

Research on the Application of Green Landscape Buildings in the Sustainable Development of Ancient Villages - Take Ancient Villages in Southwest China for Example

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Abstract:

With the further development of new urbanization in China, The protection and development of ancient villages are facing new challenges. Green landscape building is an effective way to realize the sustainable development of ancient villages. It plays an important role in improving the human environment of ancient villages and supplementing the natural ecological environment. This study first analyzed the role of green landscape building in ancient villages, and then focused on the problems and solutions of green landscape building in the sustainable development of ancient villages. Renewal of its technical method system, create a diversified and adaptable new model of green landscape building in ethnic areas, to ensure the sustainable development of ancient villages. The challenges and priorities facing building professionals, researchers and green landscape certification systems of ancient villages are discussed for the creation of more comfortable, higher performing and healthier green landscape buildings.

Keywords:

Green Landscape Buildings, Ancient Villages, Sustainable Development, New-Type Urbanization, Adaptive Design

1. Introduction

According to the nineteenth National Congress of the Communist Party of China in 2017, this paper mentions “never forget the beginning, remember the mission - speed up the reform of the ecological civilization system and build a beautiful China”. The Ministry of Housing and Urban-Rural Construction, the Ministry of Culture, the State Administration of Cultural Relics and the Ministry of Finance have issued the Guiding Opinions on Effectively Strengthening the Protection of Traditional Chinese Villages in accordance with document No. 61 of Building Villages (2014). Although there are a series of government efforts in policy and some changes in concept, in a

real sense, the sustainable development of ancient villages must form systematic countermeasures.

The purpose of this study is: Firstly, how to solve the problems of sustainable development of ancient villages and economic development of community. Secondly, how to solve the conflict between the protection and construction mechanism of ancient villages and residents. The conflict between preserving the original features of ancient villages and new green landscape building. Furthermore, the construction of new ecological balance model of green landscape building in the sustainable development of ancient villages. Finally, on the protection and sustainable development of ancient villages, how to conduct comparative analysis and research through good cases at home and abroad? So far, there are not too many research results on the methodology of realism and suitability. Because, Green-building certification systems aim at improving the design and operation of buildings. [1] However, few detailed studies have investigated whether a green landscape building of ancient villages environmental quality. Therefore, it is necessary to establish the suitability protection method and sustainable development system of ancient villages.

2. Methods and Theoretical Investigation

This study focuses on the green landscape building of ancient villages. The spatial characteristics of ancient village landscape building are analyzed. And put forward the problem points, put forward for the sustainable development plan of ancient villages in China, and study according to the same method. This study is divided into three stages. The first stage is to sort out the concepts of green landscape building and sustainable development of ancient villages. The second stage is to analyze the object of sustainable development of ancient villages in a systematic and modeled system. The third stage is to design the application method of green landscape building in the sustainable development of ancient villages by synthesizing its contents in the first and second stages. In this stage, through the analysis of the green landscape architecture space composition mode and use mode, it is a physical factor and logical method of green landscape building. Make it quickly determine and grasp the construction mechanism and application method of green landscape building in the sustainable development of ancient villages.

In this study, literature research and field investigation are important research methods in this paper. Through literature research, the general situation and development status of ancient villages are analyzed and studied as a whole. Through the literature of green landscape building and ancient villages related academic papers and research reports to link the relevant rules and regulations. Collect and analyze the literature to grasp the characteristics of the sustainable development of ancient villages.

On the most fundamental issue of the sustainable development of ancient villages, it will be “how” to choose the goal of protection and development. The selected objectives are “how” to protect and develop as required. In this study, first of all, we should clearly set up the concepts related to the sustainable development of ancient villages. Next, we should systematically formulate the goal and system of sustainable development of ancient villages. On this basis, the application methods and Construction Countermeasures of green landscape building in the sustainable development of ancient villages are put forward. It should serve as a framework for the purpose of this study, and get a methodology to improve the current problem,

because Green-building certification systems aim at improving the design and operation of buildings. [2]

2.1. Advanced Research and Examination

Recently, there are many research hotspots on green landscape building and ancient villages. In the process of China's new urbanization, Ancient villages in various regions of China have undergone unprecedented changes. On the method of sustainable development of ancient villages, relevant advance research data are relatively insufficient. There are many case studies on green buildings and ancient villages at home and abroad. However, there are not many studies on the role and methods of green landscape building in the sustainable development of ancient villages. The main related academic research at home and abroad is shown in Table 1, which summarizes the research trends in recent years.

Table 1. Relevant preliminary literature research.

Category	Author	Time	Research topics	Issuing office
Green landscape building	Son Hogi, Kim Sangbum	2011	A Study on the Traditional Experience Village Landscape Design Development and the Application for Green Landscape Formation	Journal of the Korean Institute of Traditional Landscape Architecture
	Wu Shuoxian	2015	Guide People Gradually to Enter Wonderful Scenery and Keeping Them Lingering There	Heartfelt Whisper on Gardening
	Liu Jiaping, Gao Rui	2016	Green Building Assessment and Design	South Architecture
	Chong Geonchai	2016	A Study on the Building of Architectural Landscape Image in the Vulnerable Community	Journal of the Korean Institute of Rural Architecture
	Lin xiande	2017	From Green Building to Building Carbon Footprint	Architecture Technique
	Lin Borong	2018	Green Building Design and Operation Optimization	South Architecture
Ancient villages	Lee Juock, Han Pilwon	2011	The Concept and the Method of Conservation for the Traditional Korean Settlements	Architectural history research
	Liang Shuilan	2013	The study of Traditional Villages Evaluation Index System Identified	Kunming University of Science & Technology
	Kim Young Taek	2014	Indicators System for Grading of Development Potentials by Rural Village Types	Chonnam National University
	Liu Peizhen	2015	Dissertation for the Degree of Master Establishment of the Traditional Villages' Protection Special Standard System	Northeast Forestry University
	Wang Jianguo	2017	A Preliminary Commentary on the Planning and Design of the Site Park of Grand Bao'en Temple, Nanjing	Architecture Journal
	Ruan Yisan	2018	Inherit the excellent tradition of "harmony between man and nature"	Urban Planning Forum

2.2. Concepts of Green Landscape Building

2.2.1. The Concept of Green Building

Green building is based on the coordination between architecture and environment. It follows the basic principles of protecting the environment, saving resources, ensuring the quality of human settlements, taking the virtuous cycle of natural ecosystem as its basic principle, and comprehensively considers many factors such as ecological environment, social economy, history and culture, lifestyle, architectural principles and appropriate technology [3]. Green building can also be called ecological sustainable building. Its goal is to minimize the loss of natural resources and environmental pollution in buildings during construction and use. Form a healthy, ecological and environmental space, so that environmental performance, investment costs and economic performance match. That is, without damaging the basic ecological environment, the building space environment can meet the needs of human normal social and economic activities for a long time [4]. Green buildings have incomparable advantages over traditional buildings. Their characteristics are shown in Table 2.

Table 2. A comparative analysis of the characteristics of green buildings and traditional buildings.

Green building	Traditional architecture
Consider environmental protection, health, applicability, efficiency, comfort, economy in the life cycle	Consider only shallow life cycle
Energy conservation, ecology, low carbon and Sustainability	Take maximizing economic benefits as the core
Emphasis is placed on respecting the natural environment, avoiding or reducing pollution to the natural ecological environment, and living in harmony with nature.	Neglect overall planning with external environment
Emphasis on energy conservation and clean energy use	Scale and formalization
Emphasis on saving materials and resources and recycling of materials and resources	Serious waste and low recovery rate of waste
Emphasis on healthy and comfortable indoor environment	Neglecting the influence of energy consumption and emphasizing simple process

2.2.2. Concept of Green Landscape

Green landscape refers to the harmonious coexistence of human and natural environment. Harmonize the relationship between artificial landscaping and natural environment. It will minimize damage to the natural environment and air pollution. At the same time, we should abide by the basic principles of regionality, characteristics, protection and conservation of natural resources. Such as the material and plant application in this area, the utilization of natural environmental conditions, the assistance of new energy-saving technology, etc. Green landscape is an inevitable trend of contemporary social development. It is an attitude of environmental responsibility. Constructing sustainable, economic and ecological green landscape has become a hot topic of social research.

2.3. The Concept of Sustainable Development of Ancient Villages

2.3.1. The Concept of Ancient Villages

“Tradition” is a form of culture that preserves the ideas, customs and appearance of the past times. It is called an inherent historical way of life. Ancient villages are also called traditional villages. It refers to the villages built before the first year of the Republic of China (1921). The natural environment, location and layout around the ancient villages, the original style and features of the villages, history and culture, traditional atmosphere and residential buildings are well preserved. Villages with unique regional folk customs are called ancient villages or traditional villages. The analysis of six characteristics of ancient villages (Detailed Table 3) shows.

Table 3. Analysis of the characteristics of ancient villages [5].

Contents of ancient villages	Characteristics of ancient villages
A place with a long history	Sustainability of traditional culture and history
Where influential people live	The influence of inheritance
Natural harmony	Harmony of environment
A good place for village layout	Scientific and rational layout
Places with confucian influence	Invisible relativity
Places with traditional public gardens	Universal value

Therefore, the term "folklore" has a wide range of value and significance. On the contrary, the scope of folk customs formally defined by the state (folk customs, folk customs or customs, ethnic clothing, houses, furniture, etc.) is too narrow.

2.3.2. The Value Concept of Ancient Villages

Ancient villages are a special type of cultural heritage which combines tangible cultural heritage with intangible cultural heritage. It has the value of world cultural heritage. A subjective and objective unit of measurement with value as its object. This study is an organic combination of the historical and cultural heritage, production activities, economic tourism and other complex factors of ancient villages. That is to say, value is composed of tangible and intangible factors. The specific composition of the value elements of ancient villages, as shown in Figure 1.

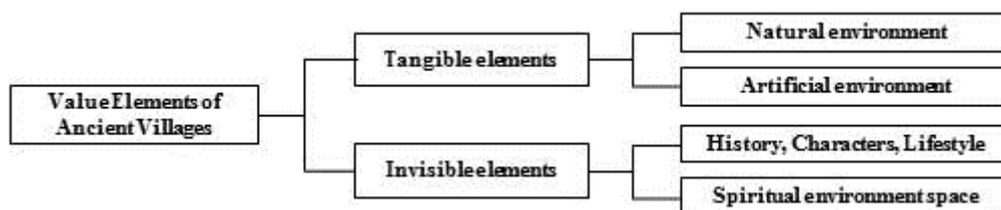


Figure 1. The element composition of the value of ancient villages.

Evaluating the value of ancient villages is one of the objectives of this study. It is an important content. The evaluation of the historical value and sustainable development of ancient villages is an important basis for the preservation and utilization of ancient villages. Ancient villages are of great value. It includes architectural value, historical value, scientific value, social value, economic value and artistic value. The specific cultural value composition of ancient villages, as shown in Figure 2.

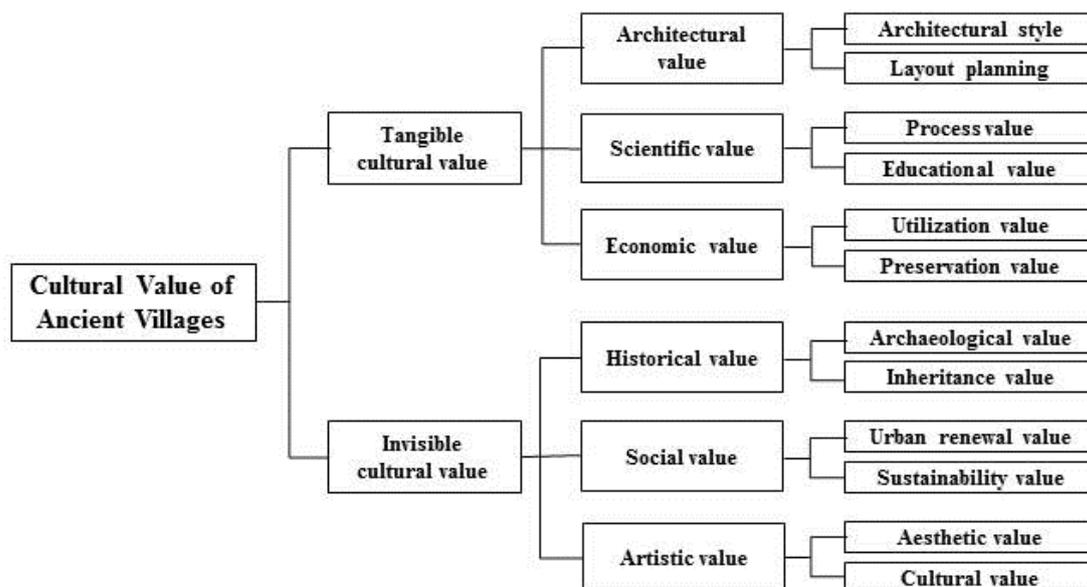


Figure 2. The composition of cultural value of ancient villages.

2.3.3. The Concept of Ancient Villages for Sustainable Development

The ancient villages of sustainable development refer to the villages where the present residence will be well preserved and sustained in the future. Generally sustainable ancient villages will continue to have the cultural and historical significance of traditional villages in the future. Specifically, it is related to the historical culture, production activities and landscape architectural heritage of traditional villages. The environment is very healthy and the production is economical. Even in practical use, there is a certain degree of value. Its deeper significance lies in the comprehensive improvement and sustainable development of the cultural construction and economy of ancient villages. This refers to the so-called sustainable development of ancient villages.

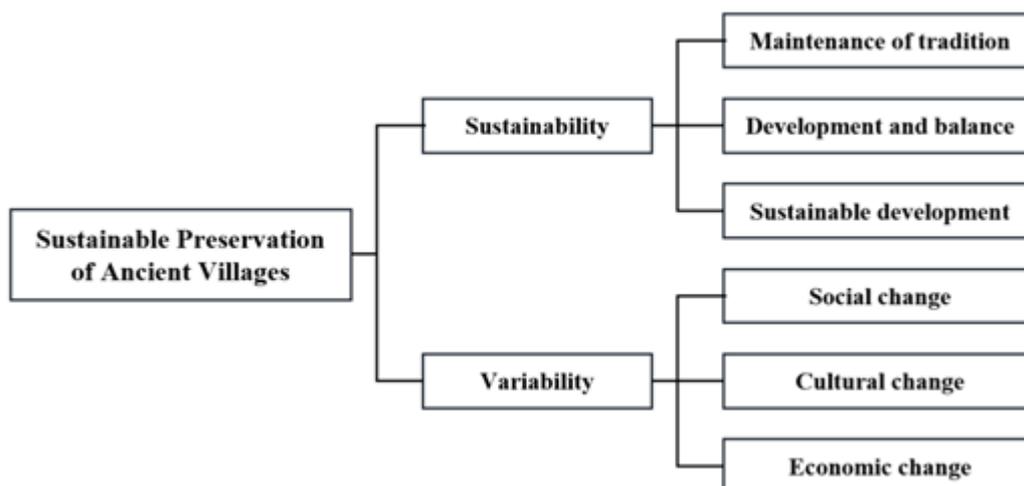


Figure 3. Conceptual composition of sustainable conservation of ancient villages.

Sustainable preservation is for sustainable preservation. Sustainable possibilities also need to maintain the physical aspects, and to maintain the symbolic and functional physical, and continue to accept changes. Therefore, the sustainable

preservation of ancient villages can be of broader significance for sustainable change. In order to maintain the sustainable preservation of ancient villages, under the background of the applicable ancient village evaluation and certification system in China, the concept of sustainable preservation of ancient villages is illustrated in Figure 3.

3. Thoughts of Green Landscape Building in the Sustainable Development of Ancient Villages

In the process of the birth, growth, decline and renewal of ancient villages, the protection of ancient villages is not only a static protection. On the premise of inheriting the folk culture of ancient villages, the protection of cultural heritage and the promotion of natural environment of ancient villages should be an integral part of villagers' life. With the perfect overall layout planning, it provides a positive response strategy for the sustainable development of ancient villages. Promoting the effective protection and development of ancient villages. Promoting the sustainable renewal of ancient villages, to achieve the sustainable development of ancient villages and successful application for heritage.

3.1. Necessity of Green Landscape Building Design in Ancient Villages

Traditional residential buildings are the product of the civilization era of agriculture and handicraft industry. The building materials it uses are relatively primitive natural materials. For example: soil, wood, stone, bamboo and artificially fired bricks and tiles, basically no environmental pollution. The modern construction industry was gradually formed after the industrial revolution in the 18th century. It is the pillar industry of modern industrial civilization. It mainly uses industrial building materials, large-scale production of steel, cement, aluminium alloy, glass and so on, thus causing considerable environmental pollution. The construction industry accounts for 34% of the total global environmental pollution. As can be seen from Table 4, the contemporary construction industry is an industry with high energy consumption, high material consumption and high production. The current development mode of construction industry will lead to the exhaustion of earth resources and global ecological destruction, and will also endanger the survival of human beings and the sustainable development of society.

Table 4. *The Impact of Contemporary Architecture on Environment [6].*

Specific pollution values			
Energy consumption	40%	Warm air emissions	50%
Water consumption resources	42%	Air pollution	24%
Good use of cultivated land	48%	Sewage discharge	40%
Consumption of various materials	50%	Solid waste	20%

Since the 1950s, the situation of environmental pollution is becoming more and more serious. Environmental pollution and ecological destruction have become major social problems. Many scholars have seriously rethought and criticized the problems of human survival and development caused by industrial civilization. Therefore, for the sustainable development of ancient villages, green landscape architecture design has a very important role and necessity. Its overall design concept first considers the regional culture of ancient villages and the design content of key points of village landscape environment. Specifically, first of all, we should consider the problem of natural environmental pollution in ancient villages, how to achieve green design;

Secondly, it is necessary to consider the design of saving land, water and materials in ancient villages; secondly, it is necessary to consider the planning and design of green sites in ancient villages. The design of green landscape architecture in ancient villages meets the needs of different villagers in terms of its use function. Ensure that the design steps are fully considered from the whole to the part and from the inside to the outside.

3.2. Design Method of Green Landscape Building in Ancient Villages

With the process of new urbanization, the green design concept has not been embodied in the new residential buildings in villages and towns, and some new residential buildings have brought unprecedented damage and pollution to the natural environment. On the one hand, the function of human settlements and the construction of natural ecology are often neglected. We should coordinate the harmonious relationship between residential buildings and the environment. More importantly, we should coordinate the harmonious symbiotic relationship between environment and human beings. Make people feel ecology and enjoy nature in ancient villages. And understand and respect the natural ecological balance model. At the same time, people-oriented, natural ecological function and green design concept should be emphasized. Detailed construction of green environment strategy for ancient villages, as shown in Figure 4.

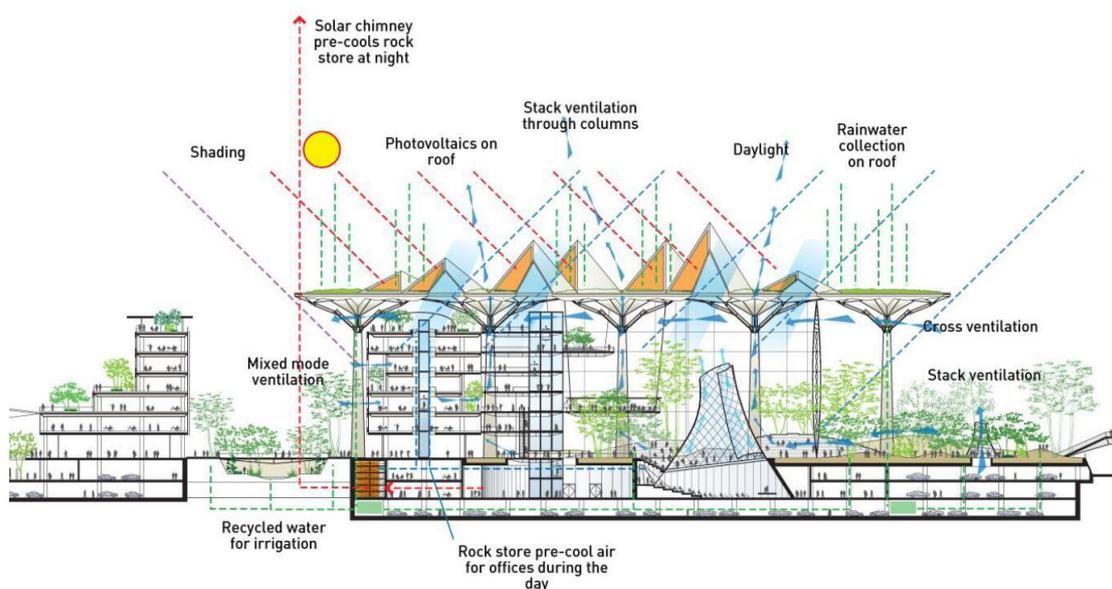


Figure 4. Construction of green environment strategy in ancient villages.

“Green design is also called ecological design. Green building is a building that coexists harmoniously with nature.” Its buildings do not disturb and destroy the natural ecosystem and biodiversity of the original area during the whole life of its construction, use and demolition. [7] Implementing “suitable design” green landscape building according to the regional conditions of ancient villages.

Focus on suitability, efficiency and environmental protection, through scientific design techniques, improve the efficiency of energy and resources utilization, reduce the consumption of non-renewable resources, and protect the ecological environment; At the same time, we can selectively learn from the traditional residential culture and traditional construction technology of ancient villages to make them have certain national characteristics and realize the humanistic upgrading of technology. [8]

Detailed design methods and principles of green landscape architecture in ancient villages are shown in Figure 5.

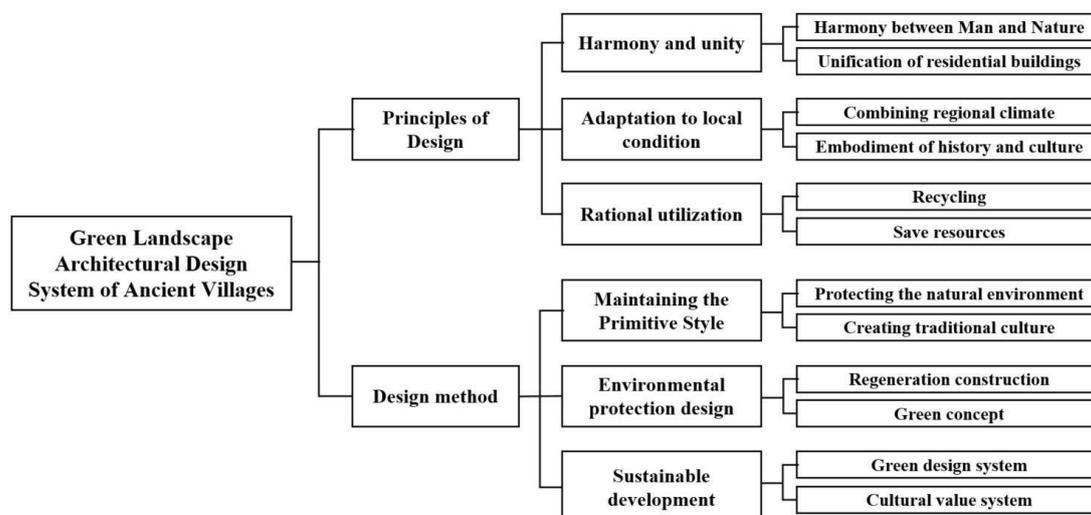


Figure 5. Design method and principle of green landscape building.

4. Research on Evaluation System

Green landscape architecture is a form of residential architecture for the sustainable development of ancient villages. Its purpose and requirement are to meet the villagers' high level material and spiritual needs. At the same time, in order to adapt to the environmental damage caused by the current climate deterioration, it provides a new technological path.

4.1. Sustainable Development of Green Ancient Villages

The protection and development of ancient villages must attach importance to the integrity of the villages. Ancient villages include material and intangible cultural heritage. Material cultural heritage is tangible cultural heritage (including village natural environment, residential buildings, roads, water systems, etc.). Non-material cultural heritage is closely related to human beings and embodies a spirit and belief. It is intangible cultural heritage (including villagers' traditional skills, performing arts, folk culture, Festival and wedding culture and oral traditional expression, etc.).

The protection of ancient villages should take villagers as the main body. To meet the basic needs of villagers' livelihood and production, Increase villagers' recognition of the sustainable development of the village. And participate in the construction and management. Promoting the full utilization of ancient village resources, it is also used to improve villagers' self-reliance. On the one hand, the state attaches great importance to the protection and development of ancient villages. Supporting the strategic plan for the revitalization of rural areas, In order to preserve and develop the ancient villages. Let local villagers participate in it to better promote the sustainable development of ancient villages; On the other hand, the development of ancient villages has improved the quality of life of villagers. Drive the development of villages and local social economy. [9]

Ancient villages are the carrier of traditional culture and the place for the inhabitants of ancient villages to survive from generation to generation. The cultural value evaluation of ancient villages is the basis of protection, and sustainable

development of ancient villages is the ultimate goal. In order to achieve long-term development of ancient villages, we must adhere to the theory of sustainable development. “Green” and “sustainable development” complement each other. Sustainable development as the core of green design is based on technology, and the two are organically combined. The sustainable development of green ancient villages is to preserve the historical culture, ecological resources, natural environment and social economy of ancient villages on the premise of protecting their original characteristics and historical and cultural values, so as to effectively inherit the excellent historical and cultural heritage of ancient villages. Detailed models of sustainable development of green ancient villages are shown in Figure 6.

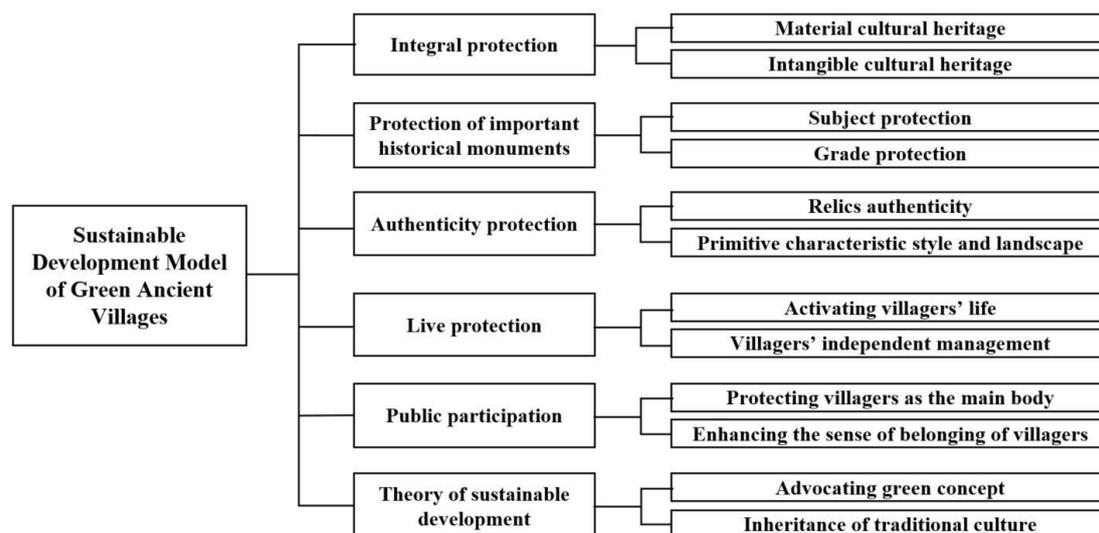


Figure 6. Models of sustainable development of green ancient villages.

4.2. Construction of Evaluation and Certification System

With the process of new urbanization, the sustainable development of ancient villages is facing new challenges. The concept of sustainable development under the background of small town characteristic building has been more and more deeply rooted in people's thinking. Maintaining human health and sustained reproduction is the most basic human rights and obligations. [10] However, green landscape building is an effective way and trend to realize the sustainable development of ancient villages. It plays an important role in improving the human environment of ancient villages and supplementing the natural ecological environment. Because of the serious deterioration of the world's environment at present, the ancient villages and buildings inherited from the primitive tradition of China are constantly disappearing. Green traditional village research and green building technology are facing both opportunities and challenges.

Combining green building technology with the long-term construction of ancient villages, Combining the existing green building evaluation and certification system with the green traditional village evaluation system (the research system in this paper). Qualitative and quantitative evaluation is made on how to preserve, repair and sustainable development of ancient villages. Therefore, the direction of this study is to study the sustainable development of green landscape architecture in ancient villages, especially the effect of green landscape architecture design and evaluation certification under adverse climate change. In typical cases, the current evaluation system of ancient villages in China and the evaluation and certification system of

world cultural heritage are selected as comparative cases to carry out. The purpose is to preserve the sustainability of ancient villages and to declare and publish the world cultural heritage. Combined with the evaluation criteria of green residential buildings, the final evaluation system is divided into eight major criteria (qualitative and quantitative evaluation method). In this paper, the existing green buildings and traditional village evaluation system are analyzed and summarized, and reasonable evaluation criteria suitable for green ancient villages are extracted. The construction of the evaluation and certification system of green landscape building in ancient villages is detailed as shown in Table 5.

Table 5. Evaluation and certification system of green landscape building in ancient villages [11], [12].

Evaluation field	Evaluating indicator	Index weight	General landscape building	Public Landscape building
Land use and transportation	Ecological value of existing foundation	3	•	•
	Reasonable underground land development	2	•	•
	Minimizing the loading of earth in geotechnical works	2	•	•
	Feasibility of sunshine countermeasure	3	•	•
	Reasonable layout of roads inside and outside villages	2		•
	Reasonable setting of living facilities	3	•	•
Energy and environmental pollution	Energy performance	12	•	•
	Energy monitoring and management assistance device	2	•	•
	Utilization of new and renewable energy	3	•	•
	Application of low carbon energy technology	1		•
	Prohibition of the use of specific ozone layer protective substances	2	•	•
Material saving and resource utilization	Use of environmental declaration products (EPD)	4	•	•
	Use of low carbon materials	2	•	•
	Use of resource recycling materials	2	•	•
	Use of harmless materials	2	•	•
	Application proportion of green Building materials	4	•	•
	Installation of storage facilities for recoverable resources	1	•	•
Water saving and water resources utilization	Rainwater management	5	•	•
	Rainwater and groundwater utilization	3	•	•
	Use of water-saving machines	1	•	•
	Monitoring water consumption	1	•	•
Ecological environment	Ecological area ratio	8	•	•
	Greening rate of natural foundation	6	•	•
	building green space axis	2		•

	Biodiversity formation	4		•
Indoor environmental quality	Application of low emission products of indoor air pollutants	6	•	•
	Ensuring natural ventilation performance	2	•	•
	Ensure household ventilation performance	2	•	•
	Noise blocking performance	2	•	•
	Prevention of indoor and outdoor noise	1	•	•
Maintenance management	Environmental management plan for construction Site	1	•	•
	Providing operations/Maintenance management instruments and guidelines	2	•	•
	Provide user guides	2	•	•
	Provide certification related materials	2	•	•
Total	34	100		

The general landscape building in the table above refers to the buildings used by villagers in ancient villages except public residential buildings; public landscape building is the public buildings in ancient villages (such as temples, private schools, stage, ancient streets, alleys, etc.). It lays a scientific basis and theoretical foundation for the construction of the evaluation and certification system of sustainable development of green ancient villages. The specific results of this study are as follows.

5. Conclusions

This topic takes the active design of landscape architecture in ancient villages as the research object. Combining ethnology, architecture and green building design and evaluation certification technology, the relationship between the function of landscape architecture and its scientific effects in primitive ancient villages is studied. Exploring the beautiful countryside that integrates “green village, healthy village, cultural village and historical memory village”.

Firstly, through the previous relevant literature and research results of this study, further exploration is made. It is found that the main factors affecting human living environment and human health are not the existing garbage manufacturing factors, but the construction and environmental facilities themselves. Therefore, the research and development of green landscape architecture technology and the function and design of renovating ancient buildings, the development of effective green building materials to prevent environmental deterioration, as well as harm human health and life, are of great significance to prevent the disappearance of ancient villages, prevent climate deterioration, and improve human health and living environment.

Secondly, this paper aims at the development process of ancient villages with the concept of “green” and “sustainable development”. Refer to the national standard G-SEED 2016 v1.2 published by Korea Institute of Construction Technology in developed countries. In view of the current situation of the protection and development of ancient villages in China, reference is made to the National Standard GB/T 50378-2014, published by the Ministry of Housing and Urban-Rural Construction of the People’s Republic of China. From the point of view of adapting measures to local conditions, life cycle and sustainability evaluation, this paper tries

to establish an evaluation and certification system by using analytic hierarchy process and BIM technology evaluation method. [13] This paper studies the evaluation and certification system of green landscape building in ancient villages in China.

Finally, through the academic research of this topic, the author explores the new construction ideas of ancient villages, the traditional villages with new functions, the beautiful primitive villages, the green design ideas of new dwellings and the new construction methods. Forming a scientific technological system can create an effective path for the rational development of ancient villages in the future, strengthen cooperation with ethnic areas, and provide technical support for protecting the earth's environment and preventing haze. [14] It has potential scientific and practical value for promoting the construction and development of primitive ancient villages and residential buildings in China. Finally, it builds a "breathing, emotional, primitive ecological, long-lived and healthy" residential building. [15]

In today's international environment, people tend to live primitively and return to nature. At present, green building technology has attracted more and more attention from construction departments and academic research institutions in various countries. Green has been increasingly recognized by residents all over the world. Therefore, this paper draws a conclusion that the application of green landscape building in the sustainable development of ancient villages has important practical significance and social value.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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