

Study on the “3F-in-1” Sustainable Reconstruction of Rural Architecture from Placeality Perspective--A Case Study of Caiyuan Village in Jingmen City, Hubei Province

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Abstract. This paper takes Caiyuan Village in Jingmen City of Hubei Province as the research object, analyzes the production, life and ecological functions of rural buildings and the “3F-in-1” inherent mechanism from the local perspective. Based on the concept analysis of placeality and “3F-in-1”, this paper clarifies the relationship among the value of life function, production function, ecological function so as to analyze the “3F-in-1” mode of rural architecture with placeality. On this basis, this thesis puts forward the strategy of sustainable spatial transformation (1) preserve the traditional overall spatial structure of villages, (2) improve the adaptability and function of rural architecture, (3) extend the rural social culture, (4) pay attention to local perception, with a view to explore an organic system design method for the exhibition of placeality and sustainable development of beautiful countryside.

1. Introduction

With the rapid development of China's economy and the acceleration of urbanization, the reconstruction of rural buildings and the construction of ecological human settlements will be the focus of future development[1]. The village is facing spatial reconstruction and functional transformation [2]. The village production, lifestyle and family structure have undergone various changes and face with new demands, while the renovation and reconstruction of rural buildings is one of the core content.

Caiyuan village is under the jurisdiction of Macheng town, Duodao District, Jingmen City, Hubei Province. It is located 18 kilometers southeast of Jingmen City, in the Golden Triangle of Hubei Province, borders upon Jiaozhi Railway, 207 State Road to the west, stays close to Han River, JingQian provincial highway, Xiang Jing, Jing-Yi Highway to the east. Right now, there are 11 villager groups, 332 households, 1358 people, 7231 acres of arable land in this village. The case studied in this paper is one of the construction projects of Jingmu Yangzhuo ecological civilization and beautiful village demonstration areas. After the implementation of this project, Caiyuan village was nominated as the “Model village for the new rural construction in Hubei Province”.

The survey found that a large number of rural construction and renovation design just simply learn from foreign villa design and reconstruct the rural architecture as unified country “villa” or rows of barracks building regardless of the urban and rural differences, ignoring the geographical



characteristics of the rural architecture. However, in the transferring course from “township” to “city” and from “villager” to “citizen”, the material production structure, spatial settlement form, resident social structure, urban and rural cultural form has witnessed a dramatic change[3]. After the thorough transformation, the original material form of the village has disappeared and lifestyle has changed. In face of silent dramatic change, we can feel the spectacular of change and the lamentable loss of rural architecture landscape and traditional local favor which resulting in rural local recession. In recent years, this phenomenon has attracted the attention of experts and scholars, who have done quite a lot researches on the new rural planning, the protection of rural landscape and traditional houses, green building and ecological construction, with researches methods changing from single disciplinary to multi-disciplinary [4]. In the study of rural building renovation, Zhao Rui et al. (2016) analyzed the symbiosis theory of KISHO KUROKAWA so as to intending to explore ways to realize the coexistence of old and new architecture style; Song Chengnuo (2016) investigated the significance of regional culture in rural architecture reconstruction, and put forward the core concept of adjusting measures to local conditions; Xue Kaiqiang et al. (2016) researched the rural construction in the central region, and put forward the concept of “renewal of history”, “preservation of life”, “adaptation of change”. On the whole, the reconstruction of rural buildings is both a focus and a difficult issue. Rural architecture has its own characteristic, its spatial elements are the basis of internal links of rural production and life, and it is a constant reproduction, adjustment and evolution of a basic unit from bottom to top. Therefore, for the transformation of rural construction and the construction of beautiful village, the top-down policy approach need to be more cautiously implemented so as to avoid the unacclimatized development. In this paper, the author tries to discuss the approaches of countryside building reconstruction from placeability perspective.

2. Concept Analysis

2.1. Placeability

In the 1970s, geographers rethought the logical positivist method of measurement [5] and scholars of humanistic geography represented by Duan Yifu started to take “placeality” as an important research topic and the essence description of local culture. The nature of the description at the same time gets the attention of scholars. Starting from the subjectivity of human beings, humanism geography believes that place is space with meaning given by human. The spatial experience of human is an important way of composing and interpreting the place, and placeality is not only a geographical phenomenon, but also a rich human experience. From the perspective of humanism, some scholars pointed out that the placeality is the spirit or trait given to the composition of the place in the long-term interaction between the human and the natural environment, it is the surface humanistic phenomenon produced and developed through the “creative activity” of human being and a regional place with local characteristics [6].

2.2. 3F-in-1

Because of the different nature of the occupation, rural residents are essentially different with the urban residents in terms of regional culture and way of life as well as their demands on architecture, this difference is an embodiment of rural placeality. Through the in-depth research on Caiyuan village, we found that rural architecture is not just a single building; it is more of a whole system which has more specific and complex functional demands. In general, there are three kinds of functional demands: the production functional demands, life functional demands and ecological functional demands. In other words, rural architecture is a three-in-one architectural form with the combination of production, living and ecological function; these three aspects are interdependence, mutual influence, affecting the overall shape and use of rural architecture. Beautiful rural architecture is a combination of “3F-in-1” spatial and social demands of production, life and ecological function, which has a strong link among these three functions.

3. “3F-in-1” Model of Rural Architecture with Placeality

People gather in space and link with the place through communication. The interaction between human, human and space has gradually produced the local significance and symbol in a certain region. These constitute the text for others to interpret the placeality. A series of symbols which belong to the space reflect the placeality, and placeality communicate with people through the space, the environment and other symbols, so as to bring out continuous experience and all kinds of emotions, among which positive emotional experience can help to form individual recognition of the place [7]. The rural architecture is one of the most intuitive manifestations of placeality, human space to create the subjectivity spatial construction of human is an important way to construct placeality[8].

3.1 Production function of rural architecture

Rural economic activities are generally dominated by the primary industry, the rural life have inseparable relations with production, while the rural production often extends from the outdoors to the interior. In the rural construction, the production function is closely related with human's economic activities, in the traditional sense, the space function of the building should be in accordance with the production demand of the primary industry.

Compared with the urban residential buildings, where a variety of space configuration are mainly designed to meet the needs of life, the space configuration of rural residential building, are undoubtedly designed for realizing the production function. Specifically, it includes the production space system composed of people's production space, storage space for production tool and production-related economic crops and animals, and other functional elements. With the continuous development of the society and the adjustment and upgrading of the regional agricultural structure, the rural production mode has gradually changed, and the supporting facilities for production function in rural construction has improved so as to achieve human, animal, machine, storage separation. (Table 1)

Table 1. Spatial analysis of production function

Production Functional Space	Usage	Tradition method and problems	Reconstruction Strategy
Production space	Grain drying platforms	Artificial smoothened ground with poor drainage function.	Construct a flower bed and shading pergola
Storage space for means of production	Garage for car, motorcycle etc.	No fixed place	Combining with modern life demands of thief-proof and easy to management
	Equipment room (tractor, Harvesting equipment etc.)	Shabby timber set, not good for machine maintenance	Complete supporting facility
	warehouse	No fixed place, easy to be eroded by rats or buds	Complete supporting facility and create air network
	Places for fertilizers and pesticides	No fixed place, easy to take or use by mistake	Complete specific supporting facility
Space for livestock	Livestock House (cow, sheep, pig etc.)	Shabby timber set with poor smelly environment	Construct in leeward side, combine through corridor, complete ventilate and faeces collection and processing design

Poultry (chicken, duck, goose etc.)	House duck,	Shabby smelly environment	timber and set with noisy	Construct in leeward side, combine through corridor, complete ventilate and faeces collection and processing design
House Guarding Livestock (cat)	for (dog,	No fixed feeding space, easy to cause pollution and hurt children from neighborhood		Build specific house for dogs or cats, get a fixed place for food feed and excretion

3.2 Life function of rural architecture

Living space of farmers and villagers is where the rural construction is directly related to human life. Compared with the living function of urban residential buildings, the rural buildings have more social interaction and ethnic consciousness because of the rural population composition, the nature of rural farming work, the rural customs and culture. In addition, the lifestyle of migrant workers, left-behind elderly women and children also lead to the diversity of rural living space in terms of the material living, entertainment and lifestyle, which should be fully taken into account in the reconstruction of rural building. (Table 2)

Table 2. Spatial analysis of life function

Life Functional Space	Usage	Tradition method and problems	Reconstruction Strategy
Resting Space	Bedroom	Functional diversification lead to poor indoor environment quality	Reasonably adjust the space to reduce the energy consumption of air conditioning
Communication Space	Function room like hall, greenhouse, room for table games	No fixed room, or use the hall for multi-function	Combining with modern lifestyle to separate courtyard with storehouse
Life Space	Front court, backyard	In disorder, use for both life and production, moody land and harden land coexist, with poor water discharge	Improve land and drainage design and afforest to optimize environment
	Kitchen	Various combustion mode coexist, cause cross contamination of food, has fire and health hazard	Combing traditional cooking bench with modern cooking methods
	Toilet	Inconvenience usage, without organized pollutant discharge, lead to breed of mosquitoes and serious domestic pollution	Design a modern bath system and improve the water supply and drainage system
	Drying space	Airing and drying clothes in the spot, has health hazard	Combining living and production space, divide a specific space for drying and airing

3.3 Ecological function of rural building

Ecological function is why the rural construction is closely related with the survival of the people. On one hand, the ecological function value reflects the harmonious symbiosis between the villagers and the regional climate, geographical conditions and natural environment. On the other hand, in the

process of local stratification, placeality is a sense of familiarity and belonging felt by the villagers themselves on the village. American geographer Seamon D proposed “place ballet”, which is described as a combination of the “body ballet” and the “time-space routine” by him and refers to the behaviors people conducted rhythmically in accordance with the habit of normal conduct. “Space-time routine” refers to a group of habitual physical activities carried out by people over time (for example daily). Place ballet gives people access to the local characteristics from perspective of physical, experience and social construction. Specifically it reflects in the plane layout, envelope design and other specific aspects of rural construction. Meanwhile, the rural architecture can also reflect the social space of the rural villagers and the family relationship of the clan, such as spiritual needs and the needs of the blood lineage. The ecological feature of rural environment and social relations are important embodiments of rural placeality, and a projection in architectural space. (Table 3)

Table 3. Spatial analysis on the ecological function of village

Ecological Functional Space	Usage	Tradition method and problems	Reconstruction Strategy
Structure spatial ecologic function	building facades, roof	Constructed randomly without unified style and without characteristic	Make overall planning to reflect regional culture
	Doors and windows	Impede lighting and ventilating	Take sunshade and lighting into consideration, use screen window to stop buds from entering
	Water supply and drainage	Without systematic design, resulting in indoor and outdoor pollution	Take an overall consideration of water supply and drainage system to reduce pollution
	Electrical equipment (solar energy, black light bulb etc)	Not take into account	Combining with modern life demands, take the arrangement of solar energy equipment, black light bulb and air conditioning into consideration
Social Spatial ecologic function	Clan space	No fixed place, incense and photos are generally placed in the hall, influence the use of hall	Design a specific room with traditional clan layout to promote the construction of kinship in modern society
	Community communication space	No fixed place, resulting in disordered functional space	Combine with hall, greenhouse, and table game rooms to enhance rural community communication

3.4 The relationship between the value of the three function

The production, life and ecological function of village buildings should be organically integrated with one another, so as to create a local architecture system with good production function value, life function value, as well as the ecological function value. Based on this system, in the rural reconstruction process, the production, life and ecological functions should be taken as a system for comprehensive consideration. Especially in the process of urban and rural planning, it is necessary to meet the various needs of use and life, but also to protect the history of rural areas and the sustainable development of humanistic culture.

4. The “3F-in-1” Reconstruction Tactics for the Rural Reconstruction in Caiyuan Village

4.1 The retention of overall traditional spatial structure

Preserving and renovating the original spatial structure of villages(1) reserving and renovating the public spaces of villages, (2) transforming traditional buildings, (3) retaining main roads and natural spatial structures of villages, (4) preserving and repairing historical information elements such as old trees,(5) coordinating new buildings with traditional architectural style. The purpose of the above measures is to create a cultural diversity of rural space, so as to realize the sustainable inheritance of local culture. In addition, the existing places for recreational activities and production activities such as: square dance, drying crops, etc. should also be incorporated into the reconstruction of the local landscape, through the integration of existing public space, new functional areas can be built or expanded to meet the new functional demands.

4.2 Adaptation and function adjustment of rural buildings

The author carried out a door-to-door investigation and research on the housing quality, housing survey, household production and living demand in Caiyuan village in line with the “3F in 1” concept, divided the rural buildings into 7 types based on the specific construction status and demands(Figure1), and proposed the following strategies for local protection.






















Type	Construction status	Thoughts for Reconstruction	Building plane	Building elevation
Common Gregarious type		Preserve both the production and living space in the courtyard, pay attention to the social and ecological relations among family members		
Crop-dominated type		Improve production and life space arrangement based on production function		
Aquaculture type		Maintain a balance between life and social ecology based on its production method		
Rich and gregarious type		Take life and ecological function as the major design focus		
Traditional spatial type		Enhance part of production and life function on the basis of traditional construction		
Improved small house type		Pay attention to the reconstruction of production and life space on the basis of traditional layout		
Non-agriculture type		Social ecological function is the major function of this type, some life function need to meet, no production space needed		

Figure1.Adaptive functional adjustment of rural buildings(Source: Drew by the

4.3 Continuation of rural social cultural

The village is a living community composed of social networks such as blood relationship, kinship, clan system and geography. Although the standard of living and way of life are gradually urbanized in the present context, production and lifestyle of village still have some fundamental difference with that

of the city. The transformation and reconstruction of Caiyuan village should be carried out around the three functional demands of local residents. The layout and decoration of family space should respect the rural life habits and the idea of ethnic group, local non-traditional rational surgery reconstruction method should be adopted for the conservation and extension of rural social ecological relations and placeality.

4.4 Focusing on local perception

Local perception is an important dimension of placeality, and it is an indispensable factor to realize the subjectivity of environment. "Nostalgia" involves space and place, and is closely related to human emotions [9]. Local perception involves the dimensions of body, experience and society. The familiarity of body with the place and the human nature embodied in it should be respected; both the old and new life experience should be preserved [10]. Jollification, united, clan, rich products, life style of rice fields are the common cognition of people in Caiyuan village. In the course of building a beautiful village, government policy and planners as external forces need to combine with the concept of "3F-in-1", attach importance to the local community's perception of rural memory and promote the local planning and reconstruction.

5. Conclusion

The reconstruction of beautiful countryside is not a "dressing" project, but a reconstruction of rural local meaning in the contest of globalization and modernization; it is the manifestation of production development, well-off life and good ecological performance. The overall and architectural transformation of Caiyuan village is based on local sustainable social construction; it will produce new local significance. In the context of urbanization development, in the beautiful rural reconstruction, we need to understand the rural life culture, respect the demand of agricultural production, and constantly explore and meet the demands of rural residents for living environment. This study attempts to carry out an in-depth and detailed social survey from the perspective of placeality, and analyzes the transformation of rural areas before and after the reconstruction.

In a certain sense, the reconstruction of beautiful rural village is to emphasize the existing rural production, life and ecology and meanwhile achieve the advancement of rural building with the times, in order to fundamentally build a rural living environment conducive to human life and production activities. In this context, the exploration of rural reconstruction has more practical significance.

6. Reference

- [1] Qiu Tong, Xu Qiang Engineering Practice of Yingdong Ecological Village Construction In Chongming Island *J Green Building* 2012 **6**
- [2] Xue Kaiqiang, Wen Jiangang, The Reconstruction Idea of Traditional Viliage in The Central Region of China *J Suzhou University of Science and Technology (Engineering)* 2016 **3**
- [3] Zhang Tingwei, Changes of Urban Spatial Structure and Its Driving Mechanism in China in the 1990s *J Urban Planning* 2001 **25**
- [4] Zhang Xinxin, Literature Review of Rural Living Environment Research *J Urban Geography* 2015 **14**
- [5] Duan Yifu, My view on humanistic geography J translated by Zhicheng Zuo Yiou Proofread by Zhou Shangyi *Progress in Geography* 2006 **25** 2
- [6] Pan Chaoyang, The geographical composition of the Placeality of Great Lakes region- the geographical interpretation from historical dimension *J Geographical Research Report (Taiwan)* 1996 **25**
- [7] Tang Lin, Ling Hong, Chen Chen, Local, Landscape and Cultural Identity: An Analysis of Cultural Geography of Old City Reconstruction in China *J Journal of Hubei Correspondence University* 2014 **13**
- [8] Seamon D. Body- subject, time- space routines, and place- ballets[M]/Buttimer A, Seamon D(eds.). The Human Experience of Space and Place. London: Croom Helm, 1980
- [9] Tuan Y F. *Space & Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press) 1977 P17
- [10] Zhou Shangyi and Cheng Zhifen, Evaluation on the Spatial Morality and Local Morality of "Nostalgia" *J Human Geography* 2015 **6**