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Evolution and Innovation of Guangxi Yao Mountain Residential Architecture Space from the Perspective of Cultural Heritage

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Abstract

Enhancing national cultural self-confidence involves promoting and strengthening the protection and utilisation of traditional national villages. Studying how to protect and inherit the resources of these villages, as well as utilising existing resources in a sustainable manner, poses a challenging issue. Further research is needed to investigate the influence of regional culture on residential buildings in the mountainous areas of the Yao people in Guangxi, and to explore how traditional architectural elements can preserve their cultural essence using modern artistic language. The project aims to: 1. Examine how regional culture influences Yao ethnic minority houses in Guangxi's mountains; 2. Evaluate existing challenges and implement contemporary design for improvement; 3. Create sustainable and culturally significant Yao mountain dwellings. The research collected qualitative data from six towns using a combination of semi-structured interviews, participant observation, and reviewing internet and print news sources. The residential structures in Yaochi Mountain District, Guangxi exhibit unique regional cultural traits, although they also have deficiencies in several areas. This study find that the beauty of the natural environment remains constant but the architectural vestiges and cultural history show remarkable variance, both of which greatly contribute to sustainable development. This study found that traditional villages in Guangxi share a number of characteristics, including a severe deficiency in clean energy and a poor rate of carbon utilisation, during our investigation of the sustainable development of the spatial dimension of the ecological legacy of these communities. According to a weight analysis performed at the sub-index factor level, the variety of building uses is the most important indicator of the spatial sustainability of traditional villages in Guangxi. The outcomes of this study provided a valuable empirical evidence and practical suggestions for areas and nations involved in the preservation of cultural heritage and the investigation of sustainable rural development.

Keywords: Innovation Of Residential Architecture,Guangxi Yao Mountain, Architecture Space, Cultural

Heritage.

"Regional culture" refers to the continued influence of different areas of China on the nation's collective history and identity. Nature, the humanities, and the social environment influence regional culture, which evolves via the adoption of new customs and lifestyles. Regional culture is a social process that influences the human spirit by shaping the area's history, serving as the primary line of historical development, and representing the reality of appearance. This encompasses the national religion, philosophy, traditions, art, value system, worldview, economic and political perspectives, and other cultural expressions. As a country developed throughout time, its values, aesthetic goals, and traditions were shaped by a combination of natural and societal influences. The Guangxi Yao ethnic Jinxiu Autonomous County, also known as Yaoshan in Chinese, is a scenic area and mountain range located in the Guangxi Zhuang Autonomous Region in southern China (Peng J et al ,, 2023).

China has fifty-six distinct ethnic minorities, each with its own history and customs, representing a valuable cultural heritage passed down by previous generations. Contemporary popular culture and traditional national culture vary significantly, thus it is important to establish a balanced connection between both. Protecting and studying ethnic communities is very practical and important from a diverse standpoint.Enhancing national cultural self-confidence involves promoting and preserving traditional national villages. The challenge lies in protecting and passing down the resources of these villages while utilising them in a sustainable manner.Traditional residential structures must continually enhance and update their practical purposes to keep pace with fast societal progress. The Yaoshan traditional dwelling houses provide as tangible evidence of the grandeur of China's ethnic minority culture. The preservation and advancement of traditional cultures are crucial in light of the widespread use of contemporary construction materials and architectural styles (Li L et al, 2021).

The stated region is home to the Yao ethnic community, known for its exceptional natural scenery, adherence to traditional Yao traditions, and unique architectural heritage. The Guangxi Yao Mountain has several distinctive features and qualities. The Guangxi Yao Mountain region is famous for its lush hills, untouched forests, clear streams, and stunning landscape, showcasing natural beauty. The area is renowned for its stunning scenery, attracting nature lovers and tourists. The Yao ethnic group is classified as one of the 55 officially accepted minority groups in China, playing a prominent role in traditional Chinese culture. The Yao people in this area have a strong commitment to preserving their cultural heritage, such as language, clothing, music, and dance (Alexandre G et al, 2021) .

Yao Mountain provides a chance for tourists to participate in traditional performances and connect with local residents, enhancing an immersive experience in Yao culture. The Yao Mountain region is known for its unique architectural style including wood houses built on steep slopes using stilts. Yao community's traditional homes often include saddle-shaped roofs made of bamboo, wood, and thatch. The architectural style showcases both practical utility and a harmonious harmony with the surrounding natural environment. Yao Mountain is a popular cultural tourism destination that draws a significant number of people (Bezner Kerr Ret al, 2023). Tourists may explore Yao villages, participate in cultural activities, enjoy real Yao cuisine, and see vivid festivals and ceremonial ceremonies. Guangxi Yao Mountain area has a variety of stunning attractions such as hiking paths, waterfalls, caves, and panoramic views, all within its lovely mountainous landscape. The location is known for Baibu Yao Village, where travellers may see traditional Yao

houses and terraced agricultural fields among the beautiful hilly landscape.

Yao women often wear embroidered jackets, flowing skirts, and colourful headscarves as part of their traditional dress. Tourists frequently have the opportunity to wear Yao clothing and take photos while dressed in these traditional costumes. Yao ancient Medicine: The Yao ethnic group have deep knowledge of old medical practices and the use of herbal remedies. Some rural villages provide herbal medicine experiences and demonstrations, allowing visitors to learn about the healing properties of native plants (Huang YC and Xu SL, 2018). Efforts have been made to preserve and sustain the cultural heritage of the Yao Mountain region. Preserving the traditional way of life and architectural heritage of the Yao people is a key goal for local communities, government initiatives, and tourism development projects.

Accessibility: Accessing the Guangxi Yao Mountain region is possible by road transport, with several access points and paths for travellers to see the area. Visitors often have the chance to arrange guided excursions to enhance their cultural and natural experiences. The Guangxi Yao Mountain offers a unique chance for people to immerse themselves in the natural beauty and rich cultural traditions of the Yao ethnic group. Scholars in China are focusing on preserving traditional villages due to issues like rapid urbanisation, insufficient rural development, environmental damage, and the decline of rural populations. This issue has become a significant area of focus in disciplines including ethnology, sociology, and architecture. China's rural rejuvenation strategy has resulted in the growth of a rising number of traditional villages. The study of village protection has unquestionably faced several hurdles.

Scholarly studies on preserving traditional villages have often focused on one-dimensional methods, emphasising static conservation by turning these settlements into "museums." However, it is commonly recognised that just preserving inactive remains is not the best approach. Therefore, it is crucial to research strategies for conserving and protecting traditional communities. Assuming that preserving traditional villages is separate from the actual needs and development requirements of the residents. Traditional communities in this situation can only partially overcome their plight even with significant financial resources (Tang YP, 2021). Therefore, studying sustainable development in traditional societies has become an inevitable occurrence.

Xidi Village, Hongcun Village, Kaiping Diaolou Village, and Fujian Tulou Village being included on the World Cultural History List indicates the worldwide acknowledgment of the importance of traditional Chinese village history in social and historical progress. Guangxi is located in China's border and coastal areas and is known for being an ethnic minority region. The region is home to 12 unique ethnic groups, making up a population of around 20.77 million people. The area has several historic villages with rich histories and unique characteristics. The villages are scattered throughout different topographical characteristics such as mountains, hills, plains, coastal areas, and other land formations. They also display more than 10 unique architectural styles. The topic covers a wide range of historical information, cultural landscapes, and architectural knowledge (Zhang HL et al, 2017). Expedited research is required to explore the preservation of traditional villages in Guangxi, along with extensive research on sustainable development in this area.

An evaluation method for sustainable spatial development of traditional villages is created by researching relevant historical elements and characteristics that impact growth. This research analyses the current geographical development of traditional village heritage and proposes sustainable development strategies for local governments. Studying the evolution of residential building in Guangxi Yao Mountain, particularly its cultural heritage, reveals interesting topics that demonstrate the interaction between tradition and modernity in

architecture and culture (Lu Y and Ahmad Y, 2023). The Yao ethnic community in Guangxi, China, has a significant architectural heritage that has evolved over many generations.

This examination explores how this legacy has evolved throughout time, considering how cultural factors and improvements in innovation have influenced its development. Preserving cultural assets is crucial for maintaining the cultural relevance of Yao Mountain architecture. Local communities and government actions have significantly impacted the preservation of these historic structures. Yao architecture's cultural relevance lies in its representation of the close relationship between the Yao people and the natural surroundings. The design showcases environmentally friendly elements and blends well with the surrounding environment. Yao tribes have adapted their traditional houses to modern living standards due to changing lifestyles. This may include incorporating different amenities like electricity, plumbing, and modern building materials.

However, a sequence of experiences and problems led to a shift in research focus towards studying people and rural areas (Liu BE, 2008). Scholars began researching subjects like the human settlement environment in villages, village government, heritage activation, resource appraisal, and value recognition. The research material covers theoretical and policy analysis related to new-type urbanisation, rural rejuvenation, and urban-rural community building. Studies during this period primarily focused on the sustainable conservation and development of traditional villages.

Many study findings have been obtained on the safeguarding of traditional villages in theory. Nevertheless, unresolved issues need more thorough and extensive investigation. Past studies primarily examined the physical and cultural aspects of traditional villages. However, due to various experiences and challenges, the focus of research shifted towards studying the residents and rural areas. This new direction emphasised topics like the living environment in villages, village management, heritage preservation, resource assessment, and acknowledging the value of these areas. The study focuses on theoretical and policy analysis within the context of new-type urbanisation, rural revival, and urban-rural community formation. Research during this time focused on the sustainable preservation and development of traditional settlements.

Thus, addressing the sustainable use of village legacy, managing the balance between preservation and progress, and fostering the sustainable growth of traditional villages are crucial societal challenges. Furthermore, the building of a sustainable development system has become a significant priority for present-day managers and scholars.

Research Objective:

The project aims to investigate the inheritance and creative design of residential structures in the Yao mountainous regions of Guangxi.

- To investigate how regional culture impacts the architectural space of Yao ethnic minority residences in mountainous areas and to analyse the spatial structure and design expression of these residences.
- To analyse the current issues with residential structures of the Yao ethnic group in mountainous regions and determine the appropriate contemporary art design approach for innovatively transforming these architectural spaces.
- To enhance the integration of the current living environment and increase people's well-being, the goal is to construct sustainable residential structures on Yao Mountain with enduring value in the modern period.

The study aims to examine how traditional residential structures may be passed down and improved in the modern period by exploring novel design concepts for residential buildings in the Yao mountainous regions, enhancing the value of traditional ethnic minority dwellings in contemporary times.

Research content:

This article focuses on the legacy and creative architecture of residential houses in the hilly regions inhabited by the Yao ethnic community in Guangxi. The literature extensively explores the traditional residential constructions of ethnic minorities, conducts a dialectical examination of connected themes, and examines modern scientific advancements. By examining modernity, grasp the extent and range of scientific research. An analysis and assessment of the state of domestic research on traditional ethnic minority residential buildings in Liuxiangmen Village, Jinxiu County, Guangxi, is conducted. This includes on-site surveys and questionnaire surveys covering aspects such as building selection, architectural functions, structures, spaces, and the use of architectural elements. The study will analyse the current state of architectural materials and decoration methods, then combine them to investigate the spatial structure and expression of architectural space in residential buildings in Yao mountainous regions. Finally, This study will outline the unique characteristics, methods, and design principles of innovative residential building design in Yao mountainous areas. Amid the modern age, sustainable development is crucial. How to blend the current living environment, enhance inhabitants' living conditions, and achieve the scientific preservation and advancement of traditional architectural culture in Yao mountain regions.

Review of Literature

Research on the current situation of construction in Yao mountainous areas in Guangxi

The residential homes in the hilly regions of the Yao people in Guangxi exemplify the architectural style of ethnic minority dwellings in Guangxi. It represents the architectural knowledge and aesthetics of the Yao people in the area, emphasising their awareness and comprehension of their history and culture. Yao communities are mostly located at a height of around 1,000 metres. Many reside in the stone mountain region of the karst landform, while a small number inhabit the steep river valley area (Jin G, 2020).

Historically, Yao dwellings were mostly constructed on elevated slopes, while Lingnan was characterised by mountainous terrain and bamboo vegetation. Local residents use bamboo and wood as the structural framework, encased in stone soil, and topped with thatched or bark material. Currently, the majority of Jinxiu Yao people's homes are constructed using brick and wood, symbolising societal advancement and the continual enhancement of living conditions (Qianni Z et al, 2023).

The dwellings on the reinforced concrete floor are becoming urbanised every day. The traditional qualities and living patterns of a country are diminishing as they increasingly diverge from the demands of contemporary life. This is a paradoxical phenomena. To really comprehend this country, one needs delve into its living habits, history, culture, and architectural culture. The Yao community lies secluded in the highlands, seeming to have remained unchanged for a millennium. The settlement is situated on a mountain at an elevation of 808 metres, surrounded by mountains, offering a panoramic picture of the karst terrain reminiscent of a painting of Guilin (Fig 1).

Figure 1: Yao villages built on the mountain (https://news.cgtn.com/news/2021-08-09/Thousand-year-old-Yao-village-hidden-in-

the-mountains-of-S-China-12AjBDELCTK/index.html)

Related research in the humanities field

The development and changes in the architectural style of Yao people's homes in the Yaoshan region represent the distinctive cultural characteristics of the Nanling Corridor. Consequently, behaviourists, historians, anthropologists, economists, sociologists, and experts in religion and folklore have shown interest in studying how the inhabitants of Yaoshan engage with the multicultural community in the local culture to promote shared prosperity. There are three primary kinds of extant research based on the breadth of items.

In humanistic study, the architecture of the Yao mountain region is mostly analysed as a concise description of village house and habitation via the lenses of anthropology, history, or ethnology (Xinhua Z and Xuelin L, 2022). The material morphological features of traditional village structures in the Yao mountain region are not extensively studied due to the many disciplines of academic study. The Yao mountain region Studying residential structures in a comprehensive and detailed manner has established a strong basis for understanding the humanistic and historical context of the Yao mountain region.

Related research in the field of construction

Begin by examining a specific Yao mountain village to analyse and research its form and architectural features. The second objective is to analyse and outline the characteristics of Yao settlements within a specific Yao settlement region. The final step is comparing the settlements of different ethnic groups and Yao houses in a minority settlement region. The fourth task is to provide a summary of Yao residential areas and housing styles, and to elucidate the causes influencing their architectural designs. (Fig 2).

Fig 2: Overview of Yao mountain residences (https://www.alamy.com/stock-photo/yao-village-on-a-river.html?sortBy=relevant)

Research conducted in the domain of urban planning (Figure 3)

(1) Investigation of the zoning and genealogy of Yao villages

(2) There has been much scholarly inquiry conducted on the evolutionary trajectory of Yao communities.

(3) Investigation on the material and intangible cultural treasures inside Yao communities

(4) A study on the preservation and development of Yao communities

Fig 3: Zoning and genealogy of Yao villages (https://www.dreamstime.com/traditional-wooden-houses-village-red-yao-tribe-longsheng-huangluo-yao-village-guilin-guangxi-china-traditional-wooden-houses-image134305288)

Current status of foreign research

Relevant foreign research focuses primarily on residential structures, with an emphasis on

"vernacular architecture." This term refers to structures that are indigenous to a region, embody its natural and humanistic attributes, and fulfil practical, everyday requirements. The concept and meaning of this term are in perfect harmony with the research's emphasis on conventional residential edifices in China, thereby furnishing significant benchmarks for analogous investigations. Extensive investigations are directed towards resolving particular challenges that are unique to rural residential structures, including material selection, adaptation to local climates, and preservation of the rural architectural style. The objective of this study is to pave the way for practical implementations and additional inquiry.

The significance of incorporating local attributes and national identity into architectural designs is emphasised by John Ruskin in his book The Poetry of Architecture. In its encyclopaedia of Rural Architecture, which is edited by architectural historian Paul Oliver, the World Encyclopaedia of Rural Architecture defines rural residential structures with an emphasis on their communal nature, environmental impact, resource accessibility, and the deliberate construction of the Brunswickkill to meet specific needs. "Local Architecture: An Illustrated History," a book written by R. W., offers a comprehensive visual account of British local architecture throughout the centuries. Until the turn of the 20th century, the illustrations depict the morphological characteristics of agricultural communities and early industrialization in British local architecture Alexandre G et al, 2021).

The study has been in the following flowchart steps explained in the fig 4.

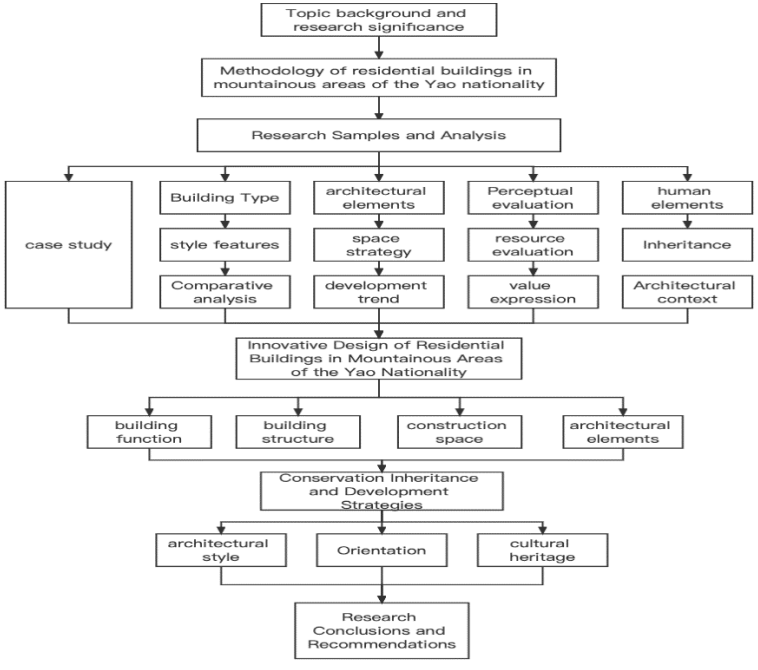

Fig 4: Paper framework flowchart

Current status of domestic research

Western conceptions influenced Chinese human geography research in the 1930s, resulting in the emergence and expansion of studies on ethnic minority settlements. An investigation into the traditional settlements of ethnic minorities begins in the field of architecture and planning with an examination of the minuscule dwellings constructed by these communities. A group consisting of professionals and researchers, Liang Sicheng, Liu Dunzhen, and Liu Zhiping, with the backing of the China Construction Society, undertook an investigation and study of regional architecture in China (Xiao Y and Wu C-H, 2022).

Over the past century, village architecture has become an increasingly diverse field of study. In early pure architecture, the examination of villages through the lens of material and spatial form. However, this has since broadened to encompass a variety of multidisciplinary perspectives. Additionally, regional culture, social economy, and indigenous customs should be incorporated into research. Enhance the research content of the settlement while establishing a topological correlation and conducting a systematic analysis of the spatial structure of the village, as well as a thorough examination of the generation mechanism, cultural thought, and social system.

The varied cultural legacy of Guangxi

Cultural identity pertains to an individual's development of pride and admiration for their own culture as a whole social and psychological entity. An individual's sense of ancestry, nationality, and heritage are deeply interconnected. Academic courses develop and expand with the increasing use and development of local cultural assets. Guangxi's unique cultural identity is analysed using three tiers: the natural element, the human element, and the architectural element.

1. Geographical Factors

Guangxi, situated in southwest China, has a subtropical monsoon climate with consistent rainfall, many rivers, and a karst landform. It is a large mountainous basin surrounded by Guangdong, Hunan, Guizhou, Yunnan, and Hainan provinces.

2 Physical trait

Guangxi's vast karst environment has evolved into a unique ecology. This species is prevalent in the far southwest, far northwest, Guizhong, and far northeast of Guangxi. A magnificent peak can be seen mirrored in the river, with the view partially obstructed by layers of mountainous terrain. Locate a site in Guilin that has the karst characteristics you want.

3, Terraced fields The Longsheng terraces, often known as "the world's top terraced fields," are a remarkable spectacle. The trees extend from the base to the peak of a mountain, and their tightly packed arrangement gives the impression of a chaotic scene.

The Yao ethnic group is widely acknowledged as one of the biggest and most populous ethnic groups living in the southern areas of China. During the Qing Dynasty, the Yao ethnic group migrated to many nations like Vietnam, Laos, Thailand, Myanmar, the United States, Canada, France, Mexico, and New Zealand. The diasporic Yao ethnic community has a population of around one million people. There are several transnational countries spread over Asia, America, Europe, and Oceania, with a combined population in the millions (Utami LA,, 2022).

Yao festivals have a wide range of cultural materials, such as traditional dances, unique costumes, visual representations, and musical compositions.

The local characteristics are very praiseworthy. Local festivals are communal events that provide a mix of amusement and business opportunities. Socialisation is the process by which people learn the essential skills, norms, and values needed to operate successfully in a certain community. It entails cultivating interpersonal connections, nurturing a feeling of oneness and communal spirit. Education is essential in equipping people with the necessary information and skills to engage in

social relationships and make meaningful contributions to society. Additionally, festivities that circle around numerous topics serve as occasions for people to get together, thus cementing social relationships and boosting cultural variety (Su J and Sun JX, 2020).

Main Area: Typically situated in the middle area of a given location, the primary structure serves as the focal point for essential activities of everyday existence and religious observance. Out of the twelve primary structures now in operation, three of them possess outside walls constructed from mud and interior partitions made of wood. With the exception of Li, Mumei's residence , the site plan of residential house reveals that the remaining eight primary structures on the premises are constructed mostly of wood. The primary structures inside Dachedong village were initially constructed with a width of three bays.. In some instances, adjacent parts might be located on either one or both sides of the home (Fig 5).

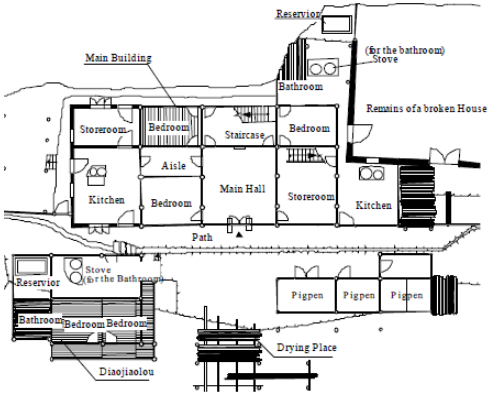

Fig 5: Site Plan of Residential House (Lu, Yong, and Yahaya Ahmad. 2023. "Heritage Protection Perspective of Sustainable Development of Traditional Villages in Guangxi, China" Sustainability 15, no. 4: 3387. https://doi.org/10.3390/su15043387)

Central Hall: On the architectural design of the main building. The main hall is often located in the central part of the main building, with a significant entrance that links the interior and outside areas. Elderly bedrooms in traditional architectural layouts are often located in the back of the main hall, with kitchens and storerooms on each side. In the following architectural design of the main structure, it was essential to construct more bedrooms to meet the increasing number of people living in the building. The decision was taken to preserve the traditional Yao practice of preserving indirect access to the sleeping chambers. Corridors were built within the main building, and the kitchen was moved to nearby buildings instead of being inside the main building (Dharmawan AH et al, 2020).

Kitchen: Unlike other minority groups in Hunan Province, the Yaos in Dachedong hamlet have a unique feature of having just three hearths in their kitchens. This is quite different from what is common among other minority populations in the province, where hearths are both the spiritual and functional centre of the home. The main cooking equipment mostly consists of stoves. Some stoves have a similarity to those used by the Hans, with a brick support that is around half a metre tall. The stoves are fitted with two or three ovens, which serve the dual function of cooking and heating. Nevertheless, there are differences among different kinds of stoves. A hearth and stove are connected by creating a square shallow pit with a stone or brick edging on the ground before building the brick stove. A trivet is put in the hole to assist in cooking rice or boiling water. The Yao ethnic group has shown a consistent trend of movement throughout history (Meng F et al, 2022).

Drying Area: The Yaos mostly inhabit mountainous regions, resulting in high humidity levels in their habitation locations. A drying facility is essential in the village to store grain and dry fuel for cooking. The drying area is often positioned in front of the main structure to maximise sunlight exposure. It consists of a horizontal platform supported by posts placed on

sloping ground. Grain or firewood are placed on a flat area outside on sunny days.

Bathroom : Since the Yaos have adopted the production method of slash and burn, their bodies are easily dirtied. Thus, they formed the habit of taking a shower everyday in their emigrating life" (Head L, 2010). The Yaos pay so much attention to cleanliness that a bathroom has become an indispensable element in their site arrangement. While other minorities in Hunan Province usually take a shower in the kitchen, the Yaos are the only minority people to have separate bathrooms. Discussed in detail, the bathroom is usually built near the main building with an area of about one square meter. Approximately ten logs are arranged in a row on the ground, with simple board walls then being constructed on four sides to form a bathroom. Near the bathroom, there is usually a reservoir for keeping water and a stove for heating it. The position of the bathroom is usually in a hidden place to avoid sight interruption

Scope of design:

The existing country houses are designed in Zhaimentou Village, Yao Village, Liuxiang Township, Jinxiu Autonomous County, Guangxi Zhuang Autonomous Region.

Regional scope:

This paper takes Jinxiu Yao Autonomous County of Laibin City, Guangxi Zhuang Autonomous Region as the research object. Jinxiu Yao Autonomous County is located in the central and eastern part of Guangxi Zhuang Autonomous Region and the main mountain range of Dayao Mountain in the northeast of Laibin City, with a total area of 2,518 square kilometers. It has jurisdiction over 3 towns and 7 townships The terrain of this area is middle high and low. The central area is dominated by mountains and forests with many streams. The border area is hilly and river valleys, and the climate is warm and rainy (Fig 6).

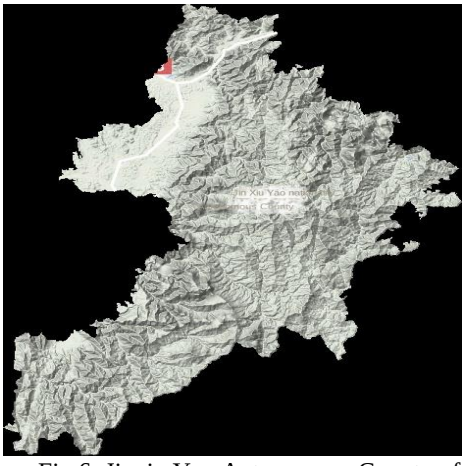

Fig 6: Jinxiu Yao Autonomous County of Laibin City

Overall: The overall study of this study is the residential buildings in the Yao mountain area of Dayao Mountain in Jinxiu Yao Autonomous County, Laibin City, Guangxi Zhuang Autonomous Region.

Sample: The sample of this study is an example of residential buildings in Zhaimentou Village, Yao Village, Liuxiang Township, Jinxiu Autonomous County, Guangxi Zhuang Autonomous Region. The village was listed in the list of traditional villages in Guangxi and was listed as a "village with Chinese ethnic minority characteristics" by the National People's Committee in 2017. Therefore, this article selects this place as a research sample of the inheritance and innovative design of residential buildings in Yao mountainous areas of Guangxi, and the corresponding inheritance strategy and innovative design research.

MATERIAL AND METHODS

In this study, the researchers obtained preliminary data by studying books, documents, articles, papers, related studies, and the study area of Guangxi Yao mountainous area. In this study, the researcher used qualitative research

and quantitative study. The research steps are as follows:

1）Qualitative research:

This study focuses on the residential buildings in the Yao mountainous areas of Guangxi. These buildings not only carry the lifestyle and spiritual culture of the Yao people from generation to generation, but are also unique in architectural style, structure and use of materials. These buildings reflect the historical evolution of Yao culture and their relationship with the natural environment.

The selection of research samples will focus on those individuals and regions that can provide in-depth information on the inheritance and innovation of residential architecture. Information provided by:

1、Five local residents with profound knowledge of residential architecture. They not only have rich traditional knowledge of architecture, but may also have experienced changes in construction methods.

2、5 experts in folk residential architecture. These experts can be scholars, architects or cultural workers. They have in-depth understanding and research on the history, characteristics and innovation of Yao folk houses.

2）Quantitative Study：

The questionnaire survey selected 302 local residents and tourists to investigate the design needs and design priorities of local residents and tourists for the innovative renovation of residential buildings in Guangxi Yao mountainous areas, formulate design strategies, and evaluate the final design results in terms of aesthetics, functionality, and satisfaction. Make an evaluation.

Material Used for the study:

Questionnaire designed for local residents

Questionnaire designed for tourists

Design interview forms and evaluation forms for government staff

Collection of Data:

1 Data research: On the one hand, the data research of the project is to collect the construction materials and documents of residential buildings in the Yao mountainous areas of Guangxi in various periods, and sort out the information needed to carry out the research. On the other hand, visit relevant experts, scholars and architects to obtain first-hand information related to the project.

2 Interview: The interviews in this section are specially designed for professors, experts and scholars in the field of architectural design, experts related to national culture research, and government staff to ensure the accuracy of the research.

3 Evaluation: This part formulates the historical value evaluation form of the building in Mentou Village and the evaluation form of the building foundation of Mentou Village according to the historical building value evaluation index system and the building basic evaluation system. It is evaluated by professors, experts and scholars in the field of architectural design, experts related to ethnic cultural research and government staff.

The research used semi-structured, in-depth interviews and participant observation methodologies, together with internet websites, print newspapers, and other literature, to gather qualitative data from six villages. Six types of interviewees were identified through random sampling by visiting village committees, households, heritage sites, production and operation institutions, and other locations. The interviewees include resident village cadres, middle school teachers, left-behind elderly, non-genetic heirs, foreign tourists, and local farmers. The questionnaire addresses various aspects of villagers' lives, such as living conditions, production and operation conditions, and the ecological development environment. It includes information on village population composition, architectural history, cultural details, living conditions, public service facilities, production and management, environment for heritage development, and restrictions on their product.

By utilising a questionnaire survey, interviews, and field investigations, the current

status of the six traditional villages was accurately depicted. This helped to identify development issues in the villages, which is beneficial for conducting further research on the long-term sustainability of traditional villages.

The process of determining weight and establishing scoring criteria and Stat Analysis

It is crucial to provide proper weights to each evaluation indicator due to the different effect and impact of each measure. In order to determine the relative value of each evaluation indicator related to the living, producing, and ecological spaces, this research used the Delphi technique and an analytic hierarchy approach. Incorporating the majority of experts' subjective opinions and collective knowledge, the Delphi method may partly capture factual truths. The parameters used to evaluate the sustainability of various settings were evaluated and given ratings by a panel of five experts with expertise in the respective fields. The analytic hierarchy process formula algorithm improves the neutrality of the weight assigned to each index. The score's numerical value, the judgement matrix, the feature vector of the judgement matrix, and the weights allocated to each index component were all calculated in SPSS. After that, we performed a consistency test, and after it was finished, we were able to derive weight information for each individual component. Both qualitative and quantitative measures are required for a complete evaluation. A grading scale from one to five (I, II, III, IV, and V) was established for use in rating qualitative indicators. Score ranges for the stages are as follows: 0-20 for the first phase, 21-40 for the second, 41-60 for the third, 61-80 for the fourth, and 81-100 for the final.

The percentage score out of five used to determine compatibility was calculated using objective metrics and rigorous standards. Assessment scores are positively correlated with sustainability; higher assessment scores are indicative of higher levels of sustainability, whereas lower assessment scores are linked to lower levels of sustainability. The evaluation used a 100-point scale, with 100 representing the maximum success and 0 representing the worst performance.

Results

Given the current state of affairs in Guangxi's rural communities, it is clear that the material basis is the fundamental factor in the quest for sustainable development. This finding is consistent with the widespread phenomenon of Guangxi's undeveloped economy, ongoing population out movement, and severe depletion of rural regions. The ecological environment of Guangxi is well-known for being pure, with a healthy equilibrium between human activity and natural ecosystems. Additionally, the rural residents of this region are well admired for their commitment to feng shui and other progressive ecological ideas. Therefore, there are usually relatively few obstacles to establishing sustainable development in the natural regions of traditional communities. According to a weight analysis performed at the sub-index factor level, the variety of building uses is the most important indicator of the spatial sustainability of traditional villages in Guangxi. Several factors in urban preservation and development were investigated in this research.

One such variable is D6, which has a coefficient of 0.03 and reflects roadway width. In addition, D8 is the symbol for a 0.01% square coefficient. D11, with a coefficient of 0.03, is the distance that may be taken to avoid a disaster. D18 with a coefficient of 0.01, representing the frequency with which public service facilities are used. The coefficient of 0.011 for D23 also stands for the legacy manufacturing style. In this case, D26 with coefficient 0.04 stands in for the total number of notable people throughout history. In addition, the manufacturing method is represented by the coefficient of 0.03 in variable D31. D36 with a coefficient of 0.03% represents the share of secondary and tertiary industries. In addition, the coefficient of 0.14 assigned to D41 characterises the kind of natural landscape. Finally, the coefficients 0.032 and 0.024,

respectively, for D48 and D51 stand for historical locations. The necessary information is shown in Table 1 below.

Table 1: Layer weight value analysis

Layer B	Weight	Layer C	Weight	Layer D	Weight
B1		C1		D1	0.06
B1		C1		D1	0.06
B1		C1		D2	0.04
B1		C1		D2	0.04
B1		C1	0.15	D3	0.07
B1		C1	0.15	D3	0.07
B1		C1		D4	0.06
B1		C1		D4	0.06
B1		C1		D5	0.02
B1		C1		D5	0.02
B1		C1		D6	0.03
B1		C1		D6	0.03
B1	0.55	C1		D7	0.05
B1	0.55	C1		D7	0.05
B1		C2		D8	0.01
B1		C2		D8	0.01
B1		C2	0.06	D9	0.04
B1		C2	0.06	D9	0.04
B1		C2		D10	0.03
B1		C2		D10	0.03
B1		C2		D11	0.04
B1		C2		D11	0.04
B1		C2		D12	0.04
B1		C2		D12	0.04
B1		C2		D13	0.03
B1		C2		D13	0.03
B1		C2		D14	0.06
B1		C2		D14	0.06
B1		C3		D15	0.04
B1		C3		D15	0.04
B1		C3		D16	0.04
B1		C3		D16	0.04
B1		C3	0.07	D17	0.04
B1		C3	0.07	D17	0.04
B1		C3		D18	0.01
B1		C3		D18	0.01
B1		C4		D19	0.04
B1		C4		D19	0.04
B1		C4	0.06	D20	0.05
B1		C4	0.06	D20	0.05
B1		C4		D21	0.03
B1		C4		D21	0.03
B1		C4		D22	0.04
B1		C4		D22	0.04
B1		C5	0.08	D23	0.011
B1		C5	0.08	D23	0.011
B1		C5		D24	0.05
B1		C5		D24	0.05
B1		C5		D25	0.05
B1		C5		D25	0.05
B1		C5		D26	0.04
B1		C5		D26	0.04

B1		C6		D27	0.06
B1		C6		D27	0.06
B1		C6	0.03	D28	0.03
B1		C6	0.03	D28	0.03
B1		C6		D29	0.04
B1		C6		D29	0.04
B1		C7		D30	0.05
B1		C7		D30	0.05
B2		C7	0.08	D31	0.03
B2		C7	0.08	D31	0.03
B2		C7		D32	0.07
B2		C7		D32	0.07
B2		C7		D33	0.05
B2		C7		D33	0.05
B2		C7		D34	0.06
B2		C7		D34	0.06
B2	0.67	C7		D35	0.04
B2	0.67	C7		D35	0.04
B2		C7		D36	0.03
B2		C7		D36	0.03
B2		C8	0.09	D37	0.06
B2		C8	0.09	D37	0.06
B2		C8		D38	0.07
B2		C8		D38	0.07
B2		C8		D39	0.05
B2		C8		D39	0.05
B2		C9	0.06	D40	0.03
B2		C9	0.06	D40	0.03
B3		C9		D41	0.14
B3		C9		D41	0.14
B3		C9		D42	0.14
B3		C9		D42	0.14
B3		C10	0.07	D43	0.05
B3		C10	0.07	D43	0.05
B3		C10		D44	0.07
B3		C10		D44	0.07
B3		C10		D55	0.06
B3		C10		D55	0.06
B3		C11		D46	0.08
B3		C11		D46	0.08
B3	0.44	C11	0.41	D47	0.06
B3	0.44	C11	0.41	D47	0.06
B3		C11		D48	0.032
B3		C11		D48	0.032
B3		C11		D49	0.05
B3		C11		D49	0.05
B3		C12		D50	0.47
B3		C12		D50	0.47
B3		C12	0.09	D51	0.024
B3		C12	0.09	D51	0.024
B3		C12		D52	0.04
B3		C12		D52	0.04
B3		C13		D53	0.07
B3		C13		D53	0.07
B3		C13	0.05	D54	0.096
B3		C13	0.05	D54	0.096
B3		C13		D55	0.077
B3		C13		D55	0.077

Evaluation of Living Space

Longji (LG), Rongdi (RD), Shuiyuan (SYT), Huma Ling (HML), Yang Mei (YM), and Sand (SZ) had high levels of sustainability. Both YM and SZ fall within the category of "plain waterfront villages" with favourable geographic circumstances, making them candidates for consideration.These little towns are well situated near larger urban centres, have a flat topography, and provide easy access to public transit. They have large amounts of land, densely populated regions, and an abundance of infrastructural services, all of which point to a high quality of public life. This kind of community tends to be spread around transit hubs and rivers. Since more people are taking advantage of water taxis, the number of piers in public spaces has increased. This change has not only resulted in an increase in the number of tourists from other countries, but it has also helped to create a prosperous business climate. Typically located at an altitude of 500 metres or more, LG is marked by a steep topography and complex terrain. Most of the homes in these communities follow the natural slope of the mountains, creating a sparse and scattered layout. In particular, you may find them scattered throughout the cliff face, mountainside, and steep slope (Zhanfeng D, 2020).

Creating habitable space on slopes steeper than 30 degrees offers significant difficulties for building projects. The conventional wisdom predicts that space sustainability will be of little importance, yet the result runs counter to this prediction. The data analysis and evaluation show that LG serves 10 various architectural tasks, has a considerable architectural past, and boasts several plazas. The existence of ethnic unity contributes greatly to the distinctive regional qualities in physically isolated alpine areas that see limited urbanisation. Residents plan the layouts and designs of their villages to best facilitate their way of life and ensure their continued existence. Given the constraints of the available land, platforms of suitable height are built out of gravel and clay. The balance point of the structures is located on the platform, which is built into the side of the mountain. Structures and columns are raised to some degree because of the strategic utilisation of above space to provide room for further expansion. A unique natural habitat that mixes production and residential activities has been created on the mountain via the harmonious integration of scattered spatial patterns and distributed terraces. Most of the streets are about 2–4 metres wide, which makes them quite practical and easy to communicate on.

Gravel and pebbles, mined in the intermountain West, are the most common pavement materials. The interaction between manmade structures and the natural environment illustrates the indigenous people's capacity for resilience and adaptation. Terraced fields in an otherwise unspoiled landscape are a great marketing tool for the area. Incorporating the results of ongoing research into native flora into rural settings has increased the happiness of locals, demonstrating a substantial degree of livability and sustainability.

Geomorphic benefits may account for the high forest coverage ratings (D46) and ecological land percentage (D49) seen in LG, RD, SYT, and HML. Because of the low level of human interference, the spatial features display a striking concentration. However, these features also provide difficulties when it comes to building roads and protecting historical sites. When it comes to using renewable energy and enacting environmental cleanup initiatives, the grades might be better. Ecological waterfront areas have a lower rate of resource utilisation than do non-ecological waterfront areas. The comprehensive and long-term growth of a village system depends on the interaction of production, living, and environmental space. There is no way to ignore any part of this link without jeopardising the community's health and future.The degree of sustainable development seen in the different landforms within the towns varies. Sustainable development is more advanced in coastal areas generally because of the various advantages these areas enjoy. The favourable climate for production, easy access to

irrigation, and abundant resources are only a few examples of the benefits that come from having a dense population. The natural topography has a major impact on the lifestyles of the people who live in villages with mountainous valleys and steep hills. Land reclamation is complicated by the area's varied terrain, especially in terms of road traffic construction, which moves at a more leisurely rate. Large-scale planting and industrialisation efforts face serious obstacles in the form of restricted production scale and insufficient agricultural modernisation. In addition, the level of sustainable development in these communities must be raised so that it is comparable to that of similar places.

Communities within living and producing heritage regions with the same landform category have varying levels of sustainable development, with most differences being attributable to the relative availability of traditional buildings, cultural heritage, and historical events. When comparing areas with similar topography, This study find that the beauty of the natural environment remains constant but the architectural vestiges and cultural history show remarkable variance, both of which greatly contribute to sustainable development. This study found that traditional villages in Guangxi share a number of characteristics, including a severe deficiency in clean energy and a poor rate of carbon utilisation, during our investigation of the sustainable development of the spatial dimension of the ecological legacy of these communities. Because of this shortcoming, progress towards a sustainable ecological society has been gradual. In order for residents of traditional villages to successfully make the transition from an agricultural society to a modern one, it is essential that they implement rational energy structures and establish effective policies, systems, and management oversight in the environmental heritage space of these communities.

1. Retain and innovate traditional architectural styles: combine the preferences of local residents and tourists, retain the traditional architectural styles of the Yao people, integrate modern design elements, enhance the fashion atmosphere of the architecture, and meet the aesthetic needs of different groups of people.

2. Balance of material selection: When building or renovating residential houses, comprehensively consider the advantages and disadvantages of new materials and traditional materials, which not only retains the traditional style of Yao buildings, but also improves the durability and stability of buildings.

3. Optimize the building structure and functional layout: According to the local terrain and living habits of residents, as well as the needs of tourists, optimize the building structure and functional layout to improve space utilization and comfort.

4. Improve building comfort and intelligence: introduce modern home technology to improve the comfort and intelligence level of residential houses to meet the pursuit of modern quality of life by residents and tourists.

5. Focus on the renovation of kitchens and bathrooms: according to the needs of residents and tourists, focus on the transformation of kitchens and bathrooms, improve the effects of ventilation, smoke exhaust, sanitation, etc., and improve the quality of living.

6. Pay attention to the design of public and private spaces: When designing residential houses, fully consider the comfort and practicality of private spaces such as bedrooms, dining rooms and living rooms, and pay attention to the design of public spaces to meet the social needs of residents and tourists.

7. Improve the aesthetics of the facade of the building: repair and transform the facade of the derepaird building, add unique patterns and decorative elements, improve its beauty and cultural connotation, and increase the interest of tourists.

Instead of taking a static, museum-like approach to the protection of cultural heritage sites, a dynamic, ever-evolving one is required (He C, et al, 2014). This study in coordination

with our studies confirmed that some of the difficulties typically experienced by undeveloped communities: Different village characteristics must be protected, the research of connotation values must be expanded, and the efficiency of unified planning must be improved. Since many locals have left the village in search of better career opportunities elsewhere, population and economic growth have both declined sharply. Discontinuity arises because of the increasing difficulty of transmitting the values and traditions of a culture with a rapidly ageing population. The existing industrial structure is disorganised, making it difficult to set up a unified system. In addition, the pattern of growth is rather straightforward. (Table 2).

Table 2. Guangxi traditional village heritage composition

group	level	**Material Heritage**	**Intangible Heritage**
living	1st	The architectural elements present in the area include folk dwellings, ancestral halls, gatehouses, archways, puddles, a stage, temples, streets, drum towers, old trees, renowned trees, ancient wells, sundecks, a ferry, and a dock.	The national language, folk literature, folk art, folk music, folk dance, opera, folk art, folk acrobatics, life etiquette and traditions, and traditional sports are among the cultural elements that contribute to the rich heritage of a country.
Production	2nd	The architectural structures in question include a palace temple, a Wind and Rain bridge, as well as various agricultural landscapes such as cropland, gardens, pastures, and grasslands. Additionally, there are functional spaces such as workshops, mills, and ditches.	The topics of interest include traditional handicrafts, rural culture, traditional medicine, production, and trading norms.
Ecology	3rd	The mentioned elements include a mountain, aquatic bodies such as rivers and lakes, as well as a terrace.	The study of folk beliefs encompasses an examination of the cultural and traditional ideas held by a particular community or group. Ecological living refers to the practise of adopting sustainable and environmentally friendly lifestyles. Folk customs include the many traditional practises and rituals observed within a certain cultural context. Lastly, folk knowledge pertains to the collective wisdom and understanding passed down through generations within a community.

DISCUSSION

Those of the Yao ethnic minority who make their home in the Guangxi Zhuang Autonomous Region in southeastern China may recognise the phrase "Guangxi Yao Mountain residential architecture space" as a synonym for the traditional dwelling and architectural style shared by members of this community. The architectural style of the location in question typifies the Yao people's ability to adapt to their natural surroundings. Their culture and history are inextricably intertwined. The following are primary characteristics and features of residential buildings on Guangxi Yao Mountain. Houses built on stilts are a distinctive feature of the Yao Mountain architectural style. The homes in issue are raised above the ground thanks to the combination of a steep slope and wood pilings. The elevated design of the building serves several purposes, such as providing protection from water and vermin, as well as shade and air circulation (Lu Z et al, 2004).

Traditional villages in Guangxi are the focus of an in-depth look at their cultural value. The purpose of heritage preservation is to provide concrete evidence of our past and current achievements. Using an index evaluation approach, researchers found that traditional villages in Guangxi contribute considerably to numerous elements of sustainable development, such as livelihood, production, and ecological space. It was found that RD and HML had the lowest average total scores of any of the factors. The lack of many historical features was identified as a major contributor after considering several signs. Therefore, in order to successfully promote the preservation and development of these traditional settlements in the future, it is necessary to engage in a thorough investigation of the component historical features and spatial qualities inherent in traditional villages in Guangxi (Li M, 2010).

Both material and immaterial things may be considered parts of a culture's heritage. Specifically, there are two ways to categorise material culture: based on how they were made or how they occurred in nature. Everything from the topography to the landforms to the hills to the water systems to the flora and fauna to the farming and gardens and crops and feng shui forests and landscape woods are all part of the natural heritage (Giliberto F and Labadi S, 2002) Throughout site selection, design, and construction, the traditional villages of Guangxi demonstrate a spatial layout that embraces particular regional traits. Due in large part to its stunning natural beauty, Guilin is becoming more popular among tourists from all over the world. Over time, people everywhere have come to realise and value the natural treasures that are a part of their shared history. The phrase "manmade material heritage" refers largely to the wide variety of structures that rural communities have erected using local materials and time-tested techniques. Folk houses, ancestral halls, gatehouses, arches, temples, stages, bridges, ponds, and roads are all examples of such constructions. However, several studies and polls have revealed that relying on material legacy for social and economic activity in modern rural places has substantial obstacles (Silva L, 2012). Our study in coordination with the previous added confirmed that on material composition has impact on social and economic activity in modern rural places that can have substantial obstacles.

Increasingly, the spiritual and cultural needs of people are being taken into account as societies progress. As a result, there has been a shift in focus towards the protection of intangible cultural assets. This includes several facets, such as the inhabitants' everyday lives, their social interactions, and the local culture as a whole. Municipality of Guangxi is known for its multiethnic and multicultural population. Language, literature, music, dancing, manual dexterity, religious practises, seasonal customs, conventions, and culinary skills are all part of the region's intangible cultural history(Plevoets B and Sowińska-Heim J, 2018).

The legacy life cycle spans the past, the present, and the future as it moves through the phases of creation, preservation, continuation, and death. Although people have a propensity to forget, there may be a way to combat this trait via the protection of historical heritage. The importance placed on heritage is crucial because it helps people learn more about the past and builds bridges across generations. Each of the three categories—living, producing, and ecological—within Guangxi's mediaeval village setting has its own specific functions and values. The living historical district exemplifies the community's core values and goals. The drum tower, the stage, and the ancestral hall are all examples of the kind of central symbolic structures that may be found inside a community. These buildings host a wide range of community gatherings that attract villagers from all around. The hub of the community's life, the village green is a symbol of the harmony and administrative efficiency that the hamlet's overall layout fosters. The purpose of the production heritage space is to protect the rural

area's cultural and economic value. In order to maximise efficiency, production rooms often include constrained zones that combine features like walkways, thoroughfares, and solid surfaces into a unified whole.

Each of the traditional villages in Guangxi has distinct environmental resources, which may either be a natural geographical area consisting of mountains and rivers or a local cultural space comprising of customary practises, residential structures, and historical and cultural elements. The concept of heritage space, like to a living entity, may undergo processes of ageing or migration, necessitating its multiplication and rejuvenation in response to the changing dynamics of society. However some of the studies contradict the statement and concluded that villages in Guangxi shall not be considered as heritage space, like to a living entity ((Li M, 2010). The space environment is characterised by a state of relative stasis, while the introduction of various human activities serves to activate and enliven this otherwise inert area. In order to enhance spatial vitality, it is necessary to conduct a comprehensive examination of the limitations pertaining to the development of spatial aspects in villages.

This entails utilising superior resources to foster industries that possess distinctive characteristics, facilitating the development of clusters, enhancing the regenerative capacity of traditional villages, and establishing a self-sustaining system that enables these villages to survive, generate profits, and progress autonomously. A notable association exists between cultural resources, internet resources, tourist resources, and industrial resources in traditional communities, demonstrating significant potential for fostering growth (Zhang HL et al, 2017). The integration of legal resource protection with contemporary societal demands is achieved by the use of spatial transformation techniques, including superposition, replacement, and rehabilitation. A novel approach has been devised that integrates the vibrancy of traditional village living spaces, consolidates the size of production spaces, and establishes connections with the growth of the ecological region. Consequently, this enables villages to sustain themselves based on their inherent natural and social circumstances. This study proved that implementation of heritage conservation principles through participatory education, cultural design, and hands-on engagement with agricultural tools has had a beneficial influence on the sustainable development of local villages. These results also proved by other similar researches (Meng F et al, 2022). This has also facilitated local government officials and external stakeholders in exploring more innovative prospects.

The persistence of processes such as population migration, spatial attenuation, and spatial diminishment is anticipated. The introduction of the symbiosis theory aims to facilitate the interchange of people, material, and information flow by means of spatial reconstruction. This approach seeks to establish a harmonious symbiotic environment and foster a novel development mode that is highly complimentary to urban resources. There is compelling evidence that the establishment of heritage spaces is closely associated with the rejuvenation of social and economic frameworks in rural regions. This is primarily evident through the facilitation of heritage site development and the subsequent rise in local residents' income as the similar study in 2010 by Li M confimed the same (Liu BE, 2008).. The interconnections between the three legacy areas of living, production, and ecologicalare evident within the temporal and spatial dimensions.

These entities exhibit interdependence and coexistence within a shared social and historical context, and have undergone analogous periods of human intervention and internal environmental constraints. The three historic places exhibit robust life via the interplay of power dynamics, service provisioning and demand, material exchange, and other related factors. Hence, within the context of heritage preservation, the adoption of symbiotic

development appears to be a more appropriate approach for facilitating the sustainable development of traditional village spaces. This approach entails the creation of novel endogenous spaces through the utilisation of external environmental resources, the establishment of guiding principles for their regular functioning, and the formation of a mutually beneficial cycle. Such an approach holds immense importance in the endeavour to construct sustainable development within traditional village spaces. The repurposing of heritage spaces holds significant social significance as a strategy for revitalising and renewing sites. It serves as an engaging and beneficial approach to establishing a meaningful connection with the site, as it directly aligns with the requirements of the new function and its modern historical context. Additionally, it serves as a method for regenerating both the physical structure and the surrounding area. For instance, by adhering to the traditional village development concept of "promoting development through protection and protection through development," and taking into account the unique characteristics of village heritage, a strategy can be implemented to cultivate diverse industries while simultaneously preserving the intrinsic value of the estate. This approach aims to infuse new vitality into the community, showcasing the cultural significance and artistic allure of local initiatives in a more direct manner. Consequently, this approach not only preserves cherished memories but also ensures their sustainable inheritance.

This study introduces a novel approach to assess the sustainable development status of traditional villages in Guangxi. The findings indicate that the sustainable development level of these villages exhibits an imbalanced condition of development. The sustainable development levels of three village kinds in Guangxi, namely basic waterfront type, hilly valley type, and high mountain slope type, are graded in descending order based on the spatial distribution of diverse geographical factors. Furthermore, the pertinent indicators also demonstrate the observation that sustainable development exhibits distinct characteristics within the three spatial categories of survival, production, and ecology. Notably, there is a noticeable disparity in development between the living space and the production space in rural areas. The study findings demonstrate a clear correlation between the allocation and use of cultural space and the sustainable development of rural areas. This link significantly impacts the social, economic, and structural dynamics of traditional villages, influencing their growth and transformation. Hence, considering the negative consequences resulting from various factors, including the unequal allocation of heritage resources, variations in spatial distribution influenced by geomorphology, the abandonment of heritage spaces, and population decline, this research examines the capacity of heritage spaces to facilitate the sustainable development of traditional villages in the context of advancing modern civilization.

Conclusion

Three development strategies for heritage spaces are proposed by the authors: "spatial reconstruction + village symbiosis," "spatial integration + resource complementarity," and "industrial cluster plus spatial enhancement." In an effort to attain a balance between development and preservation and to rectify the ineffectiveness of sustainable development in traditional villages, these approaches are implemented. The objective is to both capitalise on the present worth of these areas while safeguarding their historical significance.

Supplementary viewpoints have been proposed for subsequent inquiries in light of the outcomes of our research. These inquiries may delve deeper into the historical and modern importance of heritage areas, as evidenced by the transformation of rural and urban regions. Furthermore, by capitalising on the advantages of conventional villages, they can effectively

tackle the challenges presented by worldwide sustainable development. These results transcend the boundaries of the current investigation and may provide guidance to local governments in developing policies and planning directives that are more motivating. To ensure the protection of their material heritage, it is critical that villages actively promote the investigation and conservation of their regional history and culture, alongside the passing on of traditional abilities. Furthermore, it is imperative that these communities allocate their limited resources prudently towards the construction of public services, industrial establishments, and infrastructure that are essential for the welfare and requirements of their residents. In brief, the results of this research will furnish significant empirical data and actionable recommendations for regions and countries engaged in the safeguarding of cultural heritage and the exploration of sustainable rural progress. This study cordially invites stakeholders and researchers from around the globe with an interest in the historical domain of traditional communities to participate in collaborative endeavours that seek to investigate and preserve these authentic cultural sites.

Limitation and Future Implementation

Nevertheless, this research is limited since it remains in the exploratory phase. The number of traditional villages is periodically revised, and this research focused on analysing just six representative traditional villages. A larger sample size is necessary to accurately reflect other communities in Guangxi. For future research, it is recommended to pick various villages in groups and summarise their features. Sustainable development is an evolving process, and its assessment techniques and foundation will likewise evolve with the current trends, societal advancements, and changes in environmental circumstances. Rural heritage preservation will progress through many developmental phases, contingent upon the enduring commitment and upkeep by the local government. Future research should focus on refining spatial sustainability analysis methodologies for traditional villages and conducting a follow-up survey from the prior era. Dynamic difference analysis helps us comprehend the elements that influence the scientific character of the research process and outcomes at a certain stage. This analysis ultimately enables the adaptive conservation and sustainable development of traditional village assets.

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WORKS CITED

Peng J, Zhou Y, Zhang Z, Luo Y, Cheng L. (2023). The development logic, scientific Connotation, and promotion path of rural eco-industries in China. Heliyon. 9(7), 17780. doi: 10.1016/j.heliyon.2023.e17780, PMID 37456034, PMCID PMC10345353.

Li L, Fan Z, Xiong K, Shen H, Guo Q, Dan W et al.(2021). Current situation and prospects of the studies of ecological industries and ecological products in eco-fragile areas. Environ Res, 201, 111613. doi: 10.1016/j.envres.2021.111613, PMID 34224714.

Alexandre G, Rodriguez L, Arece J, Delgadillo J, Garcia GW, Habermeier K et al. (2021). Agroecological practices to support tropical livestock farming systems: a Caribbean and Latin American perspective. Trop Anim Health Prod, 53(1),111. doi: 10.1007/s11250-020-02537-7, PMID 33432505.
Bezner Kerr R, Postigo JC, Smith P, Cowie A, Singh PK, Rivera-Ferre M et al. (2023). Agroecology as a transformative approach to tackle climatic, food, and ecosystemic crises. Curr Opin Environ Sustain, 2023, 62. doi: 10.1016/j.cosust.2023.101275.
Huang YC, Xu SL.(2018). Analysis of traditional village layout form from the perspective of ecological landscape schema. Planner, 34, 139-44.
Tang YP.(2021). Research on the protection planning of traditional villages based on the cognition of heritage value, taking Diaoyuan Village as an example. Agric Coogie, 3, 263-71.
Zhang HL, Chen J, Zhou CS.(2017). Review and prospect of Chinese traditional village studies. City plan, 41, 74-80.
Lu Y, Ahmad Y. (2023). Heritage protection perspective of sustainable development of traditional villages in Guangxi China. Sustainability, 15(4), 3387. doi: 10.3390/su15043387.
Liu BE. (2020). The connotation, classification and institutional framework of ecological product value realization mechanism. Environ Prot, 48(13), 49-52. doi: 10.14026/j.cnki.0253-9705.2020.13.008.
Jin G. (2020). Research on the mode innovation of financial support for Guangxi village tourism development under the rural revitaliza- tion strategy. Chin Bus Theor, 5, 196-7.
Qianni Z, Xiaoxin W, Guixia Q. (2023). Ecological product value realization path based on the ”two mountains” development model: the case of Inner Mongolia. Ecol Econ, 2023, 1-16.
Xinhua Z, Xuelin L. (2022). Value realization model and formation mechanism of ecological products—a comparative analysis based on multiple types of samples. Resour Sci, 44(11), 2303-14.
Zhanfeng D, Zhenyu Z, Yanchun D, Li H. Ge Chazhong. P. (2022). Practice Mode and Path of Lucid waters and lush mountains are invaluable assets. Chin J Environ Manag, 12(5), 11-7. doi: 10.16868/j.cnki.1674-6252.2020.05.011.
Utami LA, Lechner AM, Permanasari E, Purwandaru P, Ardianto DT. (2022). Participatory learning and co-design for sustainable rural living, supporting the revival of indigenous values and community resiliency in Sabrang Village, Indonesia. Land, 11(9), 1597. doi: 10.3390/land11091597.
Xiao Y, Wu C-H. (2022). Research on the sustainable development path of folk culture village tourism under the background of ”Internet + industrial resources”. Mob Inf Syst, 2022, 7978367.
Su J, Sun JX. (2020). Spatial changes of ethnic communities during tourism development: A case study of Basha Miao minority community. J Tour Cult Change, 18(3), 333-50. doi: 10.1080/14766825.2019.1679159.
Dharmawan AH, Mardiyaningsih DI, Komarudin H, Ghazoul J, Pacheco P, Rahmadian F. (2020). Dynamics of rural economy: A socio-economic understanding of oil palm expansion and landscape changes in east Kalimantan, Indonesia. Land, 9(7), 213. doi: 10.3390/land9070213.
Meng F, Guo J, Guo Z, Lee JCK, Liu G, Wang N.(2021). Urban ecological transition: the practice of ecological civilization construction in China. Sci Total Environ, 755(2), 142633. doi: 10.1016/j.scitotenv.2020.142633, PMID 33075688.
Head L.(2010). Cultural ecology: adaptation-retrofitting a concept? Prog Hum Geogr, 34(2), 234-42. doi: 10.1177/0309132509338978.
He C, Peng W, Jiang T, He MX.(2014). Evaluation and protective development of cultural heritage resources in ancient villages in Jiangyong County—taking Tongkou Village as an example. J Hengyang Norm Univ, 35, 166-70.
Lu Z, Zhou HM. (2004). Research on the overall protection of world heritage and tourism development—taking Hongcun Village, Yi County, Southern Anhui as an example. Planner, 4, 53-5.
Li M.(2010) Cultural subjectivity in intercultural communication. Int J Arts Sci. 2010;3:272-85.
Giliberto F, Labadi S.(2022). Harnessing cultural heritage for sustainable development: an analysis of three internationally funded projects in MENA Countries. Int J Herit Stud, 28(2), 133-46. doi: 10.1080/13527258.2021.1950026.
Silva L.(2016) Built heritage-making and socioeconomic renewal in declining rural areas: evidence from Portugal. Etnográfica, 16, 16 (3), 487-510. doi: 10.4000/etnografica.2091.
Plevoets B, Sowińska-Heim J.(2018) Community initiatives as a catalyst for regeneration of heritage sites: vernacular transformation and its influence on the formal adaptive reuse practice. Cities, 78, 128-39