

# The Sustainable Strategies Research for Renewal of “Villages in City”: A Case Study of Liuzhou in Southwestern China

Kai Zhang

**Abstract**—Transformation under the reconfiguration of urban-rural relation in Liuzhou city has never been as radical and visible as it has been since the tremendous turn of the last century in China. Huanjiang village is located in Linhuashan Scenic Area in the middle east of Liuzhou city, with spectacular landscape and traditional features. Nowadays Huanjiang village has become a so-called "village in city", which is considered full of great potential for development because of the economic value of regional advantages during the urban sprawl. Communities of village found it difficult to acclimatize with the dramatic changes, which later led to numerous problems including ecological damage, unemployment of landless farmers and loss of traditional culture. Government has started up a series of renewal planings to resolve the problems, which are based on advanced technology and conform to sustainable and integrated strategies of city planning considering the original context and historical culture, superseding the traditional arrangements based on the guide of extensive economic growth. This paper aims to elaborate the context of Liuzhou city and Huanjiang village offered to both the traditional and sustainable planning approaches, in order to understand challenges and solutions of the rebuilding process. Through the analysis of the place relevant to architecture, society and culture, it will establish the corresponding systematic strategies. Considering the local features, it concludes with a comprehensive perspective on organic renewal in the case of Huanjiang village.

**Keywords**—China, Liuzhou, sustainable strategy, urban renewal, village in city.

## I. INTRODUCTION

THE rural urbanization and urban sprawl is the general trend of China's urban and rural space development. With the spread of urban space and function spillover, the villages located in suburban areas become the most affected areas. Affected by urban expansion with the dramatic changes, Many villages are gradually evolving from individual suburban area to the so-called "villages in city", which are considered more disorderly than the central city. In contemporary China, this kind of village which still keeps rural organizational system, actually hardly integrates into the process of modern urban development and management because of the inherent differences and features between urban and rural context. Previous binary economic structure leaves to the villages with household registration system, development strategy, management mechanism which was adverse to the development path of countryside. Villages in big cities are

being eroded in the process of urbanization, and continuous reconstruction of various types of space leave the city a variety of problems, such as land fragmentation, waste of resources, destruction of ecological environment, loss of arable land and deterioration of quality of original life.

Drawing on the evidence from Liuzhou in southwestern China, this research illustrates the theoretical foundation and actual need in the village regeneration. We intended to discuss the possibilities of finding integrated urban strategies to approach both the historical and ecological aspects of urban sustainability during the regeneration process. A fundamental definition of sustainability is employed in this paper as social, cultural, economic and environmental sustainability for current and future generations with the cultural, social, environmental aspects emphasized [1]. In addition, the bottom-up participation is in parallel with the top-down process, which essentially enhances the feature of integration. Through the establishment of the dynamic model system and flexible design management, it will make proper adjustments to keep the renewal on the suitable path based on the local features and a good understanding of the willingness of local people. Through the case study, we want to demonstrate different focus to provide new evidence and reference on for village-in-city regeneration in China, thus contributing to the urban-rural transitional development and spatial restructure towards the coordinated urbanization.

## II. THE ANALYSIS OF URBAN-RURAL SPATIAL RESTRUCTURE AT THE CITY LEVEL OF LIUZHOU

Considering solving deterioration of the urban function and environmental quality, the local government of Liuzhou actively pushes Village-in-City renewal planning forward to promote a people-centered urbanization, which are based on advanced eco-technology and sustainable strategies of city planning considering the original context and historical culture. By studying the macro urban planning and the spatial changes caused by urban construction, we summarize the characteristics of urban-rural spatial reconstruction in Lianhuashan District, and try to explore and summarize the key problems and opportunities of the local villages.

### A. General Spatial Restructure

According to the data of Liuzhou Urban Planning Bureau, the urbanization rate of Liuzhou City increased from 55.1% in 2010 to 62.11% in 2015, and the urban area was expanded from 135.06 square kilometers to 183.92 square kilometers with a

Kai Zhang is with the College of Civil Engineering and Architecture, Zhejiang University, Zijingang Campus, Hangzhou, Zhejiang, 310058, China (phone: 86-18867144817; e-mail: 490900149@qq.com).

growth rate of 36.2%. At the end of 2015, Liuzhou City resident population of 392.27 million, compared with the same period in 2010 increased by 4.36%, an average annual increase of 0.86% [2], which shows that the built-up area grew faster than the population of Liuzhou city in the same period of 2010-2015. The data show a substantial expansion of Liuzhou urban space and the urban gravity on the surrounding foreign population, so that many marginal villages were absorbed into the central urban space system. "13th Five-Year Plan" and the recent

construction of Liuzhou City Planning (2016-2020) put forward the "one river, one main and three new districts, multi-support" urban development pattern, which "one main" means city center area, "three new districts" include East New District, Liujiang New District and the North Ecological New Area [3]. As shown in Fig. 1, the spatial development axis from center area toward the East New District is further strengthened and developed in the new period.

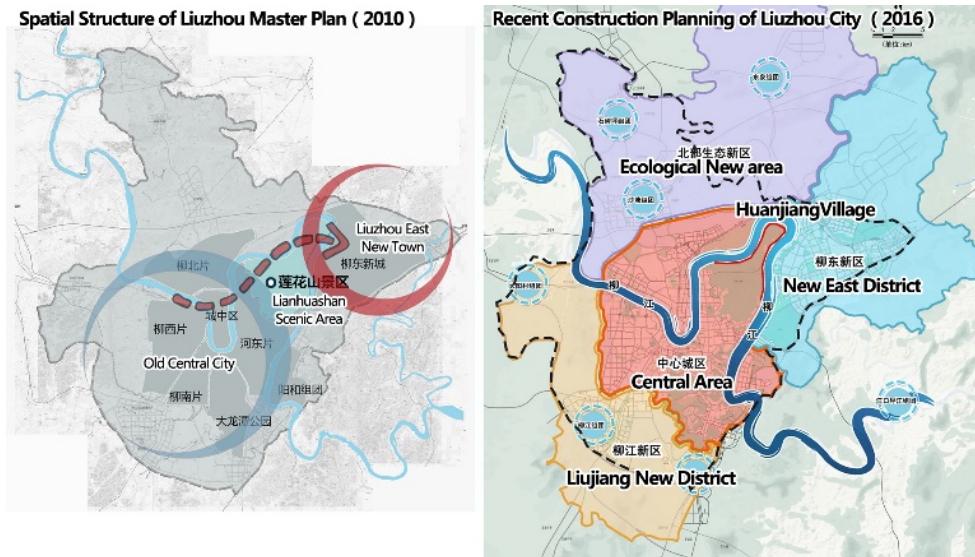


Fig. 1 Comparison of spatial structure in different periods

### B. Analysis of Conflicts in Huanjiang Village

Belonging to the Jinglan Community of Central District, Huanjiang village group consists of 17 villages along the river. At the urban sprawl, planning and construction of infrastructure guides the regional spatial restructure from negative and positive aspects. Completed and open to traffic at the beginning of 2016, the Huanjiang Waterfront Avenue became the main path connecting the historical Huanjiang village and urban space around, easing the traffic problem of mountainous villages significantly with changing the commuter mode of villagers instead of waterway.

Based on the multi-level spatial analysis and field investigation, Huanjiang village is mainly faced with the following four aspects in the process of urban-rural reconstruction:

- The threat of ecological destruction: On the one hand, the urban construction activities inevitably affect the fragile Liujiang waterfront and forest. On the other hand, the villagers lack the concept of ecological protection, and the disorderly construction activities of some returning villagers have been out of control, which had a negative effect on mountain forests, riverbank vegetation and other ecological environment.
- Poor internal accessibility and unbalance of infrastructure: The construction of the Waterfront Avenue has enhanced the reachability of the village area, but the internal country

roads are mostly cement and gravel pavement and the overall quality is poor. The village ferry traffic is replaced by road traffic and lack of maintenance, while the village does not form a perfect interconnected public system, resulting in the poor landscape accessibility.

- Fragmentation of local characteristics: Due to the lack of proper rural governance and the chaos of new building features, native memories and village characteristics are fragmented. With narrow squares mixed with dilapidated traditional buildings, it is difficult to see the traditional customs and local lifestyles in public space.
- Single low-end industry: Convenience of traffic brought a certain return of migrant workers, but the local economic system remains farming, low-end agricultural products processing industry and other small-scale peasant economy. Meanwhile, the destruction of the village environment had a negative impact on the development of new eco-tourism industry.

In summary, the multiple challenges has brought Huanjiang village to the embarrassing situation or recession.

### III. THE LEICUN PROJECT OF HUANJIANG RENEWAL PLANNING

In the Leicun project of Huanjiang renewal planning, we cooperate with the local government, to recreate their traditional living environment and restore their cultural identity. Integrated territorial policy approaches above the local level are

also integrated to steer new type of rural development in the interests of the wider region. [4]



Fig. 2 Challenges of village recession in Huanjiang



Fig. 3 Spatial transformation in Leicun area

#### A. Spatial Transformation of Leicun Project

Leicun area is the seat of the Huanjiang village committee and located in the central location of the Huanjiang village group. Layout of Leicun is quite unique that ponds, squares and ferry terminals, primary school and other historical buildings and 182 residential houses show a spontaneous original form in the dense old longan forest. With the opening of the waterfront avenue, Leicun has undergone a dramatic spatial transformation, manifested in the following aspects: First of all, the number of village buildings has increased considerably. According to the information before and after the completion of the avenue, the number of housing increased by one third, the disorder of the new buildings eroded the original dense vegetation and public courtyards. Second, the internal space is squeezed in Leicun. Although the existing road space in the village has generally extended the original strip distribution, the road space lacks the combing and reorganization, and many public traffic nodes cannot meet the modern demand. Third, there are different levels of destruction about local characteristic space. The old ferry, the farmland, pond and other characteristics are continually shrinking or fragmentation, the public open space and the courtyard for communication become crowded and deteriorating.

On the one hand, it is urgent to rebuild the environment and activate the economy through the planning project. On the other hand, the process of introducing new volumes and activities may become a threat to the sustainability of local community and culture renewal.

#### B. Principles & General Directions

The difficulty and particularity of the village-in-city renewal are very obvious. Therefore, aimed at restoring the features of the village, we try to establish the principles of the renewal process, as the following points:

- 1) Ecology oriented: take environmental repairment and ecological service function as a starting point of the "urban green core".
- 2) Internal activation: try to promote the integration of modern functional services and industry into rural internal space as the essential point.
- 3) Balanced control: combination of rural regulatory plan and flexible renovation with proper adjustment.
- 4) Culture renewal: Repairment and reactivation of local culture based on daily life and historical buildings.

#### C. Points Emphasized in the Principles

In the cultural renewal strategy of Leicun project, we intended to demonstrate the relationship between the historical rural culture and the spatial transformation through different period. Spatial characteristics and local longan forest create the unique media in Leicun, the native agricultural culture which is preserved until today. Therefore, the real powerful thing that promotes sustainable development is derived from daily needs and local life. We recognize that the cultural renewal of the local scenic area and rural settlements cannot rely solely on the external building and landscape along the avenue. Participation and accessibility to the local daily life and folk custom is the source of the native characteristics and community charm. And the original features are preserved and integrated carefully into the newly-designed infrastructures considering factors mentioned above to approach cultural and social aspects of sustainability.

### IV. STRATEGIES OF LEICUN PROJECT

#### A. The Restoration of Native Ecological Landscape

The natural environment is the one of the most important factors in urban characteristics. Artificial elements in urban-rural space can be copied, but the original landscape is difficult to imitate, and it has the eternal charm [5]. We try to protect the ecological security of the rivers and villages along the Liujiang River as a premise for the construction, and pay attention to create the ecological landscape corridors and recreation network: First of all, we pay attention to improving the ecological protection plan including the riverbank vegetation buffer, waterfront and reservation park. Vegetated buffers are strips of vegetation, either natural or planted, around sensitive areas in Leicun such as waterbodies and longan woodlands. In addition to protecting sensitive areas and restoring the overall landscape, vegetated strips help to reduce stormwater runoff impacts by providing some infiltration, slowing and dispersing



stormwater flows over a wide area. Besides, we focus on the restoration of ecological and productive landscapes, such as farmland, vegetable land, fruit trees and vegetation around, to rebuild the localized rural context.



Fig. 4 General plan of Leicun project



Fig. 5 General plan of waterfront longan park and ferry



Fig. 6 Rendering of the cycling path and old ferry

In summary, based on the existing features, it is important to preserve waterfront landscape and the characteristics of native production and rural industry through rebuilding the diversity and attractiveness. Placed in the upgraded rural environment, new format of local tourism industry will bring about the optimization of the modern rural economy structure and the sustainable development of community environment.

### B. Organic Promotion of Local Industry

Taking the modernization of the native agriculture as a guide, the renewal planning actively integrate the ecological service and eco-tourism functions to promote the transformation and upgrading of the traditional local industry under the development of the whole city.

For the development of longan theme of agricultural tourism, cycling theme of waterfront tourism and the accommodation in the farm, the design aims to create a series of corresponding public facilities to build industrial support system and recreational service network. Thus, we set up a series of landmark, cycling facilities and travel service center, providing bicycle parking stops and leisure stations for the rising urban demand for riding. Besides, restoration of the old ferry is helpful to build up the unique part with Leicun features in the whole urban watertour lines. Also we focus on strengthening open space of the rural garden among the longan forest.

### C. Restoration and Cultivation of Architectural Features

The key point in the process of architectural feature restoration and cultivation is to systematically construct and repair an architectural feature cultivation constructing system with characteristics of epoch for newly developing villages. Instead of developing architectural aesthetics individually, we try to proceed our design and planning on urban-scale and consider the distributions of villages in the county as a whole system. Distributions of villages are analyzed in deep historical context and different groups of architectures in various styles are developed according to the analysis. As a result, historical heritage and features of traditional villages could be preserved [6] and redeveloped integrating into new modern techniques of construction. Regional architectural characteristics are formed contributing to the sustainability of local area.

### D. Dynamic Database and Systematic Management

Because of the changing problems in the rural construction, the rural renewal process and upgrading must be dynamically adjusted at different stages on research, design and construction.

Therefore, based on the 3D models which are converted from UAV aerial photos, we try to build up such a set of dynamic feedback mechanism to build the design model index and database to deal with the problems in the flexible changes. As a result, we want to achieve a variety of micro-design adjustment and systematic control on the general rural features. In addition, evaluation methods are designed systematically and dynamic solutions will be offered periodically to adjust and modify the process. Based on investigation and deep analysis of village

features and dynamic experiences of future construction, along with the numerous opinions from the villagers and the government, the solution will further enhance the systematic and sustainable development of rural village housing projects. And the dynamic design system will be modified continuously according to fluctuating factors in renewal process like government policies and people's attitudes towards future village.

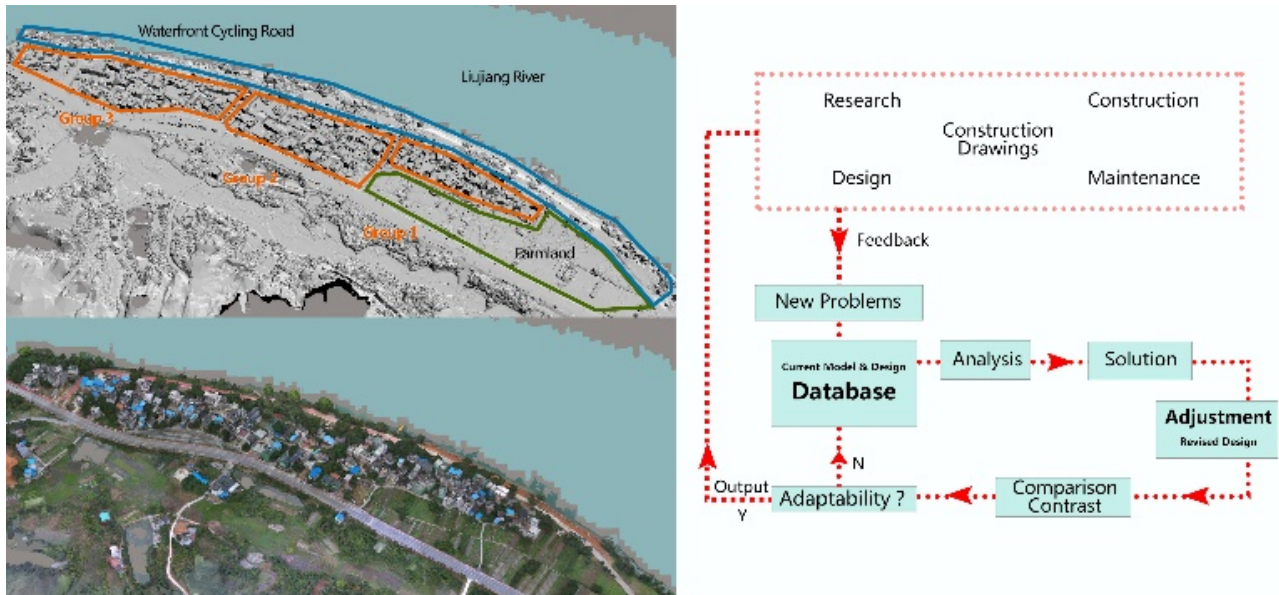


Fig. 7 Database and feedback process

## V. CONCLUSIONS

Local natural and cultural features are supposed to be preserved and redeveloped to take sustainable effects. Integration of physical space design and dynamic management programs is helpful to approach cultural and ecological aspects of sustainability in Leicun of Huanjiang village. Our practicing design and project presented above showed the possibilities of integrated solutions to the renewal of village in city. Also, the research will continue to be tested and optimized in the future multidimensionality.

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