nucleus, location, and topographical map of Aldea Los Madroñeros (Huelva), Spain.

4. Methodology Implemented by TLS

The existence or not of planimetry in the villages under study, depending on their current state, presents the need for verification in the case of the existence of such planimetry, or for realization if there is none. In the case of Los Madroñeros there is an old planimetry dated in 1979 by the Diputación de Huelva and carried out by the architect Carmen Rodríguez Liñan. More recent is the existing planimetry of the Cadastre renewed between 1994 and 2005. For the verification of this planimetry a field work has been carried out with a

point cloud survey obtained by 3D laser scanning of the central area in the village [10] with the main buildings and spaces of the proposed intervention (Fig. 4).



 Aldea de Los Madroñeros (Alájar) Altas, modificaciones y bajas padronales en esta Aldea desde el 01/01/1996 hasta el 31/10/2021 Fuente: Padrón del Excmo. Ayuntamiento de Alájar					
Dirección	Nacimiento	Nacionalidad	Sexo	Tipo Variación	Fecha Variación
Aldea de Los Madroñeros	15/03/1965	Nacional	HOMBRE	Alta	14/02/2002
Aldea de Los Madroñeros	15/03/1965	Nacional	HOMBRE	Baja	05/12/2007
Aldea de Los Madroñeros	15/03/1965	Nacional	HOMBRE	Alta	27/01/2010
Aldea de Los Madroñeros	06/05/1964	Nacional	MUJER	Baja	01/09/2010
Aldea de Los Madroñeros	15/03/1965	Nacional	HOMBRE	Baja	04/06/2012
Aldea de Los Madroñeros	05/11/1974	Nacional	HOMBRE	Alta	01/08/2014
Aldea de Los Madroñeros	05/11/1974	Nacional	HOMBRE	Baja	20/10/2014
Aldea de Los Madroñeros	28/01/1961	Nacional	HOMBRE	Alta	26/02/2015
Aldea de Los Madroñeros	17/02/1979	Nacional	HOMBRE	Alta	07/07/2015
Aldea de Los Madroñeros	08/12/1952	Extranjero	HOMBRE	Alta	13/10/2015
Aldea de Los Madroñeros	18/10/1959	Extranjero	MUJER	Alta	13/10/2015
Aldea de Los Madroñeros	05/01/1956	Nacional	HOMBRE	Alta	20/06/2016
Aldea de Los Madroñeros	05/08/1998	Nacional	MUJER	Alta	26/09/2016
Aldea de Los Madroñeros	11/01/1964	Nacional	HOMBRE	Alta	26/09/2018
Aldea de Los Madroñeros	22/09/1992	Extranjero	MUJER	Alta	14/12/2020

Fig. 4 Urban land delimitation project, Cadaster plan and point cloud obtained by 3D laser scanning.

It is a question of using a methodology of which there is abundant scientific literature [11-14], although mostly focused on singular historical buildings [15-17], etc.

The scanner used was Leica’s BLK360 model and the software used for point cloud editing was Leica’s Cyclone Register 360 and Autodesk’s Recap Pro. Finally, the graphic modeling based on the cloud obtained was performed with Autodesk Revit.

By superimposing the obtained point cloud on the cadastral planimetry, we can observe discrepancies that would be analyzed in the BIM model to be developed. Likewise, methods for the classification of the detected building materials can be implemented [18].

Aligning the cloud with the building of the Hermitage with denomination 01, important differences can be seen in some public spaces and the separation with other buildings (Fig. 5).

The revision of the location and dimensions of the buildings offers the possibility of updating the planimetry and compliance with the estimated requirements to consider the AD BIM model. Another important issue is to obtain the actual existing levels and slopes, with high percentages of accuracy, depending on

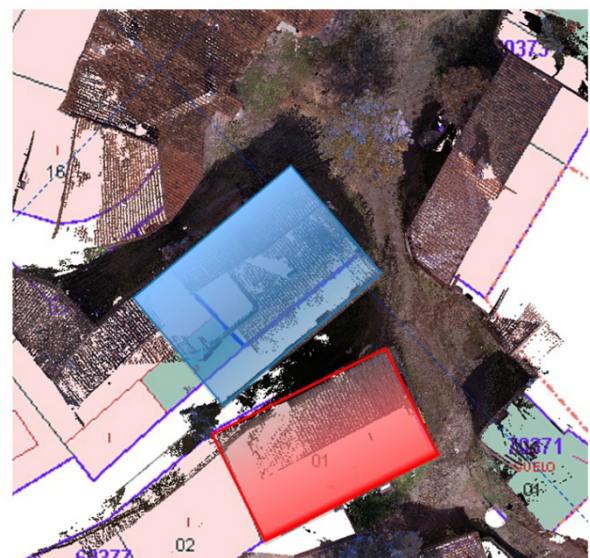


Fig. 5 Superposition and alignment of point cloud with cadastral planimetry (Los Madroñeros Village, Alájar, Spain).



Fig. 6 Point cloud section (Los Madroñeros village, Alájar, Spain).

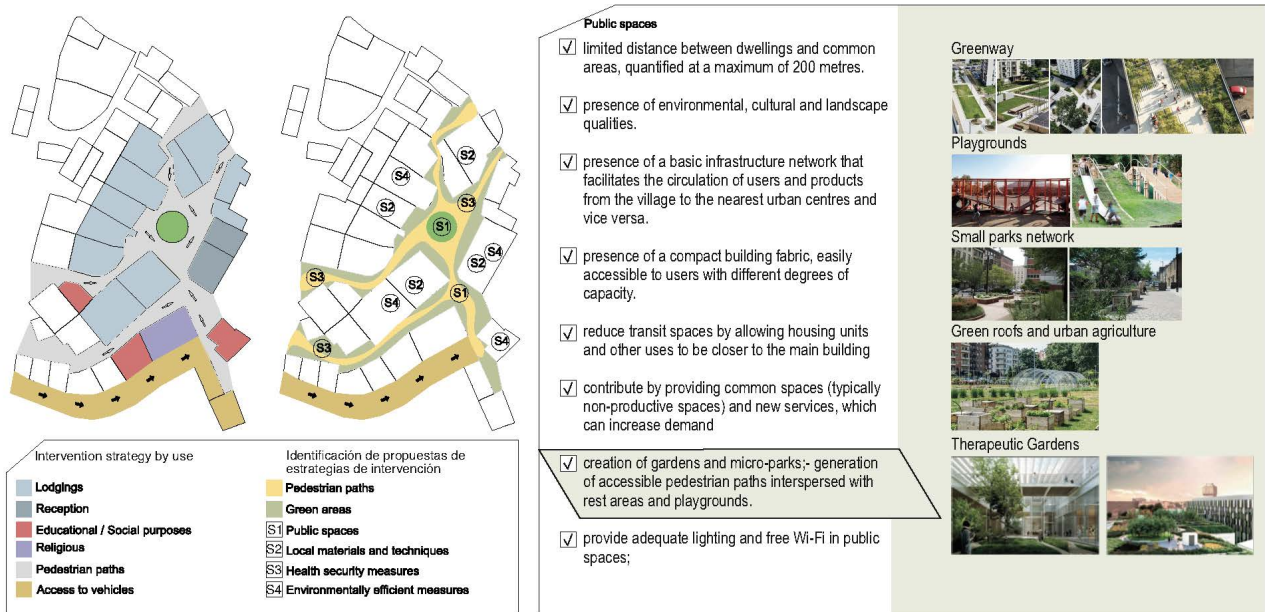


Fig. 7 Identification of proposals for intervention strategies.

the method followed [19], which may require adaptation to the accessibility requirements due to the natural inclination of its topography, as shown in the section shown (Fig. 6).

5. Intervention Strategies

After the outbreak of the COVID-19 pandemic in our society, it is necessary to rethink current urban planning, its processes, operating mechanisms, participation, to outline the characteristics of spaces and ideal uses for citizens, prevent the emergence and spread of diseases, ensure the safety of people by facilitating participation in an active life.

To this purpose, it is more necessary than ever to

develop open/adaptive approaches to change generated by the global pandemic, and to dialogue with diversified competencies and sensitivities to address the urgent task of dealing more effectively with health and human frailty.

It is necessary to propose experimental models such as the AD to support the inclusive and active dimension of public and leisure space for example, facilitate pedestrian mobility and provide services and sports facilities that can also be accessed or used by the most vulnerable people (children, the elderly and people with functional diversity), improve the quality of life of people in general and, above all, ensure health measures that provide safety for them.

The evolution from a conception of health as something to be preserved rather than repaired is a significant cultural and social evolution. The step of acting before, rather than after, can be configured not only as a strategic cultural paradigm for the definition of innovation processes in public health policies, but also for research in the sociological, medical, psychological, urban planning and architectural fields to conceive and implement healthier cities and promote autonomy and the adoption of healthy and active lifestyles by people of all ages, from the elderly and frail to children and adults.

Following these principles, an intervention proposal based on the following strategies is proposed:

- E1: Treatment public spaces, donating to the free space, currently undeveloped, of green areas on a human scale, a network of pedestrian paths that facilitate the interaction of the inhabitant with the users of the AD.
- E2: Promotion of the use of materials and techniques deeply rooted in the local building culture, and the reuse of the original typology of the existing buildings that, on the one hand, ensure the preservation of the heritage and, on the other hand, the identity characteristics of the place. Likewise, this measure promotes the creation of local jobs and favors the circular economy.
- E3: Adaptation to health safety measures in the face of global pandemic situations, such as the current COVID-19, such as natural ventilation, optimal air quality, distancing, and hygiene. This aspect will be one of the most important reasons for attracting users.
- E4: Promotion of environmentally efficient measures in relation to the improvement of facilities in the village, water supply, sanitation (currently non-existent), LED (light emitting diode) lighting, home automation, photovoltaic panels for electricity supply and reuse of rainwater or gray water, among others (Fig. 7).

6. Results and Conclusions

We may conclude that the AD system is completely

transferable to Spain, provided that the recommended characteristics exposed in this study are fulfilled, mainly related to its low population, isolation, identity, and promotion of traditional construction systems. Likewise, the application of this methodology to the village would provide the following advantages, which are typical of the AD model:

- generate a high-quality tourist product, expression of localities and territories without the generation of negative environmental impacts (nothing new to build, existing houses should be restored and put in value).
- strengthen the development of rural areas and network the local tourism offers.
- increase sustainable tourism development in peripheral areas: villages, rural towns, and historical centers of less frequented areas, thereby increasing the supply in the tourism market.
- contribute to stopping the abandonment of isolated villages.
- local entrepreneurs, in the agri-food, wine and handicraft service sectors, will participate because they see the diffuse lodging as a means to increase their own profits, due to the induced increase in demand.

This model also values the spaces in nature as an ideal place to develop a healthy life, with ventilation, air quality and preventive distancing. Finally, it reinforces the conditions required to deal with COVID-19 and other global pandemics, while allowing people to live in society.

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