

Pilot Studies into Space Planning for Towns in Mountainous Areas of Chinese Economically Developed Provinces

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Abstract— In this paper, the case study of Yangshan County in Guangdong Province is taken as an example to study how to optimize the spatial utilization level in the poverty - stricken areas of the economically developed provinces in China. The article argues that the spatial structure optimization of mountainous villages and towns should be based on the present situation of mountainous geographical conditions, build stratification frame of spatial distribution. Based on township form for compact design of limited development space and refinement function setting to give consideration to production and life. In these process, road traffic construction is the backbone of spatial planning optimization.

Index Terms— Space Planning Mountainous Areas Policy Pilot Poverty Areas.

I. INTRODUCTION

Chinese provinces and regions have unbalanced economic development, and they have huge differences in economic development levels. Just like this situation, differentiated phenomenon of economic development is prominent in Chinese richest regions, Pearl River Delta within Guangdong, mountainous areas in north Guangdong and eastern Guangdong. In 2015, GDP per capita in Pearl River Delta is 107010 CNY, more than 3.2 times that of northwest region of eastern Guangdong, and 73963 CNY more than that of northwest region of eastern Guangdong. Thirty percent of

the land throughout the whole province in Pearl River Delta gathers above fifty percent of permanent resident population, and produces nearly eighty percent of GDP as well as eighty-five percent of local financial revenue. The mountainous areas in north Guangdong have area of 71,100 square kilometers, including Shaoguan, HeYuan, Mei Zhou, Qingyuan and Yunfu. However, due to high elevation, scattered cultivated lands and poor traffic condition, social economic development levels of these mountainous areas lag behind other regions of Guangdong on a long-term basis. How to effectively utilize vast geographic space resources in mountainous areas in north Guangdong to promote optimization of space structure are the key to develop their social and economic development and narrow the gap of regional development in new period.[1] As the foundation of regional development, economic development of towns must first have optimization of space structure to realize sustainable development in economy, society and

environment.[2]The pilot project is the innovation approaches of public affairs widely used in China. It aims to let part of regions first carry out certain reform on public affairs. If it has excellent results, this practice will be extended to a larger region for controlling risks. [3]Yangshan County of Guangdong province is a national level pilot county, which brings great convenience to its adjustment of space structure for subordinate towns. With Chengjia Yao Nationality Village administrated by Qingyuan as an example, this article discusses how to utilize pilot policy advantages to optimize space structure of towns in mountainous areas combined with local situation.

II. METHOD

This article adopts methods of case studies, where Chengjia Yao Nationality Village is part of Yangshan County. The county is located in northwest Guangdong, and it is a typical agricultural county in mountainous areas. It has barren natural resources endowment, and its total population is 540,000, among which rural population is 490,000. Yangshan County has laggard economic condition, which is the provincial level poor county, one of three nationwide anti-poverty counties in Guangdong province; meanwhile, it is also a demonstration and pilot county for comprehensive rural reform at national level. Yangshan County is a typical mountainous county. As nationwide pilot county, reform on rural planning of areas under its jurisdiction has important reference value during rural planning innovation nationwide.

III. CASE ANALYSIS

A. Current situation of space structure in Chengjia Yao Nationality Village

Chengjia Yao Nationality Village is located in northwest Guangdong, and at 24°27' N and 112°48' E. It is a boundary town in Guangdong province, and borders on Yuyuan County, Shaoguan in the east, on Lianzhou in the west, and on Mangshan Yao Nationality Village, Yizhang County, Hunan province in the north; this town is 120 kilometers from Qingyuan, and 190 kilometers from Guangzhou; the National Road 323 passes through the town from west to east. Its gross area is 587.7 square kilometers. It has 16872 mus of cultivated area, among which paddy fields are 8933 mus, and dry lands are 7939 mus; the whole village administers ten administrative villages, 109 villagers' group, 4164 households, and 17360 people (among which, 4807 people for Yao Nationality). This village belongs to cold highland area. The territory is densely covered by mountain forest. Jia Pit, Huangsha Pit and Dong Pit converge into Chengjia River,

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where Chengjia is divided into East Mount, West Mount and Tianmen Mount.

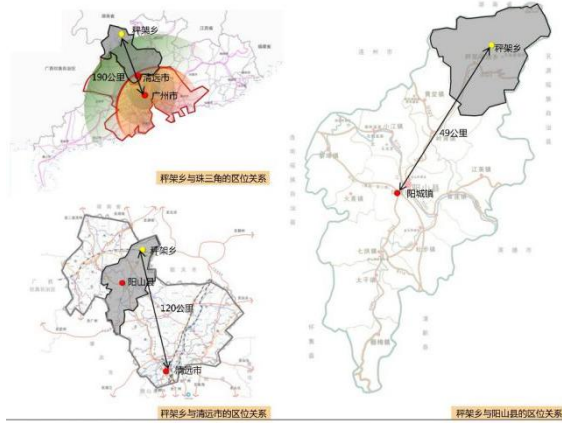


Figure 1: Location diagram of Chengjia Yao Nationality Village

B. Problems for space development in Chengjia Yao Nationality Village

Town in mountainous areas has limited general development space. Restricted by natural landform of hilly area, though Chengjia Yao Nationality Village has vast overall area in space, it has limited lands which can be used for centralized planning and construction. Most of them are sloping fields and benchlands, with high construction cost. Building lands for villager residence have scattered layout, construction lands have disordered layout, and construction lands for village are mostly distributed along main road traffic of village domain. Due to limited overall area of these lands, lands suitable for construction have already been occupied during rural economic development, with high cost for new land consolidation and development.

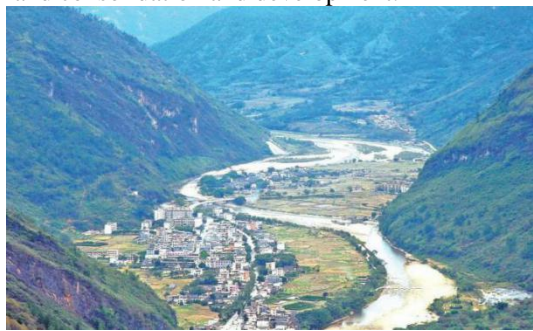


Figure 2: A bird's eye view of the Chengjia Yao Nationality Villagetownship

Township is limited in its development lands, and has difficulties in expanding urbanization space. Chengjia Yao Nationality Village is located along the bank of Chengjia River, a long and narrow banding space among mountains. Influenced by massif, township forms state of such banding space. During its development, it seems to be fragmented through being cut apart by rivers and roads, which makes it have long and narrow as well as scattered development space. It increases difficulties and costs in land utilization for township development, and goes against expansion of urbanization.

Table one: comparison in optimization direction for township space of Chengjia Yao Nationality Village

Development direction	Condition for space utilization	Cost	Development potential
North (northeast)	Valley plain	Low	Valley plain has imperfect foundation and great stress for flood control
South	Hilly areas	High	They have excellent road infrastructure and high cost for mountain leveling.
West	Hilly areas	High	They have hilly areas with steep slopes, and their space is limited.
East	Valley plain	Low	Valley plain has perfect flood control facility and convenient transportation.

The village has disordered space planning. Due to historical reasons, Chengjia Yao Nationality Village started late in centralized space planning and utilization. Long-term deficiency in plan guidance and reasonable direction guide in construction lead to disordered land utilization. Inconsistent pace among planning of rural space and land utilization as well as basic farmland protection results in frequent occurrence of deficiency and mutual contradiction for planning coordination. This makes numerous villages in Chengjia Yao Nationality Village have difficulties to deepen their planning formulation. Even though the plan can be completed in establishment, its plan implementation usually fails. Implementation failure for land without or with planning causes space planning of village to fall into halt state.

Imperfect transportation infrastructure. According to national conditions of China, urbanization development usually depends on transit highway. Shops, government, squares and residence of township in Chengjia Yao Nationality Village are build along transit National Road 323. However, with gradual expansion of township development and scale, traffic safety issues caused by transit highway and their disturbance to township gradually become important obstacle for the development of small town. In addition, excessive dependence of road network system in Chengjia Yao Nationality Village on transit highway forms imperfect road system. Road network of the town only has National Road 323 and a few by-trails, and its system is deficient in secondary main roads. Furthermore, it has many dead end highways and its system is deficient in carding.

C. optimization countermeasures for space structure in Cheangjia Yao Nationality Village

Current situation for space utilization in Chengjia Yao Nationality Village is caused by numerous reasons, among which there is objective environment of limited available space, and subjective reasons of laggard road traffic as well as disordered planning formulation, etc. Facing these complex problems, it is usually difficult for single planning manuals to take effect, while comprehensive planning and adjustment also face large constraint from policies and resources. In 2013, Central Government confirmed Yangshan County in Chengjia Yao Nationality Village as demonstration and pilot county for comprehensive rural reform nationwide. This provided large power space for this county to adjust rural planning for areas under its jurisdiction. According to objective reality of mountain area environment and social condition of laggard economy and infrastructure, this village utilized this opportunity and had comprehensive

consideration of influences for multiple factors. And then it attempted adopting comprehensive means to carry out optimization design for its space planning.

(1) To build stratification frame of spatial distribution

Chengjia Yao Nationality Village has vast hill area, and can work out space planning for land formation. There are needs for rural reform planning in China in different periods about renovation of stony desertification, migrating by going down the hill and new rural construction, etc. Combined with these situations, it is suitable to adopt stratification structure of space frame for overall spatial distribution of towns according to population aggregation degree to build some convergence points with different levels for residents. And through perfection of conversation network, organic spatial consequence is formed. Specifically speaking, it is “one three five” three-level” layout way, including one township: township of Chengjia Yao Nationality Village, distributed along two sides of National Road 323; three central villages: respectively are Shuiping Village, Taipingdong Village and Ducai Village; five basic-level villages: Wuyuan Village, Maoping Village, Dongkun Village, Lutian Village and Da’ao Village.



Figure 3: Central Village Distribution Planning

(2) Based on township form for compact design of limited development space

According to the reality of limited development space in mountainous areas, it is necessary for Chengjia Yao Nationality Village to emphasize reflecting needs of sustainable development in its township construction. Based on saving and intensive land use, it should improve land utilizing efficiency, and forms its compact development forms. Meanwhile, it should give consideration to needs for convenient life and subsequent economic development of the town. According to actual situation of its township spatial expansion analyzed above, it can adopt space structure of “two centers, three axes and two groups” in its township planning layout. Among them, the so-called two centers means township center and service center of riverside tourism, among which, township center mainly satisfies functions of government affairs development and life services for residents. Service center for tourism mainly satisfies requirements for tourists guidance, shopping and tourism center or hub; three axes mean east-west development axis, north-south expansion axis and development axis of riverside tourism services formed according to land utilization situation of Chengjia Yao Nationality Village and traffic condition; two groups mean life group and tourism service group of township.

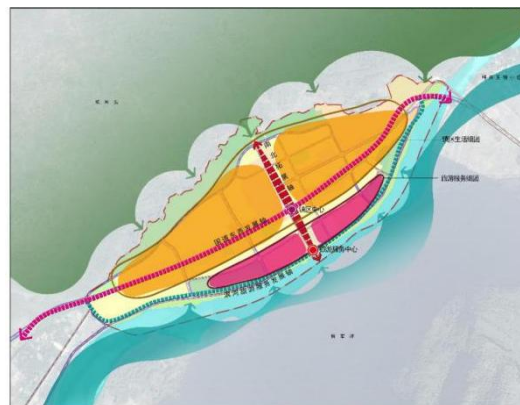


Figure 4: Township expansion direction planning

(3) Refinement function setting to give consideration to production and life

Based on overall planning of township, it should respect objective reality of existing resident lands, and actively boost land integration and intensification use of lands. Meanwhile, it should improve ancillary degree to public infrastructure during township space planning, and delimiting the limitation for residential land area. On this basis, it should have space planning for mixed commercial and residential lands as well as lands for production facility, moreover, it should increase ancillary land supplies such as public facilities, road and square as well as grassy areas. On the one hand, this can be convenient for residents’ life, on the other hand, can increase land space to develop tourist industry as well as industry and commerce. This is specifically reflected in: to retain lands and building of government house, ethnic schools and township hospitals, and rebuild the aged service centers, Chengjia theater and pedlars’ market; to have planning and construction for service facilities such as outdoors stadium and health station in town, as well as commercial finance service facilities in tourist service area.

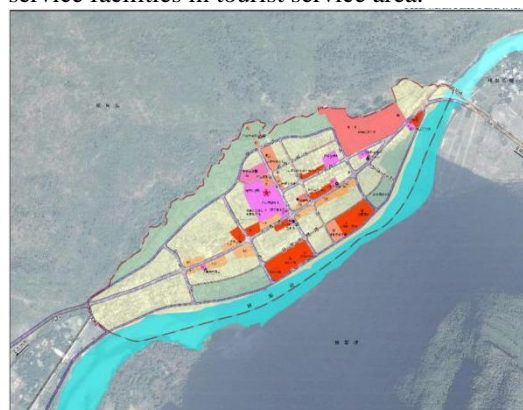


Figure 5: Planning for the production area and the living area

(4) Perfection of construction for traffic network

It should plan and form four-level planning for traffic network in town field. Four-level is respectively National Road 323, County Road 381, township road and village road. It should emphasize improving traffic accessibility from Chengjia township to the surrounding villages and tourist attractions, and vigorously enhance highway grade and pavement quality. It should connect dead end highways, and transform and perfect rural highway. Moreover, it should improve grade of rural highway and operational efficiency to achieve each village having cement roads. It should have systematic organization for road planning at towns in

mountainous areas, and confirm section forms, width of red line as well as trend of roads at different levels combined with terrain and actual requirements. It should not apply mechanically the section forms and width of red line for roads in cities, and should not impose trend of road as straight as plain type towns.

IV. DISCUSSION

Following enlightenment can be obtained through analysis into pilot optimization for space structure in mountainous area of Chengjia Yao Nationality Village:

(1) Scientific planning combined with characteristics of mountainous areas. It should insist on principles of “to adjust measures to local conditions, optimal land utilization, beneficial production, convenient life and protection of environment”. It should be fully combined with terrain features, surrounding environment and residence habit for people, and have reasonable layout to practically improve scientificity, democracy and feasibility of planning. Combined with actual situation of poor mountainous areas, it should plan construction of sloping fields village, and take advantage of topography, making the villages built along the mountains. While carrying out village construction, it should pay attention to reservation and protection of valuable and featured old buildings and historical sites, and combination of new and old forms features; it should lay emphasis on ecological protection to realize living in harmony between man and nature.

(2) Combination of land management and space planning in mountainous areas. Right confirmation and certificate issuing of rural lands, it should promote land consolidation in mountainous areas.[4] Moreover, it should gradually transform focus of work from orientation of rural land consolidation to orientation of land consolidation for town and country construction, and to new rural construction and village renovation. It should have preceding tasks of overall plan for land utilization, and guide and carry out land consolidation, reclamation of construction lands and rural residence lands; furthermore, it should actively vitalize stock lands, and solve land contradiction during development planning for township and residential areas.

(3) Consideration given to life and production according to the requirements of sustainable development. Because poor mountainous areas have laggard economic conditions, during space planning, it is necessary to link improvement of living facilities of their residents with production development. According to actual situation of mountainous areas, it should delimit or reserve space for construction of commerce, tourism, finance and real estate as well as their ancillary service facilities. Moreover, it should bring the present landscape and special products, etc into categories of central planning, strengthening economic effects of space utilization.

(4) To have long-term interests in mind, construction of municipal service facilities. Urbanization is the powerful support to boost coordinated development of the regions [Yang Chunnan. How Mountainous Areas in North Guangdong Take New-Type Urbanization Road[N]. Study Times, 2014.3.31, 010 Edition.]. Aimed at deficiency in land varieties and total for public service facilities and municipal facilities in township of mountainous areas, it is

necessary to calculate township population at last phase during planning. Moreover, according to appropriately advanced population size, it should calculate lands for municipal facilities, and reasonably arrange these facilities such as transformer substation, rubbish transfer station and waterworks. Though these appropriately advanced municipal engineering construction has large investment at early stage, if municipal infrastructure is not perfect, there brings huge hidden danger to space planning and utilization of towns. [5] Towns of regions with developed economy in Pearl River Delta of Guangdong have laggard municipal infrastructure construction. Therefore, they will face huge expenditure for land requisition and demolishing cost during replanning construction at later stage, which will cause local residents perplexed in life on a long-term basis.

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