

Research on Rural Landscape Planning Based on Ecological Concept: Taking Tian-e-zhou Development Zone in Shishou City as an Example

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Abstract The basic situation and ecological resources of Tian-e-zhou Development Zone, Shishou City were briefly introduced. Aiming at the problems such as poor plant diversity, low utilization rate of local resources and lack of local landscape in the site, and three major planning and design goals such as respecting for ecological environment protection, combining landscape resources and production resources, and creating a good plant, ecology, rural culture science popularization atmosphere were proposed under the premise of following the principle of ecological protection. Besides, it is needed to gradually restore the vitality of rice field and water of the site, give play to the popular science and tourism functions of the site, and create a rural environment integrating ecological protection, tourism, science popularization and research and promoting the development of local industries, which provides reference for the future rural environment regulation and planning design under the policy of rural revitalization.

Keywords Rural revitalization, Ecology, Travel and sightseeing, Landscape design

DOI 10.16785/j.issn 1943-989x.2024.4.013

In the *Proposals of the CPC Central Committee on Formulating the 14th Five-Year Plan for National Economic and Social Development and the Long-range Goals in 2035*, it is proposed to develop agriculture and rural areas and comprehensively promote rural revitalization. In the *Opinions of the Central Committee of the Communist Party of China and The State Council on Comprehensively Promoting the Key Work of Rural Revitalization in 2023*, the concept of “harmonious countryside” is further put forward, so as to achieve the harmonious beauty of the countryside by preserving rural culture and improving the well-being of villagers^[1], and further enrich and expand the connotation and objectives of rural construction^[2].

Shishou Municipal government emphasized the ecological management, ecological environment improvement, biodiversity protection and restoration of the project area in the ecological conservation and restoration and biodiversity conservation project of the ancient route of the Yangtze River in Tian-e-zhou. Shishou Tian-e-zhou Development Zone, with its unique ecological and cultural values^[3], has become a key area for rural revitalization and ecological protection^[4]. On the premise of ensuring ecological protection, the landscape transformation planning and design of Shishou Tian-e-zhou Development Zone have certain reference value for building “harmonious countryside”, and promoting rural revitalization and ecological protection of Tian-e-zhou Development Zone^[5].

With the improvement of people’s quality

of life, the upgrading of rural industrial structure, the progress of scientific research and education, and the popularization of the concept of green life, rural tourism and research will become an important development direction^[6-7]. Rural tourism can not only relieve the psychological pressure of urban tourists^[8], but also improve the physical health of tourists^[9-11]. Rural studies can provide urban primary and secondary students with the science popularization opportunity to experience natural and human resources such as plants, crop resources, tea production techniques, and animal living habits^[12]. Therefore, in the planning and design of rural landscape, the construction of plant landscape should follow the ecological concept, pay attention to the diversity, seasonality and stratification of plant landscape, and build rice field or wheat field landscape according to the farmland texture. Traditional activities such as cattle ploughing, tea drying, tea frying, picking and fishing are used to create rural cultural landscape, so tourists and primary and secondary students can experience rural life and learn natural and humanistic knowledge^[13-14]. Based on the planning and design of rural landscape, tourism, research and other resources should be integrated to promote rural revitalization and the construction of “harmonious countryside”.

Shishou Tian-e-zhou Development Zone is connected with two national nature reserves around it, but there is room for improvement in its internal ecology and rural landscape^[15-16]. In this paper, Tian-e-zhou Development Zone will be studied to discuss how to rely on local

and nature reserve resources to improve the rural ecological landscape and build a beautiful countryside that integrates tourism, research, industry and nature protection.

1 General situation of the site

The site, which is located in the north of Shishou City on the north bank of the Jingjiang River along the old route of the Yangtze River, is rectangular, and extends to Shatanzi community in the northeast and Xindi village in the southwest. Tian-e-zhou Fintless Porpoise Reserve is situated in the southeast, with a total area of 2,157 hm². The site is ecologically primitive, has five characteristics, such as beach wetlands, the old route of the Yangtze River, rare birds, wild elk and endangered dolphins, and has important scientific research, cultural, ecological and tourism values. As one of the best intact wetlands in the middle and lower reaches of the Yangtze River, Tian-e-zhou has been listed in the list of important wetlands in China. However, there are some problems inside the site, such as non-uniform spatial pattern, incomplete public facilities, backward road construction, poor plant diversity, non-uniform architectural style, poor look and feel, low utilization rate of local resources, single industrial form and lack of local landscape.

2 Planning principles and objectives

2.1 Planning principles

2.1.1 Principle of ecological protection. There are two national nature reserves in the site, with rich ecological diversity. Maintaining ecological

balance is crucial to the site. In the design, it is needed to ensure the harmonious coexistence of ecological environment, rural landscape and the old route of the Yangtze River, balance development and utilization, protect and restore natural systems such as wetlands, forests and waters, rationally plan functional areas, and raise public awareness of the protection of finless porpoises and elk.

2.1.2 Principle of participation. Rural landscape design is the key to improve the living environment and rural style, and the participation of villagers is crucial to enhance the living quality and local characteristics^[17-18]. Design and construction should be included in villagers' decision-making and joint construction to achieve joint creation. At the same time, the design should be integrated into tourism and agricultural experience projects (such as picking, planting, fishing, camping, etc.) to mobilize the enthusiasm of tourists and experience the farming culture and rural life. In addition, cultural exchanges and environmental education activities should be carried out to enhance public awareness of environmental protection and jointly protect rural environment.

2.1.3 Acting in line with local conditions. It is necessary to respect the ecological environment and coordinate rural landscape with the old route of the Yangtze River. The themes of finless porpoise, elk and the old route of the Yangtze River should be integrated into the landscape, architecture and decorative design to activate rural texture and create an atmosphere of harmonious coexistence with nature^[19-20]. According to the farmland texture, rural resources, and climate conditions of the site, it is needed to reasonably arrange each functional tourist areas, and create characteristics and beautiful countryside of Tian-e-zhou.

2.2 Planning objectives

2.2.1 Respecting ecological and environmental protection. The site is closely related to the nature reserves of the old routes of the Yangtze River, finless porpoise and elk. When the sightseeing belts of the nature reserves should be created, the ecological environment protection should be respected, and trees with high ornamental value and safety should be introduced to build a plant system in the design^[21-24]. Under the premise of ecological protection, landscape facilities such as viewing platforms and wooden trestles shall be built. Landscape pieces, landscape walls, sculptures, etc., are used to promote the ecological culture of local nature reserves and advocate the protection of natural ecological environment (Fig.1).

2.2.2 Combining landscape resources with production resources. It is necessary to respect the local rural style and farmland texture, create colorful rice, rapeseed fields and other special production landscapes, gather vegetable and fruit picking gardens near the site to promote harvesting activities, build ecological agricultural leisure parks, beautify and develop the pastoral landscape, increase farmers' income, and drive the development of local rural tourism economy^[25].

2.2.3 Creating a favorable atmosphere for science popularization of plants, ecology and rural culture. The rural landscape environment is a window for popular science crops, ecology and culture, and provides a channel for the public to understand the countryside. Rural farmland and breeding bases provide primary and secondary students with access to rice, wheat, vegetables and other crops, aquatic crops such as loaches, crayfish, and crucian, and rice-fish co-development science education^[26-27]. Cultural exchanges, exhibitions and lectures should be organized, and local ecological values and conservation significance should be introduced. Meanwhile, it is needed to strengthen cooperation with schools and communities to carry out environmental education and raise public awareness of environmental protection.

3 Planning theme and conceptual conception

3.1 Planning theme

The theme of the plan is "elk and finless porpoise dancing together, and water rhyme in the countryside", which means that people can get along well with finless porpoises and elk in the local environment. Through planning and design, the local farmland and ponds can form a beautiful rural landscape, highlighting simple folk customs and beautiful rural characteristics.

3.2 Conceptual conception

Based on the ecological characteristics of Tian-e-zhou Baiji National Nature Reserve and Shishou Elk National Nature Reserve, elk and finless porpoise culture will be integrated into the rural landscape to build a characteristic agricultural sightseeing park, drive the development of local industry and tourism, and build a beautiful village (Fig.2). It is needed to dig deep into the culture of the old route of the Yangtze River, build the scenic belt of the river embankment, and show the characteristics of the countryside. The main activity area is as the center to build a picking garden, fishing park, lotus pond, etc. and then a characteristic agricultural sightseeing park taking "one axis,

one belt, two wings and four areas" as the vein and integrating agriculture, tourism, culture and ecology, reflecting the inner harmony and beauty of the countryside and improving the happiness, satisfaction and sense of gain of villagers and tourists.

4 Division of functional areas and strategies of garden design

4.1 Division of functional areas

In the design, five functional zones are mainly set up (Fig.3), including rice field sightseeing area, living accommodation area, agricultural activity area, fishing entertainment area, and vitality leisure area. The activity functions of various functional areas are different to meet the different activity needs of the population.

4.1.1 Rice field sightseeing area. In the upper left corner of the area, a leisure square is built to show visitors elk culture through cultural sculptures and cultural floor shops. In the square at the entrance of Xinti Village in the area, the cultural village sign and landscape wall of Xinti Village are built to highlight the village culture and elk culture. A leisurely walk is set in the rice field to provide convenience for visitors to enjoy the rice field scenery.

4.1.2 Living accommodation area. There are parking areas, accommodation, dining places, etc. in this area, which is convenient for tourists to gather and rest. A rainbow walk landscape is created in the area, and is equipped with children's entertainment facilities and activity facilities such as rest platforms and galleries, which is convenient for tourists to exercise and children to play.

4.1.3 Agricultural activity area. The main landscape axis of the site is located in this area, including the main entrance, a camping plaza, a picking garden and other display areas. In the picking garden, people can experience fruit and vegetable picking, crayfish fishing, planting and other agricultural leisure activities. The camping site is combined with the distribution square, so the site is open and convenient for people to gather and disperse. While camping, people can also enjoy the landscape of rice and the picking garden.

4.1.4 Fishing entertainment area. The area is vast, and the core landscapes includes fishing waters, lotus viewing areas and rapeseed flower fields. The main activity venue here is the leisure fishing area, providing tourists with leisure fishing entertainment. The rape flowers and lotus ponds are combined to show a large flower field landscape. In the rape flower fields, Shishou

earth effect landscape is created, showing the culture of elk and finless porpoises protection. The flower belt leisure area is designed near the levee, and a main place for residents and visitors to walk is created along the rainbow walk.

4.1.5 Active leisure area. The node is located on the far right side of the site, and is an important entrance to the site. In the design, the entrance gathering square and leisure space of Liukouzi Village is created, and has a wide vision, highlighting the aesthetic value of the holloway landscape wall taking rapeseed flower fields as the background. Through the arrangement of rest stools, characteristic floor, and tree pool stools, display areas highlighting the village culture and residents' leisure places are created.

4.2 Strategies of garden design

Courtyards are reserved in many buildings in the site to facilitate their own activities and drying, so it is necessary to conduct classification analysis and design transformation of the courtyards in the overall planning and design.

4.2.1 Building courtyards with a height difference. There is a height difference between this type of courtyards and outdoor roads. In the design, steps and landscape low walls are combined to separate the space in front of houses from roadways, while sidewalks are reserved. Herbs and shrub flowers are integrated into the courtyards to combine with quartzite paving, create a rural atmosphere and highlight the rural style of the design (Fig.4).

4.2.2 Building courtyards without height difference. There is no height difference between this type of courtyards and outdoor roads, and landscape low walls and herbaceous flowers are integrated in the design to create rural landscape. The entrance and exit in front of a house and the adjacent parts of the house are equipped with plants to coordinate with the exterior wall landscape and create a strong rural atmosphere (Fig.5).

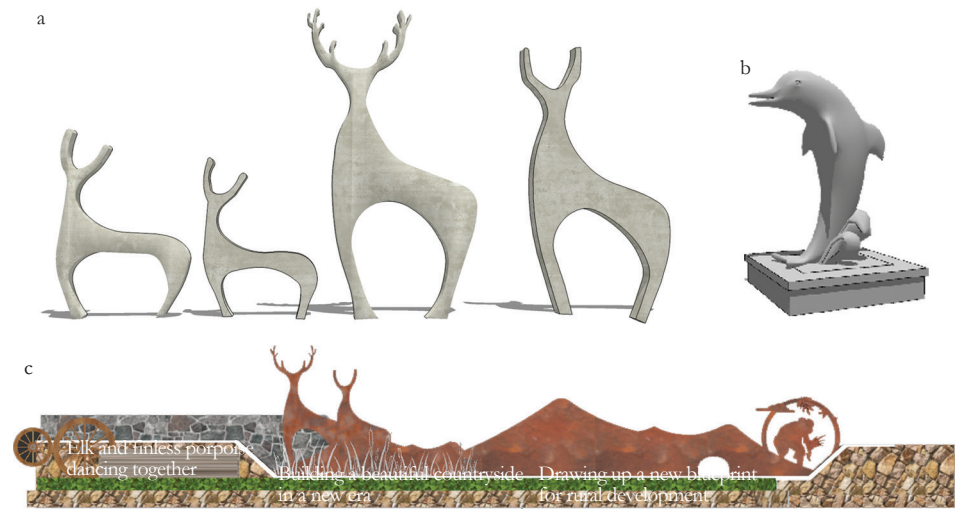
5 Plant design and special design

5.1 Design of greening plants

Plant landscape group construction needs to adapt to local conditions, considering the introduction of plant types and the collocation of trees, shrubs and herbs. For rural farmland, economic crops such as rape and rice as well as plants suitable for picking such as peach tree, watermelon, strawberry, etc. are chosen. In terms of trees, koelreuteria, conformation tree, camphor and other native tree species in Hubei are selected, and the combination of economic benefits and plant beauty should be

paid attention to. In terms of shrubs, small leaf privet, camellia, Yunnan yellow jasmine, etc. can

be chosen to achieve color matching through colored leaf plants. For herbs, auspicious grass,



Note: a. Elk cultural sculpture; b. Finless porpoise cultural sculpture; c. Landscape wall of elk and finless porpoise dancing together.

Fig.1 Display of cultural landscape facilities for ecological environment protection

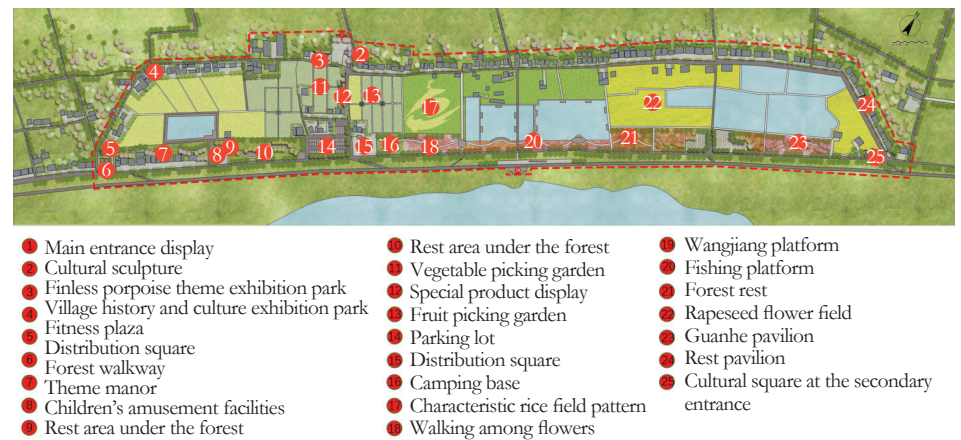


Fig.2 Planning plane

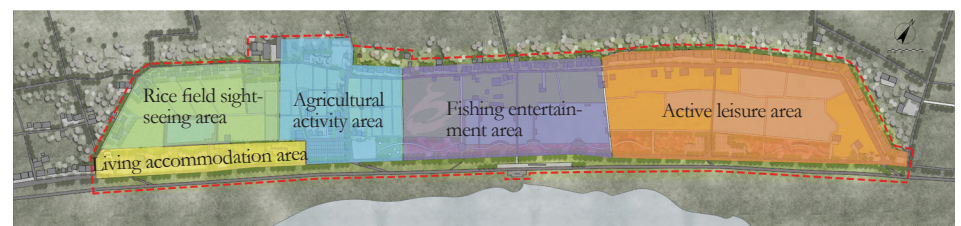


Fig.3 Division of functional areas



Fig.4 Building courtyard landscape with a height difference



Fig.5 Building courtyard landscape without height difference

pansy, ophiopogon and other plants suitable for Hubei can be selected to take into account economic benefits and plant landscaping

5.2 Special design

In order to cooperate with the construction of rural style, the seats, lamps and paving in the site should reflect the characteristics of rural style. Wooden tree pool seats are chosen for tourists to rest. Solar street lights with rural features are selected to achieve the combination of rural characteristics and environmental protection and energy saving. Walkways are paved with wood and grey Dutch bricks, which harmonizes with rural landscape (Fig.6).

6 Conclusions and prospects

The introduction of ecological concept into rural landscape planning and design can improve the rationality of planning and design, realize the protection and rational utilization of rural ecological resources, and create sustainable rural landscape. In this study, the strategies and methods of connecting Tian-e-zhou Development Zone with nature reserves to achieve protection and optimization were expounded to improve the spatial pattern of Tian-e-zhou Development Zone, incomplete public facilities, backward road construction, poor plant diversity and other problems. Three major planning priorities such as respecting for ecological environment protection, combining landscape resources and production resources, and creating a good plant, ecology, rural culture science popularization atmosphere were proposed. Landscape pieces with cultural characteristics can promote the concept of natural ecological protection, and the combination of landscape resources and production resources can better coordinate local industry and landscape planning and design. Good rural ecology, plant planting and rural cultural atmosphere can promote the local tourism economy and income.

With the development of the times, more villages will be re-planned and reconstructed in the future, and the combination of the concept of “harmonious countryside” and ecological civilization can better promote the transformation of local landscape planning and tourism economic development, provide reference for the subsequent rural transformation, and promote the revitalization of China's rural areas.

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Note: a. Tree pool seats with rural characteristics; b. Street lights with rural characteristics; c. Pavements paved with dutch bricks; d. Wooden walkway

Fig.6 Special design

- perspective of ecologically livable and beautiful countryside. *Journal of Nanjing Audit University*, (4), 85-96.
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design creativity and tourism development. We cooperated with Xiuyan County Government, Yutong Museum and Tangshuai Art Museum to sort out the creative thinking of the jade carving works of the New North School, help the cultural development of Xiuyan jade, and establish the Jade Carving College of University of Science and Technology Liaoning in Xiuyan^[8]. Moreover, we cooperated with Nantai Town, Haicheng City to jointly develop luggage products, change the quality of luggages in Nantai Town through design, and help Nantai become a major luggage town in the north. The establishment of the practice platforms has been welcomed by students and has become a medium for communication with society. Students' comprehensive ability has significantly improved under platform training, and they have received unanimous praise from enterprises after employment.

4 Conclusions

The training process of design talents has a long way to go. This paper constructed a new talent training system from the perspectives of regional revitalization and industrial upgrading, aiming at improving the value of talent training. We hope that more high-quality design students can serve the development of cities after graduation, and they not only have the feelings of loving home, but also the design strength to achieve a

win-win situation for personal development and regional development. Through the construction of talent system in six dimensions: taking morality as the first priority, taking reason as the foundation, taking quantity as the principle, taking points as the basis, connecting lines into a plane, and promoting learning through research. Different dimensions have strong correlation at the same time, and they are parallel from the external appearance, but closely connected internally. Different dimensions are supported by multiple basic elements, which collide with each other in the process of operation, and bring gains and joy again and again by constantly solving problems and contradictions. The training of design talents is a whole chain, and from enrollment to employment, every link is indispensable, and important. After years of operation, the reputation and training quality of this study have been significantly improved, and it can be regarded as a successful attempt and will continue resolutely.

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