Study on Rural Environment Construction Based on the Development of Traditional Industry——Taking Jiuxian Village of Zhanjiang as an Example

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Abstract: Under the background of the rural revitalization, it is necessary to think about how contemporary China’s villages develop new characteristics according to their traditional industry, reform and innovation to help drive the villages’ environmental construction and cultural protection. The article studies how contemporary villages implement social protection, upgrade traditional industries, display characteristics, and innovative ideas. In this article, the planning of Jiuxian Village in Zhanjiang is taken as an example, and the construction plan of rural revitalization is proposed from the perspective of sugar industry development. The rural environment construction strategies under the industrial orientation are proposed through cultural protection, element extraction, technical analysis and structural optimization of the site environment, which aims to provide useful guidance for the construction of traditional village culture and environment. This program has won the Residential Area Planning Excellence Award in the 8th IDEA-KING Student Group.

1. Introduction
In 2018, it was proposed in China Central Committee’s No. 1 Document proposed: “Taking the road of rural socialism with Chinese characteristics, and making agriculture a rewarding industry, farmers an attractive profession, and the countryside a beautiful home for living and working [1]”. However, rural construction also faces the contradiction between modernization and traditional space, cultural inheritance and economic development, ecological environment and tourism. Based on its characteristics, the program takes the contradiction between culture and economy as the primary planning orientation and explores a beneficial rural revitalization and innovation model from the perspective of planning and design. This project is located in Jiuxian Village of Huguangyan Town, Zhanjiang City, China. It is backed by Huguangyan Mountain, with a history from Emperor Wendi’s reign (AD 590) to the Northern Song Dynasty Taizu Kaibao Five Years (AD 972) [2]. The project covers an area of 44.87 hectares, among which about 16 hectares is construction area. In addition to the material heritage, the village retains the intangible cultural heritage - breakdance. There is a large-scale sugar factory in the village entrance, which is expected to solve the employment problem of 1/8 or more villagers. The existing problems in Jiuxian Village can be summarized as follows: 1), Insufficient infrastructure: lighting facilities, public recreation facilities, etc. are not perfect; 2), Low vegetation coverage: Limitation of housing distribution leads to little green coverage in the village and lack of green landscape; 3), Unreasonable distribution and protection of ancient buildings; 4), Too single industry.
2. Industry Analysis
The industrial structure is vital for village development and also a critical direction to promote the development. A single backward industrial structure affects the village’s economic development and causes labor transfer. Moreover, backward industries may bring about ecological and environmental problems. However, traditional villages will also have more opportunities in the trend of social development, and appropriate transformation in industrial structure is conducive to promoting the sustainable development of traditional villages.

![Figure 1. China’s sugar analysis](image1)

![Figure 2. Sugarcane production](image2)

![Figure 3. Growth trend of sugar industry in China](image3)

2.1. Status of Zhanjiang production area
Import exceeds export in China’s sugar industry as a whole (figure 1). Guangdong Province has the highest sugar consumption and is also the third-largest sugar-producing region in China. Zhanjiang sugarcane area is the leading industrial concentration area of the province, with the sugarcane planting area accounting for 82% of the province’s total, and the sugar production accounting for 89% of the region (figure 2). Zhanjiang sugarcane area is the highest yield area in China and is a vital sugarcane production and sugar production base in Guangdong, even in the whole country [3].

2.2. Sugar consumption demand
The supply of sugar is for both civilian and industrial consumption. At present, China’s sugar consumption is in a state of growth, and sugar prices are also showing an overall upward trend (figure 3). The total sugar consumption was 15 million tons in 2017, and it is expected to reach 18.47 million tons (increasing by 21.6%) in 2026, and the growth rate of industrial consumption (28.8%) far exceeds that of civilian consumption (14.2%) [4]. The four major aspects of industrial consumption are frozen food industry, biscuit/canned food industry, candy industry, and beverage industry (with the highest proportion).

2.3. Analysis of future demand
The demand for sugar in the future will still be dominated by industrial consumption, showing a uniform growth trend. It is indicated in the statistics of 2015-2018 that China’s sugar production and consumption have increased year by year. However, with the expanding of sugar planting area, China’s sugar imports will maintain a balanced growth.

2.4. Industry summary
Rice planting, which is among the primary industry, is currently dominant at Jiuxian Village, and the secondary and tertiary industries are relatively backward. Rice planting relies on the workforce, with low efficiency, which is faced with many problems such as low output value, little profit, and incapability to form scale planting and meet the market supply. The economic structure with low income
in the primary industry has led to the transfer of the village population and the loss of a large amount of young labour force. Consequently, the village’s transformation of the economic structure loses its motivation, which is not beneficial for its future development. The sugar factory in the village can absorb part of the labour force. Meanwhile, it can also be used to combine the secondary industry with the tertiary industry, thus achieving transformation and upgrading. When the production condition and the productive forces are upgraded, some functions of the tertiary industry, such as visits and exhibitions, can also be added so as to diversify the industry and further boost the income of the villagers.

3. Overall plan
Jiuxian Village is confronted with the problems of backward production and living conditions. Meantime, as it is the unique relic of the oldest county (Tiepa County) located in Zhanjiang City, it is the key to the designer to think about how to protect the unique cultural history and the ecological environment when the vitality of traditional industries is stimulated. Aiming to solve the problems, the designer expands and extends the elements of “sugar” in various aspects including architecture, industry and culture (Figure 4).

![Figure 4. General plan](image)

3.1. Buildings
With the goal of retaining the historic value of historical and cultural buildings in the site and keeping the entire site in its original cultural style, new buildings are built on the site or part of the reserved buildings and are connected through the gallery.

3.2. Industry
A sugar route of “raw material production – sugar processing – popular science exhibition – experience play – commodity sales” will be created after the analysis of the industrial site. Originally the sugar factory is a place to sell sugar, and now it will be used to “sell” the local life experience and will become a peak of the planning experience.

3.3. Technology
“New appearance with original context” not only means that the “old village (i.e. Jiuxian Village)”, including the village roads, squares and buildings, will be updated through the application of landscape technology. At the same time, it respects the unique historical culture and sorts out the rustic style organically. It also uses innovative concepts and advanced technical concepts in the combination of industry and architecture, life and culture.
4. Planning details
This program re-plans and designs Jiuxian Village in accordance with the concept of sustainable development. According to the different functions of the plots, the sugar mill at the entrance will be an important economic source of the village. The entrance is planned to be the sugar factory production area as it integrates production, sales, experience and popular science. The middle part of the village, with its significant science effect, will be an area of historical and cultural popular science, as the historical and cultural buildings are densely distributed there and it embodies the history and culture of the old village. The new residence will have the function of visiting and living. It is located in the southern and eastern parts of the old village. Mingjingdi, the most representative historical building in Jiuxian Village at a large square, is designed for leisure and entertainment. In order to promote tourism and commerce, cultural and commercial districts and cultural experience zones are also planned to provide visitors with a more intuitive understanding of the village’s culture.

4.1. Sugar factory production area
The economy of Jiuxian Village is mainly based on the sugar industry, which belongs to the secondary industry. Sugarcane, a valuable crop planted in the village, basically serves the production of sugar factories except for the needs of the landscape. To improve the economic benefits of sugar mills, it is necessary to increase the sugar production and develop new sugar products, in addition to the scale of the original sugar factory. In the production process, it is combined with environmental protection as much as possible so as to maximize the use of resources. Therefore, transformation and upgrading of the original factory will be carried out in this project. First, the production of sugar factories should be linked to the tourism of the tertiary industry, and the appearance of sugar factory should be transformed into a modern and ornamental building. Second, the sugar cane will be transported, processed into sugar, and the pressed sugarcane bagasse will be fermented into fertilizer to serve the planting and production. Finally, the sugar factory should “sell a kind of experience of local life” rather than “sell sugar”, which can be used as the highlight of the tour in the overall planning.

4.2. Science cultural district
Jiuxian Village has a long history and a strong cultural deposit. As the witnesses to the history of the old village, the ancient buildings in the village must be preserved. New overhead structures will be built around ancient buildings, which will facilitate the integration of old and new architectural forms and allow people to overlook the original building. The new structure enclosing the old building will enable the entire building to be displayed from top to bottom and from inside to outside, and protect the old building as well. Meantime, the sugar culture, another major feature of the old county village, should also be fully displayed to the public. This will be realized by a new sugar museum. It will serve not only as the cultural museum of Jiuxian Village displaying local history and culture and architectural features, but also play the role of popular science exhibition as the knowledge of sugarcane growth, sugar production, and waste utilization will be demonstrated there.

4.3. Cultural experience zone
Tourism is an important industry to which Jiuxian Village attaches great importance. A cultural experience area of the village is planned in order to increase the vitality, make tourists have a better understanding of the history and culture of the old village and the sugar culture and enrich the experience of tourism. Visitors can experience the whole process of sugar production at the sugar factory and can experience the process of sugar making. In addition, there is also science education space, tea room, etc.

4.4. Culture, agricultural market
Business is an indispensable part in the promotion of the development of the tertiary industry and economy. In its long history, Jiuxian Village used to have a street market for trading. The market will be transformed into “Sugar street”, a commercial street based on experience and purchase of goods,
which will not only display the style of the old village but also enhances the interactive fun of tourists and promotes the development of the local tertiary industry and economy.

4.5. Living residential area
In the development of Jiuxian Village, the improvement of human settlement should also be taken into consideration along with its economic development and industrial upgrading. A new type of living mode will be created in order to improve land utilization, reduce farmland and livestock land, and save residential land. This mode of living will be multifunctional: the ground floor will be the livestock area and the ancient building, the second and third floors will be villagers’ living areas, the fourth floor will be the planting area, and the roof will be used for roof greening or roof farming. This model not only improves the utilization rate of land use but also enhances the landscape effect. Roofing agricultural planting can both increase the planting area and purify the site air and make the environment more beautiful. On the one hand, the implementation of roof greening and vertical greening increases the area of green plants; on the other hand, it can reduce the temperature of the roof and the wall in summer. At the same time, it can also absorb noise and dust in the air, improve air quality and living environment significantly, enhance the comfort level of residents in the building, and play a role in energy-saving and emission reduction [5].

4.6. Cultural leisure square
A public rest square with the theme of sugar is designed, which is located in front of the site of Mingjingdi and combines the historical culture and sugar culture elements of Jiuxian Village. The square will include the Mingjingdi relics, the sugar sand pool, the candy sculpture, the rest area, and the square area. The candy square will fully demonstrate the characteristics and historical culture of the old village to tourists and is a wonderful place for villagers and tourists to rest and relax.

5. Strategy summaries

5.1. Renew ancient buildings based on reservations
Measures will be taken to repair and protect the historic buildings and industrial buildings of the ancient village, and to maintain the same structure and refurbish the skin of the general residential old buildings. It should ensure that the original building structure remains unchanged, while the external environment will be rectified, so as to reach an effect of restoring the flavor of the old. The emphasis is laid on renovating the interior of the building and providing complete municipal facilities to improve the quality of life for residents. For those buildings that have traditional-style (not conflict with the overall style), they will be completely preserved.

5.2. Expression of native + industrial culture
The expression of local and industrial cultural characteristics is divided into two forms, namely, the expression of external forms and the expression of internal culture [6]. The external form is embodied by the materials used in the building or structure. In this project, traditional utensils and living tools of the village are adapted, combined with the local natural landscape, to reflect the local characteristics of life. And the expression of inner culture is realized by rich history and culture that are excavated through traditional architecture, customs, stories and legends. The regional culture is passed down and expressed through the landscape design methods such as “mural painting, engraving, and landscape pavilion”.

5.3. Optimize and upgrade the industrial structure of the ancient village
The most fundamental problem in the ancient villages is economic backwardness, so industry developing is the key to dealing with it. Ecological agriculture with high quality, high efficiency and high added value should be the direction of agricultural development, so as to let villagers get rid of poverty and become rich. For advantageous villages, recreational agriculture should also be developed to combine industry with tourism. An ancient village may have multiple industries, and it is a critical
step to choose an industry as its key industry in the upgrading of its industrial structure. Therefore, a particular industry should be strengthened after a thorough analysis of the current situation of the ancient village, making good use of its local natural resources and human resources. Based on this, the planning and design attaches great importance to the planning and layout of the industry. Scientific planning enables rapid cultivation of cluster advantages and platform advantages of the characteristic local industries, so that an excellent industrial system can be well constructed to form a strong agglomeration effect. The transformation and development of industrial structure are one of the important means to achieve the principle of sustainability. Through the upgrading of the industrial structure, the tertiary industry will be dominant in the ancient village, along with the development of the primary and secondary industries. And the primary industry will no longer in the main position. The optimization of the industry will strengthen the tourism influence of the village, create a tourism brand, and finally strengthen the economic effect, thus driving the development of the ancient village.

6. Conclusion

In the context of current regional economic development, it has been a critical issue how to effectively protect and scientifically develop the internal industry of ancient villages. The program has won the Residential Area Planning Excellence Award in the 8th IDEA-KING Student Group. In order to achieve the planning goals of the industry distribution and village layout, it has been proposed a new idea of industrial structure adjustment after analysis of the status quo of the sugar industry structure in Jiuxian Village. Furthermore, it also suggests that the tertiary industry should be given priority in development based on the cultural heritage and characteristic historical buildings of the ancient village, so as to promote the upgrading of the village’s economic structure, and achieve rapid economic development.

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