Research on the Conservation and Renewal of Rural Landscape and Vernacular Architecture in Chongqing, China

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Abstract

Rural areas are regional complexes with natural, social and economic characteristics. They have multiple functions such as production, life, ecology, and culture. They coexist with urban areas in a mutual promoting relationship, and together they constitute the main space for human activities. In order to promote comprehensive rural development, China promulgated the Strategic Plan for *Rural Revitalization (2018-2022).* The plan emphasized that implementing the rural revitalization strategy was a key measure in building a beautiful China. The plan required strengthening the overall management and control of the rural appearance, focusing on the personalized design of the individual farm houses, building an upgraded version of rural areas based on the rural society, rich in regional characteristics, carrying pastoral nostalgia, and reflecting modern civilization, avoiding repeated styles in rural areas and preventing the urban tendency of rural landscapes. The plan required to conform to the development law and evolution trends of villages, and promote rural revitalization in a classified manner according to the development status, location conditions, and resource endowments of different villages following the ideas of concentration, improvement, integration into cities, characteristic protection, relocation and merging. However, in the process of planning implementation and actual construction, the problem of disconnection between theory and practice frequently occurs. The separation of theoretical researchers from designers and builders has led to rural construction in many places ignoring their own regional culture, blindly following the trend, and copying the construction modes and contents of other places. Under the influence of the urban construction mode, the traditional rural landscape rooted in the local natural and cultural environment is gradually moving towards homogeneity and alienation, and the phenomenon of misunderstanding and "constructive destruction" of rural landscapes is becoming more and more intense. This phenomenon shows that people's current understanding of rural landscape and vernacular buildings has been separated from the regions and villagers, separated from daily life, which have been replaced by a patterned and conceptualized symbol and form. On the other hand, we have realized that under the concept of sustainable development and the general framework of rural construction, the construction of rural landscapes based on regional characteristics and different classifications still lacks specific and operable strategies and methods.

Based on the actual needs of rural revitalization in the new context, with problems as the orientation and with protection and update approaches as the entry point, this study takes the rural landscape and vernacular architecture in Chongqing as the research object, referring to the latest scientific theoretical methods and technological achievements, and discusses the protection and renewal decisions of rural landscape according to local conditions, as well as the specific and feasible overall methods. This study begins with reviewing literature, grasping the subject, and interpreting concepts. On the basis of understanding domestic and foreign research, it combines the regional characteristics of Chongqing, and interprets and studies the categories, characteristics and values of the subject on the basis of quantitative and qualitative

analysis, constructs a system of elements of Chongqing's rural landscape and vernacular architectures, analyzes the internal relationship between the mutual influences and constraints of each element, and clarifies the regional characteristics of the system. The study suggests that the rural construction of Chongqing, especially the characteristic protected villages, must fully protect and renew the rural landscape and vernacular buildings with regional characteristics. The local protection of the countryside,especially the tradiontal village should be based on the cognition and understanding of the characteristics of the local natural and cultural environment, exploring its inherent cultural heritage and evolutionary drive, guiding the healthy and balanced development of rural landscape systems in the period of economic and social transformation through a systematic and comprehensive methodology. Based on actual rural construction cases in Chongqing, this study explores specific methods for protecting and renewing rural landscapes and vernacular buildings. It emphasizes that conservation and regeneration strategies need to be based on fieldwork and analysis and research. It should integrate local, artistic, multi-party construction and other multiple methods, and optimize the landscape and architectural resources while highlighting the regional characteristics, so that it can inherit the culture and meet the needs of sustainable rural development, and help rural revitalization.

Key Words: Rural Landscape; Vernacular Architecture; Tradiontal Village; Regional Research; Protection and Renewal

1. Introduction

1.1 Research background

Rural landscapes are terrestrial and aquatic areas co-produced by human-nature interaction used for the production of food and other renewable natural resources. Rural landscapes are multifunctional resources(Icomos, 2017). It carries the development of culture, records the history of mankind, is the main material carrier of national characteristics and regionalism, and is the important supporting element of sustainable rural development(Shi 2020). China is a country developed from a rural society. With rapid urbanization, the rural areas and population still occupy an important ratio in the country. However, due to imbalanced development, hollowing out of the village, and aging of the population, this vast land that gave birth to culture has caused rural poverty and loss of characteristics, making development difficult.

The current situation and future development of rural areas have become the focus of the world. The International Council on Monuments and Sites (ICOMOS) announced the theme of 2019 International Day for Monuments and Sites as Rural Landscapes, underscoring the value of preserving the heritage formed by the long-term harmonious interaction of humans and the natural environment. Protecting these landscapes is key to sustainable development(Besseau 2018).

"Rural Landscape" as the theme of the 2019 conference fully shows that the sustainable development of the countryside has become the focus of the world. The theme of the conference is to explore the path of sustainable rural development through cooperative research, and through wider exchanges and collaboration. Contribute effectively to the conservation of this heritage.
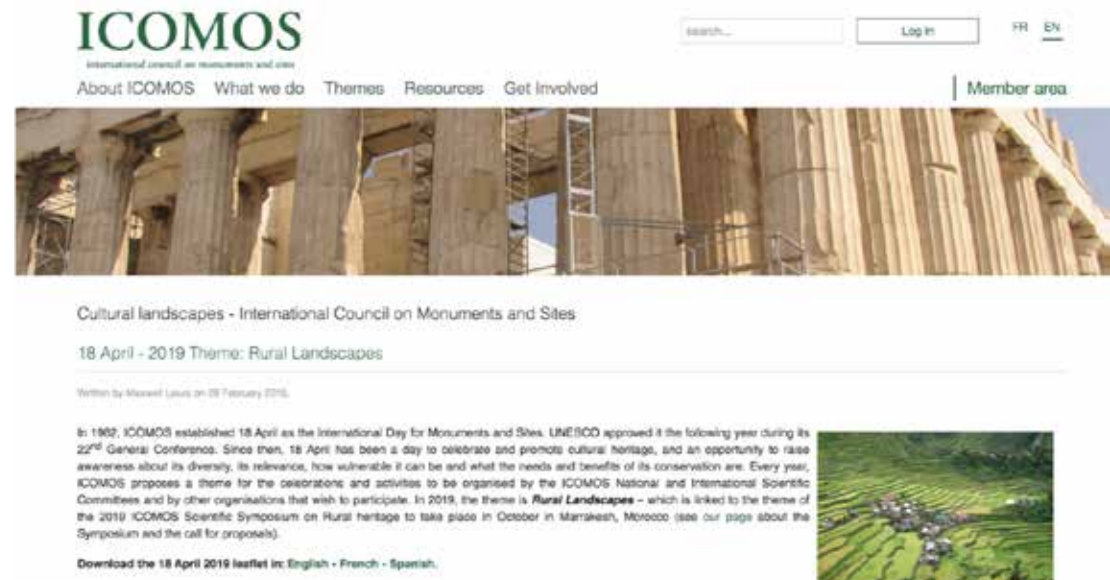

Fig. 1.1. 2019 Theme: Rural Landscape
(source: www.icomos.org/en/documentation-center/57785-18-april-2019-rural-landscapes-online-resources

The 19th National Congress of the Communist Party of China pointed out that the implementation of the rural revitalization strategy was an important foundation for building a modern economic system, a key measure for building a beautiful China, and an effective way to inherit the excellent traditional Chinese culture(xinhua, 2019). Agriculture is an important supplier of ecological products, rural areas are the main areas of ecological conservation, and ecology is the greatest development advantage of rural areas. In rural revitalization, being ecological and livable is the key. Implementing the strategy of rural revitalization, coordinating the systematic management of mountains, rivers, forests, fields, lakes and grasslands, accelerating the implementation of rural green development methods, and strengthening the improvement of rural living environment are conducive to building a new pattern of rural development in which people and nature coexist harmoniously, and realize the unity of people's wealth and ecological beauty. Chinese civilization is rooted in farming culture, and the countryside is the basic carrier of Chinese civilization.

Villages are the most basic forms of human settlements formed by human beings to adapt to the most basic living conditions and carry out various production and living activities. They are typical overall human ecological systems and landscape complexes formed by the combination of natural ecology and human ecology. China is a country with vast territory, multi-ethnic groups, rich resources and great differences in resource characteristics. Due to the differences in geographical location, production methods and customs, rural areas present different styles and characteristics. It is the consensus of all mankind to seek sustainable development on the basis of respecting national characteristics and local culture. But this consensus has been ignored in the pursuit of rapid economic development. Villages that were originally very different have been homogenized in the wave of economic globalization and the coordinated development of urban and rural areas. The "sense of place" and "sense of belonging" in the countryside has declined. What's more, some rural areas continue to use urban construction methods, resulting in constructive damage and deterioration of the ecological environment in rural areas. Faced with these problems, correct, systematic and comprehensive rural research methods are imperative. This is why this study advocates research on the characteristics and values of rural landscapes and vernacular architecture based on different areas. Only on the basis of in-depth understanding of the research objects, can rational design suggestions and strategies be put forward according to the characteristics of rural areas.

1.2 Research significance

1.2.1 Regional studies clarify the regional characteristics of landscape and architectures, and enhance environmental identification

The vast geography of China has rich regional characteristics, and rural revitalization should be based on regional characteristics rather than confusing them. Regionalization research can help to understand the characteristics of local culture more clearly and enhance the sense of regional identity.

1.2.2 Return to the rural development pattern of harmonious coexistence between man and nature

Rural landscape is one of the important types of landscape in China, and it is the core content of rural revitalization and the construction of beautiful rural areas. Sorting out and evaluating the rural landscape in Chongqing can not only help to better develop, protect and utilize the rural landscape resources, but also promote the ecological sustainable development of the rural landscape in Chongqing, and provide guidance and reference for the construction of beautiful rural areas.
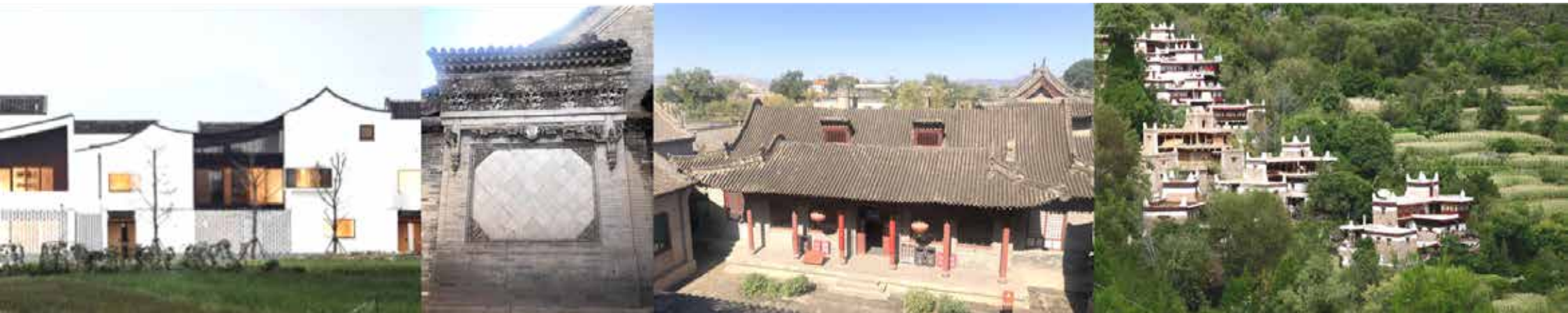
Fig. 1.2. Those beautiful vernacular architectures that do not belong to the Chongqing area(source: photo by author)

1.2.3 Restoring the alienated vernacular architectural culture

The rural environment is over-developed or heterogeneous, and the vernacular architecture lacks effective self-evolution, resulting in the destruction of the cultural landscape. When the villagers build new houses, they no longer pursue harmonious coexistence with nature, beautiful and livable. Instead, they build many inferior, rough and imitated buildings. Faced with this kind of problem, this research aims to stimulate the villagers' inner feelings towards vernacular architecture and restore the alienated vernacular architectural culture by building model cases with local regional characteristics that meet the needs of contemporary life and aesthetics.

1.2.4 Enriching and inheriting excellent traditional Chinese culture

Vernacular buildings is not only an important part of architectural culture but also an important part of rural landscape, and is the core carrier of human settlements. This study extracts and summarizes the characteristics of the external forms and internal functions of vernacular buildings in Chongqing, constructs an atlas of vernacular buildings in Chongqing, and explores the cultural value of vernacular buildings, so that it can be inherited and continued.

1.2.5 Differentiated construction model according to local conditions

On-site analysis and design strategy analysis of rural areas in Chongqing can help strengthen regional characteristics, promote the differentiated development of rural construction, and provide design templates to guide subsequent rural construction.

Protection **Renewal**

Fig. 1.3. Reconstructing the beauty of vernarcular architecture(source: photo by author)

1.3 Definition of concepts

1.3.1 Rural landscape

Rural landscapes form an essential part of our heritage,they are significant witnesses of the past and present relationship between man and his natural and built environment. They constitute an integral part of natural and cultural heritage being a timeless archive where are depicted the ways people have lived and organized themselves in certain places.

A. Rural Landscape as a dynamic tangible and intangible object

A rural landscape is a dynamic and complex object: it has changed over time in response to physical and natural events and laws and to human intervention: as each landscape, rural landscape is a physical object, and, at the same time, it is its social cultural perception(European Landscape Convention – ELC, 2000). ELC is the main international reference text (at European level and for many other cultures), summarising the contemporary cultural and political concept of landscape. As a physical object, a rural landscape can be perceived by people through their five senses (sight, hearing, smell, feel and taste): using a metaphor, landscape is like huge 'architecture' – similar to giant outdoor rooms, mostly built by natural materials (soil, sky, vegetation, animals, etc.) and manufactured materials (stones, bricks, woods, mortar, metals, …). It is always dynamic. At the same time, it is a functional space for humans: its spatial organisation is the tangible consequence of productive human activities using and transforming natural resources over the centuries (Rosina & Scazzosi, 2018). The tradition of human geography and historical studies clearly demonstrated that landscapes and rural landscapes are the expression of the physical asset of the economical, productive, social, cultural organisation of the various communities who made them up. In addition, as each landscape, Rural Landscapes are usually object of meaning and values attributed by people, perceiving it through ancient and contemporary culture.Rural landscape includes associated cultural knowledge, traditions, practices, expressions of local human communities'identity and belonging, and the cultural values and meanings attributed to those landscapes by past and contemporary people and communities. Rural landscapes encompass technical, scientific, and practical knowledge, related to human-nature relationships.

The tangible and intangible of rural landscapes are widely understood concepts, but their dynamics are often overlooked. The rural landscape is a complex integrated system, with elements that are interrelated and interact with each other. Climate change, geological movement, human behavior and economic form will all have different effects on it, so the rural landscape is by no means a constant landscape painting, it is a living historical reproduction.

B. Scope and categories of Rural Landscapes

Rural Landscapes can be terrestrial and maritime and all of them contribute to food production for humans. Rural Landscapes encompass many practices in use over the centuries: agricultural, forestry, pastoral, fishery and aquaculture, wild-resource. It can encompass productive activities as well as picking activities. Usually, the majority of rural landscapes include and combine many of these practices – and related physical elements – into a unique place: physical elements

are interdependent and function together as a system of relationships（Scazzosi,2011）.Rural landscapes can be on the ground, underground, in the air, in the water. They could embrace rural spaces as well as peri-urban areas or small spaces within built areas. They can be well managed and/or degraded or abandoned areas. They could be industrialised or maintained by traditional cultivation practices. This concept of rural landscape is coherent with the ELC cultural approach, affirming that all spaces can be considered "landscapes": "…this Convention applies to the entire territory of the Parties and covers natural, rural, urban and peri-urban areas. It includes land, inland water and marine areas. It concerns landscapes that might be considered outstanding as well as everyday or degraded landscapes"(ELC, 2000, art.2).

C. Rural Landscape official definition

The above conceptual elaboration has been the basis of the discussion among many experts producing ICOMOS-IFLA Principles Text on Rural Landscapes as Heritage (2017), endorsed and adopted, as a doctrinal text, by the General Assembly of ICOMOS in Delhi, December 2017 after a large discussion on draft texts by International Scientific Committees and National Committees of ICOMOS and other experts and international cultural organisations.

"Rural Landscape: For the purpose of this document, rural landscapes are terrestrial and aquatic areas co-produced by human-nature interaction used for the production of food and other renewable natural resources, via agriculture, animal husbandry and pastoralism, fishing and aquaculture, forestry, wild food gathering, hunting, and extraction of other resources, such as salt. Rural landscapes are multifunctional resources. At the same time, all rural areas have cultural meanings attributed to them by people and communities: all rural areas are landscapes. Rural landscapes are dynamic, living systems encompassing places produced and managed through traditional methods, techniques, accumulated knowledge, and cultural practices, as well as those places where traditional approaches to production have been changed. Rural landscape systems encompass rural elements and functional, productive, spatial, visual, symbolic, environmental relationships among them and with a wider context.

Fig. 1.4. Rural landscape in China (source: photo by Liu Jian ISCCL)

Rural landscapes encompass both well-managed and degraded or abandoned areas that can be reused or reclaimed. They can be huge rural spaces, peri-urban areas as well as small spaces within built-up areas. Rural landscapes encompass land surfaces, subsurface soils and resources, the airspace above, and water bodies" (ICOMOS-IFLA Principles 2017, I. Principles,I.A. Definitions).Principles Text 2017 is one of the outputs of the World Rural Landscape Initiative (WRLI) (www. worldrurallandscapes.org) launched by ICOMOS-IFLA International Scientific Committee on Cultural Landscapes (ISCCL) in 2012, aiming to develop knowledge and policies to protect, enhance and manage rural landscape as heritage in a more coherent way and strategy at general/world level, giving some tools to facilitate mutual understanding among scholars, technicians and professionals as well as farmers and people.

Table 1.1-1.World Rural Landscape Classification: the classification, elaborated by the ISCCL Working Group, lists the major world rural landscape systems identified based on the land value enhancement.

	Rural landscape system	Distribution	UNESCO sites
AGRICULTURE			
1.	**Soil retaining systems /** *Retenue du sol*		
1.1	Structures created by soil movement and planted and cultivated terraces in temperate areas / *Structures créées par le mouvement du sol et terrasses plantées et cultivées dans les zones tempérées*	Mediterranean, Europe, West Asia, Mexico	• Portovenere, Cinque Terre, and the Islands (Palmaria, Tino and Tinetto), Italy, 1997 • Costiera amalfitana, Italy, 1997 • Vineyard Landscape of Piedmont: Langhe-Roero and Monferrato, Italy, 2014
1.2	Flooded rice terraces / *Terrasses rizicoles inondées*	East Asia (Philippines, Indonesia, Vietnam, South China, …), Madagascar	
1.3	Tropical cultivated terraces / *Terrasses cultivées tropicales*	East Africa (Ethiopia, Kenya, …)	
2.	**Water management /** *Gestion de l'eau*		
2.1	Oasis/*Oasis*	Sahara, Arabian Peninsula	
2.2	Irrigated land/*Périmètres irrigués*	Whole world	
2.3	Drained land/*Périmètres drainés*	Whole world	
2.4	Polders/*Polders*	Netherlands, Japan, China, Bangladesh, …	
2.5	Cultivated swamps, floating gardens/ *Marais cultivés, jardins flottants*	Europe (North of France) swamp of the Tigris (Iraq), Xochimilco (Mexico), Inle Lake (Burma), Bolivia	
3.	**Cultures associated with each other, live fences /** *Cultures associees entre elles, clotures vives*		
3.1	Annual associated crops / *Cultures annuelles associées*	Mexico (Association corn-bean-pumpkin known as the "Three Sisters" or Milpa)	
3.2	Open fields / *Champs ouverts*	Europe, North America	
3.3	Enclosed fields / *Bocages*	Western Europe, Bamileke in Cameroon, …	
3.4	Agroforestry / *Agroforesterie*	Mediterranean (*coltura promiscua*), Mexico (chewing gum)	
AGRICULTURE + HUSBANDRY/PASTORALISM			
4.	**Cultures associated with livestock /** *Cultures associees avec elevage*		
4.1	Agrosylvopastoralisme / Agro*sylvopastoralisme*	Europe, Mediterranean, West Africa, New Guinea (*dehesa, montado, Faidherbia, …),* North America	• Madriu-Perafita-Claror Valley, Andorra, 2004 • Val d'Orcia, Italy, 2004
4.2	Aquatic systems / *Systèmes aquatiques*	China (rice fields with fish)	
FORESTRY			
	Forestry / *Sylviculture*		
5.1	Tropical hardwoods / *Feuillus tropicaux*	Tropical humid regions	
5.2	Temperate hardwoods / *Feuillus tempérés*	Temperate and cold regions	
5.3	Resinous / *Résineux*	Temperate and cold regions	

HUSBANDRY/PASTORALISM			
	Livestock systems / *Systems d'elevage*		
6.1	Nomadic herding / *Nomadisme*	Northern Eurasia (Reindeer), Sahara (camel and sheep), Sahel (zebu), Central Asia (horses, camels and sheep)	
6.2	Long transhumance / *Long transhumance*	Mediterranean, Australia (sheep and goats)	
6.3	Short transhumance / *Court transhumance, «remues»*	Alps (cattle), fells of England and Scotland (sheep)	
6.4	Sedentary or semi-sedentary extensive grazing / *Pâturage sédentaire ou semi-sédentaire extensif*	North America, South America, Australia and New Zealand (cattle), Argentina, Spain	
6.5	Intensive sedentary grazing / *Pâturage sédentaire intensif*	Western Europe (cattle)	
FISHING AND AQUACULTURE			
7.	**Fishing/*Aquaculture***		
7.1	Aquaculture: fish farming / *Aquaculture: pisciculture*	China, Southeast Asia, East Africa, …	
7.2	Aquaculture: crustaceans (shrimps) / *Aquaculture: crustacés (crevettes)*	Madagascar, Latin America, …	
7.3	Aquaculture: shellfish farming (e.g. oysters) / *Aquaculture: conchyliculture (huîtres, moules)*	North West Europe, Mediterranean, South-east Asia, Southeast, West Africa, …	
7.4	Fishing	Worldwide	
GATHERING, HUNTING			
8.	**Gathering and hunting /**		
8.1	Wild-food gathering / *Cueillette de nourriture sauvage*	Worldwide	
8.2	Wild-food gathering through fire management / *Cueillette de nourriture sauvage grâce a la gestion de incendies*	Australia, Africa	
8.3	Wild-life hunting / *Chasse d'animaux sauvages*	Alaska, Denmark, Canada, South Africa, …	
8.4	Wild-life hunting through vegetal architectures (e.g. migratory-birds catching) / *Chasse d'animaux sauvages grâce a architectures végétales (p.ex. capture d'oiseaux migrateurs)*	Europe, …	
EXTRACTION OF OTHER RESOURCES			
9.	**Extraction / *Autres***		
9.1	Salt cultivation landscapes / *Salines*	Mediterranean, China, Europe, Bolivia (Salar de Uyuni), Perù, Australia, New Zealand	

Table 1.1-2. World Rural Landscape Classification: the classification, elaborated by the ISCCL Working Group, lists the major world rural landscape systems identified based on the land value enhancement.

1.3.2 Vernacular Architecture

Vernacular architecture has existed for a long time, but the interpretation of its concept and its use as a research object have only taken decades. Although different scholars study the same object, scholars in different countries and regions will call it by different names. The adjective "Vernacular" is used interchangeably with other terms such as: "Folk", "traditional", "popular", "local", "indigenous", "autochthone", "ancestral", "ethnic" and "rural". It comes into contrast with the "intellectual", "polite" or "formal" architecture. The "vernacular" means Everything that was crafted, woven or reared at home and not for sale, but for domestic use. Therefore, what is vernacular has no market value（Frey,2010）. By extension, this definition includes the architecture of a territory and or a human group, or of an ethnic group, who lives there. Vernacular architecture commonly uses local materials (AA.VV,1993).

The term "vernacular architecture"in use (last half of the twentieth century) is derived from the English and arises as a reference to the work of prominent figures such as Bernard Rudofsky (1964), Eric Mercer (1975) and Paul Oliver (1997). It most commonly refers to 'traditional' or 'popular' architecture, as opposed to 'scholarly' architecture. From a theoretical point of view, Paul Oliver refers to Rudofsky in his definition of vernacular architecture and retains the notion of popular architecture, architecture without architects, or even 'people's' architecture (Oliver, 2003), expression of an "indigenous science of construction"(Oliver, 2006). One seminal definition given by Eric Mercer(1975) in the introduction to his study of English vernacular houses focuses on the concept of shared type with regard to the number of buildings, on a geographical area and for a given time. Lastly, in this brief definition, we cannot ignore the importance of the anthropological and cultural parameters.

In October 1999, the 12th General Assembly of the International Council on Monuments and Sites (**ICOMOS**) was held in Mexico and adopted the "**CHARTER ON THE BUILT VERNACULAR HERITAGE**" which is a supplement to the "Venice Charter"and is generally referred to as the Charter of Mexico. The charter introduced the concept of vernacular architectural heritage for the first time, and established corresponding management and protection principles. In"CHARTER ON THE BUILT VERNACULAR HERITAGE", The built vernacular heritage occupies a central place in the affection and pride of all peoples. It has been accepted as a characteristic and attractive product of society. It appears informal, but nevertheless orderly. It is utilitarian and at the same time possesses interest and beauty. It is a focus of contemporary life and at the same time a record of the history of society. Although it is the work of man it is also the creation of time. It would be unworthy of the heritage of man if care were not taken to conserve these traditional harmonies which constitute the core of man's own existence. The built vernacular heritage is Vernarcular Architecture. The International Committee of ICOMOS on Vernacular Architecture(CIAV),founded in 1976, regulates this definition.

The built vernacular heritage is important; it is the fundamental expression of the culture of a community, of its relationship with its territory and, at the same time, the expression of the world's cultural diversity. Vernacular architecture is the traditional and natural way

by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints. The survival of this tradition is threatened world-wide by the forces of economic, cultural and architectural homogenisation. How these forces can be met is a fundamental problem that must be addressed by communities and also by governments, planners, architects, conservationists and by a multidisciplinary group of specialists. Due to the homogenisation of culture and of global socio-economic transformation, vernacular structures all around the world are extremely vulnerable, facing serious problems of obsolescence, internal equilibrium and integration.

1.3.3 The relationship between rural landscape and vernacular architecture

On the basis of clarifying the concept and meaning of rural landscape, different disciplines will conduct research on rural landscape in subdivided fields according to their own research content and direction. Wang Yuncai (2021) divided rural landscape elements into three categories: natural ecological elements, economic production elements and cultural life elements. Among them, the elements of cultural life include architecture, transportation, public space, public service facilities, structures, scenic spots and protected areas, historical and cultural folklore and human beings and activities (Table1.2). It can be seen that architecture is a part of the rural landscape and an important part closely related to people. Among the three elements, the main manmade element is the element of cultural life, which is an important part of the formation of people's transformation of the environment. Among them, architecture is an important material space carrying people's life and production. Architectures not only carry specific functions, but are the core component of rural landscape, and they are also an important material evidence for the study of cultural life, especially vernacular architectures. Rural landscape and vernacular architectures have a subordinate relationship, and at the same time, they influence and restrict each other.

This study juxtaposes rural landscape and vernacular architectures as the research subject. The reason is that the research on rural landscapes by such disciplines as landscape science and geography focuses on macro perspectives and systems. They recognize and identify the

relationship between the components in the studies, seek the factors that influence and restrict each other, and solve the existing problems by improving and coordinating the relationship between the components, so as to achieve the goals of ecological, harmonious and sustainable development of rural landscapes. In this type of systematic studies, the importance of architecture, especially vernacular architecture, is not effectively highlighted. This study is based on architecture. It juxtaposes rural landscape and vernacular architectures as the research subject, which emphasizes the study of vernacular buildings while highlighting the importance of vernacular architectures. It is not a system separated from rural landscape. Instead, it places vernacular buildings in the context and system of rural landscape to comprehensively analyze the characteristics and values of vernacular architectures. Only through comprehensive, macroscopic, specific, contrastive and microscopic research, a systematic, dynamic, and comprehensive rural landscape and vernacular architectural characteristics can be clearly presented.

Fig. 1.5. Elements of a rural landscape (source: drawing by author)

Classification of landscape elements		Measuring rural landscape element
Natural ecological elements	**Climate**	Distribution of climate zones, precipitation, light intensity, total radiation
	Air	Temperature, humidity, dryness, wind speed, air pressure, air quality
	Topography	Landform type, elevation, slope, aspect, length
	Soil	Soil type, soil moisture, soil texture, soil erosivity, soil organic content
	Water system	River length, width, meandering degree, lake wetland area, water quantity, water quality, flood level, river network density, water surface rate
	Plants	Vegetation type, vegetation area, plant color, vegetation coverage
	Animals	Types of animals, location and extent of animal habitats, habits of marker species
	resources	Types, locations and quantity of resource
	Disasters	Types of disasters, frequency of occurrence, location, and extent of disaster-affected areas
Economic production elements	**Arable land**	Area of dry and paddy fields, texture and color of farmland, types of crops, yield, farming methods, irrigation methods, management methods
	Field	Types, areas, cultivation methods and economic value of cultivated plant crops
	Rural industry	Location of the plant, size of the plant, sewage and waste treatment facilities
	Water conservancy facilities	Reservoir area, storage capacity, operating conditions, power generation, flood control standards for embankments, diversion canals, drainage canals, reservoirs, size and materials of motorized wells
	Artificial breeding	The type, location, area of the farm, the type of livestock and poultry, and the breeding method
	Resource utilization	Available energy types, mining locations, mining volumes, utilization methods and technologies
	Industrial economy	Industry type, industry structure, gross product, economic growth rate

Table 1.2-1. Framework of measuring rural landscape element (Souce:edit by author based on Wang yuncai's paper)

Classification of landscape elements		Measuring rural landscape element
Elements of cultural life	**Architecture**	Building type, location, mass, form, style, color, material, function, time of completion, building density, average height, plot ratio
	Transportation	Location of transportation facilities, type of road, length, width, material, density of road network, mode of transportation
	Public space	The location, area and paving material of the square park
	Public facility	Type of facility, location, water diversion point, location of outfall, water consumption, sewage treatment rate, domestic waste dump
	Structure	Placement of landmarks, sculptures, materials, colors, cultural significance
	Scenic spots and protected areas	Type, level, scope of protected areas, location of cultural monuments, traditional buildings and courtyards, number of tourists
	History, culture and folklore	Folk customs, myths and legends, religious beliefs, places for festivals, types of traditional handicrafts, folk costumes
	Human and activities	Population, population density, age structure, occupational structure, population flow, population activity trajectory

Table 1.2-2. Framework of measuring rural landscape element (Souce:edit by author based on Wang yuncai's paper)

1.4 Research status

World Rural Landscapes is an initiative launched by the International Scientific Committee on Cultural Landscapes ICOMOS-IFLA to foster the worldwide cooperation in the study, management and protection of rural landscapes. （fig 1.6）

Fig. 1.6. The websit of WRL (source: http://www.worldrurallandscapes.org/)

Rural landscapes are encountering a growing interest and concern around the world. Many initiatives are being carried out to understand, protect and enhance the tangible and intangible values that the landscapes hold, as a reaction to the deep transformations they are enduring. These changes include abandonment of the land, intensification of the agriculture, loss of traditional and local knowledge, pressure of urban development, etc.

Many traditional rural landscapes have a holistic and complex character that expresses a unique sense of place, and are the key component of the identity of people. Moreover, many traditional rural landscapes are exponents of sustainable landuse acquired over years of rural practice. Such rural landscape practices respect the natural characteristics of the land they occupy, maintain the biodiversity and also keep the rich cultural diversity. In addition the rural landscape today is an economic and cultural resource for future generations and therefore, its careful protective management is crucial.The aim of World Rural Landscapes is to set the basis for a common discussion on shared principles, cognitive methodologies and ways of managing rural landscapes at various levels (international, national and local).

The large number of theoretical approaches and operational tools to deal with the study and safeguarding the heritage values of rural landscapes, reflects the diversity and complexity of disciplines, socio-cultural contexts and administrative organizations of each geographical area. However, what is missing is debate and a consideration of differing views so that common principles can be developed that can provide a more considered approach to interventions in rural landscapes to protect their heritage values.

As regards to the World Heritage Convention, rural landscapes are within the category of evolved continuing cultural landscapes and their heritage and management is a major international concern.

ISCCL(The International Scientific Committee on Cultural Landscapes (ISCCL) ICOMOS-IFLA) has launched initiative to foster the worldwide cooperation in the understanding, management and protection of rural landscapes. In support of this target the ISCCL Working Group is developing a series of documents that aim to be an international

framework reference that will allow a more coherent and collaborative approach to the matter.

This initiative is meant to allow different institutions and stakeholders to: i) exchange experiences and knowledge, and to ii) reinforce the great worth of high quality rural landscapes, based on their local distinctiveness and on the traditional knowledge and uses.

The objectives of the Initiative are as follows:

• Define a concept of rural landscape, valid for all cultures, in order to enable a common dialogue;

• Establish general principles about knowledge, conservation and management of these landscapes to ensure the safeguarding of its values;

• Provide a place for international, public-private and interdisciplinary cooperation, through the creation and administration of a website, an online workplace and a collaborative network. This place is meant to encourage collaborative work on a common strategy and the exchange of ideas, knowledge and experiences;

• Promote the collaboration between associations and local stakeholders all over the world, and enhance the projection of their initiatives and knowledge towards other spheres of land and heritage planning and legislation;

• Act to prevent the loss of traditional knowledge and local values, and reinforce their importance by recognizing and disseminating them;

• Promote research on issues related to the conservation and management of rural landscapes and encourage the development of practical actions;

• Disseminate the Initiative via the Website and collaboration with international institutions;

• Raise people's and stakeholders' awareness of the importance of safeguarding rural landscapes and their values.

ISCCL asks for participation and cultural contribution of other ICOMOS ISCs, and major international institutions and organizations (UNESCO, WHC, FAO, IFLA, IUCN, Council of Europe, NGOs etc.) as well as any Research Centre, Institution, Administration and Cultural Association interested in joining and enriching this multifaceted initiative. A series of activities including conferences, lectures, poster presentations, interviews, press releases, round tables, visits to heritage sites, heritage walks, social media events, etc. were effectively carried out with the support of the ICOMOS Committee and organized by ISSCL. Participants shared their research results, exchanged experiences, and discussed new strategies and methods under established consensus to promote the protection and development of rural landscapes. A number of research results are also displayed on the website platform. "Rural landscape as heritage: the World Rural Landscape Initiative" by Lionella Scazzosi, "Traditional agricultural landscapes in Italy and Europe: toward a multiscale and interdisciplinary Atlas approach"by Giuseppe Barbera, "The Charter of Baeza on Agrarian Heritage: background and principles aimed at improving agrarian landscape protection and management" by Celia Martínez, "Tools for a World Rural Landscape Atlas"by Raffaella Laviscio, "Rural landscapes: considerations on a glossary for the knowledge and the protection.Australia experiences" by Jane Lennon, "Rural landscapes atlas: a contribution from South America"by Diana Henríquez de Fernándezand and etc.Experts and scholars from different countries have carried out a series of studies on their own regions on the basis of common cognition.

The International Committee of ICOMOS on Vernacular Architecture (CIAV)

CIAV was established in accordance with article 14 of the ICOMOS Statutes in 1976. CIAV is an international platform for the dialogue and cooperation between professionals, experts, academics and students of vernacular heritage through CIAV annual meetings and scientific conferences. CIAV fosters discussions and activities on national, regional and international levels.The object of the Committee is to promote, consistent with the aims of ICOMOS International, cooperation in the identification, study, protection and conservation of Vernacular Architecture including vernacular monuments, groups of buildings and sites as defined by article 3 of the ICOMOS Statutes.(CIAV,2014)

The activities to accomplish its objective shall be conducted in accordance with a triennial programme and shall include in particular but are not limited to:

• scientific conferences in conjunction with the meetings of the Committee,

• study trips and site visits,

• a newsletter,

• the organisation of training courses for students,

• information to the public by its own means.

As a branch of ICOMOS, CIAV has been promoting the research of vernacular architecture through extensive collaboration since its inception. The newsletter, which started in 2006, shares the research results of each member and is also an important platform for displaying the research content of each region.

Fig. 1.7. The websit of CIAV (source: https://ciav.icomos.org/)
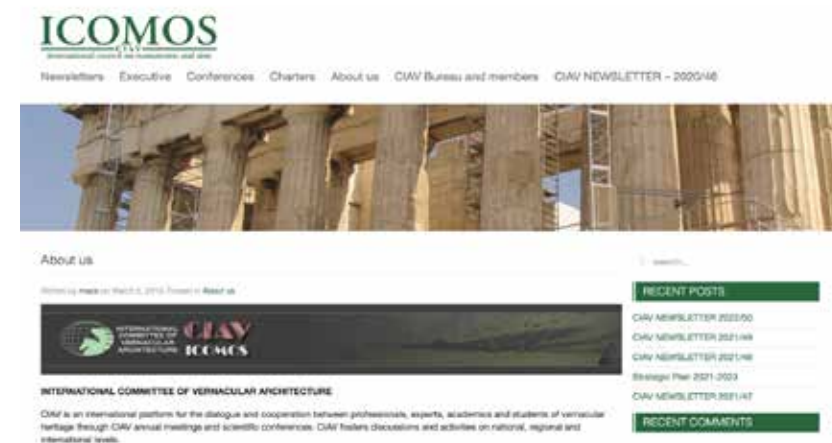
Fig. 1.8. Newsletters of CIAV (source: https://ciav.icomos.org/category/newsletters/)

By reading the newsletter, it is possible to obtain a large number of research inquiries on vernacular architecture and to understand the status of research. At present, there are a large number of researchers in Europe, North America, China and India, with rich achievements and a certain research foundation. There are still several places in the world

that still need to record and analyze their vernacular architecture. If the issues of building performance, energy efficiency and sustainability are crucial to the study of vernacular architecture, it is also necessary to place vernacular architecture in the macro system of rural landscape and consider and interpret it as a whole, combining building materials, design strategies, elements and patterns. Geo-analysis strengthens the adaptability of vernacular architecture to the environment, and enhances the interpretation and research of its cultural characteristics.

The current research on vernacular architecture in China is carried out from the architectural ontology path, the external discipline path and the architectural creation path. The research on the path of building ontology began in the 1930s. Its main objects are the dwellings and settlements. The results are concentrated in a series of dwelling books published in the 1980s, "Zhejiang Dwellings", "Yunnan Dwellings" and etc. The research in this period focused on the relationship between the individual building and the settlements, ignoring the research on the surrounding environment and culture of the building, and did not apply the theory to practice.

The external discipline approach on vernacular architecture or regional architecture from the perspective of other disciplines, through the study of the social, cultural and geographical backgrounds rooted in vernacular and regional architecture, and deeply excavates the regional and vernacular characteristics of architecture. source, the law of generation, and answer the questions of "why" and "how". This type of research no longer takes the architecture itself as the main body but takes the "relationship" as the main body and observes the relationship between architecture and these disciplines, so as to reveal the attributes and characteristics of architecture in certain aspects. History, sociology, ethnology, cultural anthropology, human geography, historical geography, communication, ecology, semiotics, phenomenology, typology, etc. This type of research emerged in the 1990s, and its results include related papers and books. "From Hometown to Nostalgia—A Cognitive Overview of China's Rural Landscape from the Perspective of Cultural Anthropology" (Li Chang, 2016); "Research on vernacular architecture from the perspective of communication" (Hong hanlin, 2003); "New Perspective of Vernacular Architecture Research" (Han Ying, 2006), etc.The focus of the architectural creation path is to explore the laws and theories of regional architectural creation, the physical characteristics and ecological adaptability of buildings, etc., and to embody its regional characteristics in modern architectural creation. These three research approaches have their own emphases and drawbacks. Synthesizing the advantages of the three and avoiding their disadvantages is the cornerstone and innovation of this thesis. The research on vernacular architecture should be placed in the overall environment of the rural landscape, not only to analyze the individual building, but also to analyze its causes and invisible cultural factors, and then place the vernacular architecture in the current context and study its advantages. The advantages and disadvantages are retained, the disadvantaged parts are updated in a sustainable and ecological way, and the research results are finally applied to the actual overall protection and renewal of the village. Theoretical research, data induction and collation are combined with the current protection of China's Historical and Cultural Villages to form a holistic and comprehensive study. It provides strategies and plans for the overall protection and renewal of

villages through research, rather than a disconnect between theory and practice.

China's Historical and Cultural Villages is a list initiated and jointly organized by the Ministry of Housing and Urban-Rural Development of China and the State Administration of Cultural Heritage since 2003. The list contains villages that are particularly rich in preserved cultural relics, have great historical value or commemorative significance, and can completely reflect the traditional features and local ethnic characteristics of some historical periods. Since 2003, a total of 487 Chinese historical and cultural villages in seven batches have been announced. (Table 4)
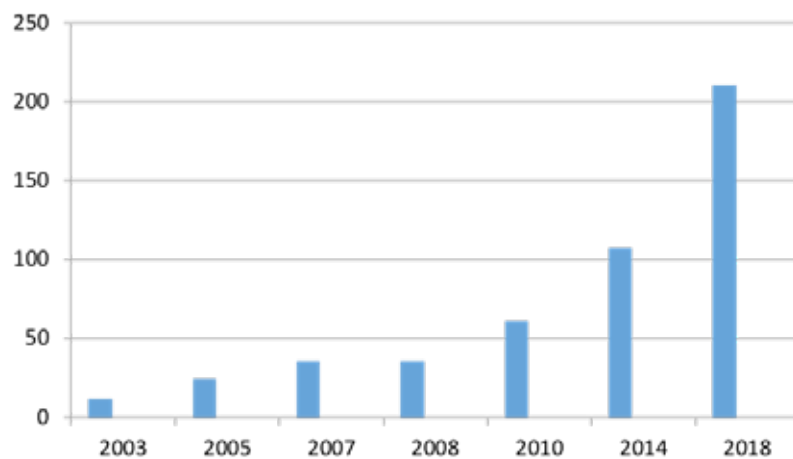

Table1-3.The number of historical and cultural villages announced in batches (source:drawing by author,data from http://gl.ncha.gov.cn/Industry/Famous-historical?titleType=CulturalVillages)

In order to expand the protection of villages with traditional value, since 2012, the Ministry of Housing and Urban-Rural Development of China has successively listed 6,819 villages with important protection value in the list of Chinese traditional villages protection in five batches so as to strengthen the protection of traditional village landscapes and buildings. Since 2014, the central government has subsidized traditional villages included in the list of Chinese traditional villages at a standard of 3 million yuan per village.The protection of Historical and Cultural Villages reflects China's concept of integrating rural landscapes and vernacular architecture into a system for research and protection.

From the establishment and work of WRL and CIAV, the branch societies of ICOMOS, as well as the traditional village protection directory established by China and the funds invested, it can be seen that the importance of rural landscape and vernacular buildings and various measures to protect them have become a global consensus. The core of research has already shifted from conceptual definition to using scientific, systematic, dynamic, and comprehensive methods to analyze objects in a specific, given time and space environment, and to identify superior resources and elements that must be protected. Through in-depth research and analysis of the problems and the deep reason of the problems, we can put forward the best strategies and technologies according to the problems and various disturbance factors, so as to seek the best protection and renewal methods, thus realizing the sustainable development of rural areas.

1.5 Research content

  This research takes rural landscape and vernacular architectures as the research subject, focuses on the protection and restoration of rural landscape and the protection and renewal of vernacular architectures, with the purpose of helping rural construction and revitalization and the mission to continue the sustainable development of human and land, harmonious ecology and cultural heritage. It establishes the characteristic system of rural landscape and vernacular architectures from the regional scale. On the basis of in-depth interpretation and classification and identification, combined with actual projects, it proposes principles, strategies and specific methods for the protection and development of rural landscapes and vernacular buildings in Chongqing, and guides the sustainable development of regional rural construction through models that drive regional development. The study includes the following content.

A. The concept and definition of rural landscape and vernacular architecture in Europe and China.

B. Characteristics and values of rural landscape and vernacular architecture in Chongqing, China

C. How to protect, inherit and innovate the rural landscape and vernacular architecture in the new era.

D. The renewal design strategy of the combination of multiple techniques.

E. Using case study to support my conclusion.
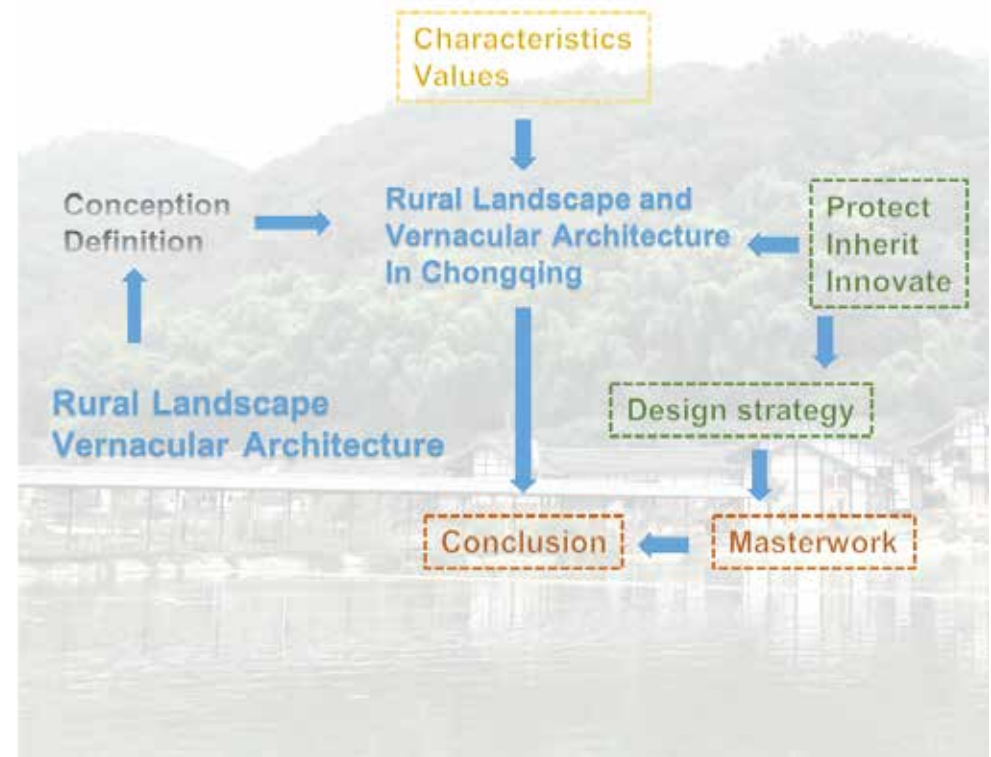
Fig. 1.9. Research Content (source: drawing by author)

1.6 Methodology

Research on the conservation and Renewal of Rural Landscape and Vernacular Architecture in Chongqing

Introduction

| Background | Meaning | Object | Definition | Status | Goal |

Theory

Literature Research → Interpretation →

European and China
ICOMOS WRL ISCCL CIAV
Rural Landscape
Vernacular Architecture

Regionalization

Investigation

Data collection
Field Research
Site-visiting
Observation

Analysis

Qualitative
Quantitative
Assessment
LCA&HLC

Rural Landscape and Vernacular Architecture In Chongqing ← Support ←

Application

Results

Values
Categories
Characteristics
Technique

Process
Principles
Methods

Conservation Renovation

Conclusion ← Proof ←

Masterwork

Project Research →
Data collection
Field Research
Site-visiting
Interview
Observation
GIS Map and
Drawing

Project Analysis →
LCA&HLC
GIS & Model
PVESM & PSPL

Problem Statement

Design Strategy →
Classification
protection
Art intervention
Low impact
Low technology
Ecological suitability
Regionalism

Design Work →
Plan
Rendering
Detail drawing
Communication
Modification

Construction Service

Post-Evaluation

Provide samples and Supplementary rural design theory system

Fig. 1.10. Methodology (source: drawing by author)

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2. The value of rural landscape and vernacular Architecture

2.1 Heritage value

The heritage value of the rural landscape has been documented and widely disseminated. In ICOMOS-IFLA PRINCIPLES CONCERNING RURAL LANDSCAPES AS HERITAGE, Rural landscapes are a vital component of the heritage of humanity. They are also one of the most common types of continuing cultural landscapes. There is a great diversity of rural landscapes 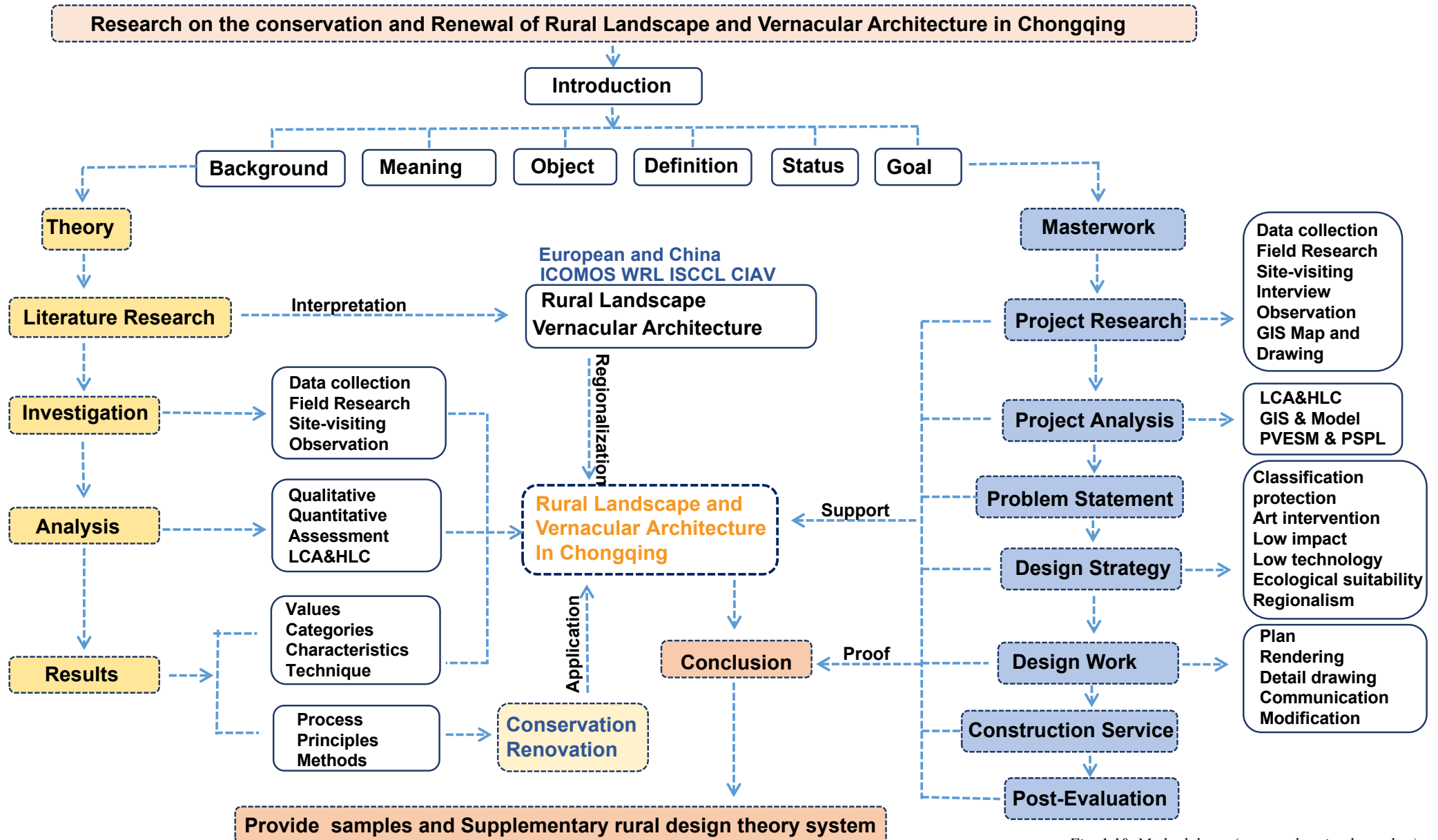around the world that represent cultures and cultural traditions. They provide multiple economic and social benefits, multi-functionality, cultural support and ecosystem services for human societies. This document encourages deep reflection and offers guidance on the ethics, culture, environmental, and sustainable transformation of rural landscape systems, at all scales, and from international to local administrative levels.

Refers to the tangible and intangible heritage of rural areas.Rural landscape as heritage encompasses physical attributes – the productive land itself,morphology, water, infrastructure, vegetation, settlements, rural buildings and centers,vernacular architecture, transport, and trade networks, etc. as well as wider physical, cultural,and environmental linkages and settings. Rural landscape as heritage also includes associated cultural knowledge, traditions, practices, expressions of local human communities'identity and belonging, and the cultural values and meanings attributed to those landscapes by past and contemporary people and communities. Rural landscapes as heritage encompass technical, scientific, and practical knowledge, related to human-nature relationships.

Rural landscapes as heritage are expressions of social structures and functional organizations, realizing, using and transforming them, in the past and in the present. Rural landscape as heritage encompasses cultural, spiritual, and natural attributes that contribute to the continuation of biocultural diversity.

All rural areas can be read as heritage, both outstanding and ordinary, traditional and recently transformed by modernization activities: heritage can be present in different types and degrees and related to many historic periods, as a palimpsest.

The heritage values of rural landscapes are recognised in some heritage inventories, such as the UNESCO World Heritage List as"continuing cultural landscapes". The values may be recognised in regional, national, and local heritage inventories and protected area regimes. Identification of rural landscapes values at any level aims to provide awareness of rural landscapes' tangible and intangible characters and values, and is the first and necessary step to promote the sustainable conservation of such areas and transmission of their associated knowledge and cultural meanings to future generations.

The vernacular architecture as a core component is also recognized by the above-mentioned documents. Even before the rural landscape has not been defined as a heritage as a whole, the heritage value of vernacular architecture has been defined in many documents. In chart"CHARTER ON THE BUILT VERNACULAR HERITAGE", The built vernacular heritage occupies a central place in the affection and pride of all peoples. It has been accepted as a characteristic and attractive product of society.

It appears informal, but nevertheless orderly. It is utilitarian and at the same time possesses interest and beauty. It is a focus of contemporary life and at the same time a record of the history of society. Although it is the work of man it is also the creation of time. It would be unworthy of the heritage of man if care were not taken to conserve these traditional harmonies which constitute the core of man's own existence.

The built vernacular heritage is important; it is the fundamental expression of the culture of a community, of its relationship with its territory and, at the same time, the expression of the world's cultural diversity.

Vernacular building is the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints. The survival of this tradition is threatened world-wide by the forces of economic, cultural and architectural homogenisation. How these forces can be met is a fundamental problem that must be addressed by communities and also by governments, planners, architects, conservationists and by a multidisciplinary group of specialists.

Fig. 2.1. The traces left by human life in the rural landscape are rich in heritage value (source: photo by author)

2.2 Ecological value

The natural elements in the rural landscape are a complete ecosystem. While forming a stable ecological balance, mountains, forests, fields and water sources also provide various necessary resources for the survival and development of human beings. Before human life intervenes in nature, natural systems are balanced and stable. In order to obtain more living resources, human beings have excessively exploited and used them, breaking the balance and causing ecological damage. Paying attention to the ecological value of rural landscape and seeking a way of harmonious coexistence between man and nature has become an inevitable way to explore sustainable rural development. In an era when science and technology were not developed, the ancients enjoyed the gifts of nature and were also subject to nature. In the long-term production activities, they have formed the survival experience of obeying and imitating nature, established the ecological laws that must be followed, and managed the rural natural resources through village rules and regulations, so as to achieve the balance of the rural ecosystem. In today's era of rapid technological and economic development, reviewing the ecological concepts of the ancients and learning their attitude of living in harmony with nature is an inevitable way for us to rebuild the relationship between man and land.

The ecological value of rural landscape is reflected in the function of maintaining the ecological balance of the villages themselves and the cities. The biggest difference between rural landscapes and urban landscapes is the natural environment full of vitality, including vast water bodies, woodlands, and crop areas, allowing them to conserve water sources, protect arable land, protect wild animals and plants, and maintain the ecological security of the villages themselves and the cities. For urban areas with high population and building density and mainly artificial environments, rural areas can provide clean air, water and healthy food, and can also play an important role in ecological balance. Many villages have become precious tourism resources due to their unique topography and ecological value contained in animal and plant resources.

Fig. 2.2. Vernacular architecture integrated into the environment (source: photo by author)

As an important part of the rural landscape, vernacular buildings seeks to live in harmony with other elements of the rural landscape. This survival attitude contains the wisdom of "harmony between man and nature" pursued by the ancients. In terms of spatial form, vernacular buildings shows a sense of conformity, identification and reverence to the natural environment. The architectural community will not arbitrarily change the natural environment, but will integrate into the natural

environment and grow naturally according to the principle of "having laws but not determinate patterns". "Laws" are the integration with the environment and the respect for nature, while "patterns" are spatial forms with regional characteristics formed according to the characteristics of different sites. The materials for the construction of vernacular buildings are ecological and environmentally friendly materials that are adapted to local conditions.

2.3 Cultural value

In the development wave of economic globalization and cultural assimilation, as cities and villages lose their regional characteristics, how to inherit the fine traditional culture is the focus of many scholars. Chinese civilization is rooted in farming culture, and the countryside is the basic carrier of Chinese civilization. Rural landscape is the carrier of inheriting traditional culture, and the inheritance of traditional culture by rural landscape is reflected in the two levels of material form and non-material culture. It is embodied in tangible buildings, settlements and intangible folk customs. From this perspective, rural landscape has profound social and cultural value, and it plays an important role in the continuation and development of rural traditional culture.

As an important part of human culture, rural landscape and traditional local architectural culture record the long-term information of people's lives in specific regions. The study of it can help us find the traces left by traditional ideas, cultures and institutions, and also understand the historical migration footprints, development processes, political, economic systems and religious beliefs of people in different regions.

Villages with rich natural, historical and cultural resources, such as historical and cultural villages, traditional villages, ethnic minority villages, and famous scenic tourism villages, are important carriers for demonstrating and inheriting the excellent traditional Chinese culture. We should coordinate and balance the relationship between protection, utilization and development, and strive to maintain the integrity, authenticity and continuity of the village, protect the traditional location, pattern, style of the village, as well as the overall spatial form and environment of natural and pastoral landscapes, fully protect the cultural relics, historical buildings, traditional houses and other traditional buildings, it shows the traditional Chinese culture.

Fig. 2.3. Cultural activities in the village (source: photo by author)

2.4 Aesthetic value

The aesthetic value of rural landscape is mainly reflected in the good visual experience brought by the natural beauty and humanistic beauty of the landscape to the appreciator. From the perspective of natural beauty, traditional villages are mostly surrounded by green mountains and green waters, so their natural environment is excellent. Whether in undulating mountains or broad plains, the rural landscape not only has a high-quality visual environment, but also has the vitality endowed by nature. From the perspective of humanistic beauty, the traditional rural settlements and vernacular buildings are in perfect and harmonious form. They truly reflect the correspondence with intangible cultural elements such as regional society, economy, culture, nature, and social customs. In the synthesis of material and immaterial elements, the historical and cultural beauty of rural life is naturally conveyed. The value of beauty can bring a pleasing, relaxed and happy mood to the viewer. It can bring economic benefits to rural villagers, balance the intense and fast urban life of urban residents, and thus play an important role in coordinating the interests of urban and rural society.

Fully interpreting the aesthetic value of the landscape will help to create a harmonious and beautiful rural style and show the unique charm of local cultural. Landscape aesthetics is closely related to regional culture. It can not only bring the viewer a sensory experience, but also a philosophical touch. For example, Chinese Taoism advocates the "unity of man and nature". This philosophical concept enables one to feel the tranquility and self-cognition in the natural beauty.

The vernacular buildings is rooted in the rich and colorful regional environment, forming a harmonious and co-prosperous environmental feature with the surrounding things. In the process of site selection, layout, and construction of buildings in ancient times, the concept of Fengshui played an important role. In the long-term development process, the feng shui culture with the core idea of "harmony between man and nature" has accumulated local people's ecological outlook and world outlook, and has profound ecological aesthetic implications.

Fig. 2.4. The spatial beauty of vernacular architecture (source: photo by author)

2.5 Economic value

The economic value of landscape is mainly reflected in the way of land use. Li Xiubin (2002) pointed out that from the perspective of economics, economic interests are the most fundamental reason for human beings to use land, and maximizing benefits is the basic driving force for land owners or users to change the way or type of land use. For traditional villages, the economic value of rural landscapes is mainly reflected in the production function of agriculture. Obtaining agricultural products through agricultural production is the basic guarantee for people's survival. Since the 1990s, rural landscape has increasingly become a tourism resource. The natural and open environment of the countryside, the beautiful pastoral scenery, the leisure and quiet life, and the local customs and culture with local characteristics are all attractive to modern urbanites. Therefore, in addition to the basic agricultural and industrial production value, rural landscape can also create a new leisure tourism economy and cultural entertainment economy, promote the development of rural economy, and improve the quality of life in rural areas. The countryside is based on local resources and a unique history and culture. We should develop characteristic resources in an orderly manner to make advantageous and characteristic industries bigger and stronger. vernacular architectures is an important factor in tourism resources. Homestays developed by renovating and updating vernacular buildings can activate the vitality of the countryside and increase economic income for the villagers. As a study on town of Metsovo mentioned that"Due to its characteristics, Metsovo receives approximately 300,000 tourists every year. Nevertheless, tourism creates inevitably a constant need for new buildings and infrastructure. (Giannakopoulou 2011). The research using Contingent Valuation assessed the economic value of Metsovo and found that vernacular architecture holds a significant economic value that could justify the implementation of appropriate policies towards the protection of vernacular mountain settlements. A significant percentage of Metsovo's visitors were willing to pay a voluntary subscription of between 30 and 46 Euro (median: 20 Euro). Taking into account the annual number of visits, the visitation rate, the demographic characteristics of visitors and the percentage of those who were willing to pay, it is roughly estimated that the annual aggregate value lies between 0.8m and 1.3m Euro. This also proves that rural areas with traditional buildings and landscapes have great economic potential and need to be conserved and discovered.

2.6 Summay

This chapter expounds the value of rural landscape and vernacular architecture from the aspects of heritage, ecology, culture, aesthetics and economy. Only by fully understanding their multiple values and their role in promoting regional ecological balance, regional traditional culture inheritance, regional economic development, etc., and determining their status to be protected, can the research team fully understand and analyze rural landscapes and vernacular architecture.On the basis of research, using the guidance of scientific concepts and methods, realize the healthy and benign development of rural landscape, better exert its comprehensive value, and finally achieve sustainable rural development.

3. Conservation and renewal of rural landscapes and vernacular Architecture

In protection and renewal, some charters that embody international consensus should be fully understood, recognized, observed and implemented.

They are:

INTERNATIONAL CHARTER FOR THE CONSERVATION AND RESTORATION OF MONUMENTS AND SITES (THE VENICE CHARTER 1964)

IInd International Congress of Architects and Technicians of Historic Monuments, Venice, 1964. Adopted by ICOMOS in 1965.

ICOMOS-IFLA PRINCIPLES CONCERNING RURAL LANDSCAPES AS HERITAGE

Adopted by the 19th ICOMOS General Assembly, New Delhi, India, 15 December 2017

CHARTER ON THE BUILT VERNACULAR HERITAGE(1999)

Ratified by the ICOMOS 12th General Assembly,In Mexico, October 1999

PRINCIPLES FOR THE CONSERVATION OF WOODEN BUILT HERITAGE

Adopted by ICOMOS at the 19th General Assembly in Delhi, India, December 2017.

CONVENTION CONCERNING THE PROTECTION OF THE WORLD CULTURAL AND NATURAL HERITAGE

Adopted by the General Conference at its seventeenth session Paris, 16 november 1972

3.1 Procedures of Conservation and Renewal

Fig. 3.1. Procedures of protection and renewal (source: drawing by author)

Inspection, Survey And Research

A. Collect all data of the project object, including but not limited to history, culture, geography, climate, soil, hydrology, management, population information, etc.

B. Literature search and compilation of drawings and materials

C. Use a variety of tools to conduct on-site research, surveying and recording

D. Existing buildings the condition of the structure and its components, including previous work, should be carefully documented prior to any action.

E. Existing timber structures on the site should be thoroughly and accurately diagnosed prior to any intervention. This should be accompanied by an understanding and analysis of the building and structural systems, their condition and the causes of any decay, damage or structural failure, as well as conceptual, dimensional or assembly errors.

Analysis And Evaluation

F. Systematic analysis and evaluation of existing data, combined with a variety of analysis methods and methods to give a comprehensive evaluation to the object

G. The main purpose of protection is to maintain the authenticity of the environment and the historical structure of the building, which needs to be clarified through evaluation to clarify the advantages and damaged parts and establish a basis for the determination of the later protection methods.

Interventions

H. The first stage in the process of intervention should be to devise a general strategy for the conservation of the building. This needs to be discussed and agreed by all parties involved.

I. The intervention strategy must take into account the prevailing cultural values.

J. The original function of a structure should be maintained or restored except in cases when the intervention would be too extensive and prejudicial to the authenticity of the structure.

K. As much as possible of the existing members should be retained. Where replacement of a member or part of a member is necessary it should respect the character and significance of the structure. In cultures where the tradition exists, aged building parts from other structures might be used in the intervention.

L. Consideration of specific values may be required to evaluate the cultural significance of some wooden built heritage, such as temporary and evolving buildings.

M. In the case of interventions, the historic structure should be considered as a whole. All materials, including structural members, in-fill panels, weather-boarding, roofs, floors, doors and windows, etc, should be given equal attention. In principle, as much as possible of the existing material, as well as earlier repair works, should be retained if they do not prejudice the stability of the structure. Conservation should also include surface finishes such as plaster, paint, coating, wall-paper, etc. The original materials, techniques and textures should be respected. If it is considered strictly necessary to renew or replace deteriorated surface finishes, the use of compatible materials and techniques is desirable.

N. All interventions must be justified based upon sound structural principles and usage.

Present-Day Materials And Technologies

O. Present-day materials and technologies should be chosen and used with the greatest caution and only in cases where the durability and

structural behavior of the materials and construction techniques have been satisfactorily proven over a sufficiently long period of time.

P. Utilities should be installed with respect for the tangible and intangible significance of the structure or site.

Q. Installations should be designed so as not to cause changes to significant environmental conditions, such as temperature and humidity.

R. The use of chemical preservatives should be carefully controlled and monitored and should be used only where there is an assured benefit, where public and environmental safety will not be affected and where there is the expectation of significant long-term improvement.

Recording And Documentation

S. A record should be made of all materials used in interventions and treatments, in accordance with Article 16 of the Venice Charter and the ICOMOS Principles for the Recording of Monuments, Groups of Buildings and Sites. All relevant documentation, including characteristic samples of redundant materials or members removed from the structure, and information about relevant traditional skills and technologies, should be collected, catalogued, securely stored and made accessible as appropriate. The documentation should also include the specific reasons given for the choice of materials and methodologies in the conservation work.

T. All the above documentation must be retained both for future maintenance of the building and as an historical record.

Monitoring And Maintenance

U. A coherent strategy of regular monitoring and day-to-day maintenance must be established in order to delay the need for larger interventions and ensure the continuing protection of wooden built heritage and its cultural significance.

V. Monitoring should be carried out both during and after any intervention to ascertain the effectiveness of the methods used and to ensure the long-term performance of the timber and any other materials used.

W. Records of any maintenance and monitoring should be kept as part of the documented history of the structure.

Education And Training

X. It is essential to record, preserve and recover the traditional knowledge and skills used in constructing historic wooden architecture.

Y. Educational programmes are an essential part of raising awareness of wooden heritage by encouraging recognition and understanding of values and cultural significance. These programmes are the foundation of a sustainable conservation and development policy. A comprehensive and sustainable strategy must involve local, regional, national and international levels and should include all relevant officials, professions, trades, the community and other interested parties.

Z. Research programmes (particularly at regional level) to identify the distinctive characteristics, and social and anthropological aspects of the wooden built heritage, buildings and sites, are to be encouraged.

3.2 Principles in Conservation and Renewal

The focuses of rural landscape and vernacular buildings are different, so the ways of conservation and renewal are also different.

For rural landscape

A. Protecting the link between nature and culture

The rural landscapes are organically evolving and sustainable landscapes. The living requirements in the protection areas will constantly change the cultural traditions and natural landscapes in the areas. Unlike many other protected areas, which focus on nature itself, the Rural Cultural Landscape Reserve focuses on the maintenance or regeneration of the bond between man and nature. The key to protecting the rural landscape is not to specifically protect some rural landscape elements, but to protect the economic and social operation mode of the entire region, and to provide a natural and organic growth environment for the rural landscape.

China's traditional rural areas have formed an agricultural civilization with a self-sufficient agricultural economy as the main body. The essence of this agricultural civilization lies in the family-based small peasant economy, the concept of sustainable development and the intensive farming system. Maintaining and regenerating the essence of traditional agricultural civilization in the development of modern agriculture is the key to protecting traditional rural landscapes. No matter how the village evolves, the protected area should retain a relatively complete traditional and unique socioeconomic system. They should serve as the representative of the traditional rural culture in the region, without being constrained by the protection of the rural cultural relics in their original state and the maintenance of objective physical evidence.

B. Preserving the visual quality of the landscapes

An excellent protection area of rural cultural landscape must have outstanding visual quality. A landscape feature is "a unique, recognizable, continuous texture created by landscape elements. It means that one landscape is different from another" (Swanwick, 2003). Rural cultural landscape reserves should monitor the changes in landscape features to protect the visual, historical and cultural value of the area. China's rural cultural landscape has unique regional landscape characteristics, such as topography, vegetation, land use and architectural forms. Through objective description and regular review of these landscape features, we can monitor changes in landscape features and avoid the occurrence of discordant landscape elements and the disappearance of important landscape features.

C. Sustainable use of natural resources

Excellent rural landscape areas must have a good ecological environment, allowing them to make sustainable use of local natural resources. The area should have good air, water and soil quality. In addition, the diversity of landform types, forest coverage, and the amount of wild animals and plants per unit area provide monitoring standards for biodiversity.

D. Protect the integrity of the landscape

The integrity of the rural landscape refers to the degree of maintenance of the rural landscape, that is, the extent to which the rural landscape is negatively affected by industrialization, urbanization or infrastructure. It should be pointed out that this refers to "negative effects". It does not negate the necessary investment in industrialization, urbanization or infrastructure of rural cultural landscape protection areas. Rural landscape protection areas in China are usually located in underdeveloped rural areas, where villagers desire and deserve a high standard of living, rather than being confined to "museum-like" villages. The management of rural cultural landscape protection areas focuses on scientifically managing various activities in the reserves and ensuring that changes in the protection areas do not damage the natural and cultural values of the areas. These changes include the construction of necessary rural infrastructure, urbanization, socioeconomic activities of aboriginal people and tourism and leisure activities of tourists. These changes are acceptable as long as it does not negatively affect the rural landscape.

For vernacular Architecture

A. The principle of classified protection

In terms of the scope and category of traditional vernacular building protection, it is not advocated at present, and we are economically not allowed to preserve all the heritage of residential settlements indiscriminately. What we can do is to protect as many settlements as possible with typical characteristics, rich historical information, high quality of buildings, and relatively complete residential building systems and living environments. The cultural relics and practical characteristics of a large number of traditional residential buildings also do not allow us to provide protection to all traditional historical buildings indiscriminately with the same standard. Instead, we should classify and judge buildings according to their comprehensive value of history and culture. Generally speaking, traditional buildings can be divided into three types in protection.

The first is the type of full protection. For those traditional settlements and single buildings with a long history, outstanding artistic value and complete environmental form, we should fully protect them and leave them as cultural relics for future generations.

The second is the type of partial protection. With the passage of time and the large-scale development of modern rural construction, many residential settlements with traditional characteristics have been eroded by modern rural buildings. Only a few valuable single dwellings or incomplete alleys remain, and their basic characteristics are incomplete. In this case, we can adopt a partial protection method based on points, and supplemented by lines and surfaces, which can roughly retain their traditional features.

The third is the type of transformation and renewal. Most of the existing traditional folk houses belong to this type. For those traditional settlements and folk houses with low historical value, short history, not very prominent style or with serious damages, we can adopt the method of overall renewal, that is, to preserve the cultural traditions and meet

the needs of the new way of life.

B. The principle of authenticity

Authenticity is a basic requirement for the protection of traditional buildings with a long history and exquisite craftsmanship, which can be regarded as cultural relics. Mr. Luo Zhewen proposed the "four preservation" principles of traditional buildings: preserving the original architectural forms, preserving the original architectural structures, preserving the original building materials, and preserving the original craft materials.

C. The principle of integrity

The principle for the integral protection of traditional buildings is described in the Venice Charter as follows: "The concept of historic architecture encompasses not only individual architectural works, but also the urban or rural environment that bears witness to a civilization, a meaningful development, or a historical event. This applies not only to great works of art, but also to works of lesser importance in the past that have acquired cultural significance through the passage of time." In 1968, UNESCO emphasized the importance of overall environmental protection on the protection of cultural relics at its fifteenth plenary session. "Artifacts are not things that can exist in isolation. Almost all cultural relics exist in groups, or are aggregates that are closely related to the central artifact and show many things in the surrounding environment." That is to say, all the meaningful things acquired by the cultural heritage buildings during their existence should be preserved. We should protect all historical witnesses during the existence of cultural relics and make their history readable. Therefore, in terms of protection objects, traditional settlements should be protected as a whole, and their ecological environment, landscape environment, planning layout structure, and shape, color and image should be protected.

D. The principle of participation

"For conservation to be successful, the entire city must be involved. This should be pursued in every situation and must be made aware of it for generations. Never forget that the preservation of historic cities or urban areas concerns their inhabitants first and foremost. " Residents in traditional settlements are most familiar with the environment in which they live, and conservation plans designed by pure architects and planners cannot fully meet the real needs of people in residential settlements. The preservation of traditional historic districts and settlements can only be made relevant through the participation of local people.

E. The principle of remaining dynamic and sustainable

The protection of traditional vernacular buildings and their environment is not purely static preservation of physical buildings. For most traditional settlements and folk houses, while protecting the physical environment, it is more important to maintain the stability of rural communities and the normal order of residents' lives, and to ensure

the improvement of residents' living environment and living standards. Therefore, the normal material and spiritual needs of residents in the protected area to improve the quality of life should be correctly guided, so as to inherit the traditional culture and obtain development in line with the requirements of the times. In terms of funds for protection, various financing channels from the government, enterprises, collectives and individuals should be opened up. Government funds are mainly used for the protection of key traditional buildings. For inhabited traditional buildings, residents can be mobilized to voluntarily participate in the protection, and the government can give appropriate subsidies for their protection and repair, so as to mobilize the enthusiasm of the people. Only in this way can the dynamic and sustainable protection and development of traditional architectural culture be realized.

3.3 Conservation and Renewal experience in EU countries

3.3.1 HISTCAPE: Historic Assets and Related Landscapes

HISTCAPE (HISTorical assets and related landsCAPE) is an INTERREG IVC project. The Interregional Cooperation Programme INTERREG IVC, financed by the European Regional Development Fund, helps Regions of Europe work together to share experience and good practice in the areas of innovation, the knowledge economy, the environment and risk prevention. (Eppich 2014)

HISTCAPE has focused on assisting rural communities in protecting their cultural heritage and landscapes. The project team members from 11 European countries worked together on identifying over 50 good practice examples, drafting implementation plans and developing 6 pilot action plans to transfer innovative ideas.In the cases they introduced, the **multi-disciplinary** approach gave the optimal solution strategy for the target project. Strategic solutions are **diverse and innovative**.

Fig. 3.2. Study case distribution map (source: Brochure HITSCAPE)

A case of preservation of lifestyle and identity **Līgatne, Latvia Recycling and resilience** is very thought provoking and provides good ideas for the establishment of design strategies.

Līgatne, located in the Vidzeme region of Latvia, has a paper mill and carpentry houses and is one of the only remaining 19th century industrial parks in Europe. The paper mill, established in 1814, has survived severe political upheaval, two world wars and numerous fires and has been rebuilt to this day. The village of Līgatne is ideal for papermaking, the surrounding forests are rich in raw materials for pulp and workers' housing, and there is a powerful hydraulic river. More than 200 years have witnessed the history of paper mills. Līgatne paper won a silver medal at the International Exhibition of Russian Manufactures in St. Petersburg in the late 19th century. The paper mill was destroyed in a fire in 1884 and then rebuilt. The Līgatne Paper Company received the Gold Medal during the St. Petersburg Manufacturers' Fair in 1895, and in 1896 was granted the right to use the Royal Seal of the Russian Empire. World War I factories ceased production, and during the war all machines and production methods were dismantled and transported to Russia. After the war, with funds from the new government of the Republic of Latvia, the factory was rebuilt, and in the 1930s, Līgatne had the most modern papermaking equipment and produced the best paper in all of Europe. During World War II, paper production stopped again, but restarted in 1945 until another fire broke out on November 5, 1993. To help with recovery, the community came together, and through private donations, and with funding from the Latvian State Forestry Service, the factory reopened. Today, SIA "PAPĪRFABRIKA LĪGATNE" Ltd. has more than 140 employees and produces 13,000 tons of high-quality art

paper and technical packaging, 70-80% of which are exported outside Latvia.

Good strategies in this case are:

Recognition of a community's vulnerability and dependence on a crucial industry and the creation of a support triangle is a key Good Practice.

Over the past two centuries, Līgatne's resilience and success is a testament to the disastrous impact on a community, its identity and way of life when it is recognised that if a company goes out of business. So naturally a stable "triangle of support" was formed to deal with the crisis, comprising government, industry and community. If any of these fail, the sustainability of the community is at stake.

Another advantage of this project is finding new growth points through continuous innovation and reinvestment. The company's efforts to innovate are clear evidence of the company's efforts to protect the environment and its business shifts in collecting and recycling waste paper. Another good practice for companies is to specialize in higher-quality paper products. Līgatne produces high-quality fine art papers as well as special-purpose technical and wrapping papers for schools and young artists - products valued above standard papers.

A key practice in the project is realizing that the community needs to be diverse. They have started to offer industrial and environmental tourism as well as the production of local specialty products. The factory tour explains how paper is recycled and made, including how waste paper is collected, diluted into pulp, and finally made into fine art paper and technical packaging. During these excursions, visitors can see the production process and the history of the company and town. After the

tour, they had the opportunity to visit a retail store and purchase special paper products.

The town of Līgatne is determined to preserve their cultural heritage and started a project in 2007 to identify their historic assets and find solutions for conservation. Another key good practice, they opened the "Līgatne Paper Mill Village Cultural Heritage Tourism Path" to fully explain the history of the community. In July 2011, Līgatne Paper Factory's Village won the European Commission's EDEN project competition (European Destination of Excellence) as the most outstanding tourist destination in Latvia. Innovation at Līgatne does not stop as the community and companies adapt to change while continuing their traditions.

Fig. 3.3. Līgatne Paper Mill Village (source:https://www.tripadvisor.com/Attraction_Review-g2167821-d7208474-Reviews-Ligatne_Paper_Mill-Ligatne_Vidzeme_Region.html)

Through this case, the research team summarizes Ideas for implementation and transferability. (Eihenbaum 2014)

• Identification of vulnerabilities and dependence on critical industries
• Analysis of potential risks and their impacts on the community
• Creation of "triangles of support" between the community, industry and government
• Identification of assets in the community including historic structures
• Embracing change, reinvestment and innovation
• Diversification into other industries

Nympheo village is an excellent case that uses **low-interference and low-intervention** methods to gradually activate the **self-construction** ability of the village with the help of voluntary and non-profit organizations

Nympheo is a small village in the mountains of western Macedonia, it is not a typical Greek island and coastline landscape, but rugged mountains with dense forests and few tourists. The village was founded around 1385 by the Vlachs Odites. Around 1630, artisans in Nympheo began mining silver locally, and the village soon became known for producing high-quality jewelry, tableware and other items that were sold further afield. Their skills in silver and trade created a thriving village with large stone estates, paved streets and religious institutions. The town served as the center of resistance movements throughout the 18th and 19th centuries and many important wars of independence in the late 19th and early 20th centuries. With the peace that followed, Nympheo slowly began to lose its place. Traders and merchants migrated to better-connected big cities closer to the coast, and the tradition of

silversmithing disappeared. The residents began to slowly disperse. While this led to a recession and depopulation, it paradoxically protected the town from drastic physical changes. By the late 20th century, there were very few residents here. But they left behind a well-preserved village with a proud history in the Greek mountains.

Good practice

Beginning in the early 1990s, remaining community members took action with former residents and surrounding communities. They build on three of Nympheo's assets: the surrounding natural landscape and wildlife, the historic village buildings, and most importantly, the community's strong sense of place. They recognize their rich natural and built heritage and have a strong desire to protect and preserve their communities. Volunteer groups were organized and started protecting the surrounding forest, clearing the streets and repairing the roofs, stone walls and windows of the village. These are the first two good practices. The efforts and vision of the community gradually attracted influential individuals and institutions. Many prominent civil engineers, architects and mechanical engineers have donated their time and expertise to continue projects at Nympheo, adding to volunteer efforts - a third good practice. Public electricity and telecommunications companies then responded with in-kind contributions. The non-profit NGO ARCTUROS established the European Centre for the Protection of Brown Bears. ARCTUROS implemented this centre as the mountains surrounding Nympheo are one of the last sanctuaries for wild brown bears in Europe. The historic school building in the heart of Nympheo has been renovated and converted into offices, an interpretive centre, meeting rooms and a museum. In the early 1990s, a local self-government party

"New Perspective" was elected to govern the community. Together with residents, they developed a formal strategic plan to continue restoring and enhancing Nympheo. The main objective is the sustainable development and resilience of the community. Priorities within the plan include preserving and respecting the natural environment, preserving and enhancing its architectural and archaeological heritage, and recognizing and promoting the community's traditions, customs and history. Slowly, Nympheo made a comeback. (Karamarkos 2014)

Fig. 3.4. Nympheo village and its surrounding (source:https://hellothessaloniki.gr/travelling-in-greece/visit-nymfaio-one-of-the-10-most-beautiful-villages-in-europe-is-in-greece/)

The community rejected the idea of economic growth for its own sake, and instead envisioned a development model based on environmental protection and historic preservation. Soon, people recognized the quality of life offered by the village and the surrounding landscape and returned or became weekend residents. New arrivals also come to settle, repair or build new homes in harmony with traditional structures.

Today, Nympheo is doing well and is known throughout Greece for its community efforts. Listed as a Landscape of Outstanding Natural Beauty, Nympheo is now protected by the Greek Ministry of Culture. A number of cultural events related to local produce are held throughout the year, and local women's groups have formed business cooperatives to jointly produce, market and sell homemade sweets and traditional recipes. But the community remains vigilant and holds regular community meetings to discuss ongoing or proposed projects and new issues. They have begun to develop tourism activities such as hiking, horseback riding and eco-tourism, and some historic houses have been converted into small hotels and restaurants. Communities are cautious about tourism and its potential impact; therefore, they have taken steps to carefully manage its implementation.
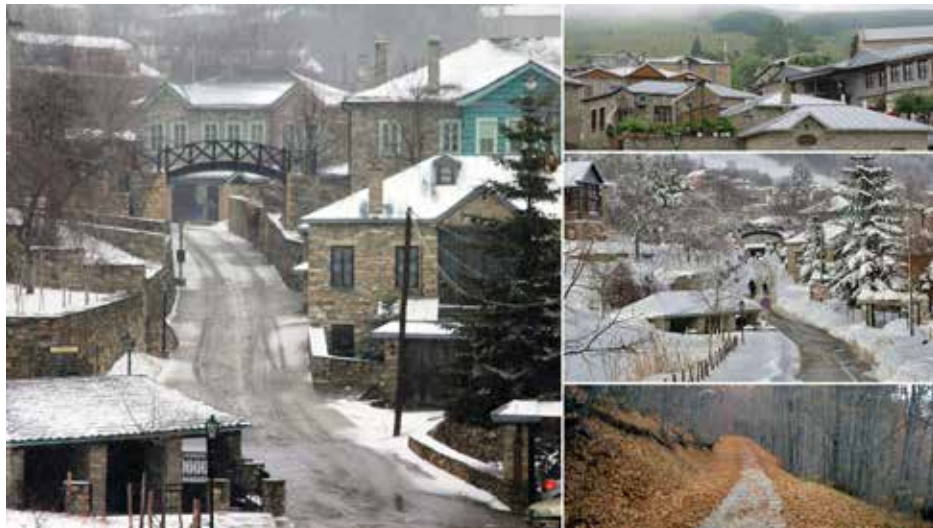

Fig. 3.5. Autumn and winter beauty of Nympheo village(source： https://hellothessaloniki.gr/travelling-in-greece/visit-nymfaio-one-of-the-10-most-beautiful-villages-in-europe-is-in-greece/)

Through this case, the research team summarizes Ideas for implementation and transferability

- Organisation and focus of community volunteer efforts
- Identification of the community's major assets
- Involvement of professionals, institutions and companies
- Continue momentum through official recognition by the Government
- Formation of a strategic plan with the community and local government
- Regular community meetings
- Dissemination to other communities

HISTCAPE not only exchanges excellent cases, but also selects demonstration projects to give rationalized suggestions to the objects by group thinking and discussion. For the selected pilot areas, the project team adopts the following methods to carry out work.

The methodology can be divided into five parts:

1). Identify issues through strategic problem statements

2). Define good practice and asset identification in each region

3). Link the issues identified in one region to good practice from other regions

4). Draft Pilot Action implementation plans

a. Identify good practice examples to adopt

b. Outline specific actions to adopt / adapt good practice

c. Present the Pilot Action plan to colleagues, partners and communities.

d. Evaluate rigorously and continuously

5). Implement the Pilot Action

a. Evaluate the results

b. Validate the methodology

The Western Macedonia Greece project is a new way to activate the community.

Western Macedonia, located in the mountains of northwest Greece, is the energy and mining centre of the country. It contains a rich history of over a hundred years of industrialization in mining and energy production. Consequently, it is home to a number of industrial sites, many abandoned or unused. Not only do these places need revitalization but they also tell the story of industrial Greece. Unfortunately, this is unknown beyond a few individuals or a chapter in textbooks.

Their Pilot Action was to create a dynamic website that was available both on-line and on smartphones. This website contains the history of these places, maps, images, statistics and, most importantly, possibilities for future reuse. It is also a platform that allows visitors to learn about the industrial heritage of Greece and contains displays of virtual reality, overlays of historic images and links to other sites of information.

The HISTCAPE team summarizes a series of strategies that can be used in conservation and renewal practices by sharing excellent cases, selecting demonstration cases and a series of studies, discussions, and conferences, which is what this research focuses on.These strategies provide a lot of reference for this research.

Rural areas face severe challenges threatening their cultural and community values. Structural and demographic change, loss of infrastructure and lack of urgent investment leave their mark on many European regions. This is often followed by a deep depression and lasting damage to rural societies.

A. Integrating planning and interdisciplinary knowledge transfer

Create adequate processes and tools to promote,

educate and communicate integrated experiences,

Support the creation of networks of different disciplines,

Cluster landscape and cultural heritage related networks,

Include the values of cultural heritage and landscape in educational programs of different disciplines,

Promote public information and education in cultural heritage and landscape subjects.

B. Organization of social and civic participation

Facilitate the processes of social and civic participation in cultural heritage and landscape preservation,

Encourage and support civic participation and voluntary engagement Steer civic participation in a professional way,

Make use of new mechanisms and instruments for participation to foster investments in cultural heritage preservation and revitalization,

Communicate Good Practice examples of social and civic participation

C. Supporting economic valorization

Identify and promote economic potential of cultural heritage

Bridge the gap between the conservation needs and economic use

Support cooperation between regions and agencies outside and inside

Create innovative financial models

Create new use for historic spaces

Develop a cross-regional information system, database and management for vacant property

Start early to avoid vacant properties

Check existing initiatives on European level for preventive actions

Shift public and private budgets from big repair to small maintenance.

3.3.2 Hallstatt-Dachstein cultural landscape

The Hallstatt-Dachstein cultural landscape is part of the Salzkammergut, and thus of the Eastern Alps. Owing to its varied mountain ranges, numerous lakes, beautiful features, and art-historie treasures, as well as the economic features in both the past and the present, it forms a generic cultural geographical unit. It was designated to the UNESCO world heritage list in 1997.The market town of Hallstatt wedged between the mountain and the south-western shore of the lake. Favoured by its location, the core of the town is a unique example of the Gothic miners' settlement with its basic structures still discernible and Late Baroque additions made after the great fire of 1750.Everyone who has been to Hallstatt will be fascinated by its rich history and classical temperament, and will be intoxicated in its romantic, ecological, beautiful and natural environment. Like a fairy tale picture scroll, it shows the world the past life and perceives the changes of history. It is an excellent case of rural landscape and architecture protection, which is worth learning from.

1). Typical case of "Living heritage"

The biggest feature of Hallstatt is that it does not display historical objects in museums, but presents them alive in people's field of vision, which can be perceived and experienced. More than 270 years of traditional houses have been continuously repaired, updated and self-evolved. So far, they have not only been used by villagers, but have also been transformed into spaces that meet the needs of tourism

development. At the same time, this transformation is carried out under strict management and control.

The cultural landscape region boasts a continuing organic evolution covering 2500 years. From the very beginning its history has been linked primarily with the economic history of salt extraction. Salt mining has always determined every aspect of life, as well as the architectural and artistic material evidence. Here, you can refer to the archaeological site to feel 7,000 years of history. History and life are presented in a real way. Due to its special historical evolution, this human landscape retains a certain degree of authenticity in nature and society, unique in the alpine region. It retains its spatial and material structure to a high degree due to the harmonious interaction between man and the environment.

Fig. 3.6. Experience the history of salt mining in Hallstatt(source：https://www.salzwelten.at/en/blog/salzburg-saltmine

2).Enact laws and strict management measures to limit environmental damage and overdevelopment

As a Crown estate the region was strictly managed from the 16th to the 20th century, With the decline of the salt industry in the mid 19th century, the development of the region for cultural and aesthetic tourism has ensured that it has retained its essential character. The archaeological areas have been studied and recorded for 150 years and protected by legislation, whilst the character of the town of Hallstatt bas been and continues to be jealously guarded by its citizens as well as the relevant provincial and municipal authorities. This is well illustrated by the refusal of consent for the construction of a main road along the lake-shore in the 1960s and appropriate alternatives being encouraged in order to preserve the historic material. Later, an underpass was built at the bottom of the town to protect the integrity of the town's spatial form. The area protection under the provisions of a range of federal, provincial, and municipal legislative instruments. Individual buildings and archaeological sites are protected under the 1923 Austrian Monument Protection Act (as amended in 1978 and 1990).

The townscape regulations, building codes, and spatial planning provisions of the Province of Upper Austria regulate all forms of building and development within the cultural landscape.
Matters relating to nature conservation and their funding are administered jointly by federal and provincial authorities, by means of the federal 1959 Water Act and the 1975 Forestry Act.

Comprehensive protection of the nominated cultural landscape is subject to the 1995 Upper Austrian Nature and Landscape Conservation Act. This designates landscape conservation zones, protected parts of landscapes, nature reserves, and individual natural sites.

Provincial Regulation No 25/1963 declares the central karst mountains of the Dachstein group, with their glaciers, barren land, and high alpine flora, to be a nature reserve. The Koppenwinkel and the Gosau lakes have also been declared nature reserves by regulation. Similar protection is afforded to those parts of the buffer zone lying within their territories by the 1993 Salzburg Nature Conservation Act and the 1976 Styrian Nature Conservation Act.

At the international level, general principles and measures for protecting the cultural landscape as a whole are laid down in the 1991 Alps Convention, which has been ratified by Austria, France, Germany, Italy, Liechtenstein, and Switzerland.

In recent years, the excessive tourist crowd has caused disgust among local residents. The local government has limited the number of tourist buses arriving daily to 50 to effectively reduce the number of tourists.

Fig. 3.7. View of Hallstatt from the lake (source：photo by author)

3). Nature-focused planning and design

The rich and variegated flora and fauna of the Hallstatt-Dachstein region draws its support from a changing mountain landscape that reaches up to the snow-belt, thus providing many ecological niches, both large and small. It is remarkable for a mountain region to have so many rare and endangered plant species that are on the Red Lists. The fact that many stretches of woodland in inaccessible locations are almost untouched by humans is worthy of special mention. Owing to the low level of development and the enclosed character of the region, these conservation areas are also of major importance for those species that are very sensitive to human interference.

Owing to its high density of historic monuments, Hallstatt is an urban monument of the highest order. The magnificent scenery has allowed little space for the architectural evolution of human settlement. The attempt to make the optimum use of the space available can clearly be seen within the basically Gothic core of the settlement and its Baroque additions, whose prominent silhouette and almost complete original ensemble have been preserved to the present day. The ancients built cascading houses on the basis of respecting the environment to reduce damage to the environment, and the current protection still retains the shape and scale of the town. There is no large-scale development in pursuit of economic interests, and there is no destruction of the original town by a large-scale building complex.

Even at a time when tourism has become a major source of income, conservation measures have not widened roads, added buildings, or expanded public spaces to accommodate development. The planning and design are strictly optimized and adjusted according to the former form, and obey the nature. The building community is layered and integrated with the mountain naturally.

Fig. 3.8. A town that respects nature and original appearance without over-development (source: photo by author)

4). Awakening of National Awareness and Public Participation

The protection of heritage and rural landscape cannot rely solely on legal and institutional constraints, and efficient management depends on the collective participation of all stakeholders.

Hallstatt Wood School, established in 1873, is now called Higher technical college is a higher federal technical college in the market town of Hallstatt in the Gmunden district in Upper Austria. The school started

with 4 students trained in woodcarving and marble processing, and expanded to include carpentry and wood turnery, From 1997/1998, the Department of Interior Design and Furniture Manufacturing opened two classes. It has trained many technical and design talents for the protection and renewal of the town, effectively guaranteeing the heritage protection of Hallstatt.

There is a growing collective awareness among Hallstatt residents of the heritage value of the urban fabric. The commune and the owners carry out day-to-day management. This approach is based on guidance provided by provincial experts and the Federal Office of Monuments Conservation. From the daily life scenes maintained by local residents, they can feel their love and affection for this place, which is also the most important reason for the sustainable development of protection and renewal.

Walking in the streets and alleys of Hallstatt, you will be moved by the care and meticulousness that can be seen everywhere. There are no commercial gift shops that are densely populated by ordinary tourist spots, and the coffee shops are carefully arranged. Residents live here, either leisurely, busy, or working, presenting a beautiful and real picture of life. This is the best demonstration of authenticity.

Fig. 3.9. beautiful scenes carefully set up by residents (source：photo by author)

3.3.3 Civic Centre Lleialtat Santsenca Barcelona

Lleialtat Santsenca founded by fifteen people in 1894, when Sants was an independent village, the Lleialtat Santsenca cooperative grew over time and, in 1924, moved to a two-story building , the building housed a food shop, storerooms and a bakery on the ground floor, while the upper floor accommodated a cafe, a boardroom, a small theater, administrative offices, and a library.With the development of the times, the original function can not meet the current needs, this old building would be transformed into a a civic center.The adaptive reuse project, developed by architecture firm H Arquitectes, was conceived to save as much of the original structure as possible.

The transformation into a civic center complied with a number of demands by the local community that, due to the lack of social spaces in the Saints neighborhood, requested the restoration of the historical building to be combined with the creation of a community center. Therefore, the architects devised a design strategy aimed to take advantage of the original spaces and structures, to increase the potential uses of those spaces, to establish a strong relationship with the context, and to create a sustainable building.

Fig. 3.10. save as much of the original structure as possible (source：https://www.archdaily.com/889515/civic-centre-lleialtat-santsenca-1214-harquitectes)

The Lleialtat Santsenca redevelopment has been included in the jury shortlist for the 40 best projects of the EU Mies Award 2019.

Before restoration, four basic objectives were set out: first, taking advantage of everything that could be used from the original; second, defining an intervention strategy marking out the essential actions, conservative or not, allowing to recover and increase the potential uses of all those spaces; third, to establish an intensive dialogue – and tense, if due – with context; and fourth, to develop a sustainable proposal, regarding the work on the existing as well as the new interventions.

Fig. 3.11. "old" walls which show traces of the past history of the building (source：https://www.archdaily.com/889515/civic-centre-lleialtat-santsenca-1214-harquitectes)

The building comprises three structural bodies: the main one on Olzinelles and Altafulla streets, the central one with access from Altafulla street; and the interior one.The "fulcrum" of the new civic center consists of a sequence of voids which connects the restored spaces and the newly-built ones. The voids merge into a central atrium enclosed

by "new" facades, and "old" walls which show traces of the past history of the building.

The atrium brings daylight and natural ventilation while, at the same time, it is the main axis of horizontal and vertical circulation, and offers a new potential of use for a wide range of special events and activities. Of the existing roof, only the trusses were maintained while three new gable roofs were built. Fastened to a metal structure, the roof covering was made in cellular polycarbonate to the south and with insulated metal sheets to the north; natural ventilation is provided by a number of roof windows, installed in the upper part of the atrium, which contribute to the convective flow of air from bottom to top; overall, the whole building features passive thermal regulation systems based on inertia and insulation.

Fig. 3.12. passive thermal regulation systems based on inertia and insulation (source: https://www.archdaily.com/889515/civic-centre-lleialtat-santsenca-1214-harquitectes)

3.4 Summary

This chapter discusses the procedures, principles and strategies for the conservation and renewal of rural landscapes and vernacular architecture. This chapter first states that prior to protection and updating, the existing charters should be fully read, understood and followed, and the procedures are drawn up in accordance with the spirit of the charters, starting from inspection, survey and research,analyse and evaluation, interventions, materials and technologies, recording and documentation, monitoring and maintenance and education gradually implemented. Each process should adjust the work content according to the actual situation of the project. Based on the difference in the focus of attention between rural landscape and vernacular architecture, this chapter proposes that the protection of rural landscape should pay attention to Protecting the link between nature and culture, Preserving the visual quality of the landscapes, Sustainable use of natural resources, Protect the integrity of the landscape. The protection of vernacular architecture should be paid attention to The principle of classified protection, authenticity, integrity, participation, remaining dynamic and sustainable.

This chapter focuses on the experiences of European countries in the conservation and renewal of rural landscapes and Vernacular architecture from three different perspectives. HISTCAPE is to use a cross-country, multi-member collaborative team to share successful cases, concentrate efforts, and use multi-disciplinary and multi-method innovation strategies to study rural renewal and development. Hallstatt is supported by national policies and adopts a top-down macroscopic approach. Planning, design, and all-round coordination to establish and protect

become a World Heritage Site. There is also a single building such as the Civic center, which can not only protect the history to the greatest extent, but also incorporate new technologies to enhance the usability and physical performance of the space in the process of protection and renewal. The above cases all provide detailed and innovative strategic references for this study in the protection and renewal of rural landscapes and buildings in Chongqing.
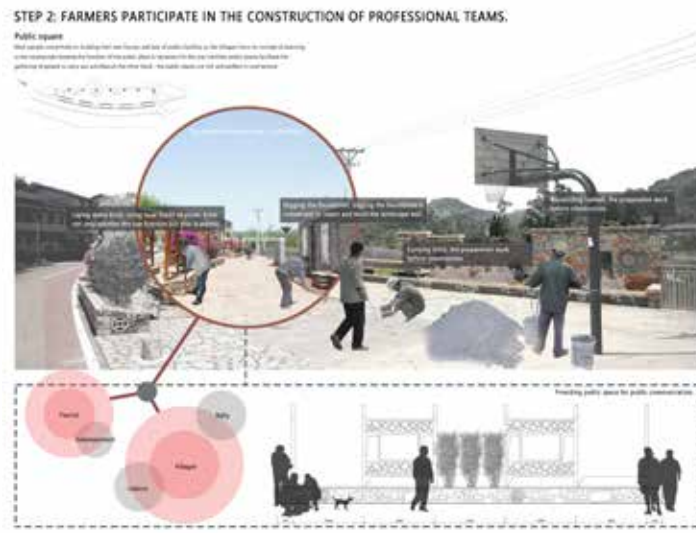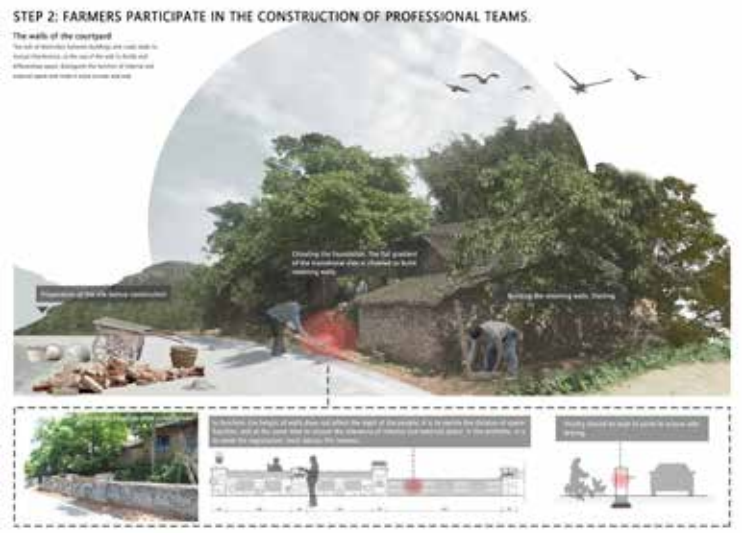

Fig. 3.13. The author and team's work in the village of Chongqing with the strategy of self-construction (source: drawing by author and team work)

4. Rural landscape and vernacular Architecture in Chongqing

4.1 Overview of Chongqing

Chongqing is located in the southwestern part of inland China, in the upper reaches of the Yangtze River. It covers an area of 82,400 square kilometers and has jurisdiction over 38 districts and counties (26 districts, 8 counties, and 4 autonomous counties). Chongqing is the only municipality directly under the Central Government in the central and western regions of China. It has a resident population of 32.054 million and an urbanization rate of 69.46%. The population here is dominated by the Han nationality, and the ethnic minorities mainly include the Tujia and Miao nationalities. Chongqing is a unique "mountain city and river city". Its landforms are dominated by hills and mountains, of which mountains account for 76%; the Yangtze River runs through the whole of Chongqing, with a flow of 691 kilometers, and meets with rivers such as Jialing River and Wujiang River. Chongqing is rich in tourism resources, with magnificent landscapes such as the Three Gorges of the Yangtze River, Dazu Rock Carvings, a world cultural heritage, Wulong Karst landforms, a world natural heritage, and Jinfo Mountain in Nanchuan.

4.1.1 Geographical pattern

Chongqing is a typical mountain city with a large city and a large rural area, with a topographical feature dominated by mountains and hills. According to the spatial combination of different landforms and the principle of combining similarity and dominant factors, Chongqing can be divided into five landform units: the mesa hilly area in the west of Chongqing, the parallel ridge and valley area in the central part of Chongqing, the middle mountain hilly area in the south of Chongqing, the middle mountain area in the northeast of Chongqing and the middle mountain and low mountain areas in the southeast of Chongqing.

1) A city surrounded by mountains and rivers and embraced by gorges

Fig4.1: The location of Chongqing and its mountain and river(source:http://www.cq.gov.cn/)

2) Three ecosystems

Natural Ecosystem: Its scale is about 51,500 square kilometers, and it is mainly distributed in the high-altitude mountainous areas such as Daba Mountain, Wushan-Qiyao Mountain, Wuling Mountain, and Dalou Mountain.

Urban ecosystem: Its scale is about 7,600 square kilometers, and it is concentrated in the mesa hilly area in western Chongqing and the parallel ridge and valley area in the middle.

Farmland ecosystem: Its scale is about 23,300 square kilometers, and it is concentrated in the mesa hilly area in western Chongqing and the parallel ridge and valley area in the middle.
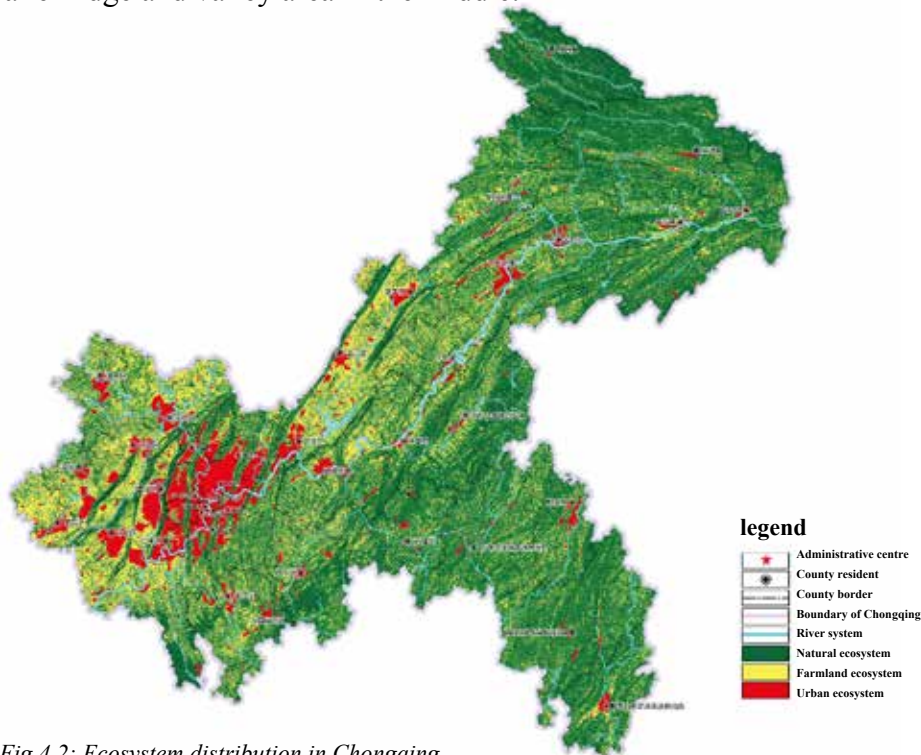
3) Four main elements

Mountain: The low mountain in the middle of the basin is like a comb, surrounded by mountains on three sides.
Mountains and hills account for more than 90% of the city's area, making it the most typical folded mountain area in the world.

Water: There is a high density of rivers and lakes.The Yangtze River, Jialing River and Wujiang River converge. There are more than 5,300 large and small rivers, about 3,868 reservoirs, and 125 large and medium-sized reservoirs.

Forest: High mountains and dense forests with lush trees and grass.The forest mainly distributed on the mountains with higher altitudes in the northeastern, southeastern and central and western regions of Chongqing.

Field: The hills are wide spread, the fields are beautiful and fertile. The cultivated land area of the city is 18,700 square kilometers, of which the cultivated land above 25° accounts for 18% of the total cultivated land area.

legend

Administrative centre
County resident
County border
Boundary of Chongqing
River system
Natural ecosystem
Farmland ecosystem
Urban ecosystem

Fig 4.2: Ecosystem distribution in Chongqing (source:http://www.cq.gov.cn/)

Fig 4.3: The mountain,water,forest and field in Chongqing (source:http://www.cq.gov.cn/)

Fig4.3: The overall pattern of ecological security in Chongqing (source:http://www.cq.gov.cn/)

legend

Yangtze river, Jialing River, Wujiang River

DaBaShan
Wushan
Wuling mountain
Dalou mountains
Other river
Mountains
The water

4.1.2 Climate,Vegetation and Soil

Chongqing is located on the eastern edge of the Sichuan Basin in the transition zone between the Qinghai-Tibet Plateau and the middle and lower reaches of the Yangtze River between 105°11'-110°11' east longitude and 28°10'-32°13' north latitude. The climate here is mild, subtropical monsoon humid climate. It is warm in winter and hot in

Climate parameters	Summer	Winter
Number of days	128	67
Average temperature of the coldest month (°C)	28. 6	7. 5
Average humidity (%)	75	82
Average wind speed (m/s)	1. 4	1. 2
Average precipitation (mm)	633. 5	445.7
Sunshine hours (h)	1107	93

Table 4.1: Chongqing Climate table (source:http://www.cq.gov.cn/)

summer, with a long frost-free period and abundant rainfall. The annual rainfall is 1000~1450mm.

Influenced by atmospheric circulation and topography, Chongqing's climate is complex. Due to the mountain barrier, the temperature in winter in all parts of the region is higher than that in the same latitude outside the region, and there is very little frost and snow here, showing obvious characteristics of warm winter; In summer, the temperature is controlled by the western Pacific subtropical high and the Qinghai-Tibet warm high pressure, the airflow sinks, and it is sunny and less rainy. The Qinba Mountains in the north block the cold air from the north, further contributing to the high temperature in summer. Especially in the valleys of the Yangtze River and Wujiang River, due to the low-lying terrain, the wind is weak and the heat dissipation is slow. At the same time, affected by the evaporation of ground water, the air humidity is relatively high, resulting in abnormally hot summers in Chongqing. Affected by the foggy weather, the annual sunshine hours in Chongqing area are only

1000-1400 hours, making it one of the areas with the lowest sunshine hours in the country. Due to the surrounding mountains and the barrier of the Qinghai-Tibet Plateau, the wind speed in Chongqing is extremely small, making it the main small wind climate area in the country. The annual average wind speed here is mostly below 1.5M/S, especially in hot summer. Except for some areas, the wind speed is mostly between 1.0-1.5M/S, making it the season with the smallest wind speed throughout the year. This further keeps summer temperatures high and humidity higher. In general, the climate in Chongqing is characterized by high humidity and rain, especially in summer, when it is hot and humid, and the room is very stuffy and dew is easy to condense. The climate has a great influence on the rural landscape and architectural form of Chongqing.

Chongqing is rich in vegetation types, of which pure forest land accounts for a large proportion, but the composition of tree species is relatively simple. The zonal vegetation is subtropical evergreen broad-leaved forest. It is located in the subtropical temperate climate zone, belonging to the semi-humid and humid forest belt, and consists of seven types of vegetation: broad-leaved forest, coniferous forest, mixed coniferous and broad-leaved forest, bamboo forest, shrub, grass slope and agricultural vegetation.

Chongqing has a vast territory. From the perspective of latitude, the zonal soil is yellow and red formed under the subtropical humid monsoon climate. However, the natural soil-forming conditions in the city are quite complicated. First, the geomorphological conditions here are complex, including large areas of medium and low mountains and deep river valleys, as well as vast hills and flat dams, with high mountains and

deep valleys, undulating terrain and large height differences. This largely redistributed the water and heat conditions in the territory, resulting in obvious vertical changes and regional differences in soil-forming factors such as climate and biology. Secondly, most of the strata from the Pre-Sinian to the Quaternary are exposed on the surface, with complex lithology and diverse parent materials. In addition, the differences in the hydrogeological conditions and the forms of human production and utilization make the soil-forming conditions more complicated, resulting in the diversification of soil types in this city.

Fig 4.3: Beautiful scene of Chongqing(source:http://www.cq.gov.cn/)

4.1.3 Cultural environment

1) An inclusive immigrant society

People in Chongqing have never been isolated or static in history, they have been constantly migrating and integrating in the process of their development. From the early immigrants to the immigrants from Huguang to Sichuan, to the large number of immigrants brought by the development of shipping on the Yangtze River, the opening of ports and trade, and the relocation of the capital during the Anti-Japanese War. Chongqing has not only been the main channel for immigrants from the East and the West for a long time, but also a place where many ethnic groups and cultures blend. The southeastern area of Chongqing is the only minority area in Chongqing dominated by the Tujia and Miao people.

2) Mountain culture

As a complex landform type, mountains have a great influence on the production and development of society and culture. After being influenced by mountains, different cultures show some common cultural characteristics, the most prominent of which are conservatism, exclusivity and advocating individuality. This feature varies from location to location. The mountainous hinterland area with inconvenient transportation is a typical area where the mountain culture is conservative, exclusive and advocating individuality. The mountain river area close to the river has the conservative characteristics, exclusivity and advocating individuality of mountain culture, but also openness and inclusiveness.

3) Wharf culture

Because Chongqing is located inland and has a developed water system, it relies on the Yangtze River and Jialing River to become an inland commercial port. The commercial activities on the wharf have promoted social communication and development, and enhanced the heroic, open and inclusive atmosphere of Chongqing.

Fig 4.4: Chongqing's rich cultural characteristics(source:photo by author)

4.2 Rural landscapes in chongqing

Due to the comprehensive influence of the natural environment such as topography, hydrology and climate, and the human environment such as population migration and social organization, the rural landscape of Chongqing presents subtle differences.

4.2.1 Rural landscape in the hilly area of western Chongqing

The topography of this area is dominated by flat dams and terraces. The villages are often located in the Pingba area, close to the water; the spatial form of the villages is most distinctive in the form of clusters and strips. In trading villages, feng shui forests and ponds are relatively rare, and in farming villages, feng shui forests are more common than ponds. The orientation is mostly multi-directional facing the road or against the hill; there are many types of residential houses, and the grounding methods include grounding and hanging foot, with shop-houses and bungalows being the most distinctive; The nationality is basically Han. Social culture includes industrial and commercial culture, hilly farming culture, Hakka immigrant culture and Buddhist and Taoist stone carving culture. Among them, business culture is the most prominent. Social organizations are mainly business associations composed of commerce and trade and geographical ties.

4.2.2 Rural landscape in the valley area of central Chongqing and in the middle mountain area of southern Chongqing

The topography is dominated by hills and low mountains, which is a typical parallel ridge and valley area. Villages are often located in the back hill area, close to mountains or water depending on where they are located; the spatial forms of villages are mainly clustered, dense and centripetal. There are basically Feng Shui forests, and ponds are rare. The orientation is basically backed by the mountain, and it is divided into one-way and multi-directional according to the terrain. There are various types of dwellings, and the grounding method is mainly grounded, mainly Chinese-style courtyard houses. The most characteristic of the residential buildings around the building is that the materials of the watchtowers are both soil and stone; The ethnic group is Han, and there are some ethnic minorities in the area adjacent to Guizhou to the south.

landscape plaques type	Specific functions
Back hill	It provides an ecological background for rural settlements and basic guarantees for the operation and development of the settlement ecosystem
Forest	It improves atmospheric microcirculation and makes up for the inherent deficiencies of the natural environment
Vernaclar houses	They are the place where the villagers live, and they are comprehensively adapted to the natural environment.
Water	It regulates the microclimate
Pond	It is the main form of water body, with functions such as water use, drainage, flood control, fire prevention, etc., and has the meaning of gathering wealth in folk culture
Terraced fields	People farm for food. They are the main source of livelihood for the villagers
Fengshui forest	It maintains biodiversity and means good luck in folk culture

Table 4.2   The function of landscape plaques in rural traditional settlements(edited by author)

The social culture here includes immigrant migration culture, farming culture in hills and mountains, military defense culture, etc., among which immigrant culture is the most prominent. The clan is the basic social structure, the size of the ethnic group determines the size of the village, and the ties within the clan are close.

Fig 4.5: Rural Landscape Spatial Analysis(source:photo and drawing by author)

4.2.3 Rural landscape in the middle mountain areas of northeast Chongqing

The terrain here is rich in types, from south to north, it is hills, low mountains, middle mountains and high mountains. The villages are often close to the mountains, and if there is water, they are close to the water, and they are mostly located at the foothills or the top of the mountain; The most common spatial forms of villages are group type, dense type and core type. There are generally Fengshui forests in the villages and few ponds. The orientation is mostly multi-directional towards the mountain; the style of residential buildings is relatively simple, and the grounding method is mainly grounded. rural settlements have a spatial sequence of "mountain-residential-farmland-river". Villagers are concentrated in the central part, which meets the actual needs of farmland management and agricultural production. In addition, cultivating feng shui forests and using unfavorable terrain to plant vegetation are also beneficial measures for environmental protection and ecological adaptation.Chinese-style houses and diaolou are the most common. Most of the the courtyard houses are located in low mountains and hilly areas. The phenomenon of using stones for walls and tiles is seen in in Daba Mountains; The ethnic group is dominated by the Han nationality, supplemented by the Tujia nationality. Social culture includes defense culture, salt culture, immigrant culture, Bachu culture, farming culture, goddess culture, Wu Wenhua, etc. Among them, defense culture is prominent. The basic social structure of the village is the clan, and the clan has a strong blood relationship.

4.2.4 Rural landscape of middle mountain and low mountainous area in southeastern Chongqing

The terrain here is dominated by low mountains and hills, making it a typical mountainous area. The location of the villages is often close to the mountains, and if there is water, it is close to the water, and most of them are located at the foothills or mountainsides; the spatial form of the villages is most distinctive in the form of groups and layers. The environment of the village is based on the Fengshui forest, and there are often ponds in the flat areas. The orientation is backed by the mountain, and if there is water, it faces the water. If there is no water, the orientation is determined according to the direction of the mountain. The houses here have prominent features and are famous for their stilted buildings. Due to the influence of the geographical environment and the degree of integration with other ethnic groups, the stilted buildings of the Tujia, Miao and Gelao peoples have their own characteristics in terms of terrain utilization, shape, overhead, details and roofs; The ethnic groups are mainly Tujia and Miao people, supplemented by Han and Gelao people. Social culture includes farming culture, immigrant culture, business culture, ethnic culture, etc., among which minority culture is the most prominent. The villages are built with the blood of the clan as the link, and there are also a small number of contract-type villages of clans.

Mountain
The village land is a shallow hilly terrain, surrounded by mountains and rich in natural vegetation.

Water
The Longtang River and the Yuhe River run through the village from north to south. The large and small fish ponds are scattered throughout the village fields, injecting agility into the village.

Farmland
The farmland is densely covered with flat land and gentle slopes, and the agricultural industrial base that has begun to take shape forms the base of rural landscape.

Forest
The current forest land is densely distributed and distributed on the shallow hills. The features are obvious and the layers are rich.

Fig 4.6: Different types of rural landscapes in Chongqing (source:photo and drawing by author)

4.3 Vernacular Architecture in chongqing

The rural areas of Chongqing are not only complex and diverse in topography, but also warm in winter and hot in summer, hot and humid and rainy. There are many rivers here, and the river features in the mountains are remarkable, and they are influenced by traditional culture, folk culture, mountain culture and national culture. The special natural ecological environment and the rich local cultural environment jointly determine the strong regional characteristics of Chongqing's rural architecture, which is different from the villages in the plains. The villages here make full use of the high-quality ecological resources of the mountains, showing traditional settlement forms that fit the topography of the mountains.

The vernacular architecture of Chongqing, which grows in this unique geographical environment and humanistic atmosphere, has strong ecological adaptability and ecological aesthetics.

Fig 4.7: New vernacular architecture in Chongqing (source:drawing by author)

4.3.1 Ecological suitability characteristics of vernacular architecture in Chongqing

The development process of vernacular buildings in Chongqing is the product of the interaction and interweaving of history, culture, clan, geography, and bioclimatic conditions. Under the influence of special mountainous and rainy natural conditions, it has strong ecological adaptation characteristics such as locality, clustering and diversity.

1) Locality rich in people's wisdom

The local characteristics of Chongqing vernacular buildings show the local characteristics of space environment and people's wisdom.In terms of spatial environment, the spatial form of Chongqing's vernacular buildings "faithfully reflects and responds" to the climatic conditions, geographical environment, cultural traditions and other regional elements in Chongqing. Whether it is mountain dwellings such as stilted buildings in southeastern Chongqing, or the application of local materials such as wood, bamboo, and stone, or the landscape pattern of rural dwellings, and the mountain characteristics of building houses built on the mountain, all of them reflect this locality. The buildings seem to have grown out of and integrated into the local environment.

In terms of people's wisdom, Chongqing's vernacular buildings condenses rich and creative folk traditional construction skills, which are the result of many years of ideas and skills. These products gradually repaired and improved by "non-designers" over generations, such as wood, stone, brick and wood carving, etc., are rich in folk wisdom. They

have flexible complexity and imagination, and reflects the adaptability to the natural environment.

2) Self-organized clusters

Chongqing vernacular buildings is a self-organized folk construction product. They show strong cluster characteristics, which can be further interpreted as "dense settlements, development from top to bottom, and pattern migration." Dense settlements refer to the fact that most of the villages in Chongqing are located in the mountains, and the construction land and cultivated land are scattered and scarce. Therefore, the rural buildings are mostly clustered into clusters and developed intensively, so as to save construction land and occupy less cultivated land. The development from top to bottom is due to the fact that there are too few available flat land and gentle slopes, so the farmhouse makes full use of the terrain environment and develops from top to bottom to save land. In the direction of "up", the building is built on the mountain, layer by layer, in the direction of "down", the building adopts construction methods such as hanging feet and space under the column. Pattern migration means that when the rural settlements form a certain scale and are restricted by the environmental capacity, they begin to migrate to the surrounding areas in the same pattern. After years of accumulation, clusters of settlements with highly similar cultural atmosphere and spatial form have formed within a certain range, forming "clusters". (Rui Zhi, 2010)
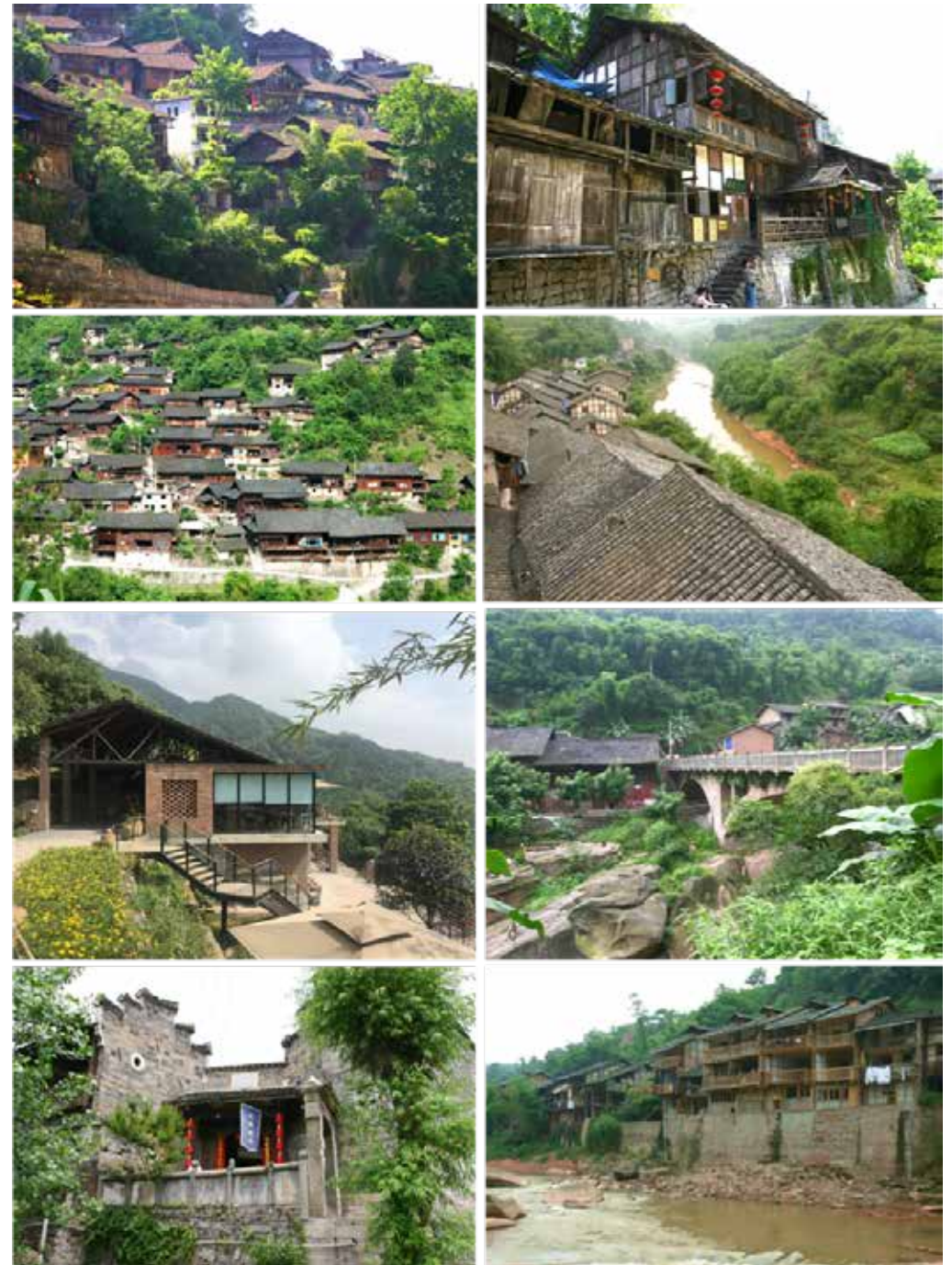
Fig 4.8: Vernarcular architecture in Chongqing (source:photo by author)

3) Diversity of environmental adaptation methods

The construction of contemporary Chongqing vernacular buildings should emphasize the locality, protect the characteristics of clusters, and reflect various adaptation methods in the aspects of nature, humanity, technology, and materials.

From a natural perspective, the farmhouses are open, transparent and ventilated, the centralized layout can keep warm, and the rivers and lakes can be used to improve the ecological micro environment. The layout methods such as building on the mountain and leaning on the mountain and the water can effectively utilize the topography and land forms.

From the cultural perspective, we can integrate the original traditional genes into the planning and construction of modern villages through prototype extraction and update design of typical farm houses.

From a technical perspective, farm houses have condensed the wisdom and traditional techniques of ecological construction in a long history, and can be combined with modern green adaptation technologies to promote coordinated development.

In terms of materials, transportation is inconvenient in traditional mountainous areas, so farmers mostly use local materials when building houses. Grey tiles, bluestones, white walls, wooden frames, etc. are simple and with distinctive features. Using local materials saves money and avoids pollution. If the building materials such as wooden frame and roof tiles are damaged, they can be partially replaced or relocated in different places. Old waste materials can be returned to the natural cycle.

4.3.2 Aesthetic characteristics of Chongqing vernacular architecture

1) Ecological aesthetic characteristics

As a new aesthetic research in recent years, ecological aesthetics is an aesthetic response to the increasingly serious global natural environment deterioration and ecological crisis, and an inevitable outcome of the transformation from industrial civilization to ecological civilization. Is in the modern context, guided by the new ecological world outlook, to discuss the aesthetic relation between man and nature as the starting point, involve people and society, man and universe as well as people with their own multiple aesthetic relationship, finally to improve present the beauty of human existence state, establish an obeys the law of ecological aesthetic state of existence. Professor Zeng Fanren pointed out in his article "The Basic Category of Contemporary Ecological Aesthetics" that "dwelling poetically" means "saving the earth", to get rid of the control of the desire to conquer the earth and make it return to its own characteristics, so that human beings can live on the earth and in the world beautifully. This is also an important point of contemporary ecological aesthetics. Looking back at the traditional self-built houses in rural communities, that is, vernacular architecture, isn't its construction concept and its relationship with heaven and earth and nature just the realistic material presentation of ecological aesthetics concept.

Vernacular architecture takes root in the rich and varied regional environment and forms an environmental characteristic of harmony and co-prosperity with the surroundings. In the process of site selection, layout and construction, feng shui concept played an important role. Feng shui culture, which takes "unity of nature and man" as its core

idea, has accumulated and condensed the ecological outlook and world outlook of local people in the long-term development process. It has profound ecological aesthetic implication, especially the idea of qi theory, which has internal consistency with the basic idea of ecological aesthetics. Driven by the concept of respecting heaven and earth, vernacular architecture integrates and co-exists with the environment and depends on each other. It pays attention to the use of mountain form and terrain, pays attention to the location and direction of water flow, and pays attention to "storing wind and absorbing gas". Generally, the site is located in a position of moderate terrain, with mountains behind and water facing it, gentle slope or flat ground, surrounded by natural forest or farmland. The building is located in rolling mountains, winding rivers and dense forests, thus forming a symbiotic state integrated with nature, which contains rich ecological beauty characteristics.

The site selection of Yao's courtyard in Shizhu County is backed by a gentle slope, with an open front. There are green hills echoing in the distance and low mountains surrounding the courtyard. There are many ancient and famous trees around the courtyard. The county tan home courtyard back is also a dense forest hills, front is a field of open vision, the distance is the wild green mountains. The tan family courtyard surrounded by mountains, houses strewn at random have sent, roofing layer upon layer, wind volcanic wall eye-catching bright, imposing manner is spectacular, all these forms the artistic conception of "unity of heaven and man".

Chongqing vernacular architecture has a strong ecological aesthetic value. When architecture and environmental elements are coordinated and harmonious, a place with a sense of home is constructed.

Therefore, it is very important to understand its integrity and apply it in contemporary construction. Vernacular architecture always blends with the environment in a state of submission and will never destroy the environment for the sake of construction. However, many new antique buildings tend to ignore environmental factors in pursuit of a larger building area. In some buildings of new ancient towns, there is even no space for green plants, which has to be said to be a major neglect of the aesthetic value of local architecture.

Fig 4.9: Vernacular architecture blends into nature(source:photo by author)

2) Spatial aesthetic characteristics

The landform of Chongqing is mainly hills and mountains, with large sloping land, numerous mountains and overlapping peaks. The geographical environment with mountains and streams is very limited for the construction land. The vernacular architecture grown in this environment shows the sense of adaptation, identification and reverence to the natural environment. Building communities generally do not wantonly change the natural environment but adopt a way to blend into the natural environment and grow naturally according to the principle of "there are laws and there is no fixed form". "Law" is the integration with the environment, respect for nature. "Type" is a space symbol formed according to different site characteristics. Therefore, the traditional architecture in Chongqing area has grown unique architectural form according to the mountain landform, showing the beauty of flexibility in accordance with local conditions.

The beauty of space is embodied in all aspects of the traditional architectural structure in Chongqing. The site selection and layout are free, and the body combination does not pay attention to balance and unity, nor does it deliberately highlight a certain part. There is often no clear center in the composition, which is often "scattered" composition or "polycentric" composition. There is generally no clear axis and fixed direction. Most of its plane layout is flexible and changeable. In the open area of the site, fengshui will be used to choose the appropriate orientation combined with the character of the owner, rather than strictly following the rules of the north building facing south. In order to adapt to the complex mountain terrain, the aggregation buildings will be built along the contour line. The overall layout does not pay attention to symmetry or orientation, so as to form a well-proportionally space. Although its spatial types are various, they can be summarized as the development of "between" space in "one bright and two dark". The "inter-space" combination is transformed into "courtyard" space, and the courtyard is transformed into " Combination -courtyard" through combination, forming the spatial sequence and level of "inter-courtyard - courtyard – combination-courtyard". However, the size of the same form of space is not unified and is more determined by the size of the site, which is the result of local conditions. The causes of building types are less based on regulations and more on the adaptation to the environment under moderate economic conditions. Therefore, it forms a rich and varied, fluctuating and diversified space, which has a strong aesthetic value. It is helpful to recreate the new vernacular architecture in the new era and new environment to realize the inherent characteristics of aesthetic feeling.

The diversity of the building plane reflects the beauty of the smart, the building facade adapt to the site also presents a plurality of aesthetic characteristics. In the space shaping of facade, techniques such as "platform, lifting, slope, dragging, shuttle, leaning, straddling, frame, dividing and combining" are often used to adapt to the terrain, among which "hanging" is the most widely used, thus forming stilted buildings with the largest number and strongest characteristics in Chongqing. This kind of architectural form has become a solidified symbol as the architectural image representative of southeast Chongqing. hanging building is a form of stilted building, namely "semi-stilted building". The building is suspended under the column in the bucket frame, and part of the building is placed on the foot column, which is used as the

structural support, so that the bottom is lifted into the air, so as to obtain a larger building area and save the base area. In this way, the contact between stilted buildings and the slope is reduced to a few points, so that the original natural landform can be protected, and the infiltration of vegetation environment can make the geological structure more stable while strengthening its ecology. The hanging buildings built in the sky not only save space, avoid heat and tide, but also have beautiful shapes. The structural characteristics of point foundation enable stilted buildings to be built near water or in mountainous areas, thus forming rich and varied landscape forms.

The smart beauty of architecture is not only reflected in the plane and facade, but also in the symbols on the top of the building. In architectural symbols of southeast Chongqing, roof bears the duality of function and beauty. In order to cope with the freedom and irregularity of the building, multiple roof forms have to be combined, resulting in an extremely diverse variety of roof forms. Building groups free combination is more flexible, roof forms of change was more abundant, combined the compound construction usually have various kinds of roof combination, all kinds of roof cascading scattered, castle peak green water, pieces of a park roof, with a beautiful artificial landscape.It is out of respect for the environment rather than destruction, out of adaptation to the terrain rather than possession, the formless vernacular architectural space is filled with natural and dynamic beauty, which is exactly what ecological aesthetics follows and advocates. The natural space constructed in the long history presents the ecological beauty of thought, and its aesthetic value should be demonstrated. In the construction of new vernacular architecture, attention should be paid to the absorption of internal beauty,

which is the wisdom derived from the respect for the site and the sense of adaptation to local conditions, rather than the simple replication of complex external forms.
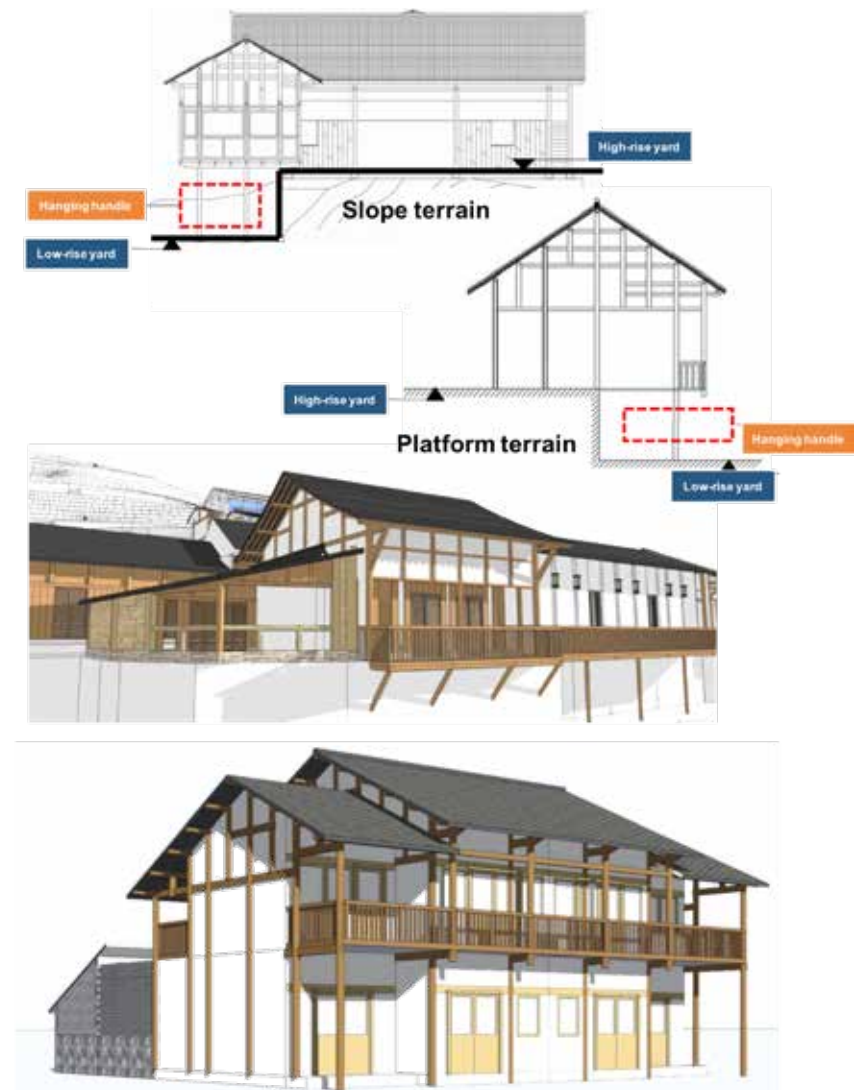

Fig 4.10: hanging building adapted to the terrain(source:drawing by author)

3) Material aesthetic characteristics

Materials are the important elements of architecture. vernacular architecture is indigenous culture, and the occurrence, development and evolution of architecture are inseparable from the dependence on local materials. The materials of traditional architecture in Chongqing have strong local characteristics and simple beauty of ecology. Chongqing is rich in wood, stone, sand pebble and tung oil, in order to efficient and convenient construction, local craftsman is given priority to use wood, brick, stone construct building, and strive to preserve the material texture, makes the building presents a natural kind of texture and color, give a person the feeling of pure and fresh, natural, simple. Presents a thick ecological simple beauty. Mr. Liang Sicheng believes that materials and natural environment are the basic reasons for regional differences in architecture. The local architecture built with raw natural materials and some materials that are slightly processed but still retain their own characteristics can fully show the unique landscape and regional culture. Mottled wood grain, weathered stone, trample ten million times of stone ladder has become a thick nostalgia.

In vernacular architecture, wood is the most used and important construction material. Because the local mountains surround, a large number of tree species, with convenient materials, easy processing, easy maintenance and replacement characteristics, wood is also an important carrier of simple beauty. The warm and natural nature of the wood adds a lot of flavor to the building. Wood texture tenacity, natural texture, visual sense is stronger, technology of plasticity, building materials in the process of selective more flexible at the same time, in such aspects as the thickness, length, mortise and tenon joint easy to meet the demand of construction, at the same time can also be used according to the actual situation in the region to adjust relevant (such as architecture, scale, material size, fine craftsmanship, etc.), In order to adapt to the natural climate of each region, to meet the use of various living space requirements.

Fig 4.11: Aesthetic characteristics of vernarcular materials (source:photo by author)

Chongqing area mountainous and watery geographical characteristics, stone sources are rich, so the villagers use local materials, stone more. The local stone is mainly stone, bluestone and cobble. Cobblestones are

often mixed with water and sand to build walls or pave floors. Stone or bluestone is more widely used, can be used for the foundation of the building, foot, wall, ditch, water, floor, railings, stone decoration, etc. Stone material has the characteristic of firm, fire prevention and water resistance, and woodiness just forms a kind of contrast and echo. In practical application, wise villagers will use different colors, textures and specifications of stone to form different textures and expressions. color relations show rich visual effects, you have to admire their innate sense of beauty. This kind of aesthetic feeling is conveyed and flowed out of the externalization of the spirit of harmony between their heart and nature, and the simple and natural aesthetic feeling is the representation of their pursuit of the essence of life.

4) Decorative aesthetic characteristics

As the ideal goal of human existence, "poetic dwelling" is fully reflected in the component decoration of Chongqing vernacular architecture. These components and decorations are refined by local villagers in their long-term life and labor, reflecting the simple and natural aesthetic concept of people in Chongqing area. For example, the Tujia people living in the southeast of Chongqing, they retain the primitive worship of nature, they believe in animism and retain a devout and primitive admiration for all things in nature, so they carved the images of animals and plants in nature into the buildings to express their respect for all things and convey their love for their homes. It is from the the love of life, the attachment to the home, and build today makes us have a strong rural feeling of home and homeland. The sculpture handed down from generation to generation is not only a direct depiction of

nature, but also endowed with symbolic meaning to achieve the purpose of blessing. Swastika, persimmon and ruyi are put together to symbolize "all the best", magpie and plum blossom means "happy on the plum tip", there is a symbol of wealth "peony", meaning peace "vase", the bat in the woodcut symbol of wealth. These meanings are similar to the folk customs of the traditional Han nationality, which is a symbol of cultural exchange and integration and the common pursuit of poetic dwelling. The Tujia people in Chongqing especially worship the white tiger, believing it can protect them and their descendants, so the shape of the tiger is often used in some decorative components. This has also become a unique and regional decorative symbol of Tujia.

Fig 4.12: Decorative windows on vernacular Architecture (source:photo by author)

4.3.3 Categories of vernacular architecture in Chongqing

   The vernacular architecture in this study takes the existing residential buildings built by farmers in the countryside as the research object. Temples, academies, ancestral halls, etc. are not within the scope of this research. The purpose of this research is to guide design practice with theory. On the basis of fully understanding the regional characteristics, ecological suitability and aesthetic characteristics of local vernacular architecture, clarify the current problems of vernarcular architecture in Chongqing, analyze the advantages and disadvantages, put forward reasonable suggestions to enhance the self-renewal ability of buildings, and restore the lost vernacular architectural culture. Rebuild villagers' self-confidence and sense of belonging. This study classifies vernacular architecture according to its structural mode, plane form, and main components.
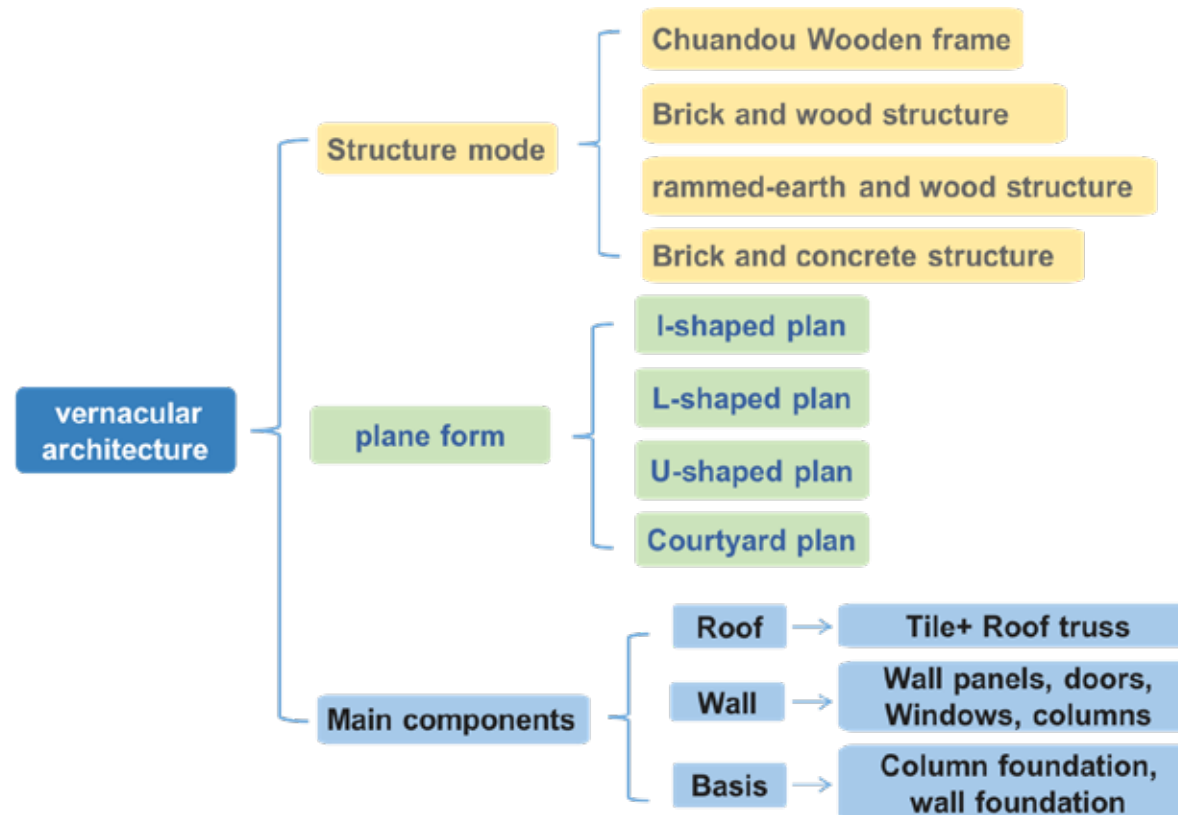
Table 4.3 Categories of vernacular architecture in Chongqing (drawn by Shi Yongting)

1) Structure mode

A. Chuandou Wooden frame

The Chuandou wooden structure house is the mainstream of chongqing vernacular architecture, especially in the mountainous areas with abundant timber resources and the minority communities such as Miao and Tujia, the Chuandou wooden structure is adopted as the architectural way of living space. In a Chuandou wooden structure, the columns are connected by ChuanFang to form a single wooden frame. The DouFang is connected to the wooden frame in a direction perpendicular to the wooden frame to form a stable structure, and the purlin is placed on the columns to form a main structure.
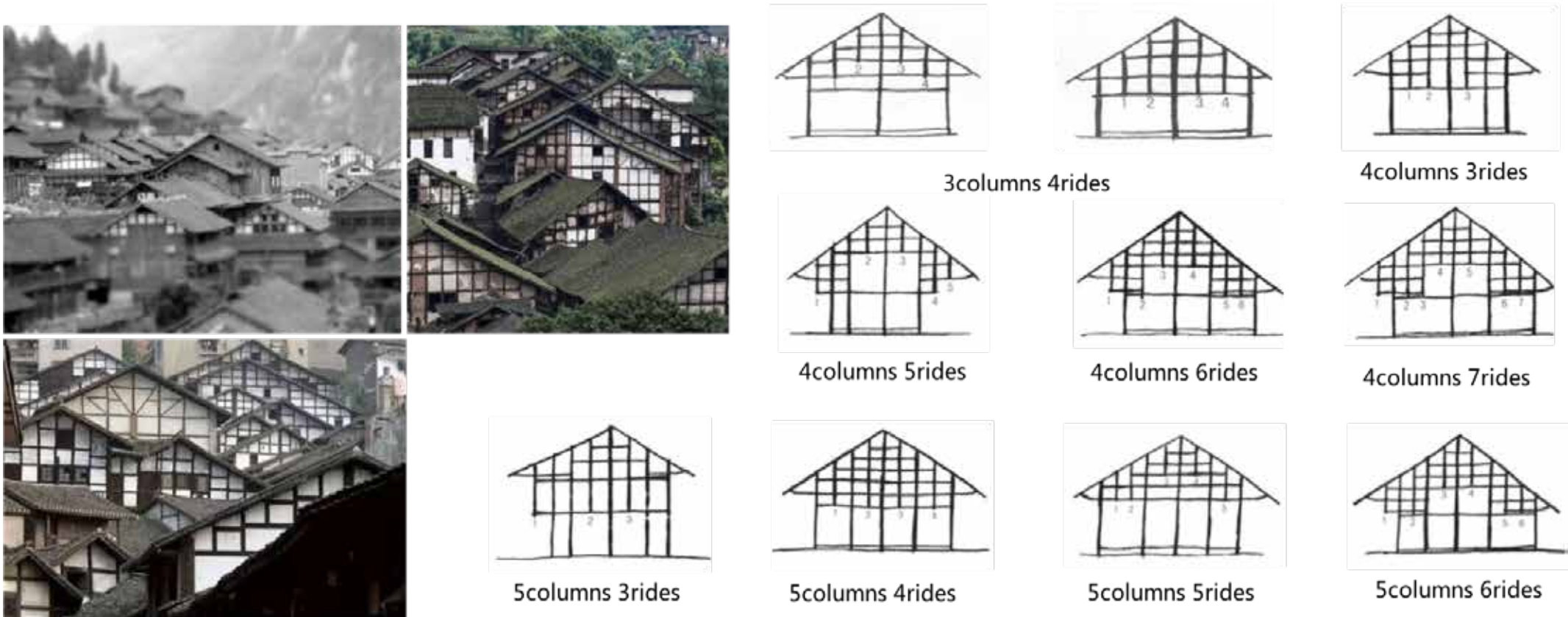
Fig 4.13: The columns and rides of Chuandou Wooden frame (source:photo and drawing by author)

1) Structure mode

A. Chuandou Wooden frame

Purlin   Chuan   Black roof tiles   Wooden floor   Decoration of The ridge   Ridge   DouFang   Wing-room   Wood window   The other side eave

Eave tiebeam

Davit

Handrail

Column   ChuanFang   Eaves gallery   Central room   Wood paneled wall   Foundation   Overhanging corridor   Hanging foot space
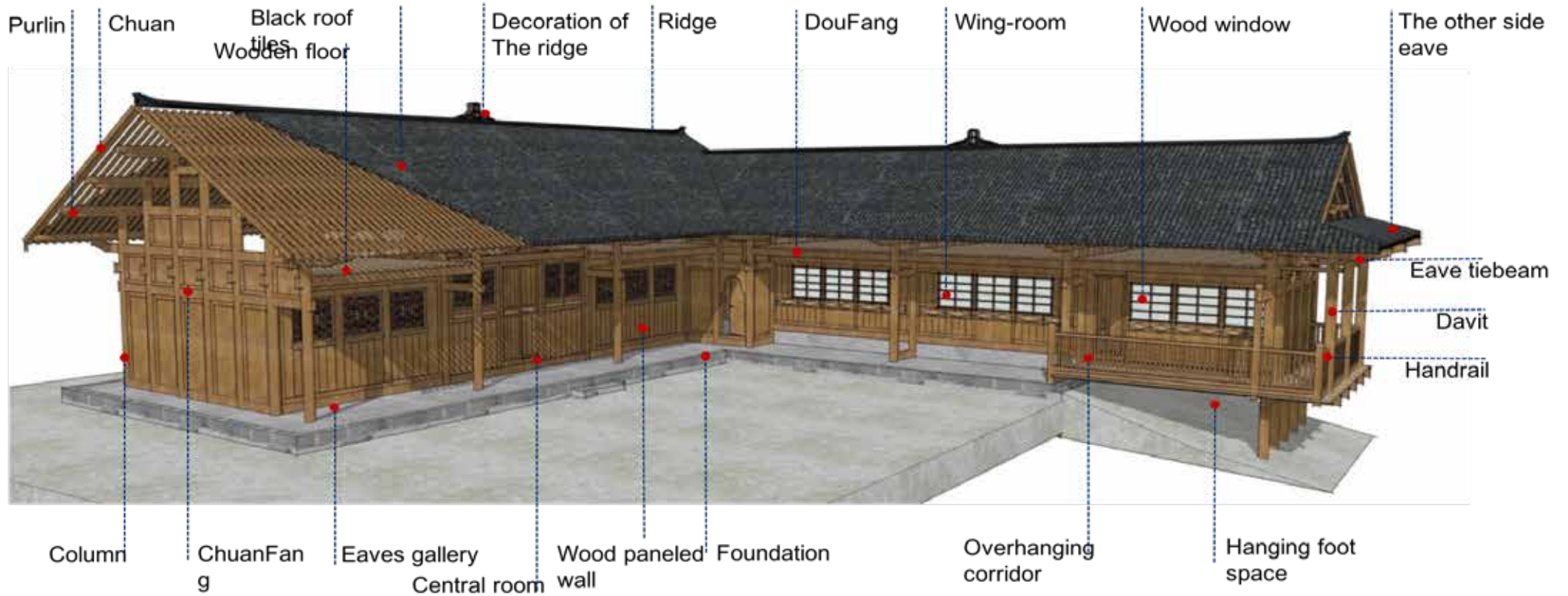
Fig 4.14: Annotated drawing of each part of the Chuandou wooden ftame (source:drawing by author)

Fig 4.14: Chuandou wooden frame (source:drawing by author)

1) Structure mode

A. Chuandou Wooden frame

Fig 4.16: Single-storey Chuandou wooden frame building (source:drawing by author)

The pin-through structure is the experience summed up by Chongqing people in thousands of years of practice. It has strong rationality and is fully adapted to the natural conditions of climate, topography and so on in this region. The perforated structure is very flexible, which can adapt to different changes of interior space. the terrain in Chongqing region is complex, mainly mountainous terrain. In some places, it can even be called "the ground is not three feet flat".

Fig 4.17: Two-storey Chuandou wooden frame building (source:drawing by author)

Fig 4.15: Schematic diagram of Chuandou wooden frame (source:drawing by author)

1) Structure mode

B. Rammed-earth and wood structure

In wushan County and other alpine areas, where the temperature difference between morning and evening is large, the winter is cold, and the tree resources are limited, rammed earth is used as the wall body, and the wooden structure roof is placed on the wall. Rammed earth building is close to nature. The physical characteristics of rammed earth building are its good heat insulation effect, low thermal conductivity, good thermal inertia, good thermal stability and strong heat storage capacity. When it is hot, it can absorb heat and store heat, while when it is cold, it can release heat and keep heat, forming the characteristics of rammed earth wall building, which is warm in winter and cool in summer.

Fig 4.18: Rammed-earth and wood structure (source:photo and drawing by author)

1) Structure mode

C. Brick and wood structure

  With the development of brick technology, bricks have become the main building bodies of economically developed towns in Chongqing. The pillars and walls used for support in the brick-wood mixed structure are made of bricks or stones, and the upper part of the wood structure or roof frame is placed on the brick pillars or brick walls. The construction method with bricks as the main body is similar to the rammed earth building, but the wall material is changed. However, the physical performance of bricks and rammed earth is different. Bricks are pre-manufactured, so the construction method is simple and the load-bearing capacity is good. The thickness of the wall is less than that of the rammed earth wall, which is conducive to obtaining a larger indoor space.
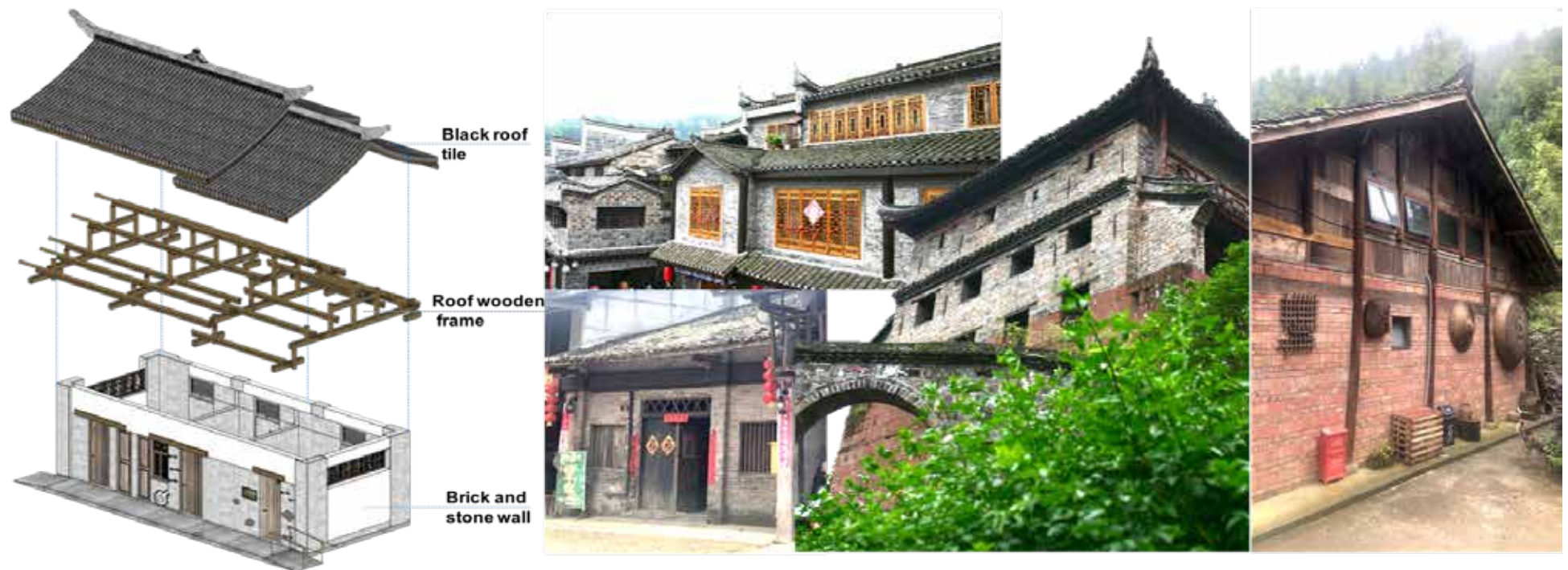
Fig 4.19: Brick and wood structure (source:photo and drawing by author)

2) Plane form

The plane form of vernacular architecture is composed of space size and space form. The space size of the building is mainly reflected in the bay, depth and column diameter.During the construction of vernacular architecture, the craftsmen first roughly arrange the houses and courtyard spaces to be built on the base according to their experience, and then design each building in detail. When designing a single building, according to the area of the base site, the number of column nets and the number of roof trusses are measured to determine the column net of the entire building, which is similar to our current design method. First determine the size of the bay and depth, it is conducive to woodworking blanking.

A. The bay of the building

The structural materials of vernacular buildings are mainly wood. Even the roofs of buildings supported by rammed earth walls and brick walls are mainly wood, so the building bays are limited by wood. The vernacular architecture is not as large in span as the modern buildings using modern building materials such as reinforced concrete and steel. The wood is restricted by its natural properties. Although the toughness is good, the bending resistance is very poor. Therefore, this determines the vernacular architecture in Chongqing. The column net bay can't be too big, but it can't be too small, otherwise it will waste a lot of building materials. In ancient architectural documents, there are only some principled regulations on the width of the house. For example, the "Construction Method" stipulates that the main room should not exceed 5.61 meters at most.

Although the structure of residential buildings is light and flexible, the width of the bays is usually determined according to the actual experience of craftsmen, but it is impossible to exceed the scale stipulated by the official buildings. In the vernacular architecture, the largest space is the main room in the center.

After comparing a large amount of surveying data, the author found that the size of the main room is about 4.5 meters for ordinary residential buildings, and about 5.5 meters for larger ancestral halls. As for the minimum size of the open space in the vernacular architecture, the author also compares it according to a large number of surveying data, and believes that it should be about 3 meters, because the length of the wood is generally more than 3 meters for the beam frame. If the open space is less than 3 meters, a lot of wood will be wasted, and the space below is not easy to use because the column net is too dense.

B. The depth of the building

The depth of the house is generally determined by the number of purlins. That is, multiply the horizontal distance between the purlins by the number of columns. The vernacular buildings in Chongqing are mostly pierced structures, which are divided into full-column landings and partitioned-column landings, such as several columns and several rides in the previous drawing. The depth of a full-column floor-to-ceiling building is equal to the column distance multiplied by the number

of column nets in the depth direction. Therefore, the key factors that determine the depth distance are the spacing and the number of column grids. The spacing of the columns in the depth direction is naturally also constrained by the natural properties of the wood. Although there is no fixed formula, there is a general range. According to the comparison of a large number of surveying data, the author believes that if the column spacing in the depth direction of traditional dwellings is full of columns, the column spacing should be about 1.3 meters. It should be about 0.9~1.3 meters.

3) Column diameter

The shape of the Chuangdou wooden frame of the vernacular architecture in Chongqing is quite light, the wooden column is relatively slender, and the diameter of the column is small, which is in sharp contrast with the official architecture. Under normal circumstances, the floor column is relatively thick, and the diameter of the non-floor column should not be larger than the diameter of the floor column. After a lot of surveying data, it is shown that the diameter of the thicker floor-standing columns of the Chuangdou wooden frame in the Sichuan-Chongqing area is generally about 20-25 cm, and the diameter of the ride columns is generally about 20 cm. The pillars are slender, with a slenderness ratio of more than 1:30, which is quite different from the 1:11 slenderness ratio of official buildings.
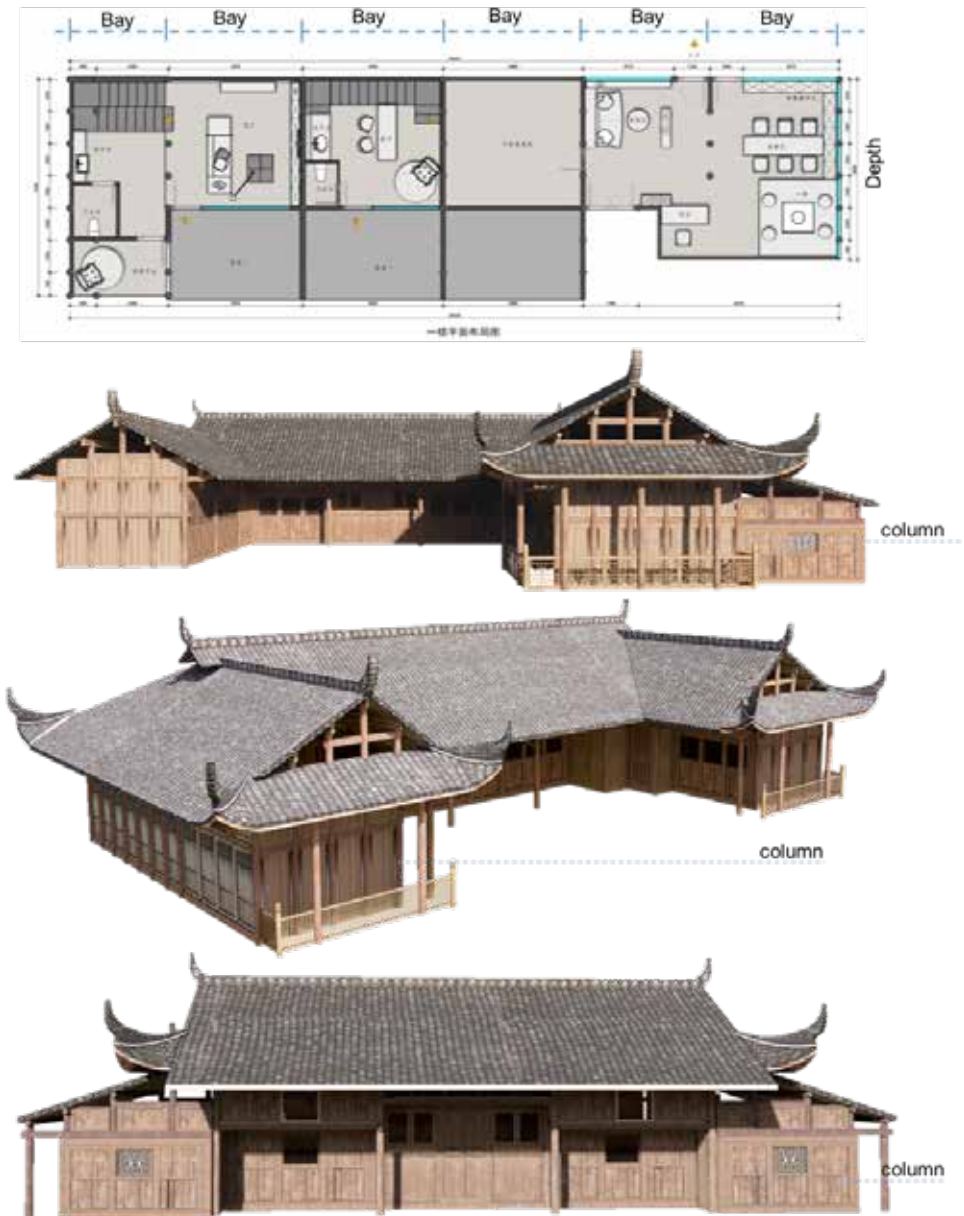

Fig 4.20: Building bays, depths, columns (source: drawing by author)

2) Plane form

A. I-shaped plan

The I-shaped plan is the basic type. This simple rectangular form is used as the core element of the other plans. The main hall serves as the ceremonial or utility room of the house and sits in the middle.
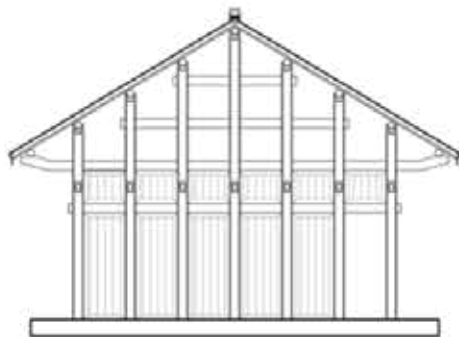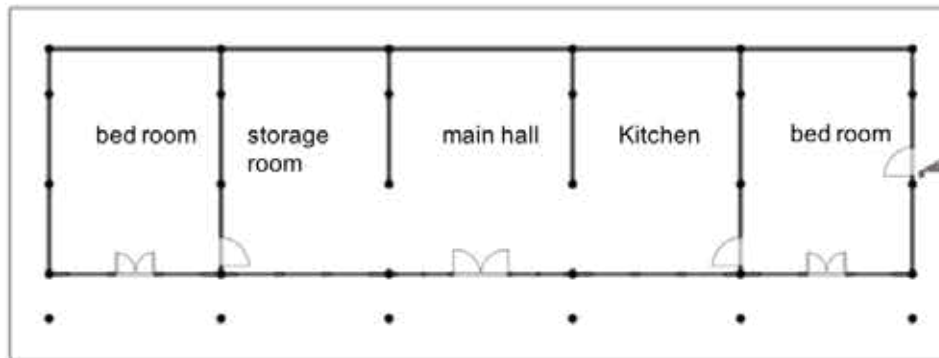

Fig 4.21: I-shaped plan (source: drawing by author)

2) Plane form

B. L-shaped plan

An L-shaped plan is formed by adding a perpendicular wing to the I-shaped plan. It is often adapted to accommodate new extended family members related by birth or marriage. The main body is generally used by the older generation, while the wing part is mainly used by the youngest. The room arrangements of the main body are similarly to those of the I-shaped plan.
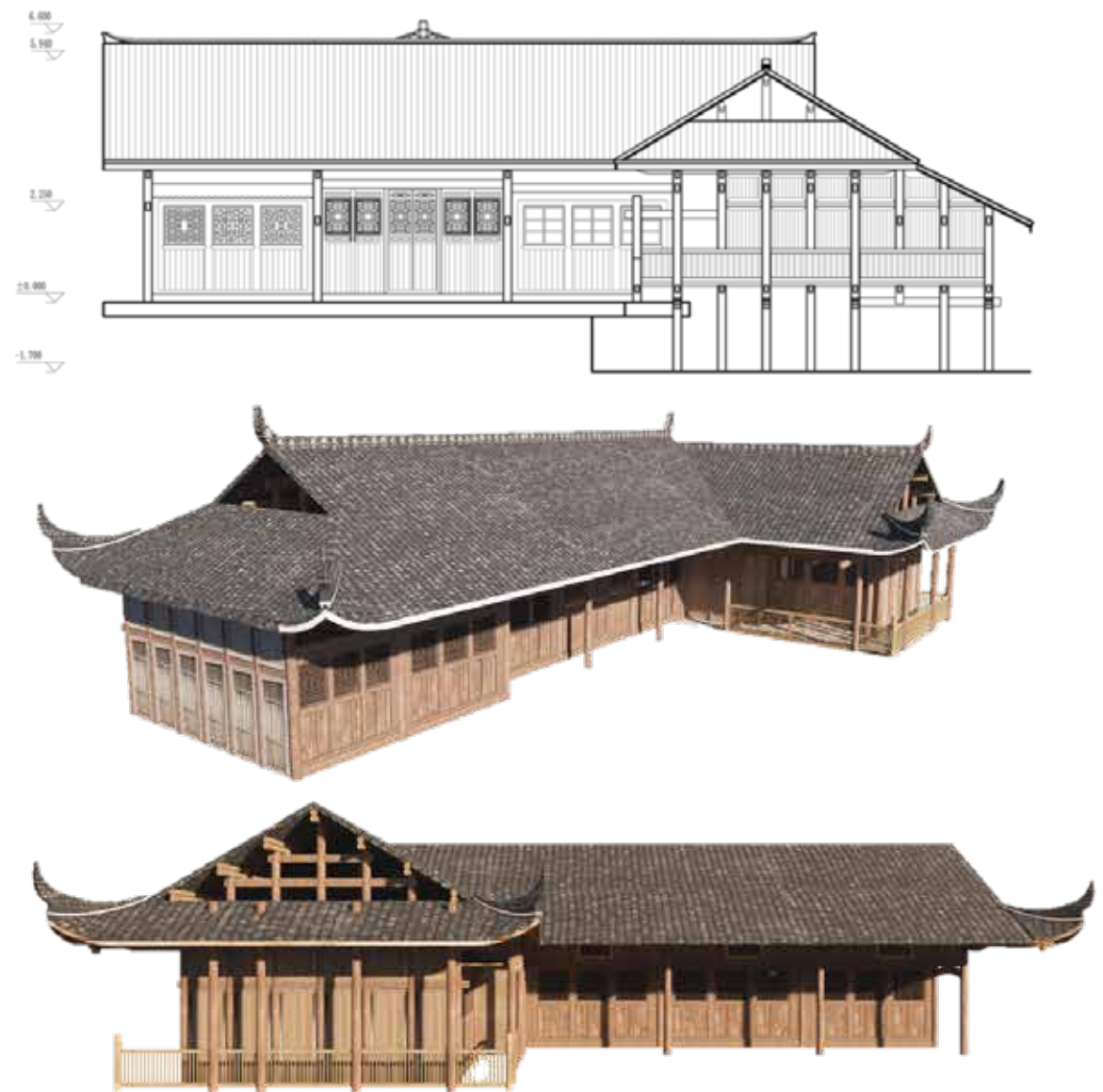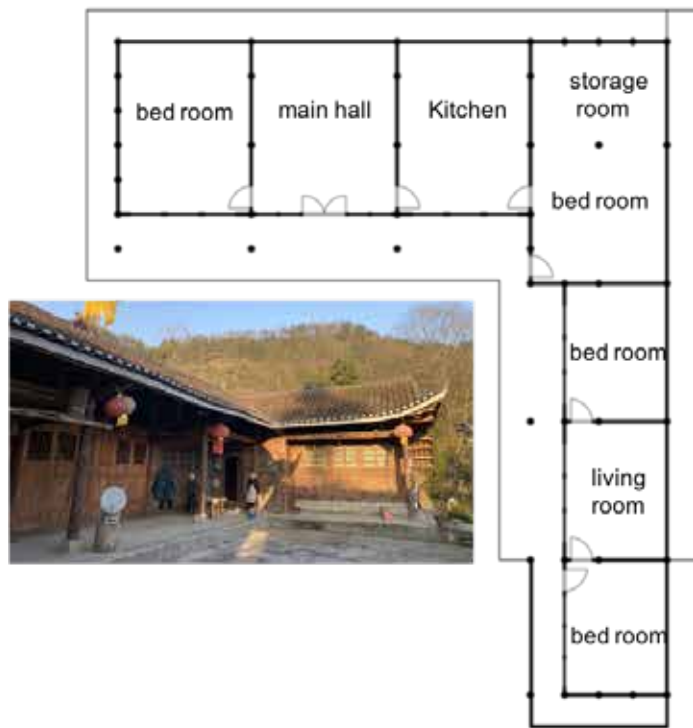

Fig 4.22: L-shaped plan (source: drawing by author)

2) Plane form

C. U-shaped plan

The U-shaped plan is developed from the L-shaped plan, with an additional wing at the other side of the main building to semi-enclose a courtyard. The wings are not necessarily symmetrical. This type of plan is mostly used to accommodate extended families with a couple and two married sons, where the elder brother takes the left wing and the younger takes the right.
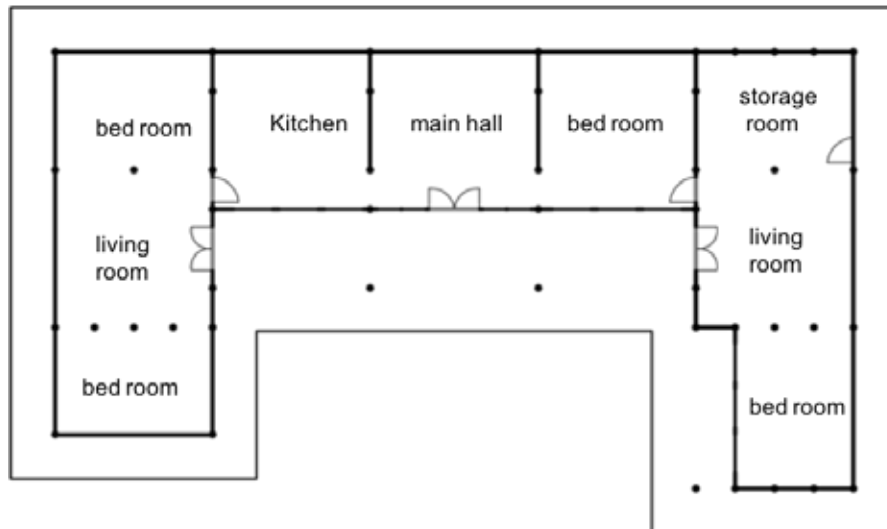

Fig 4.23: U-shaped plan (source: drawing by author)

2) Plane form

D. Courtyard plan

The courtyard plan has enclosed the courtyard with the addition of another wing connecting the two wings of the L-shaped plan. It is a type only the upper class and rich people can afford and use to show their social status. There are not many existing buildings of this type, since most of these houses were destroyed in wars and revolutions.
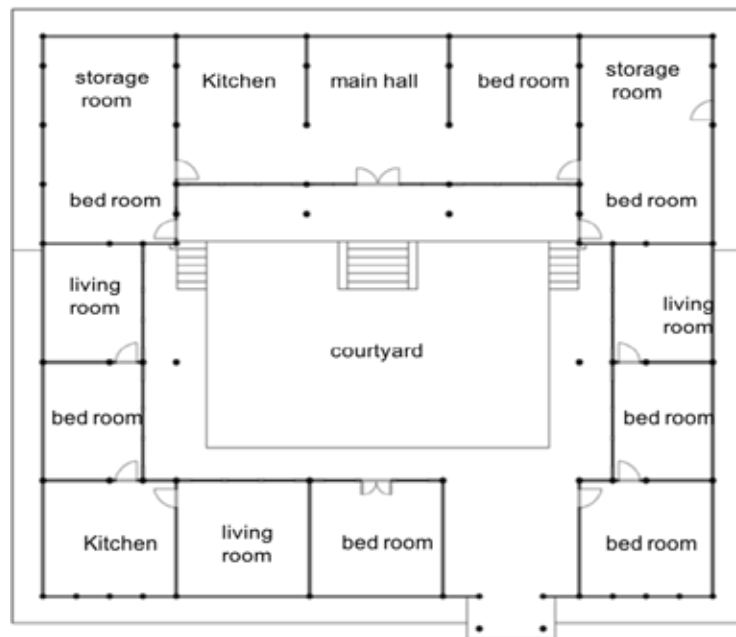

Fig 4.24: Courtyard plan (source: drawing by author)

3) Main components

A. Roof

Roof forms in Chongqing are also extremely rich. Roof forms change with the ups and downs of the terrain. The combination between roofs is close and the changes are rich. The roof of a town is a closely connected organism, inseparable, just like a picture, without any loose elements. In terms of single roof of vernacular architecture in Chongqing, there are few changes, most of which are dominated by two sloping roofs. Ethnic minorities in the southeast may have hilltops, or add eaves, side ridges and other diversified forms. The variation of the roof mainly comes from the flexibility of the roof combination, and the roof adapts to the wavy undulation and meandering forward of the terrain, which has a rhythmic beauty.

Fig 4.25: Rhythmic beauty of the roof (source: photo by author)

Double-slope roof is divided into gabled roof and saddle roof. In Chongqing area, gabbled roof is mainly used, while saddle roof is rare. The reason is that there is more rain in Chongqing area, and gabled roof is helpful to protect the side gable from rain erosion. gabled roof is the most common form in China's general architecture. It occupies an absolute majority of the roof forms of vernacular architecture. It is characterized by the two ends of eaves hanging out of the gable. Gabled roof generally has positive ridge and vertical ridge, the simpler ridge only. The double-pitched roof has a large eave in the front of the building, forming a corridor in front of the house, with a width of 3 meters. The small eave from the sealing eave board to the wall body of the building also has more than 1 meter. The eaves in the direction of the gable change greatly in Chongqing areas. The eaves of some residential houses with wooden paneled walls are larger than 1.5 meters, so the eaves must be picked out in sufficient length cover the gable to avoid the erosion of the wooden paneled walls by rain.

Fig 4.26: Gable roof avoid the erosion of the wall (source: drawing by author)

3) Main components

A. Roof

Adapting to climate conditions

Chongqing area is hot in summer and warm in winter, so it is required that buildings can be fully effective cooling and ventilation. Roofing usually places the tilts directly between the rafters and covers the gap between the two tilts. This practice is called "cold distribution tile" in Chongqing area. The underside of the roof is directly exposed to the structure, and a large area of tiles can be seen in the interior, without any decoration on the back of the tiles. This approach has a very scientific basis in architectural physics. Above the rafter without sheathing, the junction between tile and tile has many pores, and the stomata number very much, the distribution is uniform, so they will indoor discharge of the large amount of heat from the air hole, an airflow convective circulation, for each area building ventilation, dehumidification, avoid heat is very good.

Slope of roof

For the slope of the roof, local craftsmen in the South call it a few fraction of water. If it's 3 fraction of water, it means lifting 3 feet every 10 feet from the horizontal purlin to the ridge purlin, 4 fraction of water meaning is 4 feet, and so on. And the slope of each region is also different, with 4 fraction of water (about 22 degrees) and 5 fraction of water (about 27 degrees) in the majority.
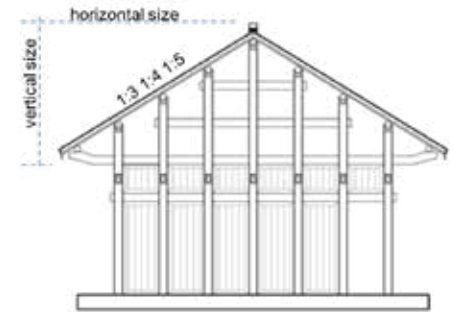

Fig 4.27: Internal structure and slope of roof (source: photo and drawing by author)

Tile

Tile according to the surface material, can be divided into glazed tile and plain tile also known as bois; Chongqing regional vernacular architecture all adopt Bois. Bois in accordance with its form is divided into cylindrical tile and flat tile, general important buildings, such as: manors mansion, temples and agency official with cylindrical tile; Ordinary residential houses are paved with flat tiles. The size of tile varies greatly from region to region and it is difficult to give an accurate size. The reason may be that there has never been a standard for making tiles.

Fig 4.28: Different shapes of tiles (source: photo by author)

Rafter

Rafters are components placed vertically on purlins that bear the roof load directly. The cross section of rafter has rectangle, circle, purse shape and so on. The official buildings in the north are mostly round and square, and the size of the section is large. The rafter that chongqing area agrestic builds is flat rectangle more, width is controlled in 10 centimeters commonly, and thickness is controlled in 3 centimeters commonly.

The rafter distance is about 1:1 in the smaller official buildings, and about 1:1.5 in the folk. That is, the rafters are 10 centimeters in width and the rafters are 250 centimeters apart.

Purline

Purlin is located on the top of the column vertical support rafters, according to the position can be divided into ridge purlin, golden purlin, purlin and so on. Small building purlin diameter is 1~0.9 eave column diameter. The practice of vernacular architecture in Chongqing is very different, and there are many accidental factors, so it is difficult to find a rule completely suitable for each dwelling house. After the statistics of typical buildings in several towns, the author thinks that the purlin size in Sichuan and Chongqing area is roughly in such a range, the ridge purlin is 0.8~0.9 times the diameter of eaves column; Cornice purlin and golden purlin are 0.6~0.7 times of cornice column diameter; Pick eave purlin for 0.5~0.6 times the eave column diameter.

Fig 4.29: The rafter and purline of Vernarcular roof (source: photo by author)

The roof ridge

The method of vernacular building roof ridge in Chongqing area is relatively simple, not as complex as the northern official architecture. Ordinary dwellings are made entirely of tiles to stack the roof ridges, and tiles can be used to form some medium flower patterns. Pay attention to a bit of practice, such as the landlord manor, is to use gray model roof ridge, and in the above sculpture has a large number of ridge ornaments, become the whole roof decoration of the most gorgeous place.

Ordinary folk houses generally use small green tiles to stack the ridge decoration directly. This approach is relatively simple. Generally, the ridge decoration will stack a middle flower in the center of the building, and then some buildings will become warps at both ends.

Fig 4.30: The roof ridge of Vernarcular roof (source: photo by author)

3) Main components

B. Wall

Wood-paneled wall

The southern climate is mild, winter is not cold, and rich in wood, so the wall of residential buildings in the south uses more wood. The method of wood-paneled wall is also relatively simple. Usually, the wood is first processed into boards about 12cm wide and 3cm thick. In the construction, wooden frame was built on the wood columns and Chuang fang, and the prepared wood boards is inlaid into wooden frame. some owners scrape a layer of earthen paint (generally Tung oil) on the surface of the wood, but in many cases directly expose the wood to the outside. Wood practice is relatively simple, the construction speed is also faster, and the texture of wood grain can be fully exposed, beautiful and generous. But wood is very easy to suffer from rain erosion, easy to be moth eaten, therefore, the use of wood as the wall of the building roof eaves and mountain surface of the general requirements are relatively large.

Fig 4.31: Wood-paneled wall of Vernarcular Architecture in Chongqing(source: photo by author)

Rammed earth wall

Rammed earth wall is a common wall form in Chongqing residential houses. First of all, the material of rammed earth wall should be loess with good viscosity and much sand. This kind of soil has little drying shrinkage and can reduce cracks. At the same time, the water content of the soil should be controlled moderate, not wet, so easy to tamp. The material is usually clay and quicklime, plus rice husk or straw to be pounded. Bamboo bars are arranged in the wall in advance, and then white plaster is applied on the wall after it is solidified. The thickness of the earth wall in this area is generally between 370~400 mm, and the wall base part of the earth wall is generally used bluestone, on which the earth wall can avoid being eroded by moisture. Earth wall heat insulation, sound insulation performance is good, and there is a certain bearing capacity, and the material is convenient, the construction is relatively simple, so the scope of adaptation is very wide, the deficiency lies in its water resistance to erosion.

Brick masonry wall

The climate in Chongqing is warm and moist, far less cold than in the north, so the use of brick walls is not so much. In Chongqing area, brick walls are mainly used in gable parts, screen walls and the places with strong defensive requirements in the landlord's manor. However, from the late Qing Dynasty to modern times, brick walls were widely used in residential houses. Because of the increasing demand for wood, people had to find other ways.
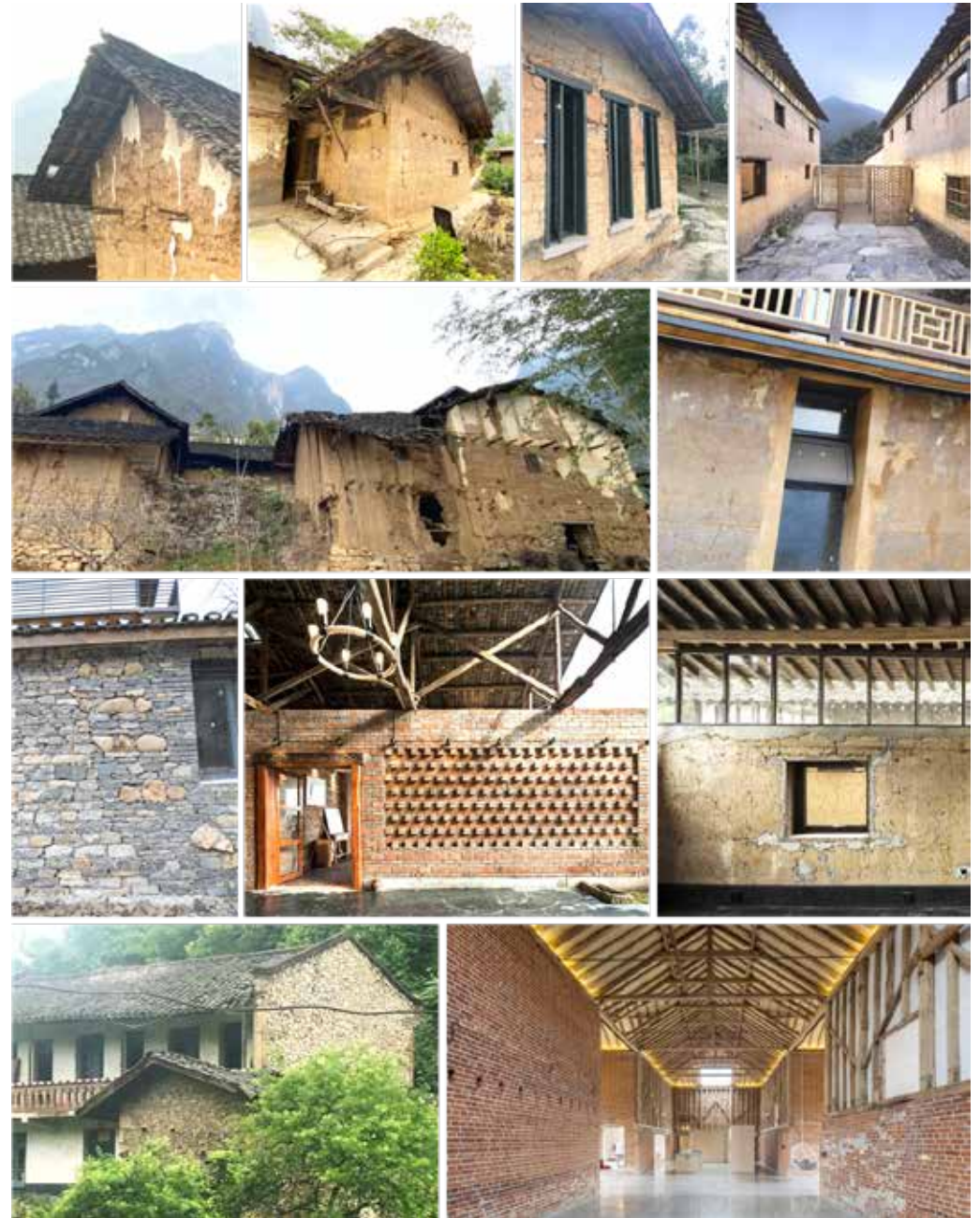

Fig 4.32: Rammed earth wall and brick masonry wall (source: photo by author)

C. Basis

Chongqing vernacular architecture adopts the column net frame system, and the foundation can be roughly divided into two forms, one is trough foundation, the other is face foundation. Trough foundation is under the column net, which is filled with gray soil, code sangpier and concrete, through the channels dug according to the column network of the building in the vertical and horizontal directions. Surface foundation is to pave the whole base of the building as the foundation, with gray soil below and stone above. The integrity of the foundation is strong, and it is moisture-proof, but the cost is also very high.

Plinth are set under the wooden columns of the building to extend the life of the wooden columns. However, some rural buildings in poor areas do not use plinth, which is usually determined by the villagers' economic conditions. Wealthy villagers would carve patterns on the plinth to express their wishes for a better life.

*Fig 4.33: The basis of Vernarcular Architecture in Chongqing(source: photo by author)*

4.3.4 Construction Technique and Tools of Chongqing Vernacular Architecture

The traditional construction process involves folk craftsmen using tools or techniques to build houses in ways that have been passed down from generation to generation. The process includes material collection, fabrication, installation and refurbishment. The traditional building process includes different levels of information such as building process, building tools, building materials, building craftsmen and building customs. Combined with the focus of this study, this paper briefly introduces the construction process by drawing, and other information will not be described in this paper.

Fig 4.34: Traditional low-tech construction of vernacular architecture(source: photo from a project of Hao dapeng)
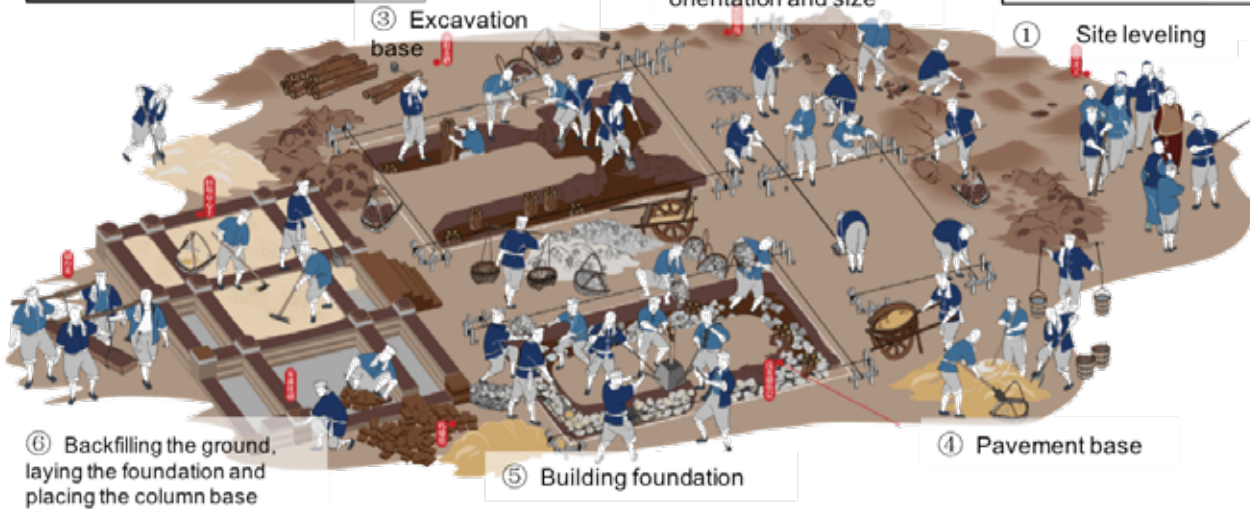
01 Site selection
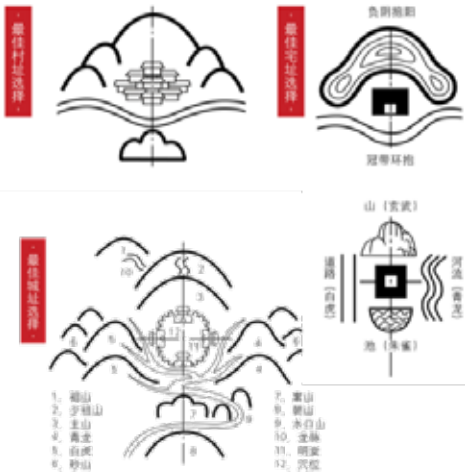
02 Big carpenter drawing

04 Production framework

Preparation of wood
Processing all types of wood construction
Install large wood architecture
Installing components such as purlins

03 Excavation and foundation

② Determine orientation and size

③ Excavation base

05 Timber or Masonry wall

① Site leveling

⑥ Backfilling the ground, laying the foundation and placing the column base
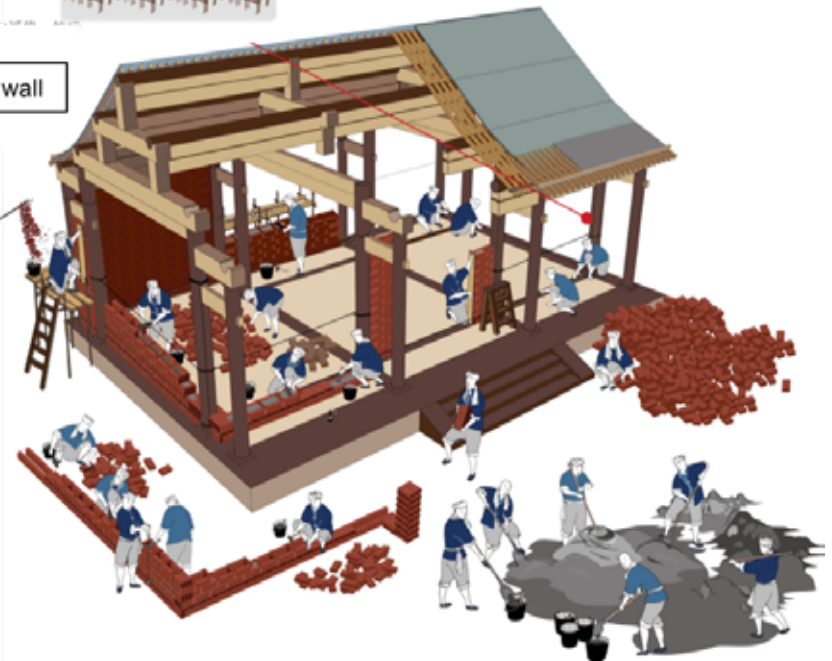
⑤ Building foundation

④ Pavement base

Fig 4.35: Step-by-step diagram of the construction process of vernacular architecture(source: drawing by author and author's team work)
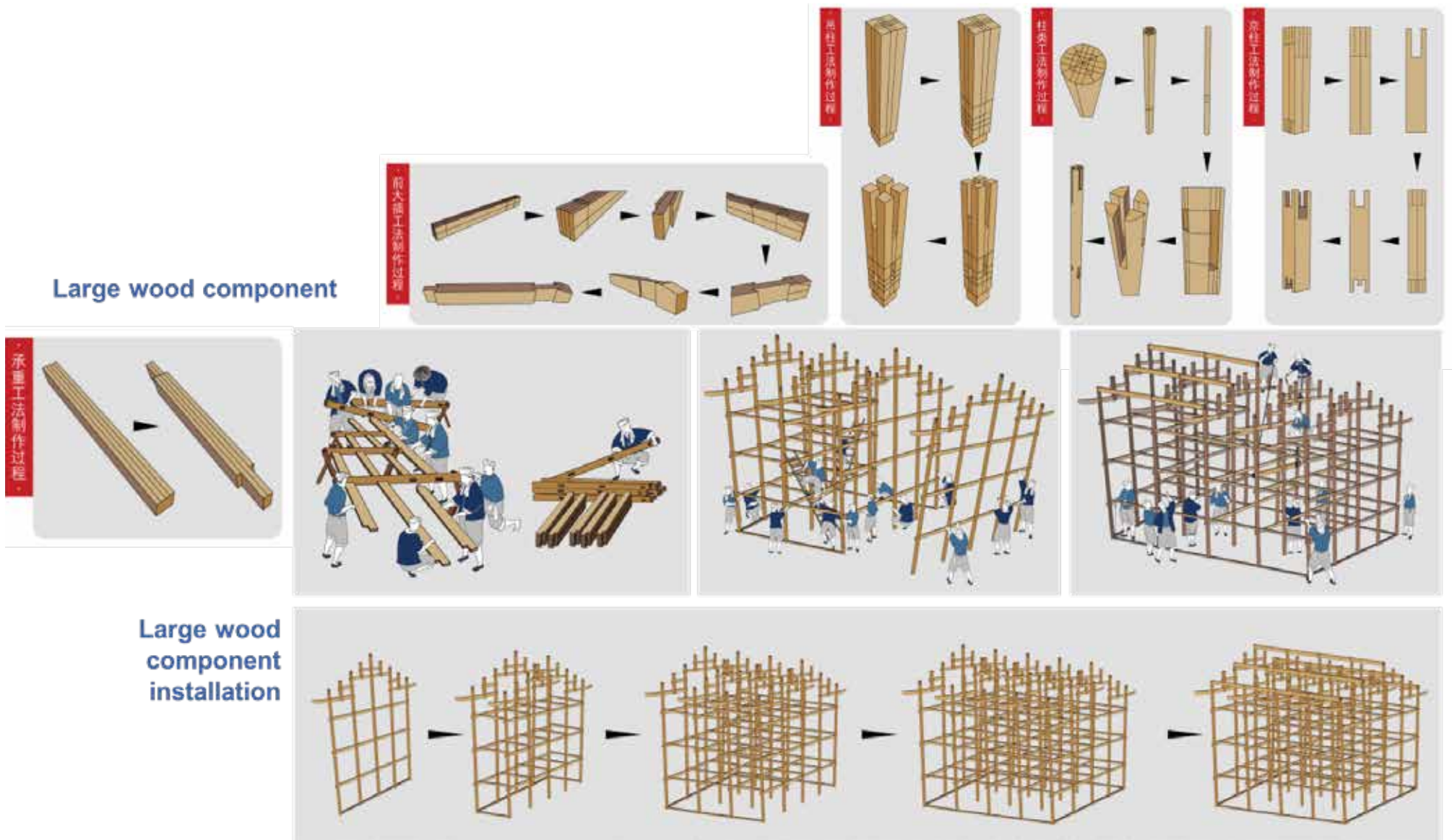
Large wood component

Large wood component installation

Fig 4.36: Step-by-step diagram of the construction process of vernacular architecture(source: drawing by author and author's team work)

06 Installing roof tiles

07 Paving floor

Installation stairs
Installation floor
Install the hanging door cover
Installation railing
Install door and window

08 Decoration

09 Oil painting

10 Moving and living

The steps above are the most complete construction process for a traditional house. In the construction process of Chongqing's vernacular buildings, some of the steps will be omitted due to economic constraints.
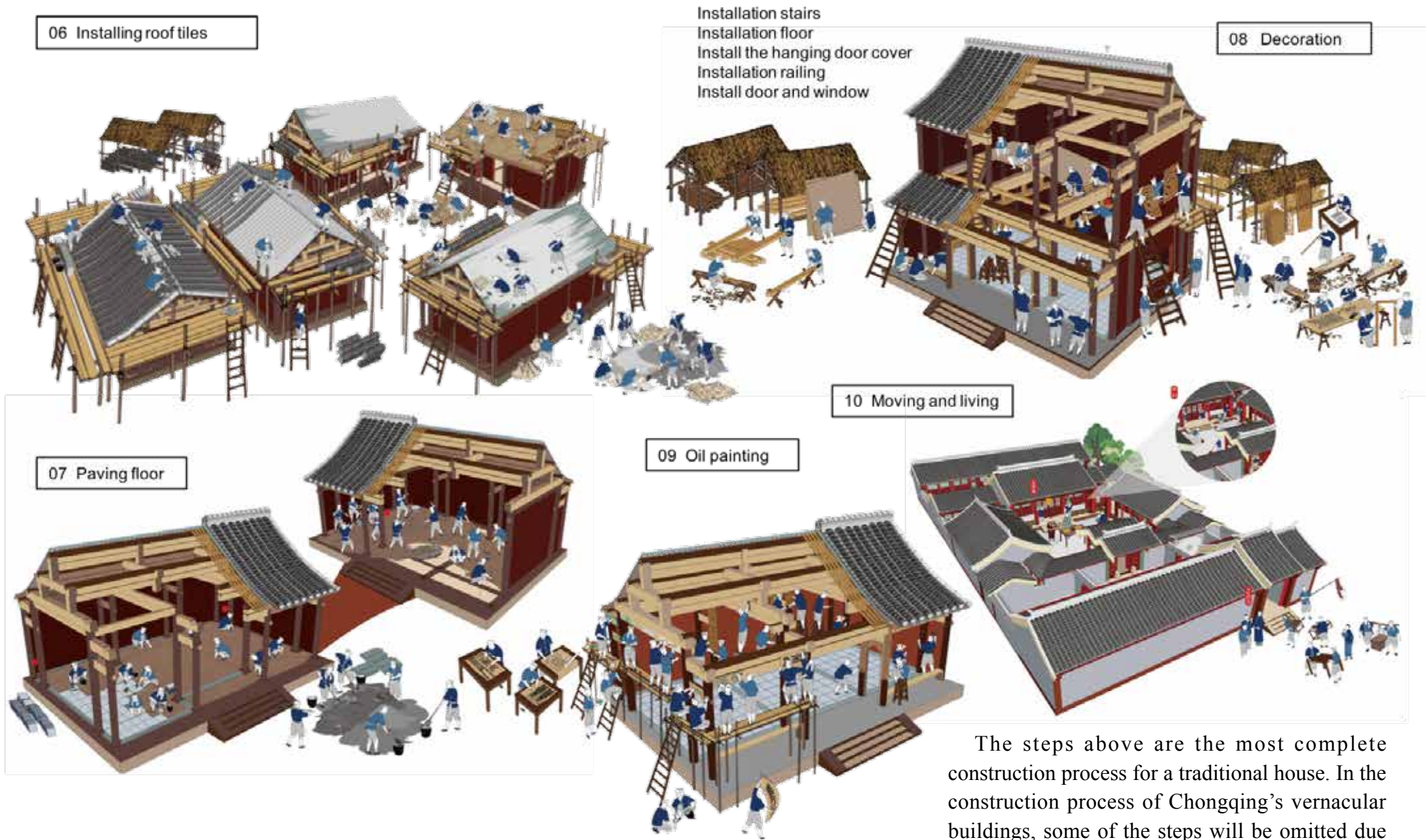
Fig 4.37: Step-by-step diagram of the construction process of vernacular architecture(source: drawing by author and author's team work)

4.3.5 Disadvantage of Chongqing Vernacular Architecture

As described above, vernacular architecture has multiple values, such as heritage, ecology, aesthetics, culture and economy. It plays an important role in rural revitalization due to its strong regional characteristics and the advantage that it can bring a strong sense of belonging to experience. However, with the decline of the current rural environment, it is an indisputable fact that most villagers do not use traditional buildings when building new houses. Facing up to the negative factors that vernacular architecture does not adapt to the life of the new era, using scientific methods to analyze and study, to clarify the representation and cause of the problem, we can make full use of the advantages and avoid the disadvantages in the protection and renewal of vernacular architecture.

1) Disadvantages of building materials

All the materials used in wood structure often and the main material of the roof structure in the building structure with rammed earth and brick all depend on wood, and it is the log without modern processing. Due to the characteristics of wood itself and the demand for use, as analyzed in the previous chapter, the size and scale of architectural space are limited, which is also the reason why there are few tall buildings in vernacular architecture. The architectural space built with traditional ways and materials cannot meet the modern people's needs for spacious space, so modern ways and materials need to be introduced in the renewal to expand the space.

As the main building material, wood is good in earthquake resistance, but it is also an important drawback in the resistance to other natural disasters. Fire is destructive to wood buildings, wood is not resistant to water, prone to termites, and high management and maintenance costs. Rammed earth does not blister and is not suitable for mass construction. There are fewer suitable clay resources.

The gray tile on the roof is not fixed, and after a long time, it will be damaged and displaced, resulting in leakage and other conditions, so it needs frequent maintenance.

Fig 4.38: Disadvantages of building materials (source: photo by author)

2) Disadvantages of the interior space of the building

Vernacular architecture is built in accordance with the lifestyle of the old era, and the interior space of the building is not suitable for the current life. In the old buildings in Chongqing, there is no toilet. The kitchen is usually located at the end of the house, and the restaurant is in the middle

of the house, separated by several rooms. Such spatial separation brings inconvenience to life. What's more, due to the increase of population, the original kitchen space was transformed into other areas, and temporary space was built in other areas of the courtyard as the kitchen, resulting in more inconvenience in rainy days. The space interior moving line is more unreasonable. Especially the wood structure of the house, the living space formed by the attic, the storey height is very low.

Some buildings scattered in the countryside, people's living space didn't separate from the space for livestock, resulting in a smelly environment and air pollution.

Fig 4.39: Disadvantages of the interior space of the building (source: photo by author)

3) Disadvantages of building physical performance

In Chongqing area, the wooden structure houses are very conducive to air circulation, but their wooden enclosure system is poor in heat preservation and heat insulation due to the lack of thermal insulation layer of single-layer boards. Wide eaves, although can effectively reduce the temperature of the building in summer, but room temperature in winter is low, usually need to set up the brazier warmth, the brazier increases the risk of fire. when person leave the brazier 1 meters, the temperature difference is big, so it constrained the desire of the people's activities in the space.it is also why people always around the brazier and less activity in winter.

The maintenance surface of rammed earth material is warm in winter and cool in summer due to its wall thickness and characteristics, but the small wooden Windows installed to strengthen the maintenance surface cause less natural light inside. There is no effective partition of the kitchen space because of the use of a lot of wood as fuel, the wood burning process produces a lot of black smoke which makes the interior space darker.

4) Disadvantages of the construction

The loss of traditional craft and master in vernacular architecture construction is serious, and there is little research and technology on the integration of traditional technology and modern processing, which makes the cost of building traditional buildings much higher than cheap industrial building materials. This is also an important reason why

traditional buildings were not chosen. Traditional building materials are mostly non-standard parts produced by handwork or small workshops, and it is this non-standard parts with strong hand-made characteristics rich in rough and plain material beauty. However, this building material means higher price and less output in the new era.

Local buildings are mostly processed with local materials on site. With the increase of labor costs and the prosperity of industrial building materials, the simplicity and environmental protection of local construction methods are also forgotten in the pursuit of cheap mass production.
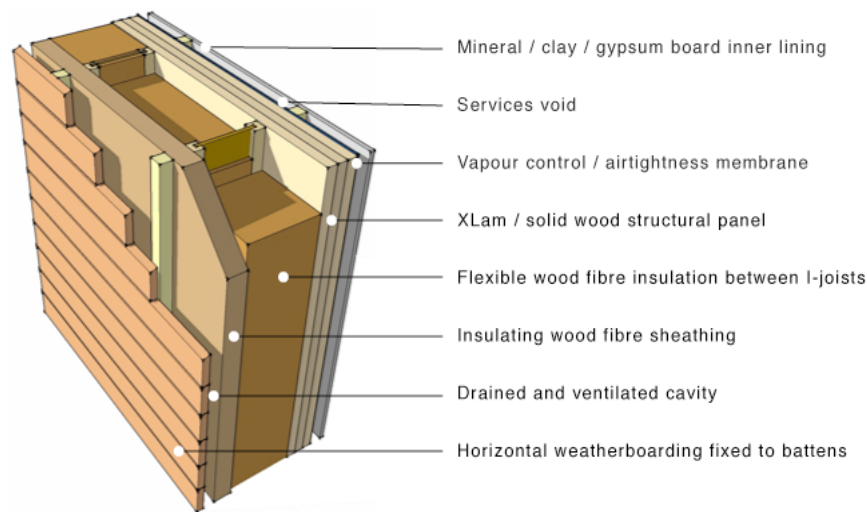

Fig 4.40: Possible wood panel wall renovation strategies (source: https://www.greenspec.co.uk/ building-design/woodfibre-xlam-wall/)

4.4 summary

This chapter introduces regional characteristics of Chongqing from the general situation, geographical characteristics, climate, vegetation, soil, culture and other aspects of Chongqing, and analyzes the types and characteristics of rural landscape and vernacular architecture in Chongqing based on regional conditions. As a unique landscape city, Chongqing has different landscape and architecture from plain areas. In this chapter, hilly area of Western Chongqing, Valley area of Central Chongqing and middle mountain area of Southern respectively Mountainous areas of Northeast Chongqing, middle mountain and low mountainous area in Southeastern China The landscape distribution characteristics of four geomorphic regions in Chongqing are discussed, and the relationship between vernacular architecture and other landscape elements in each region is emphasized. Clarifying landscape features is the basic work of respecting resources and protecting features. For vernacular architecture, this chapter also uses a large number of survey photos and drawings to describe its regional characteristics in detail from the aspects of ecological suitability, aesthetic characteristics, classification, construction process, and disadvantages, especially the disadvantages that are missing in other similar studies. Comprehensive and systematic in-depth analysis will lay a solid foundation for later protection and renewal work. The classification and protection of vernacular architecture must be based on a detailed, scientific and comprehensive understanding, integrating modern design concept and material technology to highlight the advantages and make up for the disadvantages.

5. Conservation and renewal of rural landscapes and vernacular Architecture in Chongqing

5.1 Protection and renewal design of vernacular architecture

-- A case study of Xiazhuang Village in Wushan, Chongqing

5.1.1 Introduction

Vernacular architecture, as a typical material carrier of regional culture, is an eternal art form of human wisdom, necessity and collective creativity.As an integral part of rural landscape, vernacular architecture plays an important role in rural sustainable development and rural revitalization.With the completion of the road, Xiazhuang village welcomes a good opportunity for construction and development. Under the background of rural revitalization, the village pattern and the vernacular architecture with regional characteristics have become the dominant resources for the revitalization and development of Xiazhuang Village, which are worthy of protection and renewal. The humanism of regionalism and localism is a utopia built for the future countryside.

1). Project overview

Xiazhuang Village located in Zhuxian Township, Wushan County, Chongqing.Wushan County located in the east of Chongqing, in the heart of the Sanxia Reservoir area, known as the "gateway to northeast Chongqing". The terrain of the county is controlled by the Ba and Wushan Mountain range. the area of mountain steep slope, mountain area accounted for more than 96% of the county area, of which the

higher mountain accounted for about 60%, low mountain about 36%, flat dam about 4%. Zhuxian Township located in the northeast of Wushan County.Xiazhuang Village located at the bottom of a huge sinkhole, surrounded by high mountains. The lowest point of the sinkhole is only 200 meters above sea level, while the highest point of the sinkhole is 1,350 meters above sea level. It's nearly vertical, 1,100 meters from the edge of the pit to the bottom. Due to its unique geographical location, Xiazhuang village is extremely remote and inaccessible, and the villagers almost live in isolation. Before 1997, the only way out of the village was by climbing a trail on the cliff. Half of the 396 villagers have never been out of the village. There are no roads that can be opened to traffic. Agricultural products in the village and materials from outside cannot be exchanged. The villagers live in poverty. In order to escape isolation and poverty, villagers began to dig roads on the cliffs. In 2004, villagers in Xiazhuang village finally carved an eight-kilometer "sky road" through the cliff, but it cost six villager's lives. The "Heaven Road" has completely changed the village isolated and poor, brought development opportunities to Xiazhuang.

Fig 5.1: Location analysis of Xiazhuang village (source: edit by author)

2). Design tasks

   The completion of the road promoted Xiazhuang village to get rid of poverty. The spirit of Xiazhuang people building roads under the difficult conditions of lack of materials and money is well known throughout the country. President Xi Jinping highly praised Xiazhuang villages for their "Xiazhuang spirit"[4]. In this context, Various social capitals and forces have poured into the village to help it develop and build. How to build Xiazhuang Village and help its sustainable development has become the research object of the design team.

There are no roads leading to the outside world, and villagers can only enter or leave the village via a mountain path, which can take a day to cover eight kilometers. There are people in the village who never go out.

1997 MAO Xianglin, the party secretary of the village, led the villagers, with great determination, after suffering, hard work, spend 7 years, along the cliff to build an 8 km "sky road". Since then, Xiazhuang village has opened the door to the outside world, changing the isolation of Xiazhuang. **Six villagers gave their lives to build the road**

2004 The villagers' spirit of self-improvement attracted the attention of the society, and some departments invested funds to support the road construction, and Xiazhuang entered a new era of development.

2015 In 2015, the whole village was lifted out of poverty, and the "cliff Heaven Road" became a road to prosperity for the villagers

Fig 5.2: The History of Xiazhuang Village Road - From Zero to One (source: edit by author)

5.1.2. Design methodology

1). Site analysis

After receiving the design task, the design team launched a series of research activities. In the field investigation, Xiazhuang village's industrial characteristics, spatial pattern, the relationship between mountains and fields and residential areas, road distribution, the relationship between rivers and villages, the aesthetics of spatial form, and the basic situation of buildings have all become important objects of investigation. The design team summarized the current situation of Xiazhuang Village through consulting materials and field investigation as follows:

Literature review

Field research
- Direct observation
- Participatory observation
- Surveying and mapping
- Questionnaire survey
- Communicate with local residents

- Architectural features
- Construction techniques
- Village landscape
- Geographical climate
- Economic resource
- Cultural resource
- Customs and habits
- Intangible culture

Analysis
- Qualitative analysis
- Quantitative analysis
- Descriptive analysis
- Contrastive analysis

- Building modeling
- Analysis drawing
- List of building maps
- Classification
- Cultural resource
- Customs and habits
- Intangible culture

Design strategies & Conclusion

protecting and repairing the village building and renovating the living environment

Fig 5.3: Design methodology for this Project (source: edit by author)

A. Wushan County, where Xiazhuang Village located, has been positioned by the National Tourism Administration as the establishment area of the whole region tourism demonstration area due to its rich natural ecological resources, especially the world-famous Three Gorges and small mountain Gorge. Xiazhuang Village is fortunate to be one of the key tourist destinations in Wushan County, and Xiazhuang spirit of self-improvement experience as its tourism theme.

B. Xiazhuang Village is surrounded by steep cliffs, close to mountains in the northeast, and only a gentle slope in the southwest, so the whole village sits in the northeast and faces the southwest. Use the natural terrain, rely on the mountain next to the water, with the layout of the house terrain. It reflects Xiazhuang people's pursuit of nature and pays special attention to the maintenance of ecological environment, so that architecture and nature are integrated.

Relatively independent and closed geographical units have largely preserved the natural ecological pattern, traditional settlement forms, and production and lifestyles, bringing opportunities for tourism development.

Fig 5.4: Xiazhuang village surrounded by high mountains (source: edit by author)

C. There are abundant water systems in Xiazhuang Village, including Houxi River and Fish River, which surround the southwest sides of Xiazhuang Village

D. Xiazhuang Village has a concentrated piece of gentle slope area for planting crops. The villagers make full use of the open space in front and back of the house and the gentle slope of the village to plant walnut,crisp
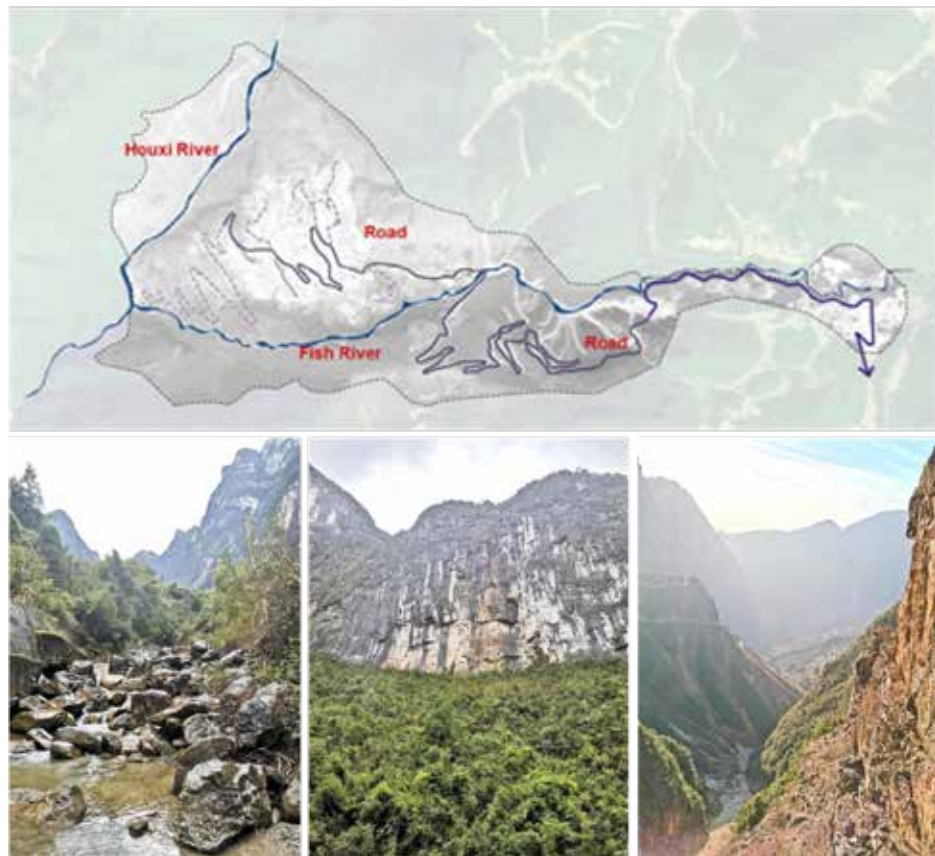
plum and orange. The mature fruits are sold to other places, bringing economic income to the villagers. But because of the limited amount of land available for farming in the village, farming cannot be vigorously developed.

Fig 5.5: Water resources in Xiazhuang Village (source: edit by author)
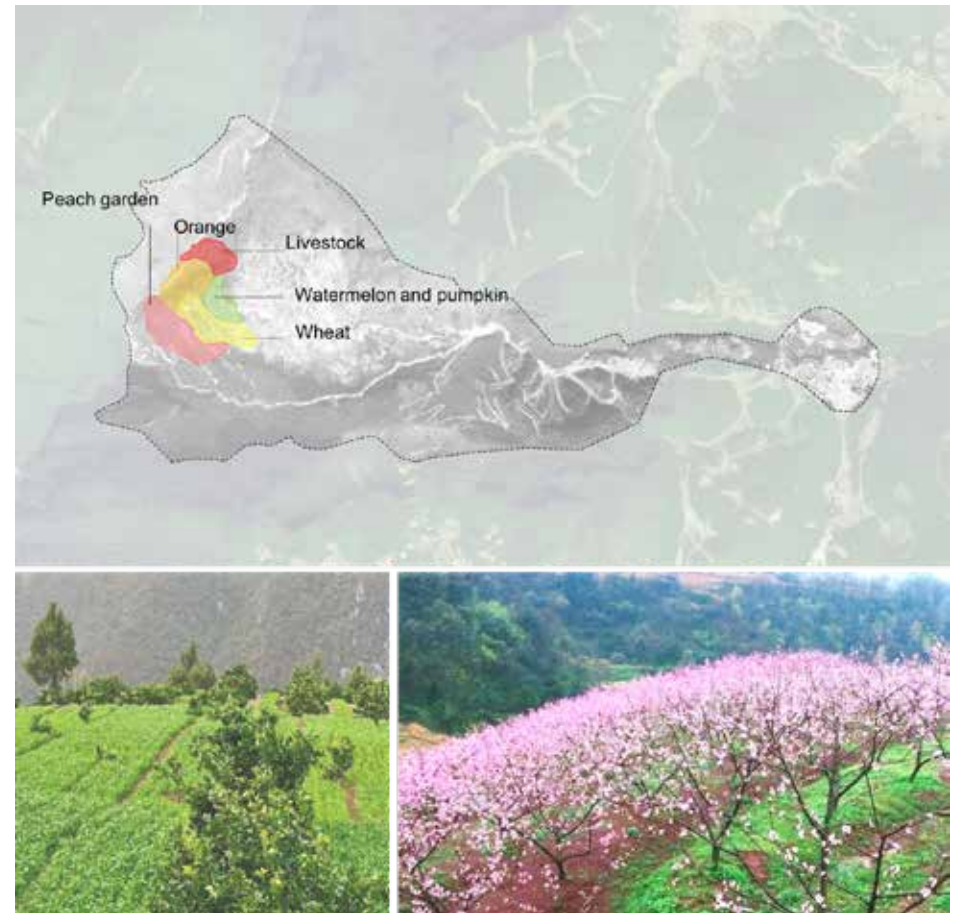
Fig 5.6: Analysis of crop composition in Xiazhuang Village (source: edit by author)

E. The residential buildings of the village are scattered on the slope, connected by winding roads. The traditional buildings are constructed with local materials and have strong ecological suitability. Rammed earth walls keep the interior warm in winter and cool in summer, while the wide eaves and pitched roof facilitate both drainage and air circulation. There are a large number of rammed earth houses built in the 1960s in the village, and many villagers still live in them, keeping the traditional primitive way of production and life, and living a peaceful life. The house is surrounded by bamboo and trees, and the sound of birds is everywhere.

Fig 5.7: Beautiful living environment in Xiazhuang Village (source: photo by author)

2) Problem Statement

Xiazhuang Village has unique natural landscape resources, unique canyons and cliffs, original ecological environment and rich vegetation. These natural ecological resources and environment can effectively support the development of local rural tourism; however, the living environment are in urgent need of change.

A. There is a total of 102 residential buildings in Xiazhuang Village, scattered in the gentle slope, among which 58 are traditional rammed earth buildings (civil structures), 4 are traditional brick and wood structures, and 40 are newly built brick and concrete structures. The whole village is a mess of buildings, with the lack of features on the facades, large areas of grey cement walls and rough and crude brick walls ruining the countryside.

B. The traditional rammed earth architecture with regional characteristics makes the countryside unique and is an important carrier for tourists to recall the traditional rural life. Some of the old buildings were so damaged that they were not usable. Although some old buildings continue to be used by people, the interior of the building is simple and lacking in functions, which cannot meet the modern life, let alone meet the tourism.

C. The courtyards in front of and behind the house were occupied by all kinds of items at random, making the environment not only lack of aesthetic sense of rural living but also a representative of dirty and messy environment.
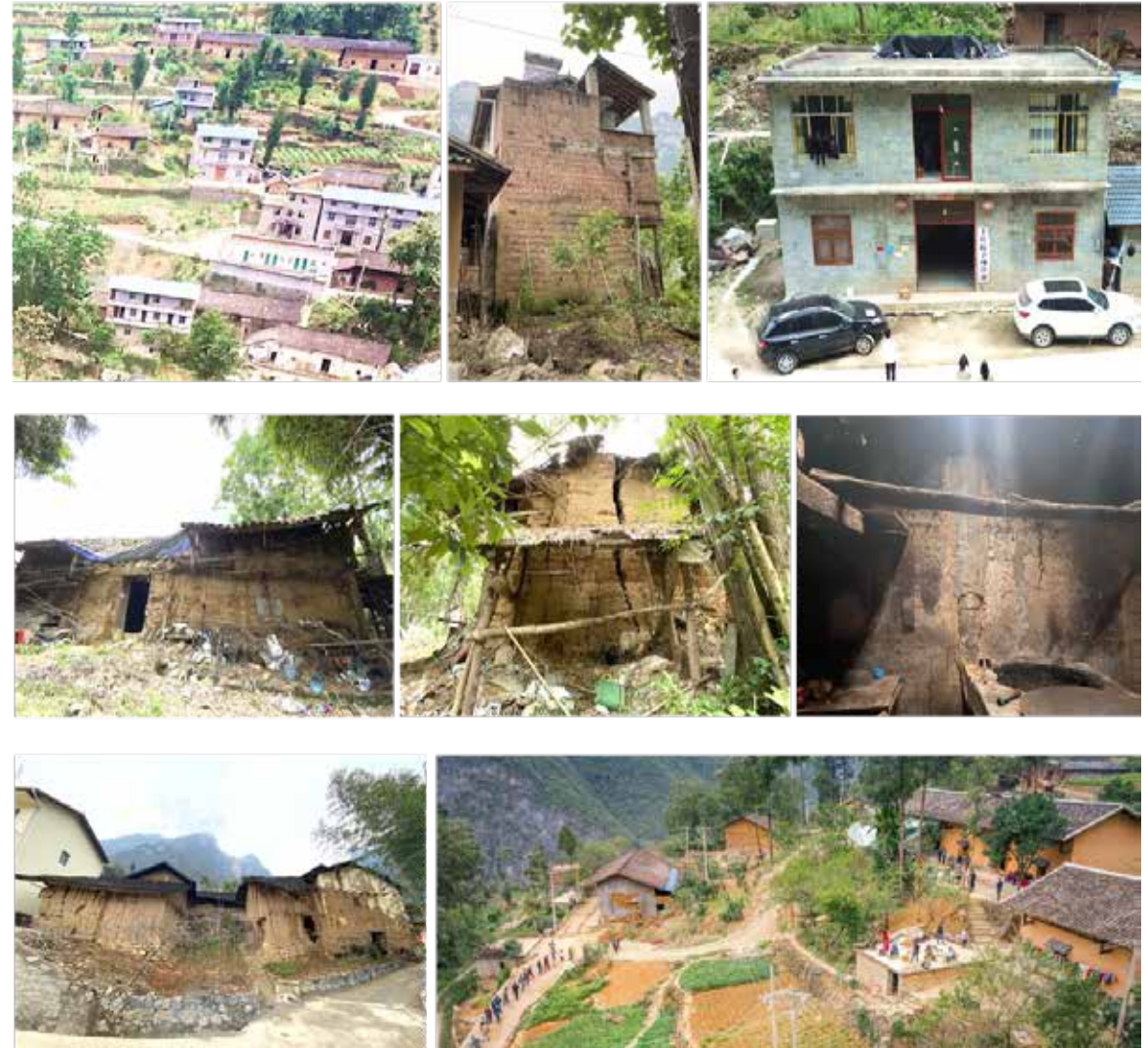

Fig 5.8: Existing problems in Xiazhuang Village (source: photo by author)

3) Design Strategy

After a series of qualitative and quantitative analysis of Xiazhuang Village, the design team proposed to shape the rural idyllic scenery with regional characteristics by means of ecologism and local construction methods. Ecologism emphasizes the respect and reverence for nature and transforms the environment in a way that conforms to nature. Simple local construction methods as passive strategies provide a stable comfortable environment, The primary task of the design is to classify the existing buildings.

For newly built brick and concrete houses, the main renovation content is the appearance of the building. Use the comprehensive way to reduce the destruction of the building to the environmental aesthetic feeling. By adding traditional architectural components, the facade of the building is enriched to make its form more traditional characteristics. Architectural color and natural integration, enhance the sense of local architecture and artistic.

For traditional vernacular architecture, the adaptive renewal should be treated differently according to the specific situation. For the well-preserved architecture, the reinforcement and repair of local materials should be the main method to show the original ecological vernacular construction to a large extent. For partially damaged buildings, in addition to reinforcement and repair, contemporary design elements such as glass, steel and timber are appropriately implanted, so that ancient building materials and ecological construction techniques collide with contemporary materials, reinforcement technology and design techniques, and fully integrate tradition and modernity. For damaged buildings, reconstruction of new Chinese style inn, the remains of the original construction decoration can serve as the ornament, to increase the places the original build memory, highlight the vernacular architecture of the "true", "ecological", "identification", and "harmony" and "adaptation" to the new part.

Fig 5.9: *The deign goal of Xiazhuang Village (source: drawing by author)*

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5.1.3. Final design

1). Ecological new vernacular architecture

It is not operable to transform 102 buildings in a short time, so it is the best way to choose the reconstruction pilot. The pilot can activate the inner power and guide the villagers to build spontaneously. The design team chose a severely damaged, unoccupied, easily accessible home with good views as a demonstration project. The original building had rammed earth walls and a wooden frame roof with tile .

The design positioned the function of the building as a rural inn that could receive tourists. The concept of design and construction are as follows:
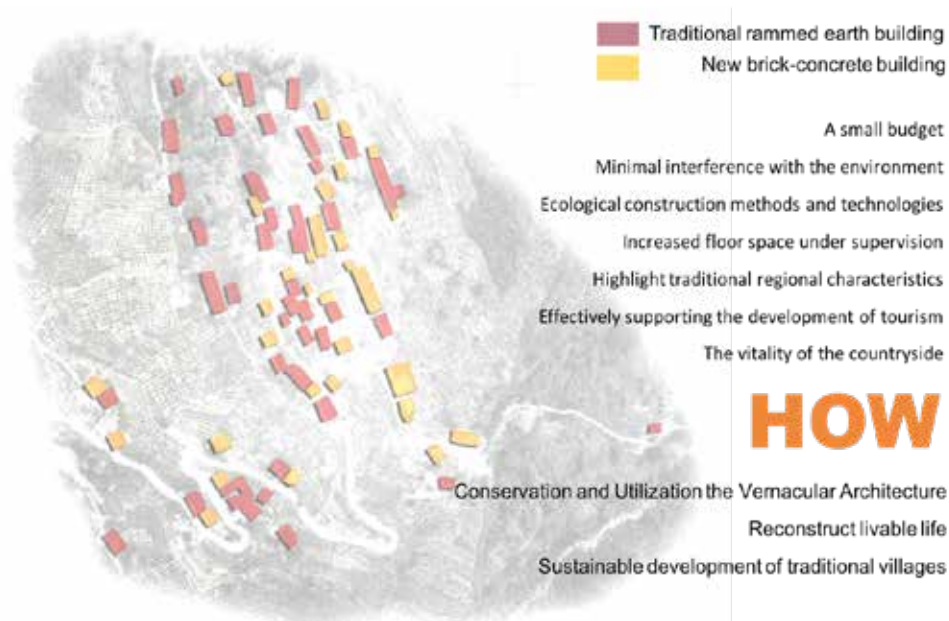
Fig 5.10: *Analysis of Existing Buildings in Xiazhuang Village (source: drawing by author)*

A. Built on the site, retaining several rammed earth walls of the original building. Although rammed earth wall does not have the function of bearing, the accumulated traces on its surface are the carrier of historical memory and the sustenance of nostalgia. This natural material is more sustainable, ecological, reusable and locally available. It is easy to produce it and transport it from nearby surroundings, which lowers the budget and has low impact on the environment. Rammed earth walls and the location of the site limited the scale of the architecture(Khalil).
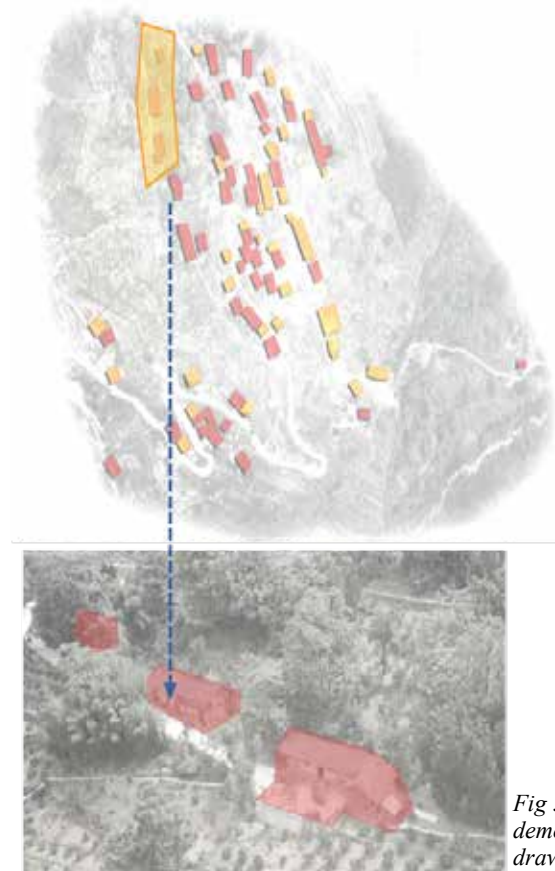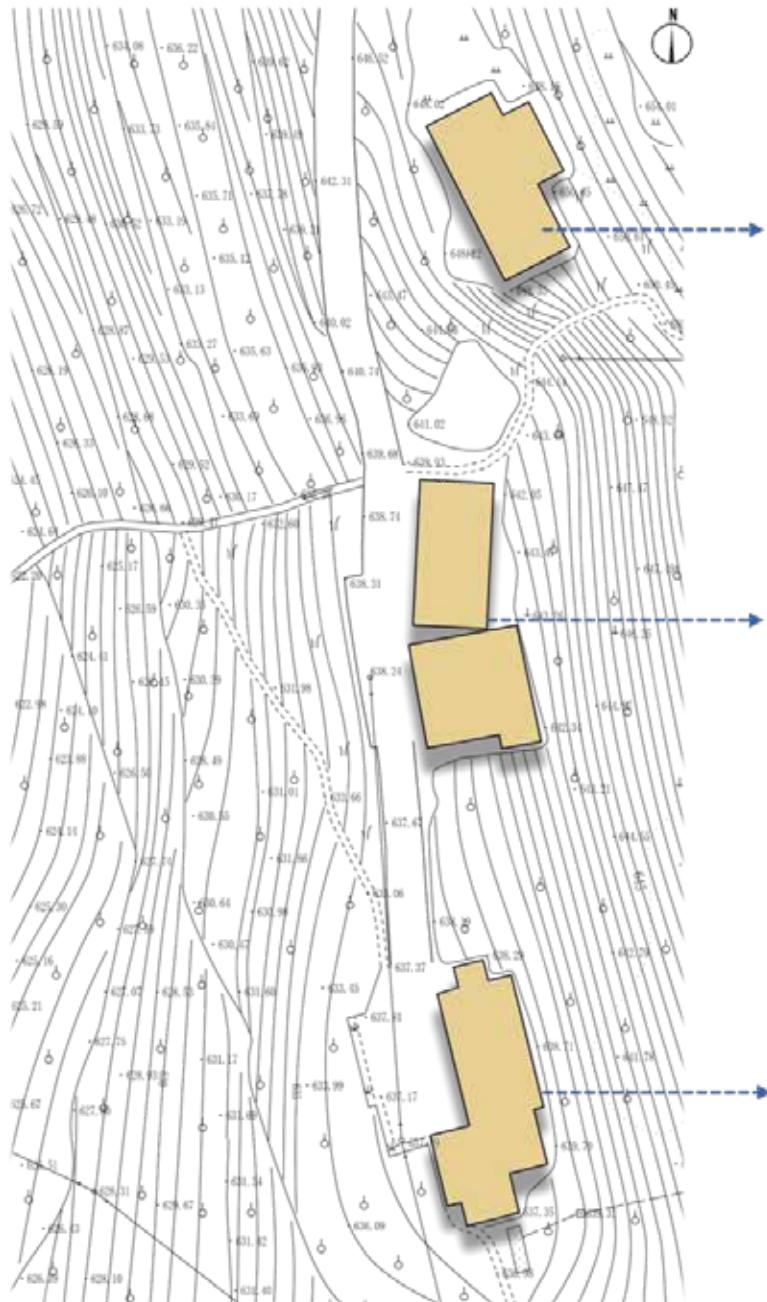

Fig 5.11: *4 buildings selected as demonstration projects (source: drawing by author)*

Building 1: The building collapsed and was severely damaged, and no one lives there. Combined with the owner's opinion, it is transformed into a Chinese style in that provides accommodation

Buildings 2+3: The main body of the buildings are basically reserved and inhabited. It is recommended to repair and consolidate the building structure

Building 4: The main part of the building is preserved, it is recommended to restore and transform it into self-occupation + homestay

Fig 5.12: Status of the 4 Demonstration Buildings (source: drawing by author)

B. The new building 1 adopts steel structure as support, the recyclability of steel reduces the damage of building materials to the environment and can effectively increase the building space and enrich the building function. The building is designed for three levels, with a reception room, dining room, tea room, kitchen and two guest rooms on the ground floor. The second floor has 3 guest rooms and a viewing deck. There are three guest rooms on the third floor. The organization of each floor emphasizes the feelings and experiences of all users.

West facade

North facade

East facade

South facade

Fig 5.13: Floor plan and elevation of Building 1 (source: drawing by author)

C. The load-bearing structure of the building is steel structure, reserved rammed earth wall are the part of the wall, the new wall is double glass and wood wall with thermal insulation function. The roof adopts slope tile roof with vernacular architectural characteristics. The selection of building materials reflects the combination of new and old, traditional and modern .

D. Through the design to form a high and low scattered roof, avoid large roof cover. So that the architectural appearance is more aesthetic. The modern materials of the building façade are blended with the old materials with historical traces, which enhances the integration of the building and the environment. The corridor space under the roof on the first floor and the outdoor platform on the second floor enhance the sense of communication between the space and the environment.

Fig 5.14: Sectional view and generated exploded view of Building 1(source: drawing by author)

Fig 5.15: Rendering of Building 1(source: drawing by author)

E. The interior space design is simple and natural, emphasizing the communication with the external landscape through the large window surface, highlighting the characteristics of rural architecture integrating with nature.The preserved original rammed earth walls are sealed in glass, making historical traces an important part of the interior landscape just like the pictures.The roof truss supported by the steel structure, without extra decoration, is exposed to the outside, reflecting the structural beauty of the building.

F. During the construction process, not only attention was paid to the protection of surrounding trees, but also measures were taken to preserve the original rammed earth wall at a high economic cost to prevent aggravated damage and collapse during construction. The construction is mostly carried out in a traditional, low-tech and low-intervention way to reflect the design concept of integrating the building into nature.

Fig 5.16: Exterior and interior design renderings of Building 1(source: drawing by author)

Fig 5.17: Building 1 under construction (source: photo by author)

2) Micro-renewal of rural building

As mentioned in the previous analysis, the newly built brick houses in Xiazhuang Village have no regional characteristics, not only lack the aesthetic feeling and ecological suitability, but also the simple construction method destroys the rural style.

The simple transformation of new houses has become the focus of this study, so a newly built house is selected as a pilot to study its renewal mode. After analysis, the design team chose to transform the building with micro- renewal. 'Micro-renewal', as a new upgrading method, which is evolution from the traditional upgrading method under culture demand, emphasizes balancing the usage function and historical culture by necessary new construction, protection, demolition methods(Gomes 2016).

The building was originally a two-story brick house, and the modeling language is the most common and economical square model. The main building has a flat roof, while the roof of the small building on the right is simple colored steel tiles.

Under the design concept of micro-renewal, the function of the building is adjusted. The first floor is for villager to live, the second floor is transformed for tourists, and the roof of the cabin is transformed into a terrace for activities, so as to enhance the richness of space. The main building strengthens the balcony on the second floor and adds a wooden frame structure to strengthen the building's characteristics. As a result, the second floor can enter the terrace from the interior through the external balcony, so that tourists have more diversified space to experience the natural beauty of Xiazhuang Village.

The roof of the main building has also been transformed from a flat that is not conducive to drainage to a pitched roof that is more conducive to air circulation and rain drainage, while giving the building more local characteristics. At one side of the building, the space for stacking sundries is also used to create outdoor leisure places with local and natural materials.

Fig 5.18: Original status of building (source: photo by author)

Fig 5.19: Architectural renderings of the micro-renewal design (source: drawing by author)

The whole design and construction process focuses on ecological, low intervention and natural way to build the building into a part of the rural natural environment, while protecting the traditional residential buildings and updating their functions, so that they can not only meet the function of rural tourism, play a positive role in the countryside, but also become a symbol of rural culture.

5.1.4 Summary

Vernacular architecture, as an important part of rural landscape, needs to be protected and inherited. Inheriting vernacular architecture and reshaping vernacular characteristics are not only conducive to the development of differentiated and characteristic rural tourism, but also conducive to rural revitalization. In the process of protection and utilization, attention should be paid to ecological protection, and restoration and reuse should be carried out according to the characteristics of existing buildings. For new buildings that destroy local style, spatial functions should be optimized, building facades rebuilt, local architectural symbols and methods added, and regional architectural characteristics strengthened. For the damaged vernacular buildings, while strengthening and repairing, glass and steel can be used to expand the new functions and layout of the buildings. It makes ancient building materials and ecological building technology collide with contemporary materials, reinforcement technology and design technology, and fully integrates tradition and modernity to highlight the charm of vernacular architecture.

5.2 Conservation and Utilization of Vernacular Architecture in Chinese Traditional Villages
-- A Case study in Gantian Village, Chongqing

5.2.1 Introduction

"Chinese Traditional Villages" refer to those villages with material and intangible cultural heritages and high historical, cultural, scientific, artistic, social and economic values. In order to promote the protection and development of traditional villages, since 2012, the Ministry of Housing and Urban-rural Development, the Ministry of Culture and Tourism, National Cultural Heritage Administration and the Ministry of Finance have taken joint actions to organize governments to improve village information and establish a list of local traditional villages. Five batches of Chinese traditional villages have been selected for protection in 2012, 2013, 2014, 2016 and 2019. By the end of 2019, a total of 6819 traditional villages in China had been selected.

In June 2019, the fifth batch of Chinese traditional villages was announced. Three villages in Anzi are listed,including Gantian Village, Anzi Town, Pengshui County. Muoushui traditional village protection area is the area with the most perfect architectural form and the best village form in Gantian village, which needs to be protected urgently. The protected area is about 1.5 km from the Village committee of Gantian Village and 4 km from the government of Anzi Town, which is located in the southeast of Anzi town. Based on its local characteristics and relying on the national intangible cultural heritage Miao Folk Song and other traditional cultures, Anzi Town gives full play to its regional

advantages and pays attention to the carrier of humanities according to the overall plan of cultural tourism of the county, so as to promote the construction of traditional villages and beautiful villages. At the same time, Anzi will actively explore various protection models for traditional villages, tap into their potential advantages, and integrate the development of tourism with the inheritance of traditional culture, construction of beautiful villages, and increase of farmers' incomes and wealth, so as to help rural revitalization.
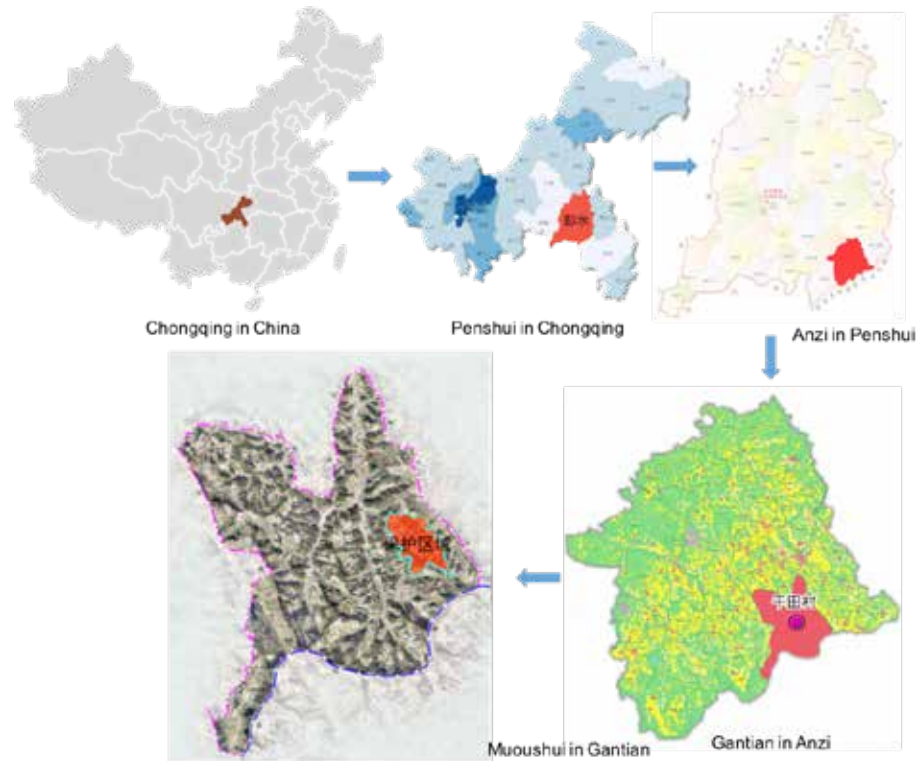
Fig 5.20: Analysis of Gantian village's location (source: drawing by author)

5.2.2 Design Methodology

1) Site and Architecture analysis

Muoushui traditional village is arranged in a scattered state at the concave of the mountain platform. The brook flows quietly through the whole village. Four settlement areas are arranged along with the scattered landform, and these four areas constitute the settlement main body of Muoushui Miao Village. The distance between them is 1000m, and they are connected by the ancient rural road that runs through fields, streams and forests, forming a typical traditional village pattern of "mountain - water - field - forest - courtyard", with obvious features and simple and graceful simplicity.

Fig 5.21: Traditional village surrounded by green trees (source: photo by author)

Current village resources can be divided into natural resources and cultural resources

Natural resources: The village's mountains, water systems, ancient and famous trees and large bamboo forests have excellent natural ecology.

Rich in cultural resources: settlement culture, architectural culture, clan culture, folk culture, farming and reading culture, folk arts and literature and art, etc. The traditional style buildings with distinctive mountain settlement characteristics and concentrated pieces are well

preserved, the inheritance of farming and reading heirloom culture is good, and the atmosphere of literature and art is strong.

Fig 5.22: Resource of Muoushuit traditional village (source: photo by author)

Building structure:

The architectural structure inherits the characteristics of traditional Chinese wooden frame and is a typical Building form of Bayu. The main roof frame with 7 ~ 9 columns is made by the wooden frame with a bucket structure. The open and dark space layout, which is grounded on the platform or stilted building due to ground conditions, has become the structural characteristics of the traditional Muoushui dwellings.

Building materials and Forms:

Building materials adapt to local conditions and uphold the heritage.

Base: local stone materials are used without mortar fillings, which has been used for hundreds of years and is preserved up to now.

Indoor and outdoor floor materials: SLATE/Sanhedrin/timber

Wall body: the main body is board wall, wooden bone (bamboo) mud wall and a few brick walls, also can be seen rammed earth wall used for livestock.

Roof: small blue shingle slope roof, shingle roof ridge and center shingle base ridge and the end of the ridge pendulum tile warping.

Fig 5.23: Architecture of Muoushuit traditional village (source: photo by author)

2) Problem statement

Through on-site investigation, the problems of the village's environment and architecture are presented.

A. Courtyard:

The courtyard pavement is excessively hardened, the boundary of the courtyard is blurred, and the soft enclosure of fences or walls is lacking.

The courtyard is messy and lacks decoration and signs.

The functional layout is vague.

B. Road:

The roads inside the village are rugged and the pavement lacks uniformity.The road slope protection lacks retaining walls, which has potential safety hazards.The trail system between villages has poor accessibility and poor identification.

Wayfinding system: Villages and farmers' courtyards lack a wayfinding system.

The toilets:

The current farmer's bathroom style is inconsistent with the village style, and is not perfect and cannot meet the normal use of the residents. The village lacks public toilets.

Public space:

The current situation of the villages lacks places for villagers and tourists to enjoy leisure, gatherings, and folk activities. Parking problem: Currently, the village lacks parking spaces for local farmers and tourists.

Fig 5.24: The current situation of the environment in the village (source: photo by author)

In the research, measuring instruments were used to scientifically analyze the physical properties of the building, and a large number of farmers were visited to investigate the specific housing status through questionnaires and interviews.
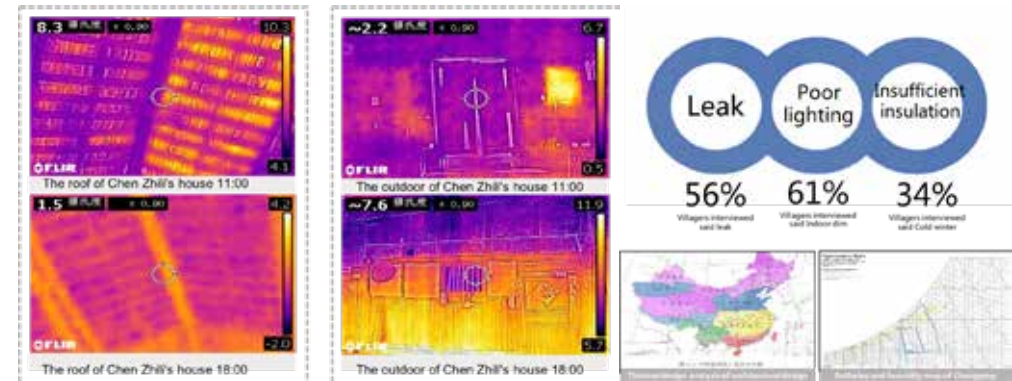

Fig 5.25: Study the physical performance of buildings (source: edit by author)

The problem of architecture

There are many problems in the houses in the village, such as leakage of rain, poor lighting, and no heat preservation in winter, Affected by topography and altitude, the houses in the village are well ventilated. Most of the houses are not decorated and decorated.Most of the houses, courtyards and dams are well drained and the drainage system works well.

The roof has no insulation layer and has poor thermal insulation performance. The Windows are only wooden grilles, without glass and other envelopment structure. Like the broken holes in the wall, they form a thermal bridge and destroy the structural integrity of the wall insulation.

The main problem of architecture climate design in chongqing:

The winter climate is relatively wet and cold, and the mountain dwelling houses need a better heat preservation and insulation structure to reduce the heat loss in the house, mainly through strengthening insolation combined with auxiliary heating.

The summer climate is hot and humid, mainly through the guidance of indoor and outdoor air circulation to achieve indoor air purification, cooling and dehumidifying effect. Secondly, the heat storage capacity of the envelope can be enhanced to meet the requirements of climate adaptability, so as to achieve the purpose of energy conservation and ecology.

The current Architectural problems:

Building base: Due to the long-term erosion of wind, frost, rain and snow and the roof leakage, the building platform partially sank and deformed, which led to the decay of the wooden piles and the tilt of the building foundation.

Structural system: The building structural system mainly bears the weight of the roof. With the passage of time, the bearing capacity gradually decreases under the influence of various external factors. When the load exceeds the allowable load of the beam frame itself, the large wooden frame will be deformed, sunk and destroyed. And the joint building between the framework is usually mortise structure, after a long time the big wooden frame often appear wall crack, aslant and other problems.

Wall: Over the years, the historic buildings, many of them wood-paneled, have fallen into disrepair without the necessary maintenance. Decay and damage are visible on the wall.

Roof :Roof leaks are common because old tiles are not properly maintained.

3) Design stratage

Design concept:

Relying on the experience of rural pastoral life

Tourist-oriented traditional Miao village

Design goals:

quaint traditional village

A sketch base with strong artistic atmosphere

Pengshui's new tourist node

Leisure B&B Village with High Quality Experience

Fig 5.26: Design stratage (source: edit by author)

The development strategy introduces the concept of "community building", and protects and develops villages from four aspects: "addition and supplementation", "maintenance and restoration", "protection and utilization", and "demolition and cleaning".

Summarize and analyze the missing functions according to the current situation, fully respect the current culture and architectural pattern, and

add new functions. Supplement the missing or damaged components and functional nodes in the current situation, so that the site can meet more functional requirements.Maintenance and repair of existing dilapidated or damaged components, ecological resources, environmental conditions, etc.Protect the nodes or buildings with great history, national culture and regional characteristics in the site environment, and protect and utilize them through modern means, so that they can continue to play their functions.Demolition of abandoned pigsties, cattle pens and other livestock pens in the current villages, and clean up the abandoned garbage inside the villages and along the roads.
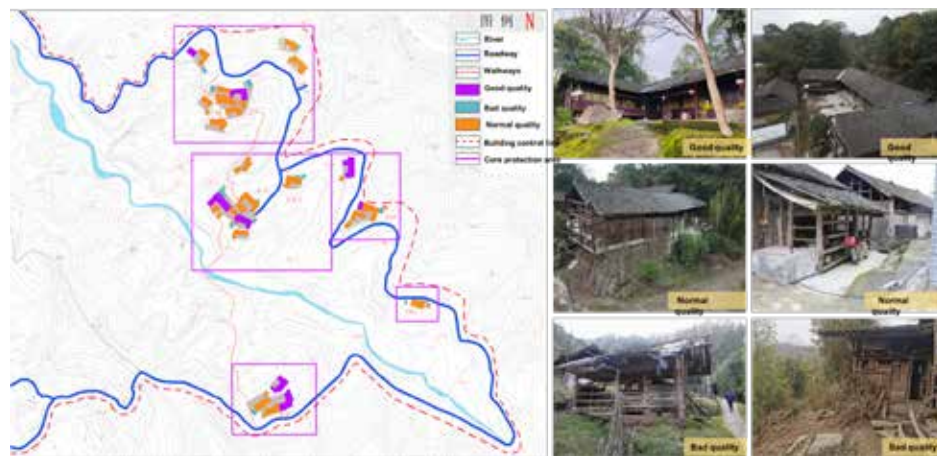
Fig 5.27: Analysis of building quality (source: edit by author)

5.2.3 Final design

According to the different current conditions of the residential buildings in Muoushui Village and the independent opinions of the villagers, two modes of protection, repair and clean-up are proposed:

A. For past—The safeguard model

The protection and renovation measures of this mode are mainly to repair the existing buildings under the condition that the structure, layout and style of the building are well preserved and the principle of not changing the history and local characteristics is observed. Repair the roof leaking and damaged, and try to use new technology to install tile, so as to reduce the maintenance frequency of the roof; Clean, repair and improve the current building facade, and reinforce the buildings with structural problems, so as to ensure the normal and safe use of villagers and at the same time make the buildings better protected.
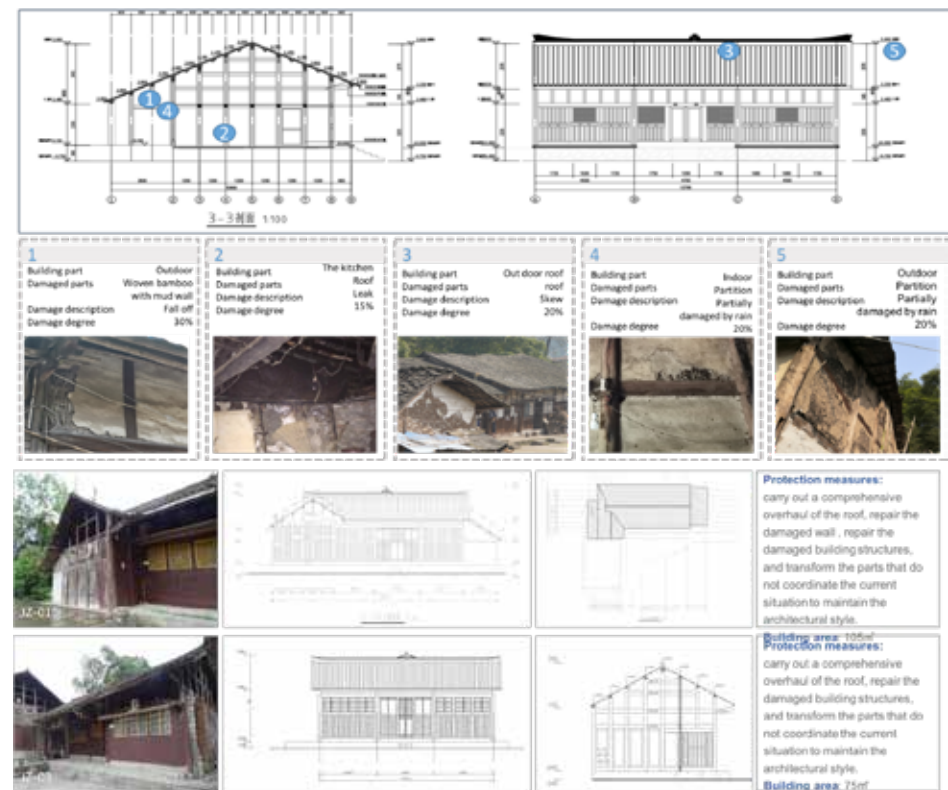

Fig 5.28: The safeguard model for past (source: edit by author)

2. For present—Transformation and Utilization model

This type is mainly used for the construction of renovated family hotels. On the basis of guaranteeing and promoting the building from the outside, the whole building can provide a higher quality of accommodation on the basis of conforming to the national history and local characteristics, and increase the income of the villagers. At the same time, the traditional Miao buildings are better protected.
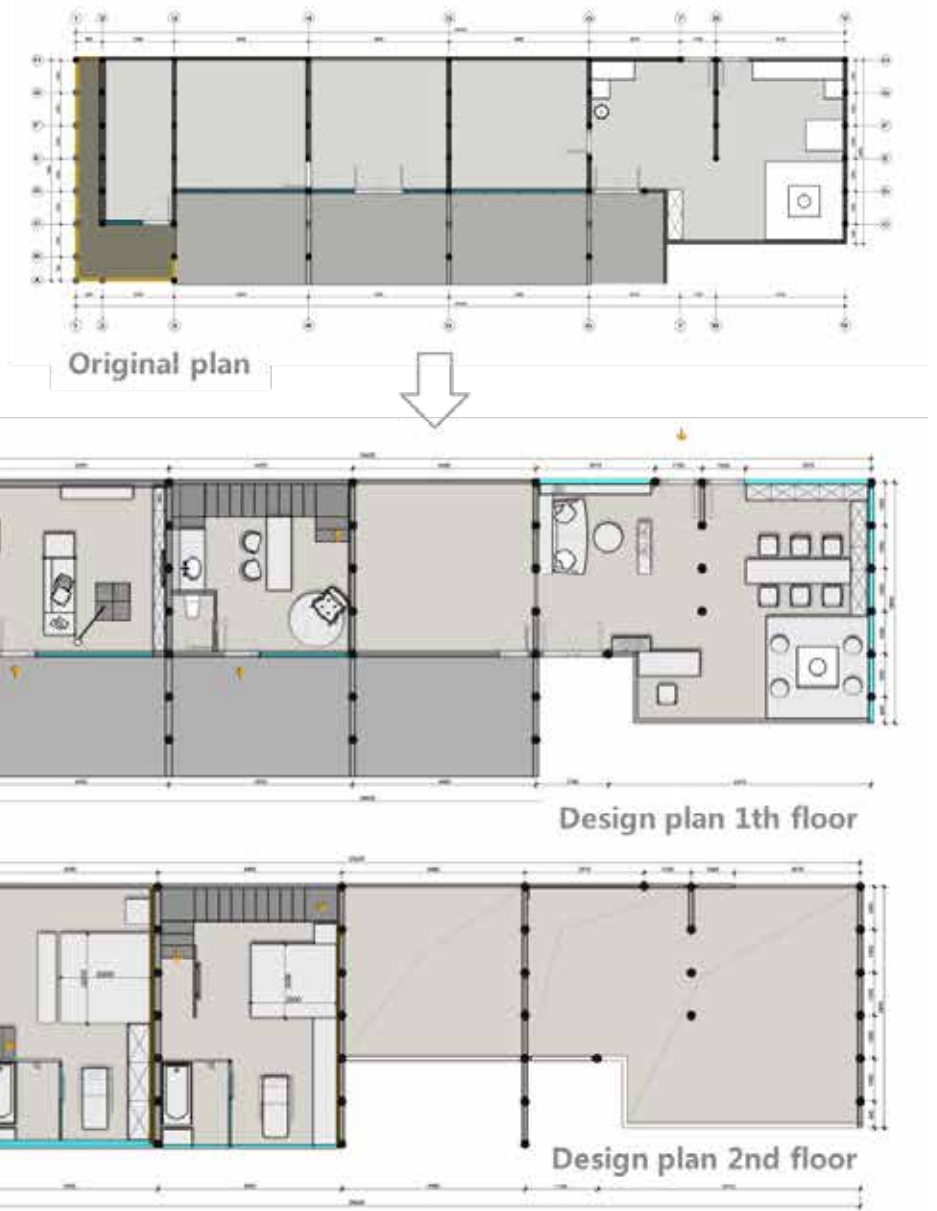
Original plan

Design plan 1th floor

Design plan 2nd floor

Fig 5.29: The current situation and design plan of the old building transformed into an inn (source: drawing and photo by author)

Fig 5.30: Renovated building facade and interior (source: drawing by author)

5.2.4 Summary

Chinese traditional villages are the objects that need to be protected and inherited. In the protection and utilization, the existing buildings should be restored and reused according to their characteristics. It is necessary to combine the traditional life with the current life, and look into the future to construct the new rural landscape in a forward-looking way, so that the traditional village will not only become the carrier of homesickness, but also the place suitable for living and placing the soul.

Fig 5.31: Traditional village under construction (source: photo by author)

5.3 Restoring Rural Landscape
—A case study in Chongqing

5.3.1 Introduction

Rural landscapes are terrestrial and aquatic areas co-produced by human-nature interaction used for the production of food and other renewable natural resources. Rural landscapes are multifunctional resources. China is a country developed from a rural society. With rapid urbanization, the rural areas and population still occupy an important ratio in the country. However, due to imbalanced development, hollowing out of the village, and aging of the population, this vast land that gave birth to culture has caused rural poverty and loss of characteristics, making development difficult.

The predicament of China's rural development has caused the government to attach great importance to it and has implemented a series of policies to promote rural revitalization. In the past 20 years, a large number of researchers, professional institutions, management methods, policies and funds have been involved into the countryside, and they have jointly explored the path of sustainable rural development from multiple perspectives and dimensions. This design project was born in this context.

1) Project overview

Zhongyi Township, Shizhu County, Chongqing is located in the northeast of Shizhu County. It is a part of the forest in the Wuling Mountains, located in the valley zone. The countryside is 21 kilometers long from east to west, 7.5 kilometers wide from north to south, 55 kilometers away from the county center, covering an area of 155 square kilometers. Within the territory of mountains overlap, ravines, moderate climate, abundant rainfall, forest coverage rate of 85.3%. The total population of the township is 8,232, most of whom are members of the Tujia minority. Because of its remote location and barren land, the incidence of poverty in the whole township is as high as 7.6%, which is one of the 18 deeply impoverished townships in Chongqing.
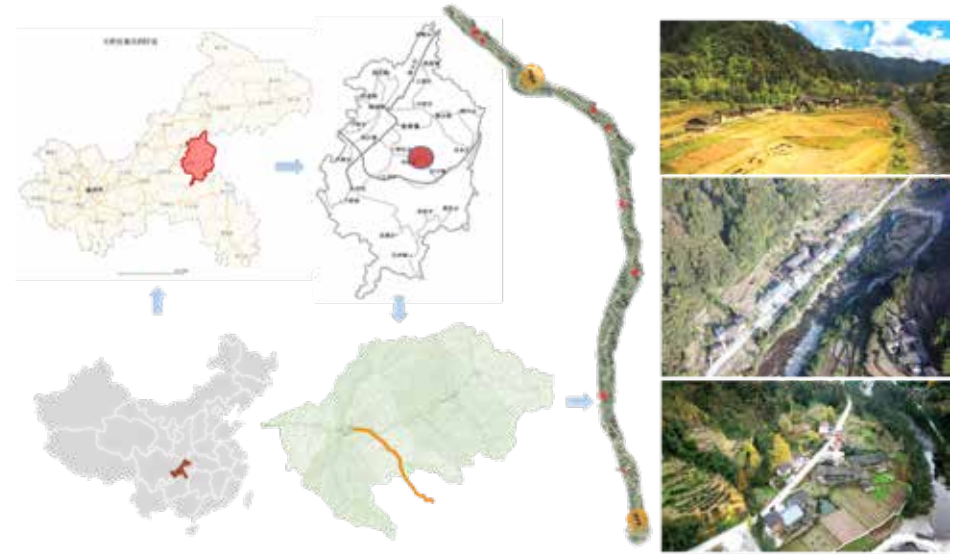

Fig 5.32: The location of zhongyi township (source: photo by author)

In order to get rid of poverty and become rich, Zhongyi Township adopted a series of methods to adjust the industrial structure. Under the guidance and organization of the government, various crops suitable for the local climate and soil were introduced to increase farmers' income. At the same time, in combination with the characteristics of climate and

vegetation, the bee breeding industry has been vigorously developed, and not only breeding bases have been established, but also honey processing plants have been established. Therefore, honey has become a new and distinctive product in this region, which not only generates income for local farmers, but also lays a foundation for the development of distinctive recreational tourism. Therefore, Zhongyi Township aims to develop rural health tourism with regional characteristics and integrated industrial development.

Fig 5.33: The characteristic industry of bee farming in Zhongyi Township (source: photo by author)

2）Design tasks

The rural landscape with distinctive features is conducive to promoting the development of rural tourism and the sustainable development of the countryside. This view has become an international consensus. As a survey indicated that the reconstruction had significant contribution to economic situation in the places of reconstruction. Greatest contribution in this sense is realized through increased tourism, (i.e. through increased visiting, and through increased employment) (Hadzic 2019). Therefore, this project was entrusted by the local government. After understanding the local industrial development goals, combining the site characteristics and actual conditions of the site, combining with the development goals of the area, based on field surveys, the pilot areas are selected to build regional rural features Landscape. Promote the development of rural tourism by shaping the rural cultural landscape with regional characteristics.

Fig 5.34: build regional rural features Landscape (source: drawing by author)

5.3.2. Design methodology

Fieldwork is the first step in this project. In the base investigation, the spatial pattern of Zhongyi Township, the relationship between mountain and forest fields and residential areas, the distribution of roads, the relationship between rivers and villages, the aesthetics of spatial forms, and the basic situation of buildings have become important objects of investigation. Drones, photo recordings, sketches and depictions are fully used in the process.

After having an intuitive impression of the village, the next task is to visit the local residents and get to know the villagers' desire for the development of the village through multiple concentrated exchanges, especially in-depth exchanges with the villagers who are willing to provide inn services, to understand the current situation of their houses, the difficulties in providing inn services. Following this work the design team proposed three pilot area options and identified them in consultation with government staff and village representatives. After comparison, analysis and discussion, the design team and stakeholders reached a consensus and confirmed the two places as design objects. The design team conducted in-depth research on these two sites to analyze and summarize the existing problems of the site. In view of the existing problems, the design team invited representatives from all sides to discuss and propose preliminary design strategies.

1) Site analysis

The two pilot sites are located on the inevitable road between Shizhu County and Zhongyi Township. One, named Longjiaba, is located in the border area of Zhongyi Township, making it a visual display. Good rural landscape will attract people to explore and stay. Another area, called Guankouyan, is close to the core area and has a relatively open roadside zone, which can be used as a tourist reception area. The residential houses in the two pilot areas are distributed along the side of the highway in a linear pattern, following the direction of the mountains from the northwest to the southeast, quietly rooted in the foothill valley on the other side of the road is the Long River, which runs down the valley. The river width varies with the terrain, the water is clear, and there are rocky beaches in the river. The entire base presents a gradual undulating space pattern composed of rivers, roads, houses and mountain and forest fields. The houses built according to the terrain are intertwined with old and new, with high and low levels, which is quite idyllic.

Fig 5.35: The current situation of rural landscape in the pilot site (source: drawing by author)

The Longjiaba area of the courtyard is 17,000 m2, with about 18 households. There are 38 new brick houses, rammed earth old houses, wooden structure old houses, and 16 separate toilets. The Guankouyan area of the courtyard is 12,500 m2, with about 25 households. There are 39 new brick houses, rammed earth old houses and wooden structure old houses, and 7 enclosed houses and independent toilets.

2) Problem statement

The pilot site has a good overall ecological environment and spatial structure, abundant vegetation, and is located in an important geographical location aiming at tourism development. However, there are serious practical problems in the region that need to be changed. Based on the analysis of the current situation of the site and the design goals, the following problems in the local rural landscape can be summarized:

A. Buildings as the main living space in the rural landscape: Due to the long-term poverty, the local old buildings with regional characteristics are in disrepair and have hidden safety problems. In order to change their living conditions, some farmers with better economic conditions tore down the old houses and built new houses. However, the new houses were poorly built, not only without local characteristics, but the exposed plastered wall and rough brick wall without aesthetic feeling even became the 'scar' that destroyed the harmonious sense of pastoral landscape
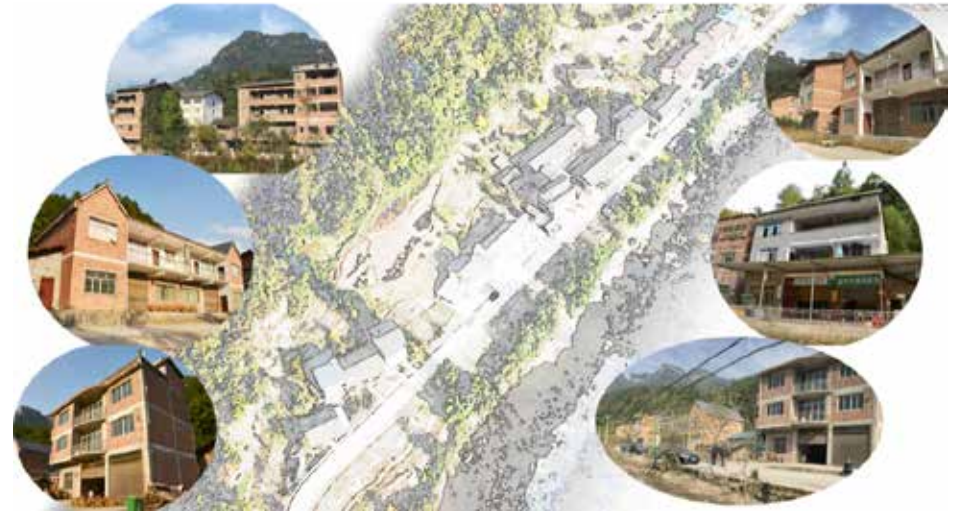

Fig 5.36: Construction status of the pilot site (source: photo by author)

B. As an important place for human living activities in the rural landscape - courtyard: as an outdoor extension of people's living space, courtyard is a transitional space between living and production activities and is also a multifunctional space. The courtyards of the pilot areas are unordered to pile up more sundries, sewage and garbage can be seen everywhere. Not only visual aesthetic feeling is poor, life quality feeling is low and the space use function is weak;

C. As an important place for human production activities in the rural landscape - fields: There is a weak correlation between crop varieties in the surrounding farming areas and the Chinese bee breeding industry. Bare land is often seen, and vegetation lacks seasonal variability, which cannot effectively support the development of rural tourism;

D. As an important natural element in the rural landscape - river: the water is clear, but there is much garbage along the river bank. The area between Long River and the highway is mostly wasteland, with low

vegetation coverage, which has not been used effectively. The site lacks suitable hydrophilic space and public space.

In summary, the rural landscape elements in the pilot areas have a good spatial pattern and basic conditions, but the lag and disordered development in recent decades not only weakened the local regional traditional characteristics, but also damaged the ecological environment to a certain extent, which is in urgent need of repair.

Fig 5.37: Courtyard field and river status of the pilot site (source: photo by author)

3). Design strategy

The design team proposed to restore the rural landscape of the pilot areas with the theme of 'pastoral environment, health and honey countryside'. In combination with the industrial characteristics and tourism development needs of Zhongyi township, the development goal is to cultivate the honey township, the design object is the idyllic environment, and the low-tech strategies and artistic intervention are the implementation means to restore the rural landscape, the scene of mountains and fields and the people's happy living.

Researchers view low technology as the opposite of high technology. Low technology, often abbreviated low-tech, is simple technology, often of a traditional or non-mechanical kind. Low tech can commonly

be created with the least capital investment by the individuals or small groups. It increases dependence on the local natural resources and passive strategies to provide a stable comfortable environment, while using simple construction methods(Khalil 2018). Also, the knowledge of the practice can be completely comprehended by a single individual, free from increasing specialization and compartmentalization. The construction concept of low technology, which is harmonious with nature and attaches importance to handwork techniques, is fully embodied in local architecture. Even in today's society, low-tech is still very much in play in remote and non-large-scale construction projects.

Artistic intervention is an interaction with a previously existing artwork, audience, space or situation. The concept of artistic intervention lacks consistency in the academic domain and is associated with various umbrella terms; it contains work arts, art-based initiatives, artful learning alliances, and art-based interventions(Cheng 2018). Artistic intervention refers to the effect of introducing art into a work setting, thereby affecting the culturally engrained routines and perspectives of an organization. New relationships are established to transform organizations(Cheng 2016). Intervention can also refer to art, which enters a situation outside the art world in an attempt to change the existing conditions

5.3.3 Final design

1) Use art intervention to enhance the experience of rural landscape

The construction of rural tourism characteristics is usually based on the experience of the experiencer. For the experiencer, the sensory

impression of the initial contact will occupy an important part of the intuitive feeling. The impression may be a fragrant aroma, a delightful visual image, or a beautiful moving melody. The design team was thinking about how to build this first impression from the beginning of the design. The involvement of public art is not only the ornaments and works of art, and it also considers and treats the public environment from the perspective of art, so as to optimize the living conditions and its own situation(zhou 2018). On the way to the pilot area, visitors will pass the bottom of a viaduct. The viaduct is the physical evidence that the artificial construction fully demonstrates human power in the natural environment. However, the relationship between the shape of the bridge and the treatment of the bridge piers and nature is rather rigid, which has become the disadvantage in the ecological landscape.

Fig 5.38: Viaduct columns designed with artistic techniques (source: drawing by author)

The design team tries to use design to turn weaknesses into strengths. After a series of brainstorming, they finally reached the goal of enhancing the recognition of the site by displaying the landscape art that highlights the tourism characteristics of the area. The design uses the volume of columns and uses a combination of 3D painting and 3D installation to create a group of masterpieces that combine flowers, honey and field scenery to form a stunning visual effect. Use the superb artistic expression to create a surprise visual first experience for the pilot area.

2) Reconstruct buildings and strengthen the regional characteristics with low-tech

As it has been stated in the previous analysis, the existing building facades in the pilot areas are ugly, lacking features and aesthetics. The building facade in this project, as a large proportion of the rural landscape, is an important part of the tourist experience, so it needs to be adjusted urgently. In view of the project's limited budget, overall engineering volume, and remote location, low-tech strategies are used to transform it. The design team made an in-depth analysis of the regional characteristics of the local buildings by investigating the existing old buildings, and then proposed low-tech transformation methods. This method is based on the construction materials, types and years of the buildings to be modified to give different and appropriate low- tech renovation. First of all, the exterior facade of the existing buildings was characterized to meet the basic aesthetic requirements of rural tourism development. After achieving this goal, the functions of some buildings were transformed according to the wishes of villagers to meet the needs of tourism services.

For the common buildings with exposed and non-characteristic exterior walls, the design combines the features of function and form, and improves the surface wall by coating the weather-resistant earthen yellow exterior wall paint. Combined with the characteristics of traditional Tujia dwellings, the local architectural components with Tujia architectural features, either traditional or modern, are added organically to the facades. It uses the appearance full of morphological changes and rhythms to highlight the local culture and restore the original rural style and characteristics. After the restoration of the building's facade, it is designed to decorate the building's exterior walls with life, industry and themes. For example, a wooden frame is built on the building's gable wall to facilitate plant climbing, so that the plant is three- dimensional. Add a structure that can hold beehives to strengthen the theme of the area. These transformation methods are designed based on traditional building components and craftsmanship and can be completed by local manual builders.
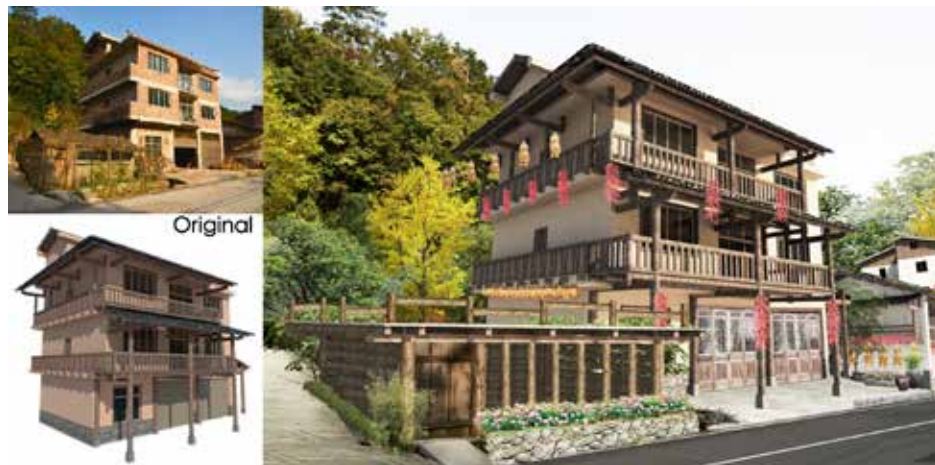
The past never returns. Nevertheless, significant references from the past could be rediscovered in the field of architecture design. History is a process of dynamic development. Vernacular architecture of different periods and regions always represents and adapts to human demands and lifestyle(Zhao 2019). The structure of old buildings has begun to deform, but the vicissitudes of appearance over time have been very precious and need protection. The design recommends strengthening the structure from the inside to the outside, replacing the severely damaged maintenance surface, and adjusting the foundation to correct the inclined wall surface. Clean up and repair part of the external walls, try to retain the historical vicissitudes of the old building, and retain the sense of memory. Use organic renewal methods to rejuvenate and reappear charm.

Fig 5.39: Adding local architectural components on the facade (source: drawing by author)

Fig 5.40: Low-tech to enhance the regional characteristics of buildings (source: drawing by author)

3) Transform the courtyard and public space with low-tech

The courtyard is not only a space for villagers to live, but also a place for tourists to experience rural life. The courtyards of the pilot site mostly present a messy scene. In the design, the low-tech in landscape, micro update methods are used to clean up garbage and useless items, and then set up reasonable and useful space. Flower gallery frame and seats are used in the courtyard.

Fig 5.41: Transform courtyard and public space by landscape micro upgrade (source: drawing by author)

The design focuses on giving full play to the initiative of the villagers, creatively using local appliances and idle living objects to create an environment with a sense of life and experience. The design of public space is also to design suitable communication space and activity place according to local conditions in the way of low cost and emphasis on creation, to integrate rural life atmosphere into the environment and make it a feature of rural tourism, instead of investing a lot of money and manpower to make large-scale construction.

Fig 5.42: restoring the rural landsape (source: drawing by author)

4) Focus on artistic visualization of tourism cultural symbols

Culture is the soul of tourism and tourism is the carrier of culture (Wang 2012). People usually understand abstract culture through recognizable symbols. In the rural construction with tourism as the main industry, it is a common way to use symbols to express the traditional culture

or unique tourism culture. Traditional symbol is an effective and no negligible material of creating attractive form. As a symbol carrier, architecture has its responsibility of reveal the truth of its surroundings and the times meanwhile it has to be powerful magnets with distinctive appeal. In combination with the theme of the pilot area's idyllic and sweet environment about bees, bee models are used in the design to enhance the artistry and interest of the rural landscape. Beekeeping implements are also presented as art installations on the framework of the external walls of buildings, which not only continue the local architectural characteristics but also strengthen the tourist cultural symbols.

Fig 5.43: Visualization of tourist cultural symbols(source: drawing by author)

In addition, a series of signboards with the theme of images related to the bee, honey and beekeeping industry are designed and placed on the roadside and site boundary to enhance environmental identification while continuously spreading local tourism and cultural symbols. The repetition of tourist cultural symbols can not only enhance the local villagers' sense of identity and self-confidence, but also deepen tourists' understanding of the village.

5.3.4 Summary

Rural landscape plays an important role in the sustainable development of rural areas in the new era. Villages with regional characteristics and rural idyllic features can usually get the first chance of success in the sustainable development of rural areas supported by tourism as an important industry. In areas where the quality resources of rural cultural landscapes are insufficient or severely damaged, it is particularly important to use multiple methods to restore the ecological environment and reshape contemporary local features with regional characteristics. In the process of restoration and reconstruction, the overall planning and high-tech construction technologies that are commonly used for rapid urban development are not very effective. Instead, local technologies with low-tech and low-interference techniques and artistic interventions that enhance environmental aesthetics and emotional resonance can more effectively stimulate rural ecological vitality and self-renewal.

5.4 Rebuilding Rural Public Space by Vernacular and Art method in Chongqing China

5.4.1 Introduction

Rural public space is the most representative and cultural village activity space in rural human settlements, and it is the focus of rural life. The rapid advancement of urbanization has destroyed its foundation of existence and has let it in a state of rapid decline. However, the existence of the countryside is realistic, and people's outdoor public activities are also necessary. As an architect, what constructive contribution can we make in the process of rebuilding the rural public space?

5.4.2 The Concept and Characteristics of Rural Public Space

In the process of the formation of human settlements, the self-adapted communication place of rural public space spontaneously formed under the promotion of meeting the needs of residents' production, life and social activities, and spontaneously updated with the evolution of social forms, which is the overall environment of rural settlements. An important part of it is also an important link between the emotional bonds of rural communities and the inheritance of local culture.

The rural public space includes the public plaza, the open space of the village entrance and exit, the passageway formed by the separation of houses, the courtyard of the public building or the environment behind the house, the open space of the village activities, and the open rural environment such as the waterfront road. The rural public space not only meets the needs of the villagers for daily life, exchanges, gatherings, etc., but also facilitates the inheritance of local culture, promotes the daily communication of the villagers and enhances the public's awareness of participating in collective activities. It is the core part of the rural living environment.

Whether it is a rural or urban public space, its users are all human beings. Therefore, meeting the diverse needs of people is the basic goal of all public space design research., all public spaces should meet people's needs in terms of security, selectivity, convenience, comfort and interactivity. At the same time, public spaces play an important role in different social groups, such as promoting various types of exchanges, enhancing community vitality, and promoting economic development. From a common point of view, public space can use the same research methods and analysis systems to carry out design and seek design methods that meet the needs of people's public activities.
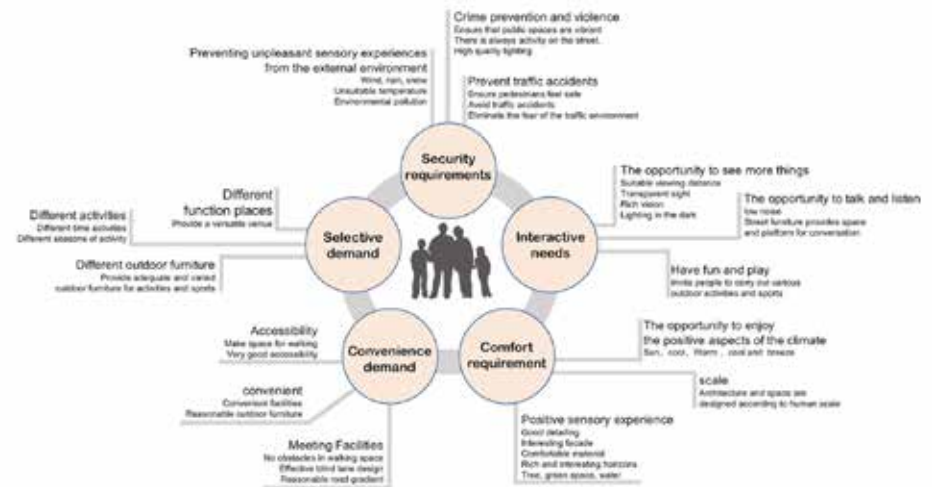

Fig 5.44: Psychological needs of people in public space(source: drawing by author)

However, while discussing the commonality of rural and urban public spaces, we cannot ignore the differences between the two. Public space, as part of the overall space of a village or city, is bound to be influenced by urban-rural differences. The difference between rural and urban areas is reflected in management style, development level, spatial form, population density, cultural characteristics and lifestyle. Therefore, the design research of rural public space should carry out on-the-spot analysis, pay attention to the correlation between human behavior and environment, and discover and summarize the use characteristics of rural public space and rules through observation and analysis of specific spatial behavior. Based on such research methods, designers can better understand the characteristics of space and design a village open activity space with rural characteristics and public vitality.

5.4.2 Methodology

Generally, scholars will conduct multi-dimensional evaluation or research on public space from the following various perspectives: planning and design of public space, historical evolution of public space, quality and suitability of public space, overall system construction of public space, public space theory and Case. For the specific public space, the Japanese scholar Isoya Shiji summarized the PVESM(Capitalized first alphabet of the words: physical, visual, ecological, social, and mental)evaluation system and evaluated the public space from five aspects: physical, visual, ecological, social, and mental. Using "Environmental comfort" to measure or guide the design quality of public spaces. This study hopes to explore and refine the public space construction mode suitable for the local rural areas through

the investigation and design practice of the existing public space. And help to reconstruct the public space form of the Chinese countryside and trigger the restoration and continuous development of rural community activities.
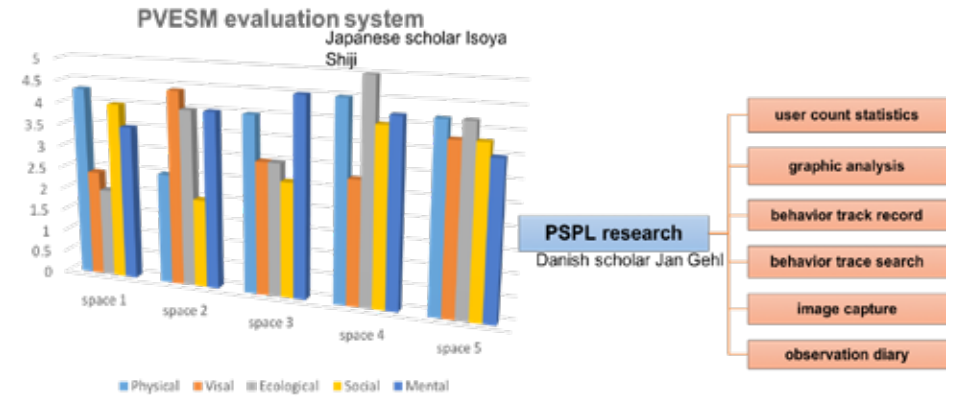

Fig 5.45: Multi-dimensional evaluation on public space(source: drawing by author)

The research was carried out by combining literature analysis, direct observation, participatory observation and qualitative research. After searching the literature, analyzing the geographical climate, combing the economic and cultural resources, summarizing the local comprehensive characteristics, using direct observation and participatory observations to conduct on-the-spot investigations. Based on the PSPL (Public space and public life) research method of the Danish scholar Jan Gehl, the user count statistics, graphic analysis, behavior track record, behavior trace search, image capture, observation diary and other local investigations were carried out according to the current situation of the project. The researchers went deep into the daily life of the local residents, conducted unintentional interviews with the villagers, fully understood the space

use, the use requirements and the reasons behind them, and used the mapping method to analyze the spatial distribution and spatial structure characteristics. These qualitative studies provide accurate reference data for the design.

On the basis of research and analysis, the design strategies and solutions of series of public spaces for the Heping Village are proposed. The design drawings are drawn and communicated with local managers and residents. The design techniques and details are adjusted on the basis of feedback. Promote the implementation of the project, cooperate with the management department to complete the construction drawing and site design services, and conduct user satisfaction surveys on some of the completed projects to obtain more feedback, so we can refine and summarize the operational rules for vernacular and artistic rural public space.

5.4.3 Case Analysis and Design

1) Project situation

The sample of the study is rural public spaces located in Heping Village, Dazu District, Chongqing, China. This project was designed by the author. Heping Village is a rural settlement close to the city (Dazu main city). It is located on the golden tourist line leading to the World Heritage Site Dazubaoding Stone Carving Scenic Area. It covers an area of 4.5 square km and administers 8 villager groups. The household registration is 872 households 3761 People, resident population of 4,508 people. As the first batch of "Top Ten Model Villages" for the construction of new rural areas in Chongqing and "City-level

demonstration for improving rural human settlements", Heping Village has potential rural natural resources and traditional cultural heritage.
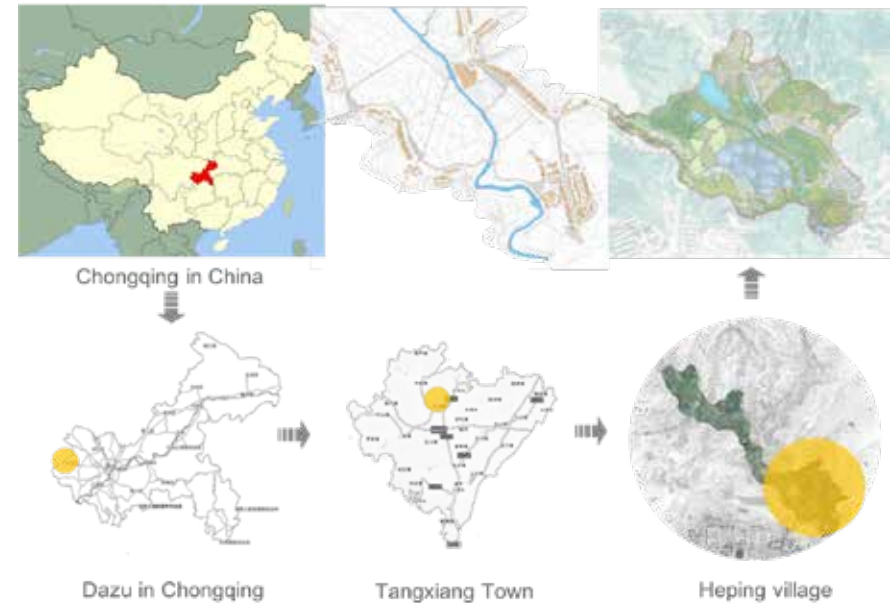

Fig 5.46: The location of Heping village(source: drawing by author)

Fig 5.47: The Resource of Heping village(source: drawing by author)

However, in the context of China's urban and rural development imbalance in the past 20 years, the peaceful village inevitably has the same development dilemma as the Chinese village: most of the young and middle-aged villagers go out to work, the elderly and children stay behind, and the resident population in the village is reduced, and the population structure are very unreasonable, leading to the disappearance of rural vitality. In addition, its location is close to the urban area and tourist attractions. It is affected by urban interference and foreign culture. The rural appearance disappears seriously, the environment is dirty, the sense of home and belonging are lacking, and the use of rural public space is at a standstill, resulting in public space and the public service facilities have declined, and the only public activity areas such as village entrances and node plazas are also lacking in people's vitality due to lack of identification and activity support functions.

Fig 5.48: The Resource of Heping village (source: drawing by author)

Similar to other traditional villages, Heping Village has the basic characteristics of contemporary Chinese villages—the agricultural state is still the foundation of the village, but the core format, resident composition, living patterns, and environmental conditions have been affected by the expansion of modern cities and the tourism economy. The traditional Chinese villages are far apart and are at the tipping point of historical change.

2) Quantitative research and analysis

According to the proposed investigation and analysis path, an intuitive observation method is carried out on the activity rhythm of the villagers within the project scope, and the distribution status and activity trajectory data of the villagers are collected. The basic settings are as follows:

A. The spatial extent of the observation record is limited to the main human settlement area in the village area;

B. The observation time is three periods: early, middle and late, about 8:30 in the morning, around 12:00 at noon, around 19:00 in the evening;

C. The public activities of the villagers are shops, health care, and administration. Management, culture, leisure and entertainment venues and roads, streams near the open space, field trails and other rural specific locations;

D. Random interviews with the activities of the observation and investigation activities. These surveys promoted the understanding of the scale and content characteristics of villagers' activities, recognized the custom behavior of villagers in rural public spaces, and obtained
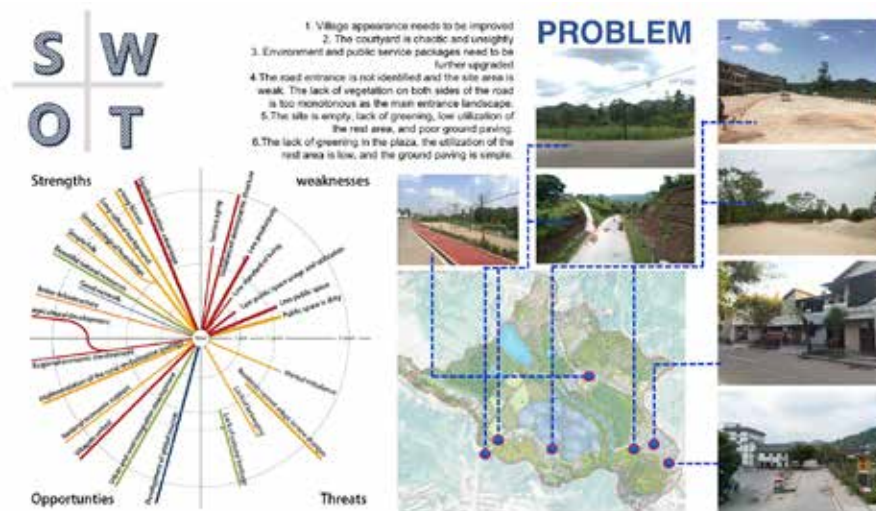
accurate information on the preferences and requirements of villagers' spontaneous activities for specific spatial elements. The results of the research and analysis are as fellow.
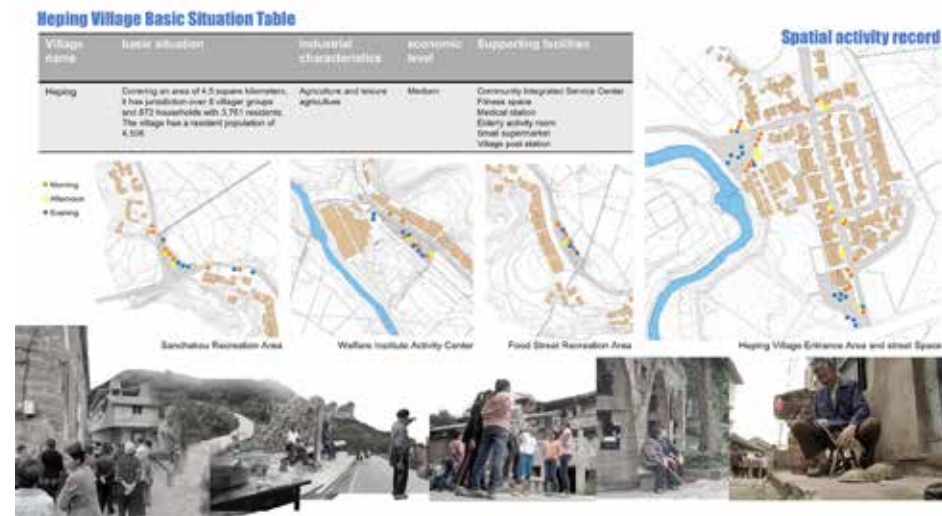

Fig 5.49: Heping Village Basic Situation Table and Space Activity Record (source: drawing by author)

5.4.4 Design concept

After research and analysis, the project team put forward a design concept for local conditions. This is to use the combination of vernacular and artistic methods to reshape the public space form of Heping Village, support the restoration and promotion of local activities, and promote the revitalization and development of village.

In the residential areas where residents are used to set up functional public spaces, the important nodes in the road space expand and optimize the environmental quality, paying attention to the diversity of public space functions and the local integration of culture. While promoting the communication of local residents, enjoying visual viewing and improving the fun of recreation, it gradually has the characteristic landscape that attracts tourists and the functional support for tourists. In the reconstruction of rural public space, special emphasis is placed on the artistic expression of the local characteristics, and the local unique Begonia flowers culture, stone carving culture and country goods. These features are embedded in public space by means of art design methods such as implantation, reorganization, reconstruction, innovation, etc., in order to create a beautiful and comfortable rural place with regional characteristics, highlighting human art, reshaping the memory of the place, and strengthening the personality recognition.

Fig 5.50: Artistic expression of the local characteristics (source: drawing by author)

1) The combination of vernacular and artistic design

The public space of the project is located at the node where the people have dense or dynamic intersections. The prominent public spaces include "Heping Village Entrance Area", "Heping Village Street Space", "Village Activity Courtyard", "Food Street Leisure Area". "Welfare

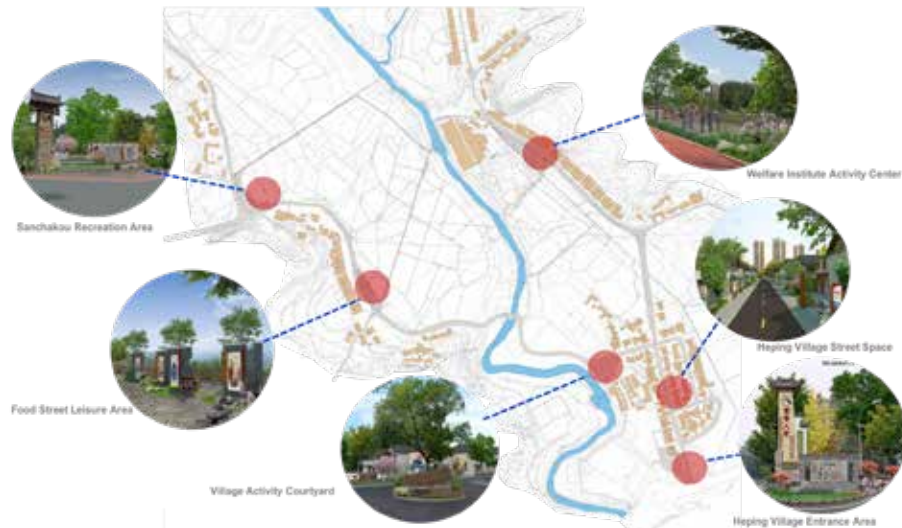Institute Activity Center " and "Sanchakou Recreation Area".

Fig 5.51: Renovated public node space in Heping village (source: drawing by author)

"Verify the PVESM of environmental design, that is, the viewpoint of local landscape design evaluation". The local landscape is "a continuation of the original spatial form of the locality, and it is a product of continuous growth and history." According to the PVESM evaluation system, we can in the countryside, find the local elements that correspond to the functional, visual, ecological, social, spiritual and other spatial comforts, such as plants, stone, wood, brick, pottery and other materials with local attributes, such as local Imprinted land love, vicissitudes of life, time trajectory, vitality and customs. These are value carriers that cannot be replaced by modern technical materials and technological equipment.

While emphasizing the local elements to construct rural public spaces, the architects incorporates artistic techniques to help the rural elements

integrate into the reconstructed rural public environment. Architects use art to discover the aesthetic advantages and disadvantages of local elements in terms of shape, texture, colour, form composition, scale and rhythm, etc., and use artistic design methods to innovate their artistic logic, such as arrays, combination, isolation, emphasis, exaggeration, implantation, reproduction, reorganization and reconstruction. In this way, the designer makes the local elements compatible with the environment in the contemporary rural public space, compatible with the times, consistent with the needs of the users, and becomes the media of the new culture.
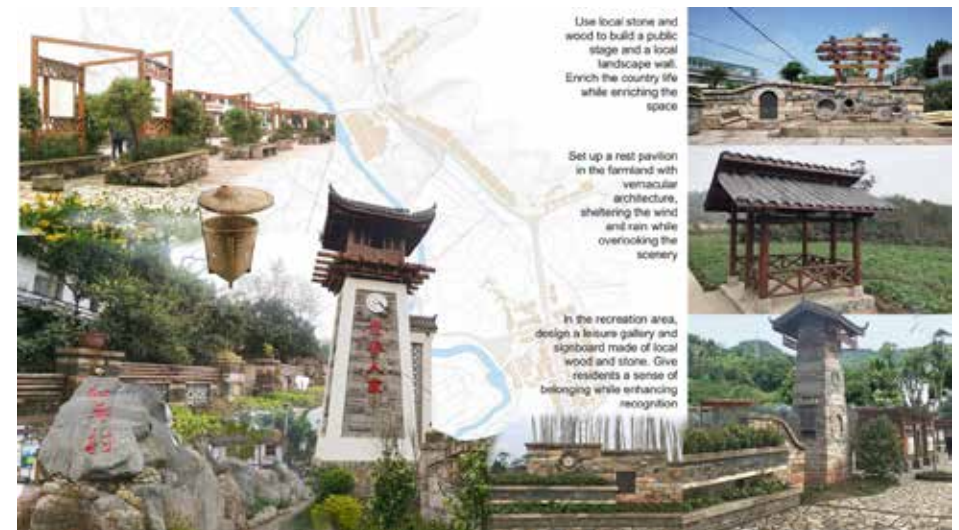

Fig 5.52: Building Heping village public space with Vernacular elements (source: drawing by author)

For the excavation of the memory story, the image is drawn by means of image depiction, and the murals based on the local stories are arranged in the public space. These murals become the talks of the villagers. They compare the quality of the stories and paintings and

feeling proud of it. These murals have also attracted the attention of foreign tourists and become a window for them to understand the local customs.
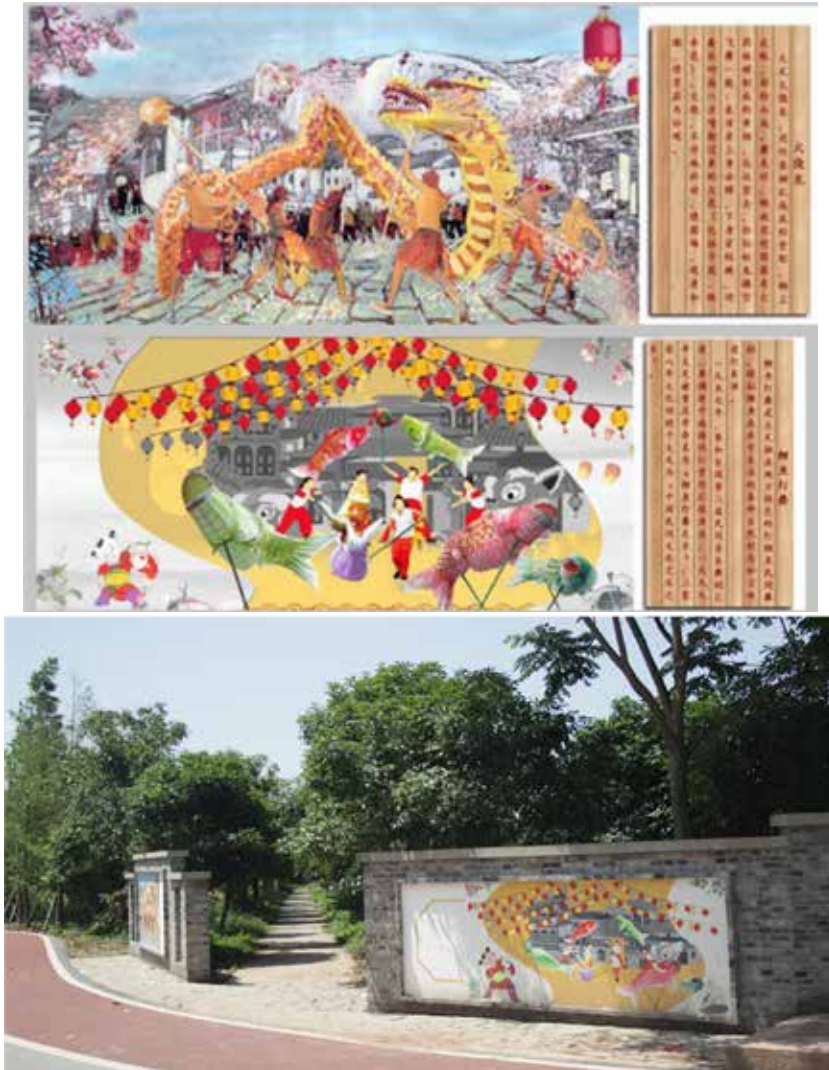

Fig 5.53:   Create storyful murals and paint on public space landscape walls (source: drawing by author's team work)

The deliberate implantation of the local elements in the rural public, on the one hand, shapes the visual style of the local personality, distinguishes the visual feeling of the urban environment, makes the villagers feel familiar and friendly, and also displays the value of the characteristic culture in the area of public activities. Conducive to the inheritance of traditional culture. Under the joint action of artistic means, the rural public space has its unique regional characteristics, which is in line with PVESM's evaluation target of human settlements and public environment, which brings vitality to the countryside.

Fig 5.54:   Renovated rural public space(source: drawing by author's team work)

5.4.5 Summary

The model studied in this paper, the public space of Heping Village in Dazu District, Chongqing, China, has been transformed from a traditional rural model to a fuzzy urban-rural integration point, that is, there is no urban prosperity or traditional rural style. In fact, it urgently needs to find memories from the disappearing countryside and use relevant theories to reconstruct the actual rural public space in China – the design conclusions and operational methods of rural public spaces. Through the experiment of rural environment construction, we found that when reshaping the past and present landscape of the village, when reshaping the contemporary rural scene with Chinese characteristics, the role of advanced technology and scientific countermeasures in the countryside became less obvious. Commonly used are simple traditional crafts, ordinary villagers can do most of the construction work. At the same time, the factors that play a positive role in the reconstruction of rural public space are elements of vernacular and artistic. The importance and input of local and art determine the effectiveness, pertinence and appeal of rural public space design.

The reconstruction of rural public space by means of local and artistic means is a systematic process of interrelatedness. On the one hand, it emphasizes the effective preservation of local cultural characteristics in the village public space, such as maintaining the original natural characteristics, respecting the living habits of the original villagers, and adapting the village conditions and public opinion, to a certain extent, achieve the continuous inheritance of regional culture; on the other hand, the visual transformation of the local elements and the cultural sublimation with the help of artistic expression language, so that the local characteristics can be close to reality, integrate with the times, and generate unique characteristics. Personalized, humanized, and time-oriented rural public space.

6. Conclusion

This paper starts with the concept, interrelation, research category, and research status of rural landscape and vernacular architecture. On the basis of discussing the heritage, ecology, culture, aesthetics, and economic value of the two, it emphasizes the necessity of their protection. On the basis of studying the existing protection theories and conventions, the procedures and principles of conservation and renewal are proposed. Through the study of a large number of cases in European countries, the multi-disciplinary and multi-angle methods of protection and renewal strategies are presented, which lays a solid theoretical foundation for later design practice. On the basis of the previous analysis, this paper focuses on analyzing the characteristics of Chongqing's rural landscape and vernacular architecture. By drawing a large number of drawings, it consolidates the foundation of Chongqing regional research and enriches the data. Combined with the design research of a number of practical cases, the following thesis are put forward on the conservation and renewal strategies of the local landscape and vernacular architecture in Chongqing.

Thesis1:
Emphasize the **integrity** of the **research object**
The research on vernacular architecture cannot be separated from the macro-system of the rural landscape, and the research on vernacular architecture based on the perspective of the rural landscape is complete, comprehensive and systematic.

Thesis 2:
Regional rural landscape and architectural research is more **in-depth** and local, which is conducive to the establishment of a **regional research system** and provides important **basic data** for macro research.

The focus of research on rural landscape and architecture has shifted from conceptual definition to regional data collation, classification and system establishment, especially in a country like China with a vast territory, diverse geographical features and distinct ethnic characteristics. The systematic research of regionalization is conducive to strengthening the regional characteristics, establishing the identification system, and effectively supplementing and improving the basic data of the overall and macro research.

The vernacular architecture in the Chongqing area pays attention to the harmony with the environment and submits to the rural landscape with modesty. In this context, the vernacular architecture is not the protagonist and should not be overly highlighted and emphasized.

Thesis 3:
Villages with **obvious geographical features** and **rich landscape resources** are more powerful in the sustainable development supported by tourism as an important industry. For the areas where the high-quality resources of the rural cultural landscape are insufficient or severely damaged, it is particularly important to **restore the ecological environment** and **reshape the contemporary style** with **regional characteristics** by using **various methods**.

Thesis 4:

Before conservation and renewal, the **advantages and disadvantages** of local vernacular architecture should be **scientifically and effectively understood** and **evaluated** through case studies. To maximize the protection and recovery of historical memory, local characteristics and cultural connotation of the dominant resources, using a **sustainable way** to update and optimize the existing security risks, functional incompatibility, negative quality of the disadvantaged state.

Thesis 5:

In the process of restoration and reconstruction, the general planning and high-tech construction technologies commonly used for rapid urban development are not effective. Instead, **low-tech, low-interference local technologies**, as well as **artistic interventions** that enhance environmental aesthetics and emotional resonance, can more effectively stimulate the ecological vitality and self-renewal of the countryside.

Thesis 6:

Modern building materials should intervene in the protection and renewal of vernacular architecture in a **low-interference way**.

Thesis 7:

In the process of design and construction, **"co-creation"** and other methods are used to expand **multi-participation**, stimulate the endogenous power of the regeneration of rural vitality, and realize the continuous renewal and sustainable development of rural areas.

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