

Article

Landscape, Architecture and Environmental Regeneration: A Research by Design Approach for Inclusive Tourism in a Rural Village in China

Tiziano Cattaneo ^{1,2,*}, Emanuele Giorgi ^{2,3} and Minqing Ni ¹

¹ Environmental Futures Lab., College of Design and Innovation, Tongji University, n. 281 Fuxin Road, Yangpu District, Shanghai 200092, China; nminqing@tongji.edu.cn

² China Lab. for Architecture and Urban Studies, Department of Civil Engineering and Architecture, University of Pavia, Via Ferrata, 1 - 27100 Pavia, Italy

³ Escuela de Arquitectura y Diseño, División de Ingeniería y Arquitectura, Tecnológico de Monterrey, Campus León, Av. Eugenio Garza Sada S/N, Cerro Gordo, 37190 León, Mexico; eggiorgi@tec.mx

* Correspondence: tiziano.cattaneo@tongji.edu.cn or tiziano.cattaneo@unipv.it

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Abstract: This paper presents project-based research focusing on regeneration for sustainable tourism in a rural village in China, namely Dongjingyu Village, Yuyang Township, Ji County. The research by design approach was applied, introducing to the Chinese context the concept of landscape services, with a particular focus on tradition and the evolution of historical landscape element (HLE) categories and types, whose value is determined by a qualifying relationship between human beings and the environment. The aim was to regenerate and transform the village for uses that are suitable to contemporary ways of coexistence between villagers and the growing tourism industry. Although there are partial limitations to the application of participatory methodologies in the Chinese context, the authors opted for a methodological approach based on research by design in order to foster dialogue and create awareness for both government authorities and citizens regarding potential design solutions, which were determined based on landscape patterns and not only land use. Two outcomes were achieved: (1) the research working package might lead to experimental actions, including changes to land-use models, administration capabilities and considerations of feasibility; and (2) the entire work package can be applied to and implemented in other rural villages in China. Moving beyond environmental scenarios, the outcomes provide evidence that participation and social inclusion might have a deeper and more positive impact on rural village regeneration.

Keywords: rural–urban; landscape and architectural design; sustainable tourism; inclusive tourism; landscape patterns; historical landscape elements; rural China

1. Introduction

The concept of social innovation has recently been receiving increased attention, yet has received limited attention together with the topics of the environment, and even less if considered together with environmental design [1]. Furthermore, social innovation, along with the topic of sustainable tourism, has also recently received increased attention if approaching the topic through the lens of inclusive tourism, here considered as a tool for social integration. Additionally, to the best of the authors' knowledge, there is a considerable fragmentation of studies and research on social innovation combined with inclusive tourism from the perspectives of design for culture, heritage, and communities in rural spaces. On the other hand, one can observe a considerable number of studies and publications on these topics (as well as increased interest from the media, governments both local and national, and citizens in general). Nevertheless, those findings remain confined within specific

disciplinary sectors and there is little, if any, interaction between the the triad of terms: inclusive tourism, social innovation, and culture and heritage. This evident opposition between research and results is the context in which the current research is placed, addressing this problem through a research by design (or research through design) approach, applying the concept of landscape services (LS) [2–6], along with the categories and types of historical landscape elements (HLE) [7,8], whose wealth is determined by a qualifying relationship between human beings, the environment and cultural services. The research by design approach in the field of environmental design was selected to guarantee an interdisciplinary framework approach and, as a process, is committed to creating and facilitating a sustainable “life–environmental ecosystem” [9] using holistic, life-based and sustainable means. Within this framework, the research question is: How can we use design to renew the lost relationship between the environment, culture, heritage and citizens, with the aim of fostering inclusive tourism as a social integration tool?

The complexity of this research project was increased by applying this approach in the Chinese context using Dongjingyu Village, Yuyang Township, Ji County as a case study. It is well known that China is currently in a historical period in which urbanization is assuming a key role in defining the fate and destiny of Chinese territory, in particular for rural areas. These numerous and vast areas of China are the victim of migration toward the cities, and historical rural settlements are becoming increasingly abandoned landscapes [10,11]. Furthermore, landscape regeneration is a complicated process, as it involves a lot of parties each with different interests and agendas. Moreover, Li et al. stated that the regeneration of rural villages is an even more intricate issue in China due to the dual systems of property rights over urban and rural land [12].

It is well known that rapid industrialization and urbanization in China has induced people to abandon their rural villages. There are authentic historical villages that have fallen victim to the rural exodus, such as the Dongjingyu Village. Conversely, many articles, studies and publications [13–16], report an increasing interest in historical villages. Consequently, domestic tourism is expanding in many old- fashioned towns, while others are in a deep state of abandonment, despite their exceptional cultural and historical value. Ji County, which was investigated in this study, is of particular interest in this respect [14,17].

Wang and Tang observed that, in general, two modes of rural renewal and regeneration have primarily been applied in contemporary China [18]:

- The first mode is government-led rural renewal: local governments control the entire process (from planning to investment) of rural village regeneration with the main aim of land-use optimization [19–21].
- The second mode is self-organized rural renewal: village committees and self-organized farmers lead rural development fostering local resources (natural, social and economic) and consolidating rural land [22,23].

Nevertheless, Long et al. [20] argued that regardless of the modes of rural renewal that might be pursued, current policies usually involve a top-down approach to rural regeneration that unavoidably requires the consensus of local actors. However, it is noted that the lack of engagement of local policymakers in the process has led to resistance to the plans, including, sometimes, protests against the demolition of housing. Long et al., in their research [20], suggested that ‘bottom-up’ planning actions might also be included in rural regeneration in China. Although the Chinese context is very different for instance from European rural areas in terms of political, economic, social and cultural characteristics, rural regeneration is a dynamic, multi-scalar and hybrid process that shares common elements worldwide.

2. Research Method

Research by design and qualitative analysis are the methods applied in this research project. This article is set out as follows: first, the research context of the research by design approach is

defined. Second, the scientific resources introducing the concept of landscape services [LS] and the historical landscape element categories and types are described. Third, the context of the selected case study of Dongjingyu Village, including the landscape mapping and the goal setting of this design project is described in detail. Fourth, the entire design phase process, including not only the text and descriptions, but also the images and drawings elaborated by the design team, is outlined. Finally, the project outcomes are critically discussed. The research framework is shown in Figure 1.

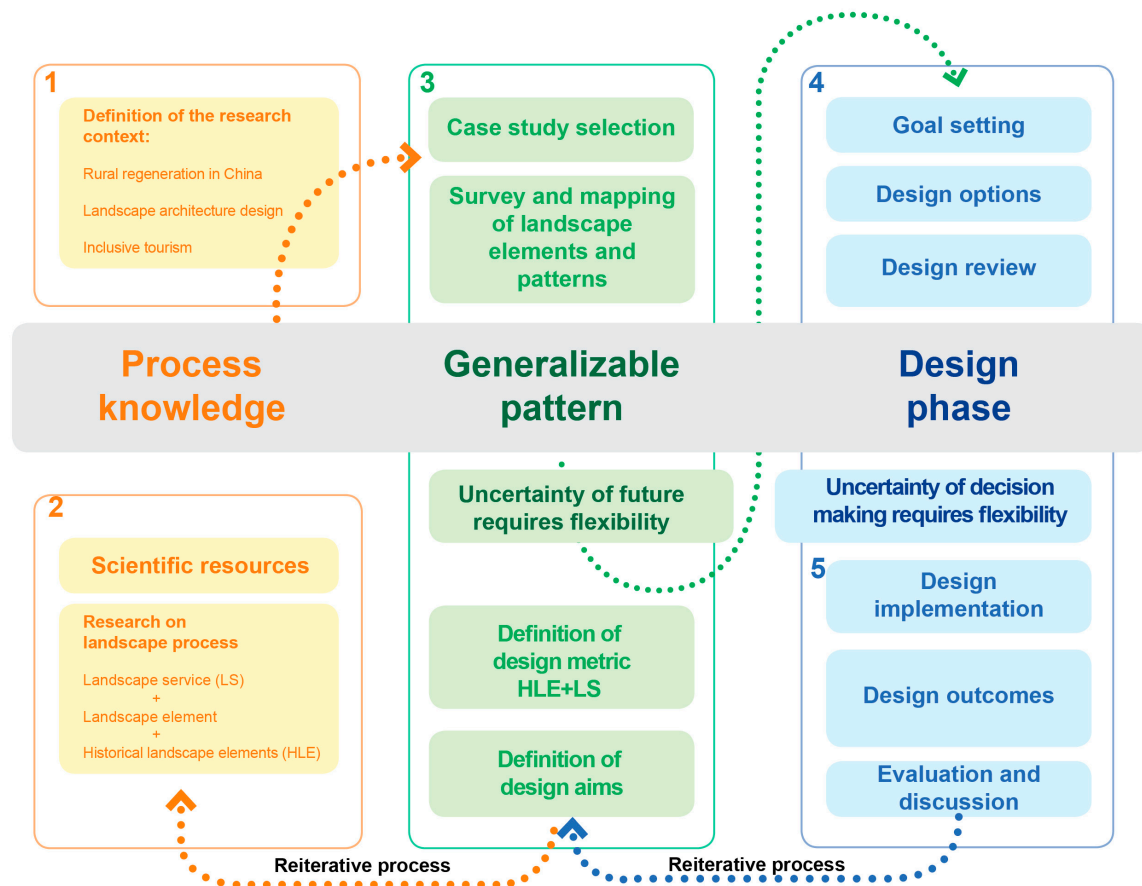


Figure 1. Research framework diagram, modified and adapted from Nassauer and Opdam [24].

2.1. Research by Design Approach

The research by design approach was developed from the Dutch practice at the Faculty of Architecture in Delft [25,26]. The research by design approach was defined by Hauberg [27] and Roggema [28] as follows: “Research by design is a type of academic investigation through which design is explored as a method of inquiry, by the development of a project and also exploring the different materials by which a design is carried out—sketches, mapping, among others” [28,29]. Moreover, research by design is a strategy, as Hauberg stated [26]: “It is used to describe the various ways in which design and research are interconnected when new knowledge is produced about the world through the act of designing. The methodology aims to generate desirable, maybe unexpected, urban perspectives in place of probable, but less desirable, urban developments” [30]. Nassauer and Opdam claimed that design is a common ground for scientists and practitioners to bring scientific knowledge into decision making about landscape change, demonstrating that the pattern–process paradigm should be extended to include a third part, namely design [24]. In this research project the research by design method was applied for the regeneration of Dongjingyu Village, Ji County, China.

2.2. Defining Scientific Resources

In this research, the concept of landscape services was used according to the definition by Bastian et al. [5]: “Landscape Services are the contributions of landscapes and landscape elements to human well-being”. This means that the service is provided by landscape elements rather than an ecosystem. The term ecosystem services (ES) has become outdated, making space for the use of the term landscape services (LS). Dongjingyu Village is characterized by ancient relics, ruins, and historical heritage. According to Tveit et al. [4], historical landscape elements (HLE) are regarded as fundamental components of cultural landscapes, becoming important bearers of collective services.

The use of the term landscape is not new in the context of the ecosystem service scientific literature. Vallés-Planells et al. [6], building on the studies of de Groot et al. [31] and Hermanns et al. [32], proposed a new services classification of landscape services. Landscape services and ecosystem are considered synonymous concepts. However, according to the total human ecosystem theory by Naveh [33,34], landscape and ecosystem differentiation is not concerned with the factor of scale. Landscape is different from an ecosystem because it includes different scales of study and interpretation and includes the human and holistic perspective. A change of focus, therefore, was required for the current project. With regard to social innovation and inclusive tourism, the main goal of landscape design and planning should go beyond land-use optimization. This means improving the landscape performance by delivering services that better meet human needs along with biophysical and socio-cultural factors [2,6,35].

The new services classification elaborated by Vallés-Planells et al. [6] adapts the Common International Classification of Ecosystem Services (CICES) classification [36] to the concept of landscape services and considers landscape from an integrated and transdisciplinary approach. The new landscape service classification by Vallés-Planells et al. [6] is structured around six classes, containing 18 groups, with related definitions and concepts. We added a numeration of classes and groups to the original table by Vallés-Planells et al. [6], as can be seen in the central column in Table 1. To allow better general comprehension of the new landscape service classification, the original table by Vallés-Planells et al. [6] is included as Figure A1 in Appendix A.

Regarding the historical landscape elements (HLE), the authors modified and adapted the table outlining the HLE categories and types by Walz et al. [7] and Bastian et al. [5], to transfer it to the Chinese context. The HLE table by Bastian et al. [5] is structured around 10 categories and a series of types that represent the physical typology of historical elements. To the original table by Bastian et al. [5], we added a several types of historical elements from the Chinese context, as can be seen in the left column in Table 1. To allow better general comprehension of the historical landscape element (HLE) categories and types, the original table by Bastian et al. [5], is included as Figure A2 in Appendix A.

LS and HLE became design tools in our applied design project. Through the case study of Dongjingyu Village, this study intertwined the new landscape service (LS) classification with the historical landscape element (HLE) categories and types [5,7,8], creating a new HLE + LS working framework, which is described in detail in Section 3, Table 1. As a consequence, this concept integrates landscape services with historical elements correlated to the regeneration of rural villages.

Table 1. New HLE + LS design metrics.

HISTORICAL LANDSCAPE ELEMENTS (HLE)		LANDSCAPE SERVICES CLASSIFICATION (LS) Classes and Groups																	HLE + LS	
HLE Categories	Selected HLE Types According to Site Survey	1			2			3		4		5					6			DESIGN AIMS for Dongjingyu Village
		Daily Activities			Regulation of Spatial Structure			Health		Enjoyment		Personal Fulfillment					Social Fulfillment			
		a	b	c	a	b	c	a	b	a	b	a	b	c	d	e	a	b	c	
Agriculture	hedges, stone ridges																			Develop new organic rural economy
Forestry and mountain	mountain																			Develop a better rural eco-system
Settlement types	scattered settlements																			Combine inheritance preservation and development
Traffic	paved stone paths																			Developing better local and touristic mobility
Mining	-																			
Processing of food and materials	handicrafts workshops																			Enhance handmade and eco-production activities
Military, security, administration	-																			
Building types	local architectural style, materials, ruins																			Strengthening of facilities and opportunities for citizens
Religion	-																			
Fishery and hunting	water pond																			Respect the environment

Note: Background color highlights the interaction and correspondences between the HLE categories and different LS classes and groups. (Dark grey mean that there is strong correspondence between HLE and LS with direct influence on design aims; light grey mean there is weak correspondence between HLE and LS with less influence on design aims; empty background (white) mean that there is not correspondence between HLE and LS with none influence on design aims).

2.3. Case Study Selection and Survey Method

This project was part of a long-term program established in 2015 with a focus on small town urbanization in China that was awarded by the MIT Climate CoLab Platform [<https://www.climatecolab.org/contests/2015/rural-resilience/c/proposal/1319004>]. The final task was to create environmental scenarios (or pilot projects) for selected rural villages. There are thousands of abandoned rural villages in China, especially in the areas surrounding the three major urban–industrial agglomerations, which are the Pearl River Delta region, which includes Shenzhen, Guangzhou, Dongguan and Foshan; the Yangtze River Delta region, which comprises the Shanghai–Suzhou axis; and the Bohai regions in the vicinity of Beijing and Tianjin, where Dongjingyu Village is located. Moreover, Dongjingyu village was already under observation by this research team. In 2016, when the international design competition was announced, it became a case study and was selected for the project. The international design competition entitled “The Ruins Rebirth. Dongjingyu Village Regeneration International Landscape Design Competitions” [37] was co-organized by the China Building Centre (CBC), the Yuyang Township Government and the Tianjin Urban Planning and Design Institute. As a point of departure for the regeneration of Dongjingyu Village, the competition requirements were to respond to the rural revival movement across China and explore the local culture and charm of the village. The competition topic was considered the best test bed to apply this research framework for two main reasons: (1) the competition requirements matched the aims of this research; and (2) the design competition in itself did not impose any constraints in terms of design investigation, leaving a wide spectrum of freedom for the designers to explore the most experimental and unexpected design solutions.

Briefly, the design principles for the new landscape masterplan of Dongjingyu Village, as reported in the design competition brief [37], were as follows:

- (1) Preservation-mindedness: To respect and protect the site as much as possible.
- (2) Symbiosis: To fully demonstrate the idea of “vernacular symbiosis”; the project must be in harmony with the surroundings.
- (3) Feasibility: The proposal should have in mind the actual construction and keep the project feasible and cost-effective in terms of both construction and maintenance.
- (4) Ecology: The proposed project should reflect environmental awareness and a genuine understanding of organic, low-carbon and sustainable construction through the application of eco-friendly materials and construction practices.

2.4. Context Description: Historical Background and Current Status

Xijingyu (West Well Valley) Village came into existence during the Ming Dynasty. Nestled in surrounding hills, there are currently 620 residents from 160 households, 90% of whom are “Zhou” (a common Chinese surname) families. The village is located in the north of the county, only 2.5 km from the urban area of Ji County, and behind the culturally and historically renowned Fujun Mountain. The region is also part of the National Geological Park of Jinxian County, a geographical park of the middle-upper Proterozoic era. It is a natural park enveloped by hills on all sides boasting unique scenery. More importantly, the area has a wide range of stone buildings that have rich cultural significance. Ancient stone courtyards and houses are still in good shape, while paved stone paths, stone hutongs, stone steps and tools made of stone abound. It is a mesmerizing panorama of shaped stones [37]. To reinforce the preservation of the natural and cultural richness of Xijingyu Village, Yuyang Township took the official decision to preserve this place in 2005. In 2009, the Municipal Bureau for Urban Planning and the government of Ji County collaborated in compiling the “Famous Historical and Cultural Village of Xijingyu Village, Yuyang Township, Ji County”. In July 2012, the village was designated by the Ministry of Housing and Urban-Rural Development (MOHURD) and the State Administration of Cultural Heritage as belonging to the group of the so-called “Chinese Famous Historical and Cultural Villages”. In December 2012, Xijingyu Village was simultaneously recognized

as a traditional village by MOHURD, the Ministry of Culture, the State Administration of Cultural Heritage and the Ministry of Finance. About 1 km east of Xijingyu Village are the ruins of the ancient agricultural settlement, Dongjingyu (East Well Valley) Village (see Figure 2), which was also founded during the mid-Ming Dynasty and is roughly contemporary with Xijingyu. However, in the 1980s, over 100 Dongjingyu households collectively moved to another village called Taohuayuan due to transportation disadvantages, lack of electricity and water shortages.



Figure 2. An aerial view is an important tool for designers. It provides evidence of the exact location of the project area, but mainly provides insights regarding the topography and morphology of the region under investigation. The red line defines the perimeter of Dongjingyu Village [37]. The box on the bottom left shows a map of China with Ji County marked in red, located between Beijing and Tianjin. Source: Wikipedia.

Prior to leaving Dongjingyu, the villagers tore roof tiles and purlin wood from their stone houses that date back hundreds of years. The entire village has since been reduced to rubble and ruins. The remaining stones, which were acquired in the local mountains, as well as the gables and sidewalls erected without any slurry, have turned into a sort of magnificent piece of land-art nestled within Dadong Ravine, which is embraced by Tao Mountain, Beiling Mountain and Baishi Cliff. This beautiful landscape, which is naturally endowed with breathtaking and extraordinary views, together with the restoration of the ruins through proper intervention approaches, might become another Tianjin tourist site.

Information on the Project Site

The situation of the abandoned village is considered worthy of preservation. The local government provided analysis of three sites, shown in Figure 3. Starting from the entrance of Xijingyu Village in

the west and within the ridgelines of mountains around the Dongjingyu Village, the area expands for 60.3 hectares. The areas of Dongjingyu Village, in comparison, covers around seven hectares [37].

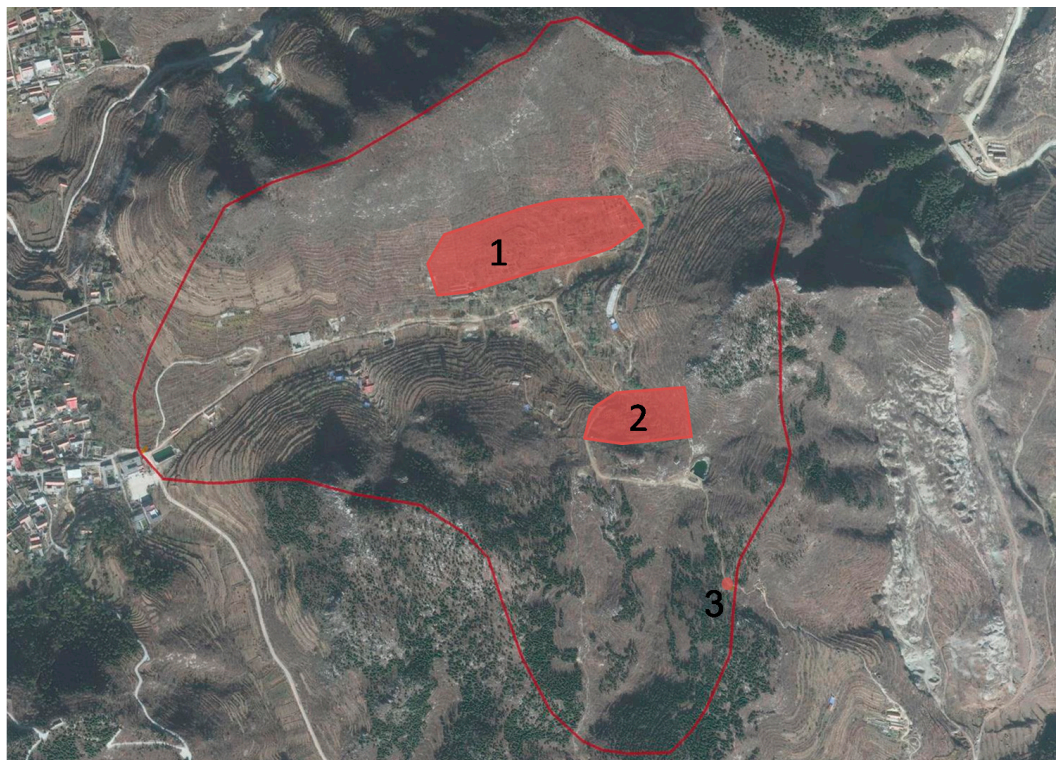


Figure 3. Aerial view of Dongjingyu Village modified from the ruins rebirth competition material [38]. The red solid areas identify the location and perimeters of the three project sites.

2.5. Survey Method: Mapping Landscape Elements and Patterns

A transdisciplinary and international design team, composed of eighteen members including senior researchers, PhD students, practitioners and experts from both China and Italy, engaged in an international collaboration between the China Lab. for Architecture and Urban Studies at the Department of Civil Engineering and Architecture of the University of Pavia (Italy), and the Environmental Futures Lab. at the College of Design and Innovation, Tongji University in Shanghai. The pre-design phase began with a field trip to China at the beginning of summer 2016, and was organized for team design members to observe the dramatic rural transformations underway at various scales in the environment in and around the village. During the field trip, the design team, guided by Chinese PhD students, made analyses and collected data on the context and, when possible, conducted unstructured interviews with villagers. Unstructured interviews are useful when the identification of important concepts is one of the research aims, as in this project. Moreover, unstructured interviews allow researchers to ask relatively open-ended questions to discover interviewees' perceptions on the topic of interest [39]. Design team members also attended seminars and exchanged ideas about sustainable development in rural areas with representatives from Tongji University as well as with planning experts. All the information collected provided the basis for the site evaluation, analysis of existing conditions and, mainly, the mapping of landscape patterns. Following the field trip, design team activities were structured around groups to systematize the fieldwork materials. Based on these findings, the researchers were able to make preliminary decisions about features, and then to define the new working HLE + LS framework for Dongjingyu Village. This framework is described in Section 3, and was incorporated into the design phase, described in Section 4. Using a photographic survey, along with the photographic material provided by the competition organizers, the landscape elements and patterns of the three sites, shown in Figures 4–6,

were described. Looking at the photographs, first-hand material, and the survey documentation (sketches, data, unstructured interviews, etc.), the researchers defined a matrix of landscape elements and materials, shown in Figure 7.



Figure 4. Six photos showing the landscape elements and patterns of Site no. 1, which is a flat ground area of 3000 sqm located near the Dongjingyu relic area. Walls and terraces in local stone entangled in thriving vegetation characterize the area with ruins.



Figure 5. Six photos showing the landscape elements and patterns of Site no. 2. Site no. 2 is characterized by a reservoir and a platform. The area dimension is 2000 sqm, located to the south of Dongjingyu Village. Water, vegetation and open views toward the valley are the main landscape features of this site.



Figure 6. Four photos describing the landscape elements and patterns of Site no. 3. Site no. 3 is 1000 sqm and is located at a strategic point, with open panoramas toward the urban district of Ji County.



Figure 7. Matrix of the analyzed landscape elements and materials.

3. Definition of the Design Aims and Goal Setting: Design Metrics of HLE + LS for Dongjingyu Village

The definition of the design aims and goal setting was part of the process of definition of the design metrics of the HLE + LS method for Dongjingyu Village. The design metrics were a result of the overlapping and intertwining of mapping and site survey data, interpreted using the scientific

tools of LS and HLE (see Figures A1 and A2, respectively). Using this process, we obtained the results shown in Table 1, the new HLE + LS design metric.

Table 1 is structured around three parts: the left column lists the HLEs selected according to the mapping and site survey; the central column lists the LS classes and groups numbered according to the original LS table by Vallés-Planells et al. [6]; and the right column lists the design aims, which represent the final design metrics of HLE + LS.

To define the HLE + LS design metric for Dongjingyu Village three steps were needed. First, the historical landscape elements were defined according to the mapping and site survey, as described earlier. Second, similarities, occurrences and coherence between HLE and LS were combined with the site mapping. Third, the interaction between the HLE categories and different LS classes and groups were evaluated in order to define the design aims for Dongjingyu Village. For example, with regard to the HLE category “building type”, the authors analyzed the site survey and mapping and found that the local architectural style, materials and ruins had several correspondences with LS classes and groups (see Table 1). As a result, a design aim was determined that was to be achieved through the regeneration design of the ruins. Specifically, the design aim was defined as follows: The strengthening of facilities and opportunities for citizens (see Table 1, far right column). All the members of the design team reiterated this process for each of the selected HLEs, finding correspondences and occurrences with the LSs and consequently defining all the design aims and completing the far right column of Table 1.

The HLE + LS working framework thus has the advantage of setting the economic, ecological, and social benefits that can be implemented in natural and cultural (historical) landscapes on the same level. This means that the new working framework is a form of decision-making tool for designers and local policymakers involved in the rural regeneration process.

When analyzing the results of the new HLE + LS working framework adapted to the current project area in Ji County China, it became evident that tourism, while being the main function of the activities established in the abandoned village, as well as the main investment and business for local regeneration, remains as a kind of corollary if it is not complementarily developed with the citizens who are the actual local engine of community development. That is to say that tourism, if it is understood as a function in terms of landscape design, cannot be subjected to the simplifications imposed by the perspective of land-use occupation for tourism. Hence, tourism should be considered a virtuous function toward a hypothesis of landscape regeneration that incorporates the co-presence of heterogeneous elements and materials (tangible and intangible, physical and intellectual) that are claiming to be redefined in terms of their identity [38]. Therefore, the prevailing feature of Ji County is an image that refers to its rural past, a past that is closely linked to the history of the community and to the deep connection that this entails, with the landscape as a permanent and continuing element. This is a landscape rich in traces and stratification that Corboz [40] describes as a “palimpsest”. Table 1 highlights that the landscape service class number 4, which is strictly linked to the tourism issue, is the only class that occupies all the HLE categories and types. Group 4a “Passive enjoyment” is transversal and occupies the whole HLE list, and Group 4b “Active enjoyment” covers half of the HLE categories and types.

Basically, “Passive enjoyment” is considered an enjoyment of attractive vistas, a quiet place to read a book, the possibility of seeing wildlife, or cultural heritage and aesthetic appreciation, which are all landscape elements for both citizens and tourists. “Active enjoyment” is strictly linked to tourist engagement in more dynamic ways of enjoying spare time, like opportunities for hiking, climbing, gardening, hunting, fishing, or providing a place for children to play as well as recreation opportunities such as tourism and ecotourism [6]. Tourism as a means of social inclusion and a source of social innovations for community development can be understood through three differing discourses: (a) changing governance processes to improve participation; (b) social entrepreneurship by individuals; and (c) social community innovation with a focus on collaborative innovation within a community setting [1,41].

Furthermore, the new HLE + LS working framework demands the adoption of other methods and techniques to map landscape services and make them “spatially explicit”, for instance the HLE

categories and types “Agriculture”, “Forestry and mountain”, and “Processing of food and materials” become landscape patterns to preserve and not simply kinds of land cover [42,43]. This shift from land cover to landscape patterns implies a shift in mapping techniques that should also include not only natural elements (abiotic and biotic factors), but also human actions, into landscape patterns.

Recalling that the aim of this project was to regenerate and renew the lost relationship between the environment, culture, heritage and citizens through the HLE + LS concept, in order to foster inclusive tourism as a social integration tool, the design aims for Dongjingyu village were as follows:

- Develop a new organic rural economy;
- Develop a better rural ecosystem;
- Combine inheritance preservation and development;
- Develop better sustainable local and touristic mobility;
- Enhance handmade and eco-production activities;
- Strengthen facilities and opportunities for citizens; and
- Respect the environment.

Goal Setting

Taking in account the design aims defined above, the successful design should achieve a set of goals that embraces the three roles of the sustainable rural village: ecosystem, source of resilience, and services [44]. In other words, the overarching goals of a sustainable regeneration project at the village scale introducing new functions of hospitality for tourism are threefold, involving a qualifying relationship between human beings, the environment and cultural services.

The goals set out in Figure 8 are built on the groundwork laid in previous research [15,45,46] by the authors and have already been published elsewhere. These goals explain a basic understanding of how a sustainable life–environmental ecosystem in a rural village should work, which should guide a designer’s decisions when choosing between different physical interventions and design options using holistic life-based and sustainable means. If this is done, the design outcome will respect and enhance the existing local natural systems in accordance with the four goals.

Building and Design	Environment
The construction and/or restoration of a building are important actions for the transmission of cultural heritage, the enhancement of history and of the local businesses. The design and the construction of an intervention become a key moment in re-enhancing the economy, the environment and the communitarian spirit of the village. Architectural restoration of the ruins, and new designs of eco-buildings in stone-respecting local architectural typologies and styles, are key landscape elements to strengthening facilities and opportunities for citizens accompanying tourist inclusion.	This goal means enhancing the quality of the territory, its natural resources, its characteristic elements and the territorial natural systems in which it is inserted (agroforestry, green systems, ecological corridors, etc.). It means paying attention to quality issues while preserving quantitative aspects of the natural heritage. This goal underlines the ability of the intervention to integrate the environmental aspects with the local activities and with the local resources, for example, combining a sustainable development of a better rural eco-system through the enhancement of eco-agriculture and handmade eco-production.
Community inclusion	Economic
Who actually makes a place (a living place) is the community that lives in it; the renewed sense of community is increasingly present in the cultural debate, particularly in the architectural design field. Providing new services, places to be shared and focal spaces might represent the ability to stimulate a sense of belonging (to a place or to a social group) that strengthens the quality of the intervention and helps to give hope to people, improving their quality of life, personal and social fulfillment.	Economic sustainability is a difficult component to be embodied in the project, but likewise, is an important objective to be considered. The economic aspect of design intervention could be considered as both a set of actions aimed at reviving the productive activities and the employment opportunities, and as economic sustainability within a plan on a larger scale. Developing a new organic rural economy is the project goal and it considers the enhancement, in a sustainable way, of the peculiarities of the natural and cultural heritage resources.

Figure 8. Design goals as defined by authors in previous research [15,45,46].

4. Design Phase: Project Description

The design phase forms the heart of the research by design process. Following the field trip to China (Phase 1, as described in Section 2.5) the design team's activities were structured around groups to explore the ways in which future real projects could promote rural sustainability (Phase 2). Sustainable rural development can go beyond environmental considerations, and should be inclusive, economical and provide equitable access to public goods and public services. The current design pursues resource efficiency, citizen inclusiveness, accessible community facilities, and mobility [47].

The design process is concerned not with how things are, but with how they might be. Based on the programmatic research/design questions, a series of design options were developed and rationalized (Phase 3). The design options were assessed and coherently modified in an iterative process (Phase 4). At the end of this iterative process, syntheses were discussed, explored and critically reviewed by the whole design team (Phase 4 and Phase 5) [24]. A diagram of the design phases is presented in Figure 9.

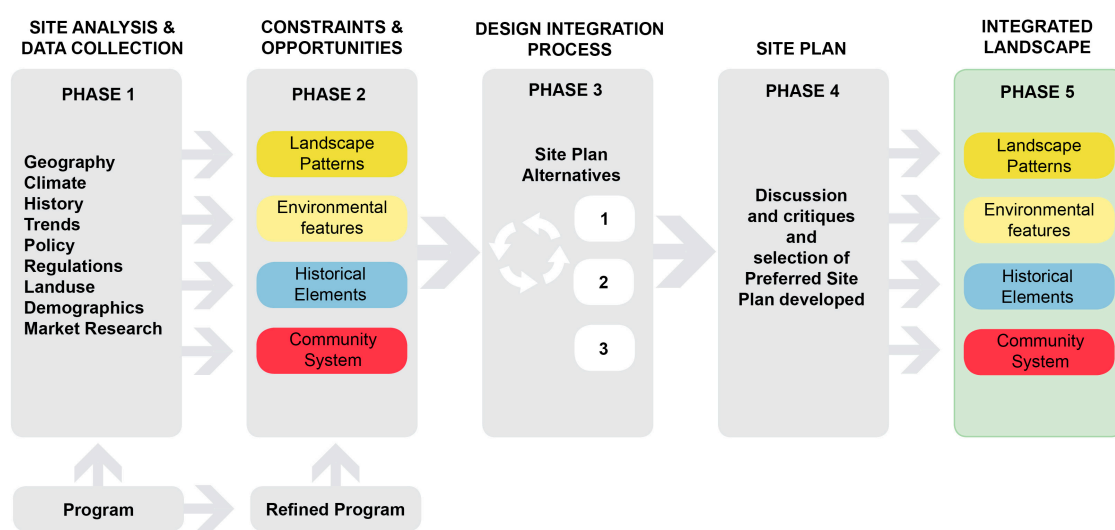


Figure 9. Design integration process, adapted for the current case from Lee [47].

The design actions as described should be read as a generalizable pattern for landscape regeneration. It was a starting point that can act as a stimulus for further actions to regenerate the entire territorial complex of Ji County and the process became an important occasion for thinking about the opportunities for the sustainable development of the entire county.

Overall, the actions proposed are concerned with the spatial and functional regeneration of pre-existing locations [48] of considerable historical and cultural value, drawing on the list of HLE categories and types. Therefore, the primary principle of the current project was to promote the territory, its history and its community. Working with the environment, respecting not only the general and essential technical rules (which were not the focus of the project, but were considered inescapable guidelines for contemporary design), but primarily respecting the environment, which was considered a common good to be protected and enjoyed. Great importance was given to reflecting on the landscape (in terms of aesthetics, economy and production), on the relationship between the built environment and untouched forest, and on the relationship between wild and productive green areas.

Working with the pre-existing context, using a sustainable approach that was able to highlight the potential still present in the architectural elements, the philosophy of this project was to find a cultural and social value even in the abandoned elements and in the ruins. Ruins are a reminder of architecture's transience, but they also embody often-contested projections of meaning and memory [49]. Working with the iconographic value of architecture is a perceptual and cultural aspect that allows for some physical elements (be they buildings, paths, lights or monuments) to

become components around which the community finds a sense of belonging and a collective identity. The elements that are always noticeable and draw the attention become the tools to achieve this goal.

By working with these issues in the three areas mentioned above, the project aimed to create relationships. The environment of relationships refers to the idea that an essential element of environmental design is developing and designing relationships, rather than independent entities. A conceptual master plan of the actions described above is shown in Figure 10.

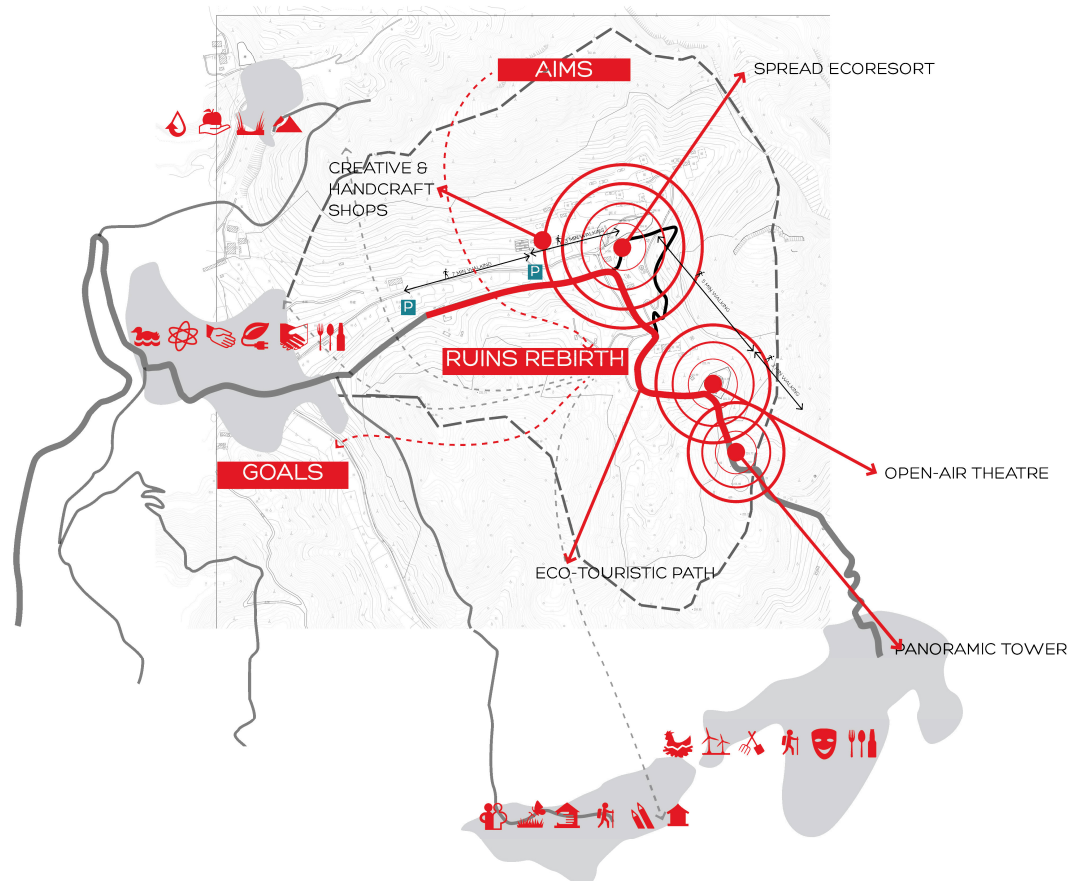


Figure 10. Conceptual master plan of the project: the three interventions go beyond the surrounding area, creating an environment of relationships inside and outside the village itself, enabling functional relationships within the existing touristic resources of the Ji urban region.

4.1. Design Options

According to the master plan, the design team was divided into three sub-groups, coordinated by supervisors, which elaborated three projects on each site. Prior to introducing the design descriptions, the design options were to be interpreted through the landscape patterns of the Chinese rural context summarized previously in Figure 7: the matrix of the analyzed landscape elements and materials. Above all, the matrix displays the landscape elements, the local architectural elements and the Chinese landscape iconography. Moreover, Dongjingyu Village is in a state of abandonment with consequent degradation of the landscape and natural resources. The authors believe the alternative to this state of total abandonment is a project that draws on the HLE and the LS approaches, rather than a top-down planning approach based on the optimization of land-use, which would have an even greater impact on landscape patterns. This research project clearly does not intend to criticize the planning policies of the central government or the local government, but rather intends to demonstrate the applicability of an alternative approach based on the landscape, natural resources and historical architectural and cultural elements.

The three project sites were developed on a feasible scale and the three proposals are not intended to explain all the details regarding material reuse, recycling and the sustainable approach of the design, although the proposed solutions are set out in Table 2 in Section 4.2. Moreover, as mentioned earlier, the context, landscape elements, and architecture as a temporary fact, and Chinese iconography, were the basis of each proposed design solution.

Table 2. Design outcomes: matrix of interaction between design goals and design outcomes.

Goals \ Outcomes	Outcomes			
	Architecture and Landscape Design	Environment	Community and Social Inclusion	Sustainability
Buildings and Design	Use of traditional building typologies and construction techniques.	Use of eco-friendly and local construction materials.	Employing workers that adopt and transmit the building skills (as cultural heritage).	Enhancement of the existing resources using recycled materials and reuse of existing buildings, etc.
Environment	Sustainable design approach: (materials, techniques, typology, 0 km, etc.).	Use of local (and renewable) energy resources and the prevention of environmental risks.	Creation of sustainable productive handcraft activities that are hosted or that have been promoted by the citizens.	Limit soil consumption through landscape services.
Community Inclusion	Design of public spaces. Creation of landscape elements to foster identity and a sense of place.	Improving public safety through environmental open views.	Improvement of the quality of life for vulnerable groups, (elderly and children), along with initiatives to facilitate the participation of young people.	Strengthening of community awareness, quality of life and feelings of belonging.
Economic	Design of flexible buildings can be adapted to the changing market.	Enhancement of the historical and natural heritage.	Creation of immediate job opportunities through tourist attractions.	Economic sustainability within a business plan.

For example, at Site 1, the ruins and the ancient stone walls were integrated into the project through their conservation and reuse. The hospitality functions are grafted into the ruins through a simple construction solution, thus the historical walls return to life (Figure 11a).

Site 2 is distinguished by the presence of the reservoir. The current proposal is to regenerate it through the installation of a wooden stage using the existing concrete base as the foundation for a platform, while the bleachers are conceived as a temporary steel structure that, over time, might be completely removed. The water element, in this case has lost its technical function as a reservoir and becomes a natural element framed in the historical typology of classic Chinese opera theater. Water features are a typical element included in ancient Chinese gardens, which reflect Chinese culture (Figure 11b).

Finally, the design proposal for the panoramic tower on Site 3 should also be interpreted through the lens of the Chinese landscape iconography. The panoramic tower takes its shape and dimensions from the pagodas that are present in the landscape of the Ji County valley. The pagodas are always placed at strategic points on the top of hills or mountains overlooking the surrounding landscape. The most famous pagoda in the valley is the Mount Panshan scenic spot (Figure 11c). Thus, the panoramic tower is a re-interpretation of the Chinese landscape iconography that bolsters the identity of the inhabitants. Moreover, the panoramic tower was designed with a main structure out of bamboo, which is a local material and a well-known construction material used by local craftsmen. The internal structure is a staircase in recyclable steel. The foundation is the only part in concrete.

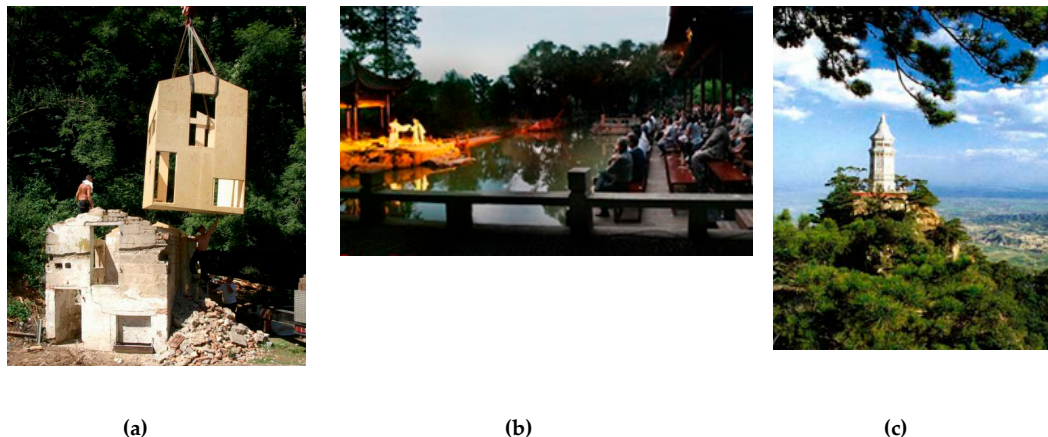


Figure 11. (a) Construction solution for the ruins. Source: @Naumann Arcjitektur. (b) Typology of a classic Chinese opera theater on the water. Source: China Daily, June 2015. (c) Mount Panshan pagoda, which defines the landscape. Source: Ji County, Tianjin, China, Stock Photo www.123rf.com.

The results of the design work are described in the following paragraphs.

4.1.1.1. Eco-Resort

The hospitality functions located at Site 1 are inserted into the leftover spaces of the ruins, and in a new building that is architectonically coherent with the pre-existing geographical lines, as shown in Figure 12. It stands as a reception area for the accommodation system. The new building hosts the new functions of resort reception, facilities, bistro and village museum. The building is detached from the ground by three stone bases; it is lifted, creating a perception of horizontality in the landscape, integrating and assimilating the properties of the surrounding environment.

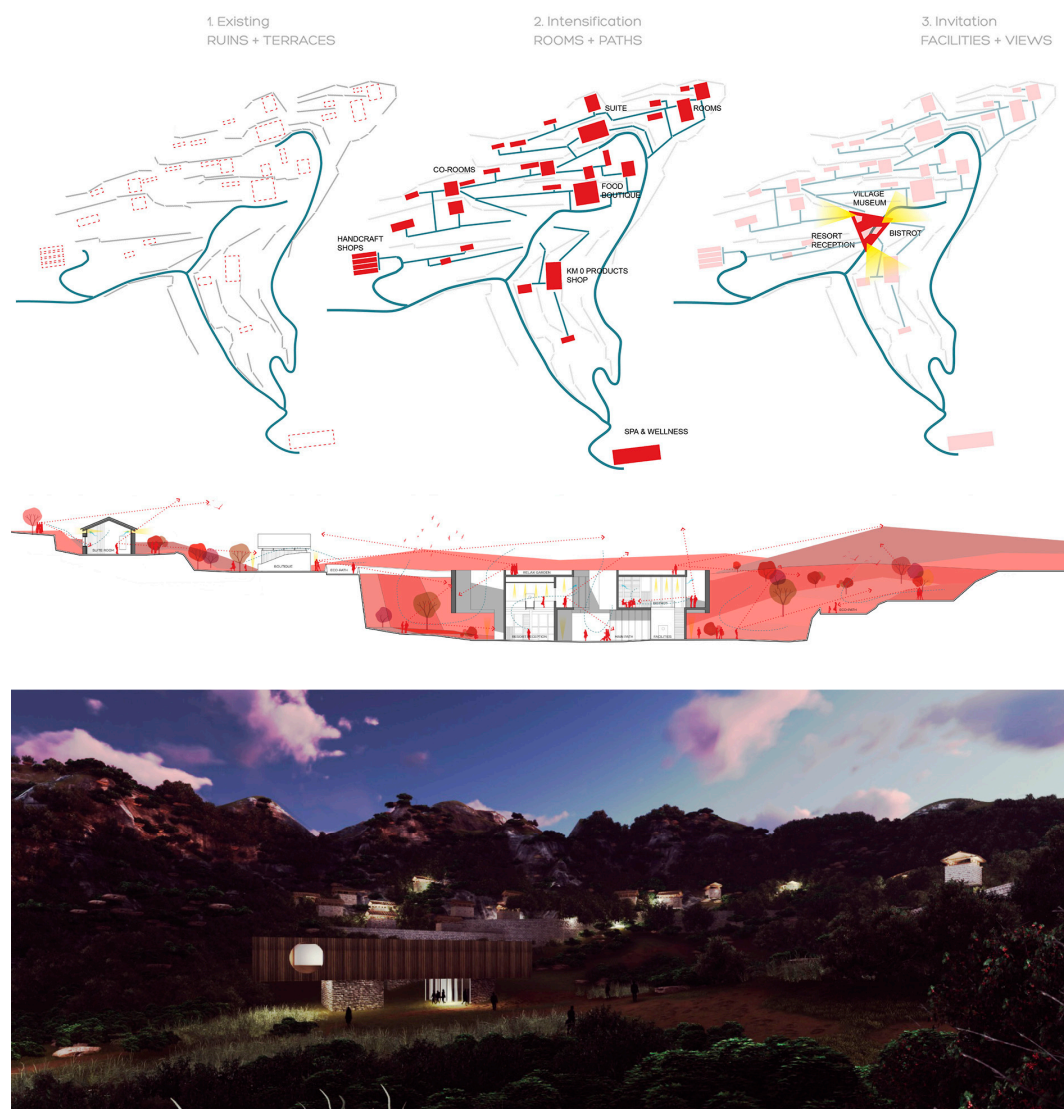


Figure 12. Design of the eco-resort. Looking from top to bottom: ruin regeneration layout; transversal section of the regenerated ruins and existing terraces, and the new service building; 3D view.

4.1.2. Open-Air Theatre

The evident features of Site 2 are the topography and the land conformation interrupted in their natural shape by the intrusion of the reservoir (see Figure 5). This specific geomorphological scenery became the base on which adapt the theatre functions in relationship with the reservoir.

The reservoir was used as “water platform” to open new panoramic views toward the valley of Funshan Park. All these elements (present but unexpressed) find their realization in an adapted open-air theatre in a new building following the ancient typology of Chinese theatre [50,51]. The light structure of the bleachers overlooks the water pond and the stage structure frames the landscape, using the landscape itself as a background, as shown in Figure 13, drawing on the ancient art of Chinese theatre.

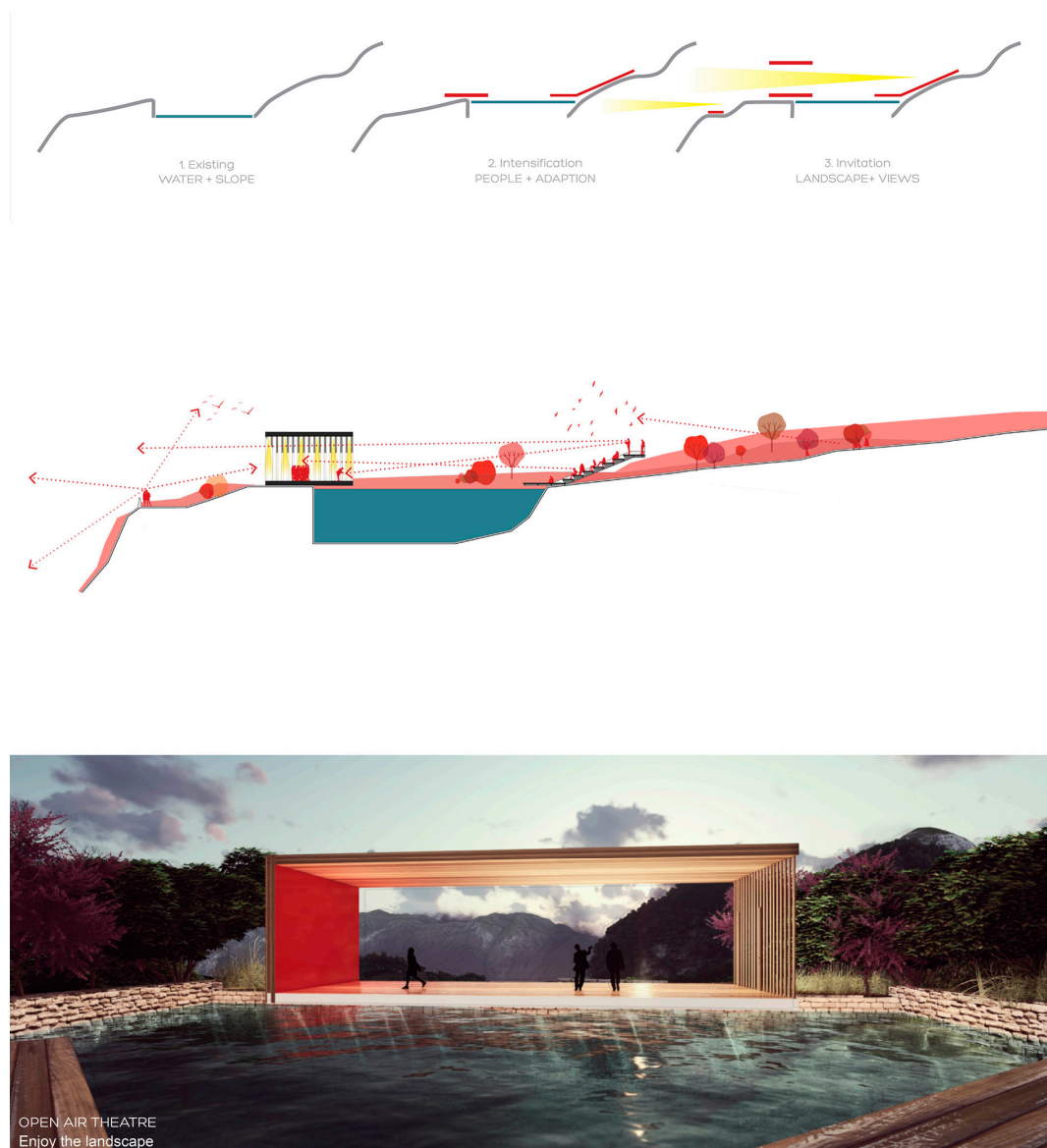


Figure 13. Design of the open-air theatre. Looking from top to bottom: conceptual diagram of the section of the theatre platform on the reservoir; section of the open-air theatre and regeneration of the reservoir; 3D view from the seating steps (bleachers) of the theatre toward the stage—according to the typology of ancient Chinese theatre, the stage frames the landscape.

4.1.3. Panoramic Tower

The aim of the project was not limited to the three areas—it aims to expand its benefits into a wider territory. The integration between the project and the context is not limited to functional and organizational/productive aspects, but it aims to go as far as the iconographic and perceptual levels allow. The new architectural vertical panoramic tower, with its bamboo structure, is an iconic element that will be perceptible from the entire intervention area, as well as from the surrounding Ji County valley, becoming a “landscape attractor” node that connects the landscape physically and visually. The lightweight bamboo structure will host cultural activities for the promotion of an ecologically-sustainable life committed to wellness. A diagram, drawings and 3D views are presented in Figure 14.

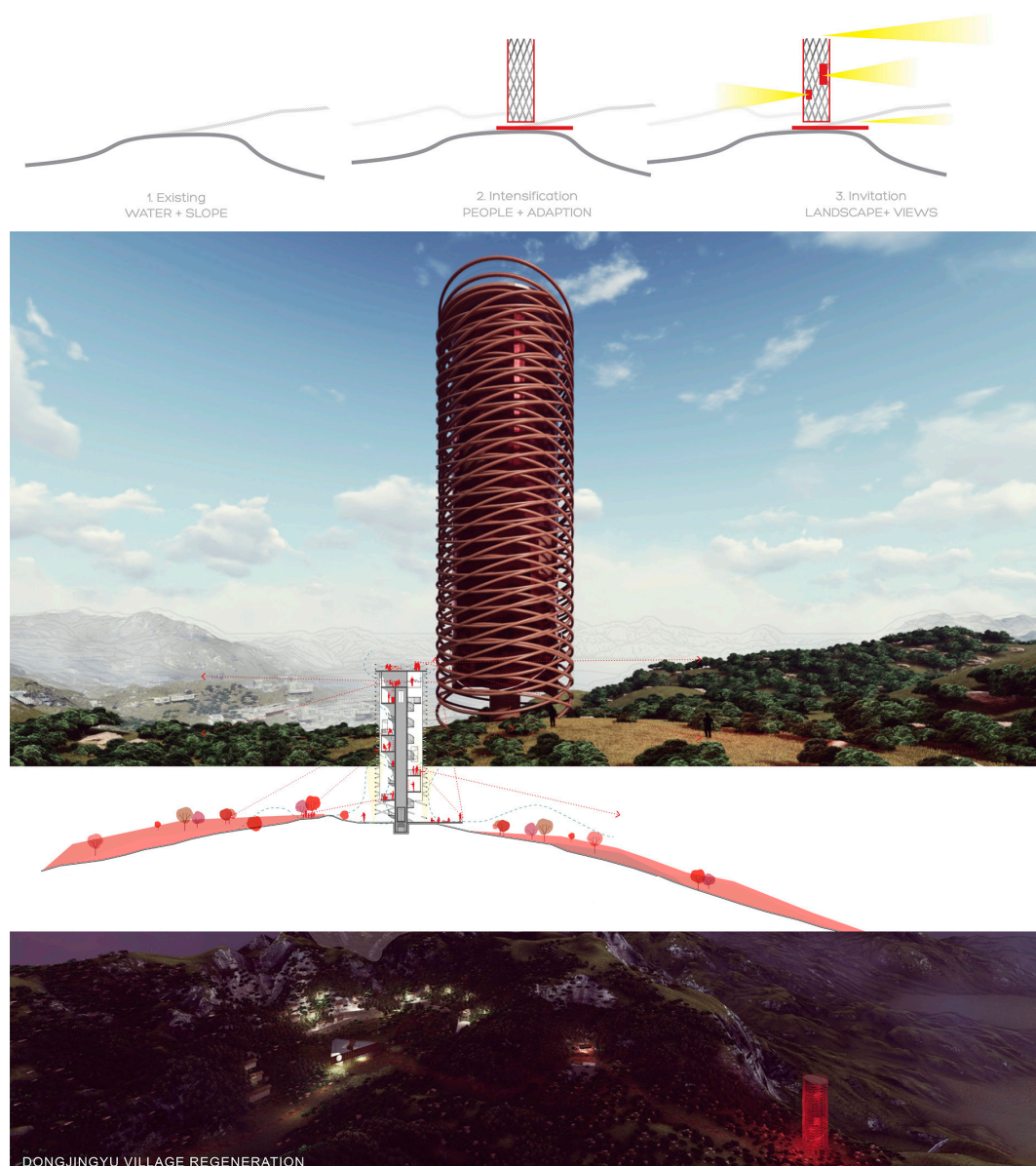


Figure 14. Design of the panoramic tower. Looking from top to bottom: conceptual diagram of the section of the panoramic tower; 3D view of the panoramic tower, which creates a visual relationship with the valley; transversal section of the tower and the surrounding landscape; general night-time birds-eye-view of the project area.

4.2. Design Outcomes

The research process for the Dongjingyu Village case study provided new knowledge to inform the design options.

The design team members constantly exchanged their understanding and new knowledge during the design process. Thus, the design options were subjected to new research inquiries, and the research outcomes were assessed using the modified design options, completing a circular iterative process.

As final results of this iterative process exchanging knowledge and understanding are summarized in Table 2, which presents the final matrix of the interaction between design goals and design outcomes.

To conclude, by summarizing the design outcomes it is possible to affirm that the matrix of the landscape regeneration of Dongjingyu Village can be seen as a result of and as a new starting point for designers, policy-makers, citizens and stakeholders, offering them a list of priorities as follows:

- **Environment** Attention to the environment is an inescapable starting point for contemporary design. The sustainable coexistence of nature and humans enriches diversity and accessibility. Functions of natural systems and human artifacts and activities do not necessarily conflict with each other. The whole environment, including other natural species and elements and humans, are part of a larger ecological system, and people's enjoyment, as well as the needs of thriving natural systems can coexist within buildings and street settings. Thanks to the renewal of the ruins, the project aims to reestablish a balanced relationship between the settlement and the physical environment. Facilities that provide an incentive for an eco-approach are organized in the renewed ruins.
- **Community and Social Innovation through Inclusive Tourism** Tourism can be a powerful tool to tackle an environmental and socio-economic crisis. Returning inhabitants to an abandoned area is a good occasion to promote new and sustainable forms of social interaction through tourism facilities. With the knowledge of the importance of sharing and participation in the contemporary world, the project proposes functions based on collaboration: co-production, co-living, co-events, etc. Designing for a sustainable environment begins and ends with intimate knowledge of the particular place, complete with its unique characteristics of climate, type of soil, native species, and patterns of living. The solutions proposed here are fit for the village scale, and are responsive to local natural systems, local people and visitors.
- **Sustainability** Sustainability is not only a magic word that is too often used by designers and policy-makers to attract attention. Sustainability is a duty for all of us—for us as designers, as decision-makers, as citizens. Sustainability is an approach to exploiting the resources of a territory without compromising the opportunity for future generations to do the same with the same chances. This project seeks to enhance the existing natural, human and cultural resources of this area, exploiting its capital and leaving a better environment for future generations. The proposed design seeks to develop social inclusion, environmental and economic sustainability. Moreover, sustainable eco-systems require long-term implementation and programming. As natural systems evolve and stabilize, for instance, they become capable of providing more ecological services that are more resilient to impacts without needing much support. However, in earlier phases, nature needs time to grow and targeted maintenance is helpful. With regards to the economic sustainability and associated costs of this project, the research team has elaborated a draft of the construction costs. The construction cost table was defined according to the standard construction costs in Ji County and, of course, in the Chinese Yuan currency. It should be considered a budget orientation, and further economic analyses and detailed pricing should be carried out according to a detailed design. The construction cost table is reported as Figure A3 in Appendix A.

5. Discussion and Critique

The project was developed through an iterative process of landscape and architectural design that aimed to regenerate and transform the village for uses that are suitable for contemporary ways of living, while encouraging the coexistence of villagers and the growing tourism industry. Using the research by design process, along with the scientific resources from landscape science, the authors defined a research framework that combines the site resources (natural resources, landscape, artifacts such as ruins, walls, etc.) with the “landscape service classification” and “historical landscape element (HLE) types and categories”. Applying this research framework was a necessary shift in thinking in order to boost the main goal of landscape design and planning toward the inclusion of citizens as active agents throughout the entire process, rather than focusing on the provision of opportunities for participation. Hence, two results were demonstrated: (1) Sustainable village regeneration that considers bioclimatic requirements can only be achieved with a supportive and cooperative citizenship. The new rural landscape development required by contemporary social challenges will be a place without power hierarchies, a place of equal opportunities and cooperative citizenship. (2) The village becomes an

expression of social and individual events. During this project, the emphasis was placed on displaying the expression of social, individual or complementary events that enable mutual performance in place and time. Finally, the relationship between nature and the environment is directly entangled in a form of mutual exchange and hybridization, we therefore aim to create reconciliation between traditional material production, nature and landscape.

Critical to the project was the need for public consultations at least at two stages of the design process in order to identify and assess the proper landscape services: the first at the beginning of the analysis and site survey, and the second after the design phase of drafting the project proposal and its implementation. This would require the application of participatory processes and social value methodologies [52,53] and community-based processes [54,55]. Nevertheless, it is necessary to clarify here that this working package suffered due to its being difficult to apply in the Chinese context. In fact, it was not possible to develop a proper fieldwork phase of consultations and social engagement. The preliminary phase of the analysis was managed and directed by the local authorities. This was mainly due to two issues: the current dual operating system of the regeneration of rural areas in China, as described in the introduction, and the fact that, in China, feasibility projects (or applied research) are frequently (perhaps always?) used to start negotiations between the various stakeholders involved in the process of regeneration and reactivation of complex rural areas.

Consequently, as we were aware of the partial operational limitations and, above all, were aware of the latter reason for this, the authors opted for a methodological approach based on research by design with the aim of fostering a dialogue and creating awareness for both government authorities and citizens regarding potential design solutions that were determined based on landscape patterns and not merely land use.

Undoubtedly, the application of participatory methodologies of social value and participatory processes based on the community can play an important role in project design and can provide both general knowledge and specific information on the project area regarding the connections between prevalent landscape features and landscape models [56,57]. Furthermore, they might provide indications of the benefits that different groups of citizens perceive from the same landscape. This process is an important subject for discussion, thus negotiations should be opened between local authorities, and representatives of the citizens and communities, while the team from the Environmental Futures Lab of the College of Design and Innovation of Tongji University could facilitate communication between the various stakeholders.

Finally, along with the intrinsic originality of the whole working package of this research project, there are three crucial aspects of innovation that go beyond the creation of an environmental scenario itself and consider the social impact in a real context in China.

- First, research and the engagement of authorities: landscape planning and the development of action plans should be initiated in cooperation with government authorities and citizens to ensure coherence between plans and the real problems of the context. Research activities such as experimental projects and pilot projects might have an impact on land use models. For this reason, research activities cannot be separated from policy-maker activities and the involvement of citizens and should combine a top-down and bottom-up approach. Through this two-pronged approach, a project can improve and include an assessment of market needs for both the public and private sectors.

- Second, participation and social inclusion: participation and social inclusion might have a deeper and more positive impact on rural village regeneration. Basing on consolidated model of participation already tested by the authors in several previous projects, workshops, seminars and public events were organized. Those events brought together scholars, tutors and students of Tongji University of Shanghai and the University of Pavia in Italy and involved more than 20 people highlighting emphasis on the importance of authorities, stakeholders and citizens engagement in the design process. To improve future projects social engagement should be expanded beyond academia to involve authorities and citizens.

- Third, generalization and transferability: the entire work package can be applied and implemented in other rural villages in China, moving beyond the specific environmental scenario of this project. The research framework and design phases have the advantage of a wide degree of generalization. Even though the generalization of qualitative research can be controversial, after intensive study of this case, the authors affirm that their research outcomes provide a rich, contextualized understanding of many aspects of landscape patterns and historical landscape elements [58]. Following Vincze (2013) [58] and Shuttleworth et al., (2008) [59], this research project can be generalized in terms of analytic generalization and transferability. Analytic generalization refers to a theory as a set of scientific resources (HLE and LS) through which new findings can be unlocked: in this case, landscape design and planning using landscape patterns with the inclusion of citizens as active agents. The second possible generalization was with regard to transferability, which does not involve broad claims, but invites the readers of research to make connections between the elements of a study and their own experience [58]. This means that researchers can quite easily apply the research framework in other rural villages in China, interpreting the data gathered from the new context in connection with their experience of the site under investigation.

Together, these three aspects can be considered to be of great impact and innovation in and for the Chinese system. In contrast to the state control of urban planning prevalent in many East Asian cities, a combined top-down and bottom-up action might be an alternative mode of development that embodies the subjectivity and agency of rural dwellers, and initiates the pursuit of a more open and dynamic form of landscape design in China and beyond.

To conclude, the authors believe that this research project allows us to perceive future profound transformations or changes in the Chinese territory, as well as innovations in which different crucial elements of modernization and tradition can find a common space of interaction and co-existence. New knowledge and a mutual understanding of values (cultural, natural, tangible and intangible) can contribute to the enrichment of the rural–urban culture and architecture in China).

Finally, the authors would like to mention that in design disciplines such as architecture, landscape, urban design and planning, etc., the outcomes include not only written texts, but also a huge quantity of design works such as sketches, presentations, reports, panels, drawings and schemes, 3D models, 3D virtual models, and pilot projects, which are produced during seminars, workshops and long working days. These materials are almost impossible to present in their entirety, although sometimes they might be revealed in local exhibitions. The research outputs can also follow the path of academic production and publishing, as demonstrated by this paper.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Class	Group	Definition	Concept
1 Daily Activities	1a Place to live	Provision of a space for residential location, a home.	Carrier functions Provision of space
	1b Place to work	Provision of open spaces or urbanized areas where people develop their job.	
	1c Place to move	Provision of spatial communication. It is not only related to transport networks but also to open spaces that allow people to commute, travel, or just access other services.	
2 Regulation of the Spatial Structure	2a Connection of spaces	Ability to facilitate ecological, visual, or functional connectivity between different areas.	Connectivity
	2b Buffer disturbing use	Ability to separate incompatible uses and temper negative interactions from an ecological or perceptual point of view.	Buffer zone
	2c Provision of spatial complexity	Related to the degree of diversity and richness of landscape elements that might improve possibilities for exploration, resilience, and visual absorption capacity.	Diversity Heterogeneity complexity
3 Health	3a Physical health	Contribution to the enhancement of physical fitness by facilitating walking or other alternative ways of transportation and the practice of open air sports.	Physical health
	3b Mental health	Opportunities to relax, recover from stress, escape from the daily routine, find tranquility, be calm, or just fulfill the need of mental space.	Mental health calm and escapism
4 Enjoyment	4a Passive enjoyment	Enjoyment of attractive vistas, a quiet place to read a book, the possibility of seeing wildlife, or cultural heritage.	Aesthetic appreciation, values, and heritage
	4b Active enjoyment	Related to more dynamic ways of enjoying spare time like opportunities for hiking, climbing, gardening, hunting, fishing, or providing a place for children to play.	Recreation, tourism, and ecotourism
5 Personal Fulfillment	5a Way-finding	Provision of cues that enhance spatial orientation, the sense of where one is, and how to get where one is going.	Orientation
	5b Scientific resources	Source of research for a wide range of fields such as history, geography, botany, ecology, geology, or archaeology.	Information and knowledge, knowledge systems, science
	5c Didactic resources	Opportunities to learn about rock formation, flora and fauna species, past civilizations, or traditional farming practices.	Education, educational values, learning
	5d Spiritual experience	Provision of sacred places for religious practices or sites connected to legends or myths.	Spiritual experience and religious values.
	5e Source of inspiration	Inspiration for art, literature, music, architecture, cinema, or advertising.	Inspiration for culture, art, and design
6 Social Fulfillment	6a Social interactions	Provision of social surroundings separate from the two usual social environments of home and the workplace that provide opportunities for social encounters.	Community activities, social relations
	6b Place identity	Contribution to shaping of community identity by providing icons and distinguishing it from others.	Sense of place, place identity, cultural diversity, and identity
	6c Sense of continuity	Provision of stable reference points through the life course.	Sense of history, sense of continuity

Figure A1. Classification of landscape services: description of the new services and their related concepts (from Vallés-Planells et al. [6]). Numeration of classes and groups are indicated in bold.

HLE categories	HLE types (examples)
Agriculture	Old rice paddies and terraces , vineyards, meadows with scattered fruit trees, hedges, stone ridges, old agricultural field terraces, wet or damp meadows, heathlands
Forestry and mountain	Pastoral woodlands, sacred mountain ,
Settlement types	Single-street villages, scattered settlements, compact settlements
Traffic	Sunken pathways, water pathways , tree-lined avenues, narrow gauge railways
Mining	Relics of old ore or coal mines, relics of peat cuts, former stone or chalk quarries
Processing of food and materials	Wind and water mills, old warehouses and silos , workshops of wood, stone, ceramics, etc.
Military, security, administration and representation	Battle fields, ramparts, fortresses, castles, walls
Building types	Buildings in the local architectural style, manor houses, bamboo houses, gardens, ruins
Religion	Monasteries, cemeteries, temples
Fishery and hunting	Fishery and hunting

Figure A2. Examples of historical landscape elements (HLE): categories and types (modified and adapted to the Chinese context from Walz et al. [7]; Bastian et al. [5,8]). New proposed categories and types are indicated in bold.

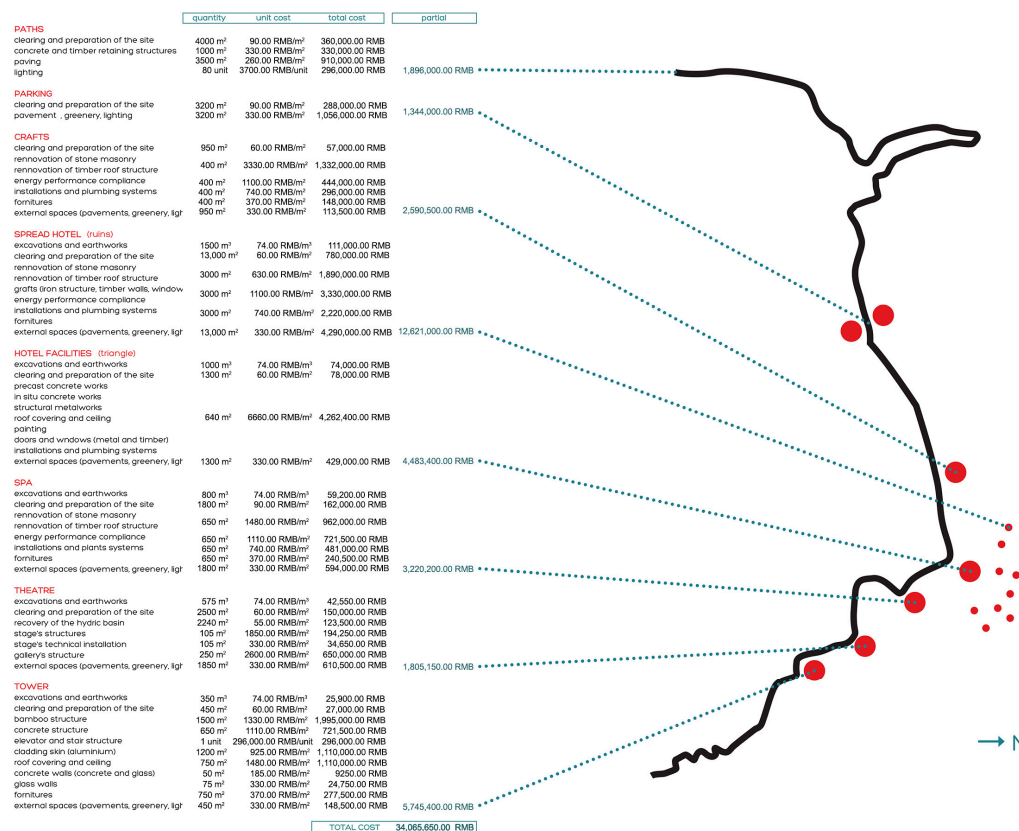


Figure A3. Draft construction cost. The construction prices are in Chinese Yuan. The total cost amount is almost 35M Yuan (equal to ca. 4.37 M EUR or ca. 4.95 M USD). This is a relatively low cost if considered in terms of the long-term benefit to the environment and in terms of the potential revenue from the touristic activities.

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