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**Culture·Space·Ecology·Carrier—Exploration and Practice of the Design of Suburban
Rural Complex
under the Symbiosis Theory in China**

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Abstract

With the advancement of industrialization and urbanization, cities are accumulating an increasing number of production variables, and current difficulties are exacerbated by city expansion. Simultaneously, the development of suburban construction is lagging, and many suburban problems require immediate attention. On February 5, 2017, the Chinese government issued the No. 1 document of the Central Committee, which designated the "rural complex" as a suburban development model in order to solve various urban problems, close the gap between urban and suburban areas in China, and strengthen the construction of backward rural areas. In recent years, the use of rural complexes has increased across the country. The planning and design of rural complexes has gradually revealed its distinctive policies and strategies as practice has advanced and theoretical research has deepened. This is an interesting avenue to pursue.

First, this study has a thorough knowledge of the idea of suburban rural complex and related theories, and it deeply evaluates the development status, planning, and design of suburban rural complex at home and abroad, as well as listing the challenges that suburban rural complex faces.

Second, the suburban rural complexes are classified, and the characteristics of suburban rural complexes in different modes are simply summarized, using interpretation and case studies, as well as the supplement of theoretical knowledge related to the planning and design of suburban rural complexes.

Finally, based on case studies and research of suburban rural complexes in the United States and abroad, as well as relevant theoretical knowledge, this study summarizes the principles of suburban rural complex planning and design, as well as the functional division, functional layout, and traffic flow lines of suburban rural complexes, according to general principles.

This study plays a certain guiding role in the planning and design of the rural complex in the suburbs of the city, and also guides people to build the rural complex more beautifully, thanks to the research on the planning and design of the rural complex in

the suburbs of the city.

Key words

Suburban Rural Complex; Space Design; Symbiosis Theory.

Methods of research used

1. Literature research

Consult a large number of research literatures on suburban rural complexes, as well as relevant country policies and regulations on suburban rural complexes, to gain a more detailed understanding of research trends and results in related fields, and obtain relevant theories through extensive literature reading and collation, which provides a solid theoretical preparation for the subject's research.

2. Inductive analysis

Reading a large number of related literature, analyzing and researching a large number of suburban rural complexes, conducting detailed research on existing or completed cases, and using the guidance of related theories are all part of the research on the planning and design of the suburban rural complex. Take in the superb research results of research scholars, construct the theoretical foundation of this article, and summarize the research findings of this article.

3. Survey

According to the current condition of suburban rural complex development in China, it is proposed to research the important characteristics and development advantages of various types of pastoral complexes. The study and summary give a solid foundation for scientific classification and evaluation of the suburban rural complex's future development model.

Introduction

i. Background of the research

Many European cities experienced enormous population expansion following the Industrial Revolution. This expansion has been compounded by people migrating from rural to urban regions in quest of better prospects. While cities have become more appealing, concerns such as pollution and the growth of informal settlements have also increased. At the same time, rural villages near nature have abundant natural resources, but they are also hampered by isolation from the outside world and limited work prospects. In response to these issues, the garden city concept was proposed around the end of the nineteenth century. Ebenezer Howard was a pivotal figure in the Garden City movement. He began researching cities even before urbanism was recognized as an academic discipline. Howard's book, *To-morrow a Peaceful Path to Real Reform* (1898), was reissued four years later as *Garden Cities of Tomorrow* (1902) and became well-known^[1]. This urban planning model is distinguished by an advanced ideal city designed to address the issue of rural displacement and the ensuing disorderly urban growth. The Garden City is built from a collection of miniature cities, ideal communities that blend the benefits of both urban and rural environments.

Lewis' economic theory guides agricultural sector after reform and opening up in China. William Arthur Lewis believes that the transfer of surplus rural labor to non-agricultural businesses will eventually lead to a bottleneck in the reduction of rural labor.^[2] Many significant cities in China have now progressed to the later stages of industrialization, and they have discovered that Lewis' economic theory is incompatible with the country's economic conditions. According to scholar Cai Wanhuan, in the process of economic development guided by Lewis' economic theory, urban expansion and reduction of rural land will force farmers to be separated from their land,

^[1] Howard, Ebenezer. *Garden Cities of Tomorrow*. London: Swan Sonnenschein & Co. Ltd., 1902.

^[2] Lewis, W.A. *Economic Development with unlimited supply of labor*. The Manchester School, 1954, 22(2): 139-191

resulting in a large relatively surplus population, forming an industrial reserve army, resulting in lower wages and relative poverty of workers, thus To increase the income disparity even more^[1]. The core national condition of China is that the divide between urban and rural areas is wide and will remain so for a long time. According to scholars Fei Jinghan and Ranis, the "Lewis turning point" will not be reached quickly, and in less developed countries, this process could take decades.^[2] China is seeing a significant urban-rural divide. Many professionals and scholars have looked to Theodore W. Schultz's "Transforming Traditional Agriculture" to help bridge the urban-rural divide and encourage rural economic development. He believes that conventional agriculture's weakness stems from farmers' exhaustion of the benefits of "production technology" as a component of the inputs and knowledge at their disposal, and that farmers' savings and investments are utilized to build up stocks of various forms of reproductive capital. There isn't much stimulation^[3]. This has indicated a path for the development of modern Chinese rural regions, namely, supporting the reproductive development of rural areas, in order to direct rural economic development in China using Schultz's classic agricultural transformation theory.

ii. Objects of the research

This thesis is on a suburban rural complex that combines industrial, tourism, and communal purposes. It strives to decompress huge cities, rejuvenate the countryside, achieve urban-rural integrated development, and derive suburban rural complexes in response to the widening distance between urban and rural areas. The suburban rural complex has undergone thorough planning and design. Theoretical knowledge of planning and architecture is utilized to enhance the theoretical knowledge of other disciplines in the

^[1] Cai Wanhuan. On the Applicability of Lewis Turning Point Theory to Chinese Economy. Marxist Studies, 2012(03): 54-62

^[2] Fei and Ranis, Growth and development from an evolutionary perspective. Malden, MA: Blackwell Publisher, 1999,10-25

^[3] Schultz, T. W. Transforming Traditional Agriculture. New Haven CT Yale University. "Economic & Political Weekly", 1966, 8-12

context of the suburban rural complex, as well as to summarize different types of suburban rural complex situations. The study of the rural complex's general planning, architectural, and environmental design on the periphery.

The rural complex on the edges of the city is the focus of this study. The benefit of this definition is that it narrows the area of the investigation while increasing its depth. The urban outskirts defined in this thesis are regions that are within a 2- to 3-hour drive from the city center, have good accessibility, and are in a good location. The term "urban outskirts" refers to areas on the outskirts of urban development that are connected to the urban road network. As a result, as compared to distant mountainous places, its location has apparent advantages, and travel is more convenient; urban growth affects natural resources on the periphery of cities. It is a small country with a lot of natural resources, a well-balanced environment, and a strong traditional culture. Its original rustic village style has been preserved. However, the country has accelerated the construction of new rural regions in recent years, and many villages have changed their appearance. To some extent, the original traditional buildings have vanished. The infrastructure construction on the outskirts of the city is relatively complete, but the construction of public service facilities is relatively backward compared to the city, and it is not reasonable or perfect, particularly in education and medical services; the majority of the land on the outskirts of the city is used to develop the small-scale peasant economy. The land use is both absurd and adequate. As a result, the urban outskirts provide fertile ground for the construction of rural complexes that may not only integrate numerous resources, but also encourage rural economic development and the merging of urban and rural areas.

Cities' suburbs offer good location benefits and convenient transportation. They are usually found near the crossroads of two or more cities, or attached to larger cities. This type of region is part of the urban-rural junction, which connects the countryside and the city. It may effectively combine various beneficial resources while maximizing the benefits of urban-rural joint development; such a region can serve as a fulcrum for good rural

development as well as a reserve for urban development. At this stage, rural development in the country is still inextricably linked to city development, and city development is also dependent on rural materials; the area of 2 to 3 hours' drive meets the best driving requirements for people's weekend leisure and vacation, and the area has a beautiful environment and rich natural resources. Agricultural production is in good shape, and it is best suited for the growth of weekend leisure tourism and other sectors, mitigating the impact of off-peak and peak tourism seasons, and is best suited for long-term steady and sustainable development.

iii. The aim of the research

This subject's research goal is to summarize the experience and deficiencies in the planning and construction of domestic suburban rural complexes, as well as to combine the strategies, methods, and experiences of international agricultural development to supplement and improve the country's current rural development and the practice of suburban rural complexes in theory and innovation, in order to solve agricultural problems. The second goal is to analyze and study successful cases of international agricultural development and domestic suburban rural complexes, as well as to investigate the development direction and methods of suburban rural complex planning and design under the new urbanization process, as well as the methods of architectural and environmental design, in order to promote comprehensive and integrated development of urban and rural areas in China.

1 Related definition and discrimination of suburban rural complex

Suburban rural complex is a new theoretical achievement of rural construction research in China in recent decades. Its construction is still in the exploratory and development stages. To understand and research the suburban rural complex, we must first understand its fundamental principles and then trace their beginnings to understand its theoretical framework.

1.1 Definition of suburban rural complex

In 2017, the "No. 1 Central Document of China" clearly put forward the concept of "suburban rural Complex", which is specifically expressed as: "Support conditional rural construction with farmers' cooperatives as the main carrier, allow farmers to fully participate and benefit, and integrate circular agriculture, creative agriculture, The suburban rural complex integrating agricultural experience will be demonstrated through channels such as agricultural comprehensive development and rural comprehensive reform transfer payment."^[1]

The term "complex" first appeared in architecture and refers to a multi-functional and organic composite mode. It is built on a certain field, integrates related functions, and essentially has all of the field's features.^[2] The suburban rural complex is a complete paradigm founded on the suburban rural field as its foundation, which evolved from the rural complex and tourism complex. At the moment, most complexes research focuses on urban complexes, and research on other complexes is still in the exploratory stage, with only few suburban rural complexes. Some academics interpret the concept of suburban rural complex based on their own knowledge and study.

Different researchers have different definitions of the suburban rural complex.

^[1] Liu Qi. The National Proposition of "Tianzi No. 1": suburban rural Complex (Part 1) [J]. China Development Watch, 2017, (Z2): 102-104

^[2] Zhang Ruoyang. Research on the Development Model of China's Tourism Complex [D]. Shandong University, 2012.

Wang Chun, a planner, argues that the suburban rural complex is a new concept, model, and practice.^[1] Yang Liu, a scholar, defined the suburban rural complex in three descriptions: "new economic organization model," "comprehensive planning area," and "development platform," and provided a straightforward definition of the concept: A collection of the new method of comprehensive rural development that merges modern agriculture, leisure tourism, and suburban rural communities, the suburban rural complex is an unavoidable trend of modern agricultural growth.^[2]

According to some scholars, the suburban rural complex is based on enterprise and local cooperation, finance and enterprise financing, and rural cooperatives as the carrier, with enterprises, farmers, and the government all fully participating, farmers benefiting the most, and farmers carrying out overall and comprehensive planning, development, and operation in rural society. Agriculture, cultural tourism, real estate, and community development are all part of a comprehensive development paradigm.^[3]

Another group of scholars bases the suburban rural complex on the concept of rural space and region, defining it as follows: using agriculture and rural land as the carrier, featuring complex functions, development parks, and diversification of main bodies, integrating live functions, and promoting rural development. It is a new composite carrier that unites the three industries and encourages the area economy's transformation, upgrading, and development. They believe that the suburban rural complex is a composite carrier that spans industries and domains. It is a comprehensive multi-functional and multi-format operation that symbolizes the industrial agglomeration and functional complexity of the suburban rural complex.^[4]

Based on the domestic research on the concept and connotation of suburban

^[1] Wang Chun. How to Understand "suburban rural Complex". *Architecture Times*, 2018-01-08(07):1-2

^[2] Li Qin, Zhou Chao, Dong Qiaofeng, et al. Exploration of the planning and design of innovative suburban rural complexes. *Anhui Agricultural Sciences*, 2017, 45(34):222-224+227

^[3] Landscape suburban rural. The development model, planning design and industrial introduction method of suburban rural complex.

http://www.sohu.com/a/162903571_99940497, 2017-08-07

^[4] Gaohua Ecology. The complex model you need to know. http://www.sohu.com/a/162456545_99954120, 2017-08-05

rural complexes, this thesis defines the “suburban rural complex” as: based on the concept of urban and rural integration, using countryside and agricultural land as the carrier, through the cooperation between enterprises and local governments, an urban-rural complex with spatial integration, subject diversification, industrial agglomeration, and complex functions formed oriented by the agricultural economy will be created. The suburban rural complex mainly includes the following three elements(Fig1.1):

(1)The agricultural industry's building The agricultural industry must lead the integration of the three industries in the suburban rural complex. Its principal industry is modern agriculture, which uses high-tech farming technologies and scientific management to boost agricultural output value, enhance agricultural reproduction, and integrate primary, secondary, and tertiary sectors. The industrial backbone of the suburban rural complex is modern agriculture. Economic growth is only possible with industries. It is both the material foundation and a major driving force for the growth of the suburban rural complex. Other industries are linked to contemporary agriculture and encourage creative reproduction. Agriculture, forestry, animal husbandry, fishing, processing, manufacturing, catering, warehousing, e-commerce, finance, tourism, health care, real estate, and other businesses are all part of the suburban rural complex.

(2)The development of suburban rural complexes is mostly driven by leisure tourism. Rural communities need urban people's strong spending power and brand publicity, and urban people need the rural atmosphere to rest and feel the nature. How can the requirements of both be met? Rural places can create leisure tourism based on their own natural riches and entice city dwellers to visit. Vacations can not only stimulate rural economic development, but they can also help with public relations. The best approach to link urban and rural communities is through leisure tourism. It is a method for people to find a second home. It is a pioneer in rural industrial growth, a driving force in the creation of suburban rural complexes, and a catalyst for industrial integration.

(3) Suburban rural housing and community serve as the foundation for the long-term development of suburban rural complexes. A community is formed by the assembling of people's productive activities and lives, and only with a community can there be sustainable economic development. Leisure tourism satisfies people's yearning for a second home, and in conjunction with the gathering of local residents, a community with rural roots and agricultural produce as its mainstay will emerge. The concept of a suburban rural community is built on the magnificent natural suburban rural scenery, where farmers and urbanites coexist and everyone contributes to industrial development and communal development. Through the community, ideological and cultural gaps between rural and urban areas are bridged, the economic divide between urban and rural areas is bridged, and overall integration of urban and rural areas is achieved.

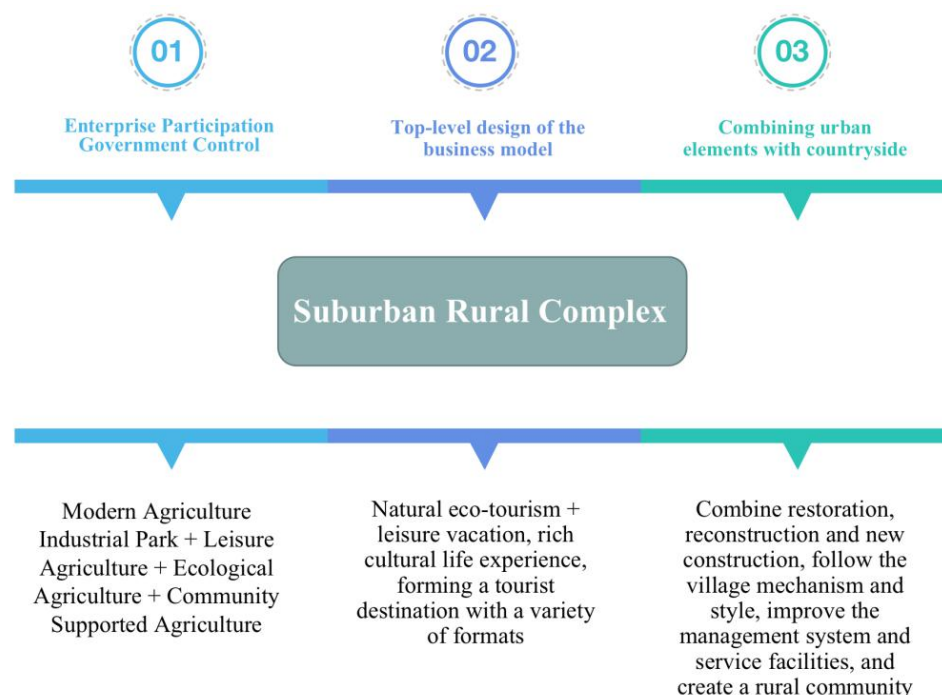


Fig1.1 The concept of Suburban Rural Complex

Source: Drawn by the author

1.2 Construction concept of suburban rural complex

Recognize the three aspects of the suburban rural complex, combine the relevant concepts of new rural construction and the suburban rural complex's

planning and building practice, and summarize the construction concept of the "suburban rural complex."

(1) Rural tourism has become a global trend, and tourism business in China is expanding at an unprecedented rate. The concept of global tourism, particularly in recent years, has given additional fuel to the growth of tourism business in China. Tourism is an industry that arose from nothing. Many things in rural China are devoid of tourism resources. However, with the growth of global and rural tourism, the creation of beautiful countryside, and the innovation and upgrading of rural sectors, tourism has become a means of bringing urban populations to rural consumption. As a result, tourism is the most important industry in suburban rural complexes.

(2) The growth of rural areas is inextricably linked to the support of industry, and the development of industries generates economic advantages and raises people's living conditions. The agricultural industry of the suburban rural complex is the main content of its construction, employing local characteristic culture or agricultural production, introducing technology, innovating industrial models, developing processing industries, researching and developing high-quality characteristic agricultural products, and developing related tourism services centered on characteristic agriculture, resulting in a one-of-a-kind suburban rural complex. As a result, the core of suburban rural complex construction is comprised of distinctive industries.

(3) Each village has its unique history of growth. It preserves its unique customs, architectural styles, and folk festivals, removes the rough and extracts the essence, innovates and inherits, and promotes the dissemination of characteristic culture by engaging people in farming activities, learning traditional handicrafts, tasting special delicacies, and savoring the quiet rural life. As a result, culture is the soul of the suburban rural complex.

(4) Perfect infrastructure is required for the development of suburban rural complexes, and the timely deployment of some critical infrastructure will offer continuity and ductility to later development. The suburban rural

complex cannot exchange information and communicate with the outside world swiftly and easily due to a lack of modern water, electricity, gas pipeline network systems, transportation, communication, logistics, people flow, and information flow. As a result, infrastructure such as transportation, logistics, and communication are critical supports for the development of suburban rural complexes.

(5) People living in urban reinforced concrete forests lack life experience. The suburban rural complex is a production, life, ecological, and life complex. It creates numerous agricultural-related products. People can feel vitality, appreciate the value of life, and share in the joy of life through participating in experiencing activities. As a result, the value of the suburban rural complex is experience.

(6) The primary goal of the suburban rural complex is to address the "life, industry, ecology challenges." It blends rural and urban life, peasant and worker culture, traditional and modern production, and life. Its goal is to revitalize and rebuild the countryside, to rationally use existing resources, to unite people's hearts, to bring new vitality and vitality to depressed villages, to reactivate the rural economy, culture, and thinking, and, finally, to achieve overall integration of urban and rural areas. As a result, the goal of urban and rural planning is rural revival and rebuilding, which is also the goal of suburban rural complex construction.

(7) The suburban rural complex is concerned with "ecological protection" and adheres to the overall design of "living, working, and traveling, producing, and ecology." It must not only preserve the original idyllic natural features, but also protect natural resources and cultural history, as well as develop a circular agriculture model, integrate into new production and lifestyles, and create a complete ecological cycle chain within it, forming a system that operates according to natural laws. Model of green and sustainable suburban rural complex development^[1].

^[1] Wang Ling. Exploration on the Construction Mode of Modern Agricultural Sightseeing suburban rural Complex in the Suburbs of Northern Cities——Take Shenyang Daomeng suburban rural Complex as an Example [J]. Value

(8) The suburban rural complex is an industrial agglomeration that integrates three industries while emphasizing "innovation" and sticking to the local structure. According to the location and geomorphological characteristics of the area in which the builders are located, the builders make full use of the local characteristic resources, spark the birth of new industries through creativity, and form a sustainable industrial chain, carry on local cultural and folk activities, and refuse to copy and assimilate.

(9) The suburban rural complex differs from the urban complex in that it is an agricultural development complex that integrates diverse industries and combines many functions with vigour. It adheres to the principle of sustainable and recyclable green development, is guided by market demand, accumulates production elements and resources, combines primary, secondary, and tertiary sectors, promotes endogenous power, and develops a green production chain. Finally, a sustainable development cycle is achieved.

1.3 Other complex concepts

Urban Complex

An urban complex is a mix of three or more roles in the city, such as office, commerce, exhibition, residence, dining and entertainment, and transportation, that produces a dynamic interaction of interdependence and mutual benefit among the many elements^[1].

Engineering, 2018, 037(031):15-18.

^[1] Jiang Difei. Architectural Trend, Towards a Peaceful Residence. Zhonghua Construction, 2005(S1):69



Fig1.2 Hubinyintai in77 urban complex in Hangzhou,China.(by Zhou Kai)

From website:

<https://www.google.com.hk/url?sa=i&url=http%3A%2F%2Fwww.linkshop.com%2Fnews%2F2019437431.shtml&psig=AOvVaw27Rtx29jT7xVyroHW3SJFV&ust=1643457975963000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCOjllpu01PUCFQAAAAAdAAAAABAI>

The construction land space of urban complexes is relatively small, with less land and more people, particularly in core city areas. Human and material resources should be concentrated in the horizontal direction as much as possible when planning and designing, and extended in the vertical direction as much as possible. Second, the geographical position of the urban complex is often in the city center or a residential region where the people is concentrated, with easy access and convenient transit. high caliber The activities of urban complexes are distributed in both horizontal and vertical directions, and internal traffic flow lines are complicated, with some being directly coupled with urban rail transit, which performs part of the role of evacuating people. With a strong commercial atmosphere and different creative landscapes, the urban complex focuses on the shaping of indoor space. It is a popular retail and leisure destination.

Agricultural complex

The agricultural complex is a new type of agricultural industry that focuses on gathering and developing its service industry platform carrier, with urban agriculture as the main content, leisure tourism as the marketing point, the

establishment of full-resource tourism^[1].



Fig1.3 Longping Hi-Tech agricultural complex in Changsha,China.(by Lundao)

From website: <https://mp.weixin.qq.com/s/IdMDkkZ8m-Nu8qhhTAI6UQ>

The agricultural complex, based on industrial thinking, focuses on the agricultural industry's production and innovation reform, in general, the production and research and development of modern agriculture, as well as the processing of high-tech agricultural goods. It is a large-scale agricultural product or agricultural and sideline product production base. The function is relatively basic, the spatial layout generally follows the industrial park model, the land is divided and the industry is spread out in a checkerboard pattern, and the interior structure is straightforward.and the landscape environment is relatively monotonous.

Tourism complex

The construction of a cluster of tourism-related industries such as transportation, tourism, accommodation, catering, shopping, entertainment, and other tourism-related industries within an appropriate spatial and geographical scope, relying on advantageous tourism resources and service facilities and other factors, and providing market demand-oriented services,

^[1] Guo Wei, Cao Ronglin, Huo Ziwen. Research on the Development Planning of Hangzhou Modern Urban Agricultural Complex. Jiangxi Agricultural Journal, 2011, 23(06):139-142+147

is referred to as a tourism complex. Diversified products such as sightseeing, recreation, business, exhibition, and dwelling have combined to produce a comprehensive tourism development zone with integrated space, format agglomeration, complex functions, and diverse values^[1].



Fig1.4 Santa claus village in Rovaniemi,Finland.(by santaclausvillage)
From website: <https://santaclausvillage.info>

The tourism complex focuses on tertiary industry development and relies on the creation of tourist attractions and the construction of tourism projects. The sorts of tourism complexes can be broadly classified as theme parks, scenic sites, or tourism complexes that focus on culture and include previous residences, traditional dwellings, and folk practices. Its interior tour routes are diverse and rich, with many recreational projects, creative and natural landscapes, architectural styles, and spatial shapes.

1.4 Discrimination of suburban rural complex and similar concepts

The agricultural industry serves as the core of the suburban rural complex, leisure tourism serves as the guide, and the suburban rural environment serves as the foundation, with the goal of growing the rural economy and coordinating urban and rural areas. chain. The suburban rural community, as well as leisure tourism and other industries within the suburban rural complex, can stimulate agricultural transformation and upgrade, creating new

^[1] Wang Linxia. Research on Tourism Complex Development Based on Driving Analysis: [Guangxi Normal University Professional Master's Thesis]. Guangxi Normal University, 2014, 16-30

value for agriculture and rural areas.

The suburban rural complex's leisure tourism is mostly based on the area's original natural resources and agricultural growth. The goal is to entice urban residents to visit for vacation and leisure, so promoting rural economic development and urban-rural integration. It is possible to argue that leisure tourism is merely a minor component of the suburban rural complex's formation.

Real estate and suburban rural settlements are part of the suburban rural complex. Real estate is a byproduct of the development of suburban rural complexes. The introduction of real estate will ultimately result in community development. The agricultural industry is the foundation of the suburban rural community, and the suburban rural environment is the background, infrastructure and public services, appropriate grass-roots management, and a mature operation team with an exceptional industrial planning team.

The comparison of the above three complexes and the suburban rural complex in terms of planning and design is shown in Table 1.1 below:

| Type | Organization | Purpose | Industry | Layout | Architecture | Landscape |
|-------------------------------|---|---|---|--|---|---|
| Suburban rural complex | The scale is variable, the location is good, and the geographical environment is superior | Liveable communities, agricultural economic growth | The three industries are integrated, and the industrial composition ratio is balanced | Various layout forms, blurred partition boundaries, and strong comprehensiveness | Traditional architectural style and appearance, comfortable space and scale | natural environment, strong integrity |
| Urban complex | Small scale, good location | Land value, economic benefits, space utilization | Commercial, Office, Real Estate | Clear division and various forms | Various forms, modern styles, various spaces | Less landscape, poor environment, human landscape |
| Agriculture complex | Small scale, deviating from the city | Agricultural economic growth, scientific and technological research and development | Modern agriculture, scientific research, secondary and tertiary industries | neat layout | Industrial building with strong practicality and simple space | Less landscape, human landscape |
| Tourism complex | Small scale, good location | Attract tourists to promote consumption | tourism, service industry | The layout has a single form, has a theme, and has clear division boundaries | Theme building style, exotic style, single space | Artificial landscape, creative, diverse environment |

Table 1.1 Comparison table of various types of complexes.

Source: Drawn by the author

2 Development and analysis of suburban rural complex

2.1 Development and analysis of international suburban rural complex

2.1.1 The origin and formation of international suburban rural complex

As early as the beginning of the 20th century, Western cities were in a period of rapid development. Facing the problems of urban development at that time, Ebenezer Howard (Ebenezer Howard) of the United Kingdom put forward the theory of "Garden city" which is an organic combination of the advantages of urban life and the beautiful environment of the countryside, and advocates a new social form that integrates urban and rural areas.

The degree of construction of its suburban rural complex is determined by the level of worldwide rural development. Rural development has resulted in the suburban rural complex. It is vital to understand the development of rural building in foreign developed countries in order to properly research the development of the international suburban rural complex. Rural construction in developed countries has the following characteristics in its current state:

1. Developed countries will implement a slew of programs to encourage rural development and agricultural development. (1) Invest heavily in the advancement of agricultural science and technology. There are four major categories of worldwide agricultural science and technology promotion at the moment. The first is the agricultural technology extension model centered on the government agricultural department; the second is the agricultural technology extension model centered on the university (agricultural college); the third is the farmer cooperative organization for the promotion of ties; and the fourth is the commercial market promotion mode^[1].(2) The entire

^[1] Song Xiuju. Foreign Agricultural Science and Technology Promotion Mode and Reference. Socialist Research, 2006(06):118-120

agricultural production process is subsidized. Developed countries have substantial financial resources to encourage agricultural economic development, such as the fallow subsidy in the United States. (3) Significant government public money have been invested in agricultural production, and state and municipal governments have provided various policy supports and service expenditures for agricultural development. (4) Government tax breaks and credit loans. (5) The price of agricultural products is supported, and the government regulates and subsidizes the price. (6) Implement preferential policies to encourage agricultural product trade and cut prices in order to increase domestic agricultural products' international competitiveness.(7) To provide agricultural sector guarantee services, insurance for the four linkages of preparation, planting, management, and sales, and to share risks with farmers^[1].

2. In industrialized countries, rural public infrastructure and fundamental system construction are nearly complete. The state spends extensively in rural infrastructure development, which is often led by the government and finished by society, the market, and farmers^[2]. The rural management system is flawless, and the division of labor among several divisions is transparent and cooperative. Many industrialized countries have progressed to the post-industrial stage, with administrative offices, social services, and daily living shifting from large cities to rural areas. Rural communities have good basic services, medical care, and education, and the living and natural environments are attractive. With the advancement of information technology, many businesses have relocated from the city to the countryside, many technical occupations have been replaced by machines, and people's working ways have also evolved from the outside to the inside. Many jobs may be done at home, making the countryside a more livable setting for people's

^[1] Sun Caimei. Classification and Effect Analysis of Agricultural Protection Policy Models in Western Countries. Charming China, 2006(2):6-7

^[2] Feng Shuquan. Basic experience of foreign rural construction. Scientific Socialism, 2006(1):13-15

daily lives. Various economic cooperation strategies offer multifaceted support for the development of suburban rural complexes. Currently, foreign rural economic cooperation groups have created three development models: the specialist agricultural cooperative model represented by Europe, the Japan-South Korea model, and the China-Japan model. The third comprehensive agricultural cooperative model is the cross-regional cooperative cooperative model represented by the United States and Canada^[2].

3. Developed countries have a comprehensive public service system that ensures farmers' welfare and quality of life, and farmers' medical insurance, endowment insurance, and social security are guaranteed by state laws and supported by city governments; Equality, particularly in Japanese education; ensuring the practicability of rural vocational and technical driving.

4. Foreign rural areas have a well-organized social and political life as well as a great life management system. Foreign governments have granted preferential policies to rural cooperatives and generally exempted cooperative operations from income tax in order to protect and assist the economic growth of rural areas^[3]. The United States, for example, is a federal country. In each state, municipalities, townships, counties, and villages coexist. The duties of the rural grassroots are straightforward, but the organizational forms are varied and diverse. However, there is no tight administrative hierarchy between local and grassroots political organizations, and they are legally largely independent. Implement a high level of independence^[4].

^[2] Cheng Youzhong, Hu Zongshan. Lessons from foreign rural construction. *Contemporary World and Socialism*, 2007(2):100-104

^[3] Li Huiian, Zhang Xiangmao, Ren Junfeng, et al. Investigation Report on Rural Cooperatives in Brazil and Mexico. *Rural Management*, 1996(6):40-43

^[4] Cheng Youzhong, Hu Zongshan. Lessons from foreign rural construction. *Contemporary World and Socialism*, 2007(2):100-104

2.1.2 Development status of international suburban rural complex

The suburban rural complex, as a rural development model, is dependent on the state of development of the country's rural areas and the country's concentration on agricultural development. Rural areas in wealthy countries have essentially attained modern production, as well as complete infrastructure and excellent public services. The rural administrative management system is developed, and the government vigorously promotes agricultural growth, providing great fundamental circumstances for the development of suburban rural complexes.



Fig2.1 Mokumoku Farm, Japan. (by Mokumoku)
From website: <http://www.moku-moku.com/farm/>

International suburban rural complexes are mostly created in wealthy countries. Diverse countries have different agricultural environments and agricultural production methods, and they have evolved suburban rural complexes with distinctive characteristics. Japan, for example, has a tiny land area and a restricted amount of land suitable for agricultural development. As

a result, the development of small-scale leisure and sightseeing agriculture is aimed at producing high-quality agricultural products through the use of scientific production models, advanced production facilities, and refined agricultural management. The pursuit of the ultimate quality of agricultural products has an excellent brand effect, attracting many domestic and international tourists. The United States has a big land area, flat topography, significant government agricultural investment, a high level of agricultural modernisation, and a high level of specialization. It is excellent for the construction of large-scale recreational agricultural suburban rural complexes, and agricultural product output is high in the country.



Fig2.2 The autumn rice field art village, Japan. (by Justin velgus)
From website: <https://en.japantravel.com/aomori/rice-field-art/2947>

In general, the modern agricultural industry in developed countries is essentially mature and stable, owing to the development of their agriculture, the government's encouraging policies, and the humanized services of management and operation agencies, resulting in the formation of a suburban rural complex model with national characteristics. Consider the "Vine Valley" wine region, which is the suburban rural complex of the wine business.



Fig2.3 Napa valley in California,America.(by Napavalley)

From website:

<https://www.napavalley.com/blog/most-beautiful-wineries-in-napa-valley/>

"Hunter Valley" is located on Australia's east coast in New South Wales. It is a valley and hilly area that extends for around 190 kilometers. Sydney is only a two-hour drive away. It has an excellent geographical location and a lovely rural setting. Its exceptional ecological environment and soil and water climate have nourished more than 120 vineyards and wine cellars. The first-class wines are complemented by superb food, distinctive boutique lodging, and a variety of entertainment activities, attracting a large number of domestic and international visitors. Wine and culinary enthusiasts can go on a winery tour and experience the local cuisine and wine. Wellness and fitness aficionados can relax at the spa or test their skills on the championship golf course, which also serves as a grass seed testing ground. Those interested in sightseeing and entertainment can spend time in the area's different themed gardens or participate in the seasonal festivals.



Fig2.4 Hunter valley in New South Wales,Australia.
From website: <https://www.huntervalley.com/visitor-infomation.html>

The "Hunter Valley" aspires to become an international tourist destination with distinctive wine goods as its mainstay and leisure and vacation as an industrial extension. It is primarily defined by the following characteristics:

- (1) A professional team develops a distinct tourist destination brand image, which is then publicized and promoted through a variety of methods.
- (2) The park uses a slow-moving transit system with the qualities of "roaming," "interesting," and "diversity," as well as other handy and various forms of transportation.
- (3) The "Hunter Valley" has a well-developed and distinct lodging and catering infrastructure, resulting in a distinct Hunter Valley cuisine.
- (4) A comprehensive recreational activity system that takes full advantage of the benefits of local ecological quality to suit the segmented needs of tourists.
- (5) Extensive retail and entertainment opportunities, with high-quality wine goods and traditional festivals attracting visitors from all over the world.
- (6) Winemaking, farming, animal husbandry, leisure, vacation, and other industries make up the Hunter Valley's industrial system.

The sustainable and circular value chain of this system, as well as the interaction and mutual benefit in operations, accomplish a coordinated and win-win economic gain.

International suburban rural complexes are built on the development of domestic agriculture, with leisure tourism as a guide and a high-tech

agricultural industry as a foundation to promote the production and processing of high-quality products, resulting in a sustainable cycle of production, processing, sales, and e-commerce.

2.1.3 Characteristics of international suburban rural complex

In developed countries, the suburban rural complex model is mature and has distinct characteristics. Each country adopts a different agricultural economic system based on its own basic national and economic conditions, soil geology, and environmental climate, employs distinctive agricultural production methods, produces distinctive high-quality products, and integrates into tourism, leisure, tourism, and other related industries. Create an international brand identity. In conjunction with the current state of agriculture in various nations, the types and characteristics of suburban rural complexes in various countries are examined, and various suburban rural complex development methods are examined and summarized.

(1) To construct a rural complex for large-scale agricultural industry production in remote places. Remote rural locations have a vast amount of farmland and require less labor, making them ideal for the development of contemporary large-scale production agriculture based mostly on mechanized farming. Construction of suburban rural complexes based on leisure experience in city suburbs, and agriculture based on leisure experience, can well attract urban people to come to the countryside for vacation, especially to experience the activities in person, which can not only entertain and entertain, but also allow the entire people to participate, which is very suitable for vacation A family with a short time away from the city to relax and unwind.

(2) New industries are created as a result of an integrated system of production, transport, sales, and service. As the basic industrial system, international suburban rural complexes are based on an integrated system of production, tourism, and sales. The cornerstone is high-tech agriculture production, while leisure tourism serves as a guide to drive product sales. Some suburban rural complexes will also provide additional experience. Not only may you participate in farming operations, but you can also sample gourmet meals and learn about agricultural successes.

(3) As the core, the agricultural business is specialized, with a focus on brand image. Agriculture is the industrial foundation of international suburban rural complexes, and it includes not only primary agricultural production, agricultural processing, and agricultural and sideline products, among other things, but also agricultural reproduction, such as leisure agriculture, sightseeing agriculture, and experience agriculture. Each suburban rural complex will have its own major agricultural goods, which will be manufactured using high-tech methods and sold all over the world. The lavender garden in Provence, for example, is a world-famous lavender growing area as well as a popular tourist attraction.

(4) Place a premium on environmental protection. The development of suburban rural complexes in developed countries is based on the protection of the ecological environment and rural style, making full use of local characteristic agriculture and natural resources, and using reasonable analysis and planning to enrich vegetation, species, and landscape levels, forming a stable and harmonious development of the ecosystem.

2.2 Development and analysis of suburban rural complex in China

2.2.1 Formation and development of suburban rural complex in China

The Communist Party of China 16th Central Committee's Fifth Plenary Session in October 2005 outlined the specific requirements for constructing a new socialist countryside, including "development of production, affluent living, civilized rural customs, clean and tidy village appearance, and democratic management." The country began to place a premium on rural construction, particularly infrastructural construction^[1]. The 17th National Congress of the Communist Party of China proposed in October 2007 to "coordinate urban and rural development and promote the construction of new socialist countryside," as well as new requirements for building ecological civilization, and proposed that one of the important goals of building a moderately prosperous society in all aspects is to become a good ecological environment by 2020. The central government suggests coordinating urban and rural development, with a focus on the link between cities and villages^[2]. Anji Province and Zhejiang Province announced the "Beautiful Villages in China" initiative in 2008 and issued the Action Plan for "Building "Beautiful Villages in China" to guide the creation of beautiful villages in diverse locations^[3]. Beautiful rural construction was practiced throughout the country throughout the "Twelfth Five-Year Plan" period. In 2012, the first suburban rural complex project of "Tianyuandongfang" in Wuxi was completed as part of the ongoing investigation of rural construction. The "suburban rural Complex" was incorporated in the No. 1 Central Document in 2017 as a new paradigm for rural development^[4].

^[1] Sun Wanzhu. Research on the construction of rural customs and civilization in my country [D]. Northeast Agricultural University.

^[2] Xu Songzhu, Su Yixin. Promoting the construction of new countryside in the overall planning of urban and rural development [J]. Leadership Science, 2008(5):2.

^[3] Ru Xin, Fu Chonglan, Zhang Chaowei, et al. "An Action Plan for the Construction of "Beautiful Villages in China" in Anji County.

^[4] Lu Wenbin, Lan Yan. Research on the Development Model of suburban rural Complexes in my country: Taking



Fig2.5 Peach village in Wuxi,China.(by Tianyuandongfang)
From website: <https://www.tydfjt.com/index/title/index.html?id=20>

2.2.2 Characteristics of suburban rural complex in China

This study finds that Chinese suburban rural complexes have the following characteristics based on the evolution of Chinese suburban rural complexes and the analysis of complicated cases:

- (1) One of the suburban rural complex's goals is to provide a "three-in-one" area for locals to live, work, and travel in production, living, and ecological. Reduce real estate intervention and make farmers the primary beneficiaries^[1].
- (2) The main businesses are demonstration agriculture and recreational tourism. The main industries are demonstration agriculture, agricultural tourism, scientific and technology agriculture, and agricultural scientific research. Experience Agriculture is a distinctive industry.
- (3) Adopt a multi-party financing approach to encourage agricultural development and the introduction of new industries. However, farmer participation is poor.

Fujian Pomegranate as an Example [J]. Rural Economy and Technology, 2018, 29(9):2.

^[1] Chen Liping. Discussion on the Development Mode of suburban rural Complex in my country. Rural Economy and Technology, 2017, 28(21): 219-220

(4) The infrastructure is flawless, and life is simple and quick. However, the suburban rural community building is insufficiently robust, focusing on the introduction and development of industries while ignoring the construction of harmonious communities and providing insufficient public services such as medical education.

(5) Organizations such as planning, management, and operations lack research on their industries, resulting in the phenomenon that the industry develops too quickly and the management mechanism is backward, and the display, sales, and promotion work is not in place, publicity is insufficient, and brand awareness is weak.

(6) During the design and construction process, do not pay attention to the preservation of the original buildings.

(7) The understanding of environmental conservation is out of step with the construction of suburban rural complexes.

2.2.3 Problems in the development of suburban rural complex

De-agriculture, standardization of development patterns, insufficient land availability, and poor rural governance have all emerged as difficulties in the development of suburban rural complexes, posing severe threats to their long-term viability and rural regeneration.

(1) The development paradigm is skewed.

According to the 2017 Central Document No. 1, “a suburban rural complex

that allows farmers to fully participate in and benefit from...”^[1] This is consistent with the transformation of our society's main contradiction, and it also demonstrates that the construction and development of suburban rural complexes should respect farmers' dominant position, mobilize their enthusiasm, and strive to improve their lives and increase their income in order to promote the long-term development of the countryside.

In some areas, the concept of development and construction is skewed, resulting in the abandonment of agriculture, disregard for farmers' rights and demands, large repairs and constructions, encroachment on arable land, residences, forest land, and even attempts to drive farmers away. Large-scale land transfer, farmland modification, and land expansion, for example, are frequently employed in the construction and development of suburban rural complexes in recent years for developing catering and accommodation, outdoor venues, leisure projects, and so on. The restoration of the land is quite challenging. If the suburban rural complex's development is unsustainable, the suburban rural complex's agricultural planting role may be lost. At the same time, this condition will result in a rural population exodus, culminating in a growing problem of rural aging and hollowing out. Furthermore, it not only encroached on farmers' land on a massive scale during its growth and operation, but it also ignored rural culture, ruined the local biological environment, and damaged local historic buildings. The behaviors listed above do not respect farmers' dominant role in the development of suburban rural complexes and rural areas, but they do contribute to the long-term stability of suburban rural complexes and rural development. Have a negative impact on the environment.

(2) The development model is seriously homogenized

^[1] Several Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Structural Reform of the Agricultural Supply Side and Accelerating the Cultivation of New Momentum for Agricultural and Rural Development [N]. People's Daily 2017-02-06(001).

Each village's resources are distinct, and each community has its own distinct cultural legacy, distinctive scenery, major industry, and geographic conditions, among other things. To increase their attractiveness and competitiveness, suburban rural complexes must evolve with local features. However, current suburban rural complexes are unable to conduct in-depth study and scientific planning of regionality, locality, and differences in rural resources. Because the phenomenon of homogeneity is serious, the development model is fixed and single, the content is the same, and the characteristics are insufficient, most existing suburban rural complexes rely on the natural landscape of the countryside and later miniature landscape to develop rural tourism, lodging, and catering, which makes it difficult to satisfy people's relaxation. Consumer demand for entertainment, sightseeing, and vacations, as well as health preservation, is multi-faceted. The role and significance of culture in suburban rural complexes are neglected, folk customs and folk customs are not excavated, historical culture is inherited, traditional literature and art are developed, and cultural characteristics are lost, especially during the construction and development of suburban rural complexes. The suburban rural complex appears to be devoid of soul.

Personalization is the most potent rivalry among suburban rural complexes. Without individualized development, the suburban rural complex's development model will be ambiguous, the development orientation will be confused, the brand reputation effect will be poor, and the benefits will be hidden. Strong and weak appeal, a low overall level, and a lack of competitiveness. The complex must adhere to local traits and cannot freely duplicate, replicate, or plagiarize.

(3) Inadequate land supply

Land has become a major stumbling block to rural settlements' sustainable progress. Rural land resources are few, and most are planted and produced

one at a time. The land is scattered and the themes are more complex, which limits the use of large-scale rural land; during the development process, it is forbidden to occupy or cross the boundary of land use, and it is not allowed to arbitrarily increase the scale of its land use, as well as planning blindness, resulting in low effective land utilization. Because of the aforementioned factors, there is a scarcity of land, which hinders the intense, industrial, and professional development of rural areas.

(4) There are flaws in rural governance.

Rural governance encompasses a broad variety of issues and is crucial. To achieve long-term progress, suburban rural complexes and rural rejuvenation require an ideal and harmonious rural government environment. Rural areas, on the other hand, are currently seeing tremendous growth as a result of the encouragement of modernisation and urbanization. Unprecedented changes provide potential for the countryside, but they also pose a number of concerns and challenges: The problem of aging and hollowing out is serious, resulting in a labor shortage in the countryside; due to the development of the countryside, the conflict of interests of the villagers has progressively intensified under the stimulation of the economy; Investment in rural culture, education, health, and other endeavors is insufficient, and resources must be improved in order to meet the construction needs of suburban rural complexes. All of the aforementioned factors directly contribute to a lack of forward momentum for rural revitalization and suburban rural complexes, as well as an insufficient development environment, which will ultimately harm farmers' interests and rights, as well as the overall advancement of the countryside and the realization of rural revival. Overall, rural governance is quite weak, and there are numerous impediments to the development of suburban rural complexes and the regeneration of the countryside. Its problems and challenges must not be overlooked. In this regard, it is critical to improve the village environment, rural government, and actively

contribute to the long-term viability of suburban rural complexes. Moving forward to make nice space is on the horizon.

3 Theories related to the planning and design of the complex

The development of the suburban rural complex is inextricably linked to the guidance of theory, particularly given its complex functional composition; it requires the guidance of a number of theories in order to form a rationally functioning organic whole. This study primarily identifies and evaluates theories connected to suburban rural complex planning and design, industry, architecture, and environmental design, as well as how these theories drive suburban rural complex practice. Because present suburban rural complex in China is still in its early stages of implementation and many projects are still under development, its own theoretical framework is not yet flawless, and it relies mostly on relevant theoretical information as a guide for construction. It will gradually build its own theoretical framework as it evolves slowly.

3.1 Theories related to the planning and design

3.1.1 Symbiosis theory

Deberry argues that symbiosis is a natural occurrence in which distinct species rely on and interact with one another in a specific way in order to survive, producing a symbiotic relationship of co-existence and co-evolution^[1]. Dr. Yuan Chunqing of China was the first to apply the symbiosis theory to economics, and he creatively integrated the symbiosis theory of biology into the symbiosis theory of sociology, creating a new way of thinking and conducting academic research. He believes that symbiosis is not only a biological phenomenon, but also a social phenomenon, and promotes it in a broad sense, pointing out that symbiosis refers to the relationship between symbiotic units in a specific symbiotic environment and following a specific symbiotic pattern, and thus defines the three major elements of symbiosis: symbiotic unit, symbiotic pattern, and symbiotic

^[1] Ahmadjian V, and S Paracer. Symbiosis: An introduction to Biological Associations. Hanover, N. H., University Press of New England, 1986, 212

environment^[1](Figure 3.1).

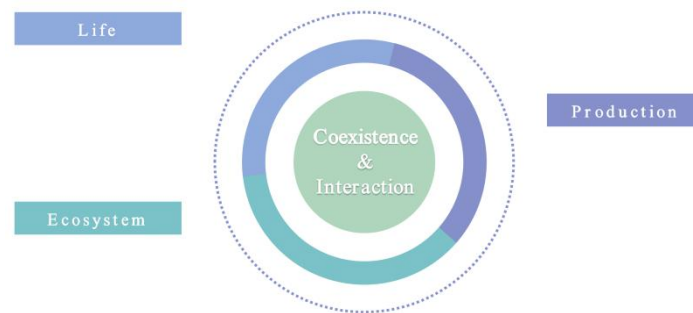


Fig3.1 Symbiosis Theory.
Source: Drawn by the author

The primary focus of symbiosis theory is the investigation of the mode and environment of information transfer, material exchange, energy transfer, and cooperative symbiosis among complex populations. This perfectly suits the suburban rural complex's structure while also having good compatibility and adaptability.

1. The suburban rural complex is being built to address China's difficulty of coordinating urban and rural areas. The goal is to bridge the gap between urban and rural areas, coordinate urban and rural growth, and integrate urban and rural areas into an interconnected and mutually reinforcing urban-rural complex.
2. The suburban rural complex pushes the countryside's economy through city growth, brings high-tech agricultural technologies and a good management and operation model to the rural, and encourages the urban population to visit the countryside for consumption. At the same time, the development of the suburban rural complex gives material support and labor supply to the metropolis.
3. suburban rural complexes are built on agriculture, industry, tourism, and community development, which can not only enhance urban growth but also

^[1] Yuan Chunqing. Symbiosis Theory——Also on Small Economy. The first edition. Beijing: Economic Science Press, 1998: 23-26

serve as shared resources, mutual markets, and mutual services. Model of continuous development

3.1.2 Urban-rural integration theory

The goal of urban-rural integration planning is to bridge the gap between urban and rural areas and to plan for both urban and rural areas as a whole. In general, it is to make a reasonable overall deployment of population, production factors, resources, and the environment in urban and rural areas with differences, to fully utilize the support and feedback role of urban secondary and tertiary industries on agriculture, and to promote rural economic development. Make a win-win development pattern for urban and rural development a reality. The following are the main contents of the urban-rural overall planning theory: (1) evaluation of the status quo, existing problems, and development conditions of urban and rural development; (2) overall strategic planning for the overall development of the urban and rural economy and space; and (3) land use.(4) Overall infrastructure construction planning; (5) Planning of rural environmental protection and ecological construction; (6) Planning of phased goals of overall urban and rural development and key project construction planning; (7) Overall urban and rural development planning and countermeasure planning^[1].

The suburban rural complex's planning and design content is similar to the basic material of urban and rural planning. The suburban rural complex is a new composite carrier that encourages the integration of three rural sectors as well as the transformation and upgrading of the area economy; its planning is based on its existing basic infrastructure. Completely assess the distribution of various resources within the research base based on circumstances and

^[1] Zhao Liying. Theoretical basis and content analysis of urban and rural overall planning. Urban Planning Journal, 2006(01):32-38

resources, sort out land types and land use conditions, and carry out overall planning and design in collaboration with the industry. At the same time, we must prioritize the protection of the natural environment.

3.2 Industry theory

3.2.1 Industrial cluster theory

Mike Porter proposed the theory of industrial clusters in *National Competitive Advantage* in 1990. Industrial clusters, he argues, refer to interconnected organizations, specialist suppliers and service providers, enterprises, and linkages in linked industries in a certain field. Aggregates that are spatially concentrated as a result of a competitive or cooperative interaction^[1]. The benefits of this type of industrial cluster are that it can increase enterprise productivity, secondly, it can improve enterprise sustainability, and thirdly, it can lower the risk of enterprise entrance and support the emergence and development of firms. According to Chinese scholars Li Wuwei and others, multiple types of industries collect together to develop, infiltrate, intersect, and eventually merge into one, producing a new industry or a new development point^[2].

^[1] Michael E. Porter. *National Competitive Advantage*. Li Mingxuan, Qiu Rumei. Second Edition. Beijing: Huaxia Publishing House, 2002, 7-48

^[2] Li Wuwei. The Connotation of Industrial Clusters and the Strategic Thinking of Cultivating Industrial Clusters in China. *Journal of Shanghai Lixin Accounting Institute*, 2003(04):2-5

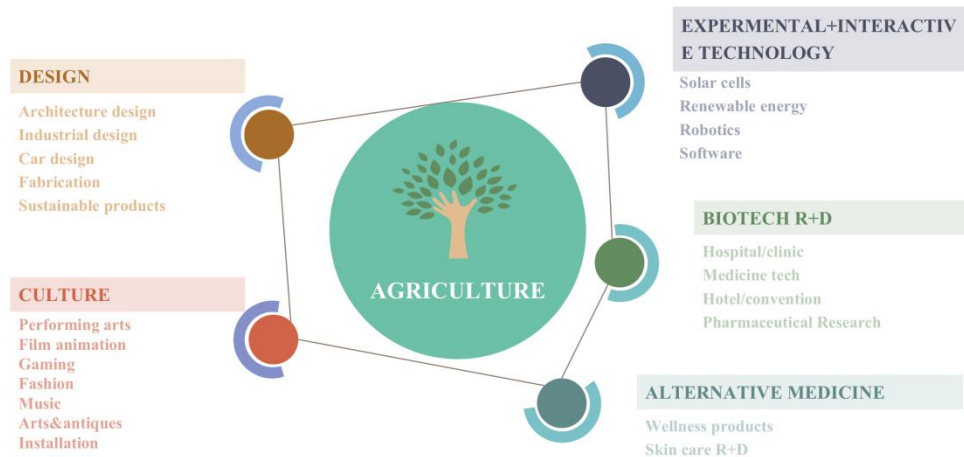


Fig3.2 Beijing Songzhuang Cultural and Creative Industry Cluster.
Source: Drawn by the author

The suburban rural complex is also located in an unique rural location. An integrated industrial agglomeration, an urban-rural complex, includes modern agriculture-related industry development companies, the financial industry, the service industry, tourism, real estate, and other industries and enterprises, as well as township government agencies and rural cooperatives. The industrial cluster theory's application to the suburban rural complex is primarily evident in the following aspects:

1. The suburban rural complex's main industry is modern agriculture, with a production chain integrating agricultural production, processing, display, and sales at its core. Competitive products, in turn, drive industrial value and agricultural transformation and upgrading; the integration of the tertiary industry service industry can first attract tourists and provide satisfactory services to tourists; second, it can promote the industry's publicity and sales and establish a brand image. The integration of primary, secondary, and tertiary sectors, as well as the gathering of numerous firms, has the ultimate goal of promoting rural economic growth, and each enterprise achieves a win-win situation.
2. The suburban rural complex, with its rich cultural heritage and distinctive folk customs, attracts investment in the tourism industry while also bringing in the service industry; it introduces high-tech production technology,

develops the agricultural product processing industry, agricultural and sideline product manufacturing, and other related industries. When performing cultural creation, the secondary sector might drive the integration of more new industries. Around agriculture, each industry fosters its own innovation. Through innovation and integration, several sectors promote and attract new industries. To maximize economic benefits, all industries collaborate.

3. The consolidation and integration of various industries will provide a powerful impetus for the development of new industries. Different industries are interconnected and work together to create a good and stable industrial environment. The risk of entering with small firms can stimulate the formation and development of new enterprises, and different enterprises can promote and progress together to establish a sustainable development of the suburban rural complex economic model.

3.2.2 Global tourism theory

"Global tourism" refers to the active integration of various industries, the joint management of various departments, the participation of the entire city's residents, and the full use of all the attractive elements of the destination to provide tourists with experience products of the entire process, time, and space, in order to fully meet tourists' all-round experience needs^[1].

To introduce "tourism Plus" is one of the main meanings of the concept of all-for-one tourism. The tourism sector can be organically merged with other industries through tourism guidance, so that the tourism department and relevant government functional agencies can establish a collaborative force that not only offers resources, products, and services for tourism development. At the same time, it encourages the growth of other sectors and the enhancement of social functions. Global tourism theory is complicated,

^[1] Su Jian. Theoretical Discussion on Global Tourism. China Tourism News, 2017-05-02(003)

involving a vast variety of knowledge and rich material that can be summarized into the following points:

(1) A single goal: fully realize tourism's driving and all-encompassing function, promote regional economic and social growth, and transform picturesque tourism into a destination.

(2) Two adaptations are required: the first is to adapt to the shift in tourism from sightseeing to leisure and vacation tourism. Sightseeing tourism does not provide as much learning and experience as leisure and holiday tourism, particularly self-driving travel, independent travel, family travel, and other travel and leisure types. The second step is to adjust to the growth of new urban areas. Only modern urbanization, including the construction of characteristic towns and the planning of beautiful villages, is possible to foster the entire development of a rural area.

(3) There are three major networks: First, the transportation network should not only be convenient for transportation, but it should also have exceptional qualities and be diverse. 2. The information network, information coverage, and information transmission should be extensive and timely. 3. The service network, infrastructure, and services must be in place.

(4) Four innovative global tourism concepts^[1]: 1. Resource planning for global tourism, with an emphasis on essential projects. 2. Pay close attention to the product's qualities. They can only be attractive, attract people, and drive the economy if they have traits. 3. Focus on industrial concentration and the formation of industrial clusters. 4. Conduct thorough market research. We must not mindlessly follow the trend in order to build global tourism. Certain market study and investigation are required, and the market will guide the industry's development (Table 3.1).

^[1] Li Xinjian, Zhang Lingyun, Cui Li. Global Tourism: Conceptual Innovation of Building a World-Class Tourism Destination: Taking Beijing as an Example. *Human Geography*, 2013, 28(03):130-134

| Global Tourism | | | |
|---|---|--|--|
| Sources | Products | Industries | Markets |
| Natural tourism resources Humanistic tourism resources Social Tourism Resources | Sightseeing and tourism products Leisure and vacation products Business conference award products | Industry intersection Industry penetration Industrial fusion | Foreign market Local market International market |

Table3.1 Four innovative global tourism concepts.
Source: Drawn by the author

The global tourism idea serves as the theoretical framework for the suburban rural complex's leisure tourist planning. The suburban rural complex encompasses a number of tertiary sectors that integrate a number of tourism components centered on modern agriculture while also incorporating a number of innovation-based new enterprises.

3.2.3 Green industry theory

The green economy, or sustainable development economy, is the essence of the economy in the twenty-first century. The theory of green industry is to fully utilize modern science and technology, to concentrate on the implementation of biological resource development and innovation projects, to vigorously develop green resources with comparative advantages, to consolidate and improve low-polluting or non-polluting industries that are conducive to maintaining good ecology, and to strengthen environmental protection in all industries. Protect and develop clean production, continuously improve and optimize the ecological environment, promote the harmonious development of man and nature, coordinate and promote each other among population, resources, and environment, and achieve long-term economic and social growth^[1].

At the moment, the international market has increasingly high standards for

^[1] Wang Guomin. On the Innovation and Development of Agricultural Industrial Organization. Journal of Sichuan University (Philosophy and Social Sciences Edition), 2000(4):9-16

the quality, safety, reliability, sanitation, and environmental protection of green products, and the international market has increasingly high standards for the quality and safety of Chinese green products, making crop production and production more difficult. To fulfill worldwide green food standards, processing must rely on better science and technology. The suburban rural complex's modern agricultural business strives for ecology, pursuing high-quality, high-yield, ecologically friendly, and pollution-free agricultural products, and developing green industries.

The suburban rural complex's modern agricultural business strives for ecology, pursuing high-quality, high-yield, ecologically friendly, and pollution-free agricultural products, and developing green industries.

The suburban rural complex's economic development is built on the agricultural industry, which is inventing its structure and pushing agricultural sector upgrading through science and technology. This necessitates the use of green industry theory to guide the industry's transition and upgrading, to build green and circular production through scientific and technological means, and to increase product quality. The quality, safety, and dependability of the green food meet worldwide requirements. The green industry philosophy is being utilized to guide the ecological protection of the suburban rural complex, with the goal of combining production, living, and ecology.

3.3 Architecture and environmental design theory

3.3.1 Vernacular architectural design theory

Bernard Rudowski advocated vernacular architecture in the 1960s, pointing out that "architecture without architects" has been a neglected sector of architecture for a long time^[1]. Amos Rappot encapsulated the fundamental

^[1] Despan D, Bedidi A, Cervelle B, et al. Bidirectional Reflectance of Gaussian Random Surfaces and Its Scaling Properties. *Mathematical Geology*, 1998, 30(7):873-888.

qualities of vernacular architecture. He believes that vernacular architecture does not require theoretical or aesthetic guidance because it is symbiotic with its surroundings, non-professionalism, diversity, and regionality^[1]. According to the Greek scholar Lianne Lefavy, the village is an organic system based on agriculture that displays the diversity of rural society during the era of agricultural civilization^[2]. The development of rural architecture design theory has progressed from empiricism to theoreticalism. The new vernacular architectural design theory focuses on the summary, analysis, and research of earlier vernacular architecture, and develops a new model that is more appropriate for the development of current rural architecture. Field research and comparative analysis are frequently used in modern vernacular architectural design, and sometimes questionnaires are used to pay more attention to the ecology of the building and the participation of villagers; the scale space gives people a sense of being close to nature, forming a sustainable and recyclable architectural value system.

In terms of spatial form, vernacular architecture pays attention to the differences of individual units, the rich diversity of regions, and the integration with the traditional cultural environment, grasps nature's initiative, creates the rapidity of the human environment, and skillfully uses the ecological environment to form rural buildings suitable for people to live in. It stresses the creation of spiritual locations, strengthens the exploitation and reuse of varied local building materials, and innovates construction processes and traditional crafts in terms of creative techniques. Nature, humanities, and technology are all considered in modern rural architectural design.

^[1] Lapp. *Housing Form and Culture*. 2nd Edition. Zhang Meimei. Taipei: Jing and Xiang Publishing House, 1976, 15-36

^[2] Lefaivre L, Tzonis A. *Critical regionalism : architecture and identity in a globalised world*. Prestel, 2003(05):17-24



Fig3.3 Primary School Tanouan Ibi, Mali.(by LEVS Architecten)

From website:

<https://www.archdaily.com/951667/what-is-vernacular-architecture>

The presentation of distinct regional artistic languages on different building carriers, which emphasizes the reasonable inheritance of styles and the creation of new aesthetics, is the embodiment of the diversity of characteristics.

Both modern and vernacular architecture can be found in the suburban rural complex's architecture. The vernacular architecture design theory should not only guide the design of the original buildings within the complex, but also serve as a reference guideline for the new architectural design of the complex in order to coordinate the overall style of the building and the complex's design. create a suburban rural complex with great integrity and cultural traits that are remarkably blended into the suburban rural environment.

3.3.2 Ecological design theory

Ian McHarg's book "Design with Nature," published in 1969, was the first to integrate ecology with landscape design, and it advanced the idea that design should respect nature. The dawn of a new era^[1]. It promotes the use of scientific methodologies to guide landscape design. Landscape designers are no longer solely concerned with the practicability and artistry of the landscape, but rather with the combination of ecological, artistry, and practicability as the main objective of landscape design. The term "ecological design" was coined by famous landscape architects Stuart Cowan and Ryan: "ecological design" refers to design forms that do not harm the environment and work in tandem with the ecological process^[2]. Ecodesign is concerned with the interplay of man-made landscapes with the natural environment. The concept of ecological landscape design is to protect the original ecological environment to the greatest extent possible, to make full use of the original landscape of the transformed rural area, and to create a healthy and stable combination system of artificial and natural landscape with self-healing ability.



Fig3.4 Benin's National Assembly in Porto-Novo Proposal.(by Kéré Architecture)

^[1] Huang Zhikai, Shen Shouyun, Zhang Sujuan. Exploration of Ecological Design Concept in Contemporary Landscape Design. Guangxi Horticulture, 2008(02):26-28

^[2] Yu Hong, Peng Jinhui, Zhu Jiqi, et al. Research progress on ecological design of urban parks. Anhui Agricultural Sciences, 2009, 37(18):8789-8790

From website:
<https://www.archdaily.com/959450/francis-kere-recvies-the-2021-thomas-jefferson-foundation-medal-in-architecture>

The suburban rural complex's landscape design should use the ecological design idea as a foundation to guide the completion of the landscape design throughout the entire area. Focusing on the ecology of ecological design, minimizing damage to the original ecology, preserving the rural natural environment and traditional architectural culture to the greatest extent possible, and combining the new agricultural construction concept and green industry concept to form an ecological balance and harmonious development of industry, life, and nature; The suburban rural complex, focusing on the artistry of ecological design, creatively takes the suburban rural natural scenery as the environmental background, while also integrating the creative ecological landscape of modern agricultural ecological landscape and leisure and entertainment industries, and organically combines the suburban rural, farmland, and artistic creation. The suburban rural complex focuses on the practicality of ecological design, uses local original building materials to the maximum extent possible, protects the original architectural style and lifestyle of the people, and carries out local ecological improvement through rehabilitation and innovation. Adjust, design, and restore the ecosystem within the entire complex to achieve recyclable and sustainable development, establishing an ecological landscape system with self-healing capabilities.

3.3.3 Landscape ecology theory

Troll C, a famous German biogeographer, created the phrase "landscape ecology" in 1939 in order to organize and harmonize the study activity of scientists in the two domains of ecology and geography^[1]. The theoretical

^[1] Naveh Z, Lieberman A S. Landscape Ecology. Theory and Application. 1994, 7-11

foundations of landscape ecology are holism and system theory, and its theoretical study aims and contents can be characterized in three parts:

(1) The structure and function of the landscape. Landscape ecology classifies landscape elements into three types: point, line, and area. The primary modes of landscape structure are point, line, and area mode, and each element within the landscape structure interacts with one another. The function and effect, as well as its size, shape, edge length, branch, and so on, all have variable degrees of influence on the function of the landscape, and different landscapes have distinct internal structural layouts.

(2) Landscape integrity, the landscape is made up of a series of ecosystems that interact closely, establishing an ecological community with a specific structure and function; the destruction of any connection will result in the instability of the entire landscape ecology system [39]. At the same time, the landscape exhibits accumulation, edge effect, and fragmentation.

(3) Landscape variety, landscape diversity refers to the diversity and variability of landscape features in spatial structure and function, expressing the landscape's complexity, primarily through patch diversity, component type diversity, and pattern diversity. Three elements were investigated [40]. Landscape diversity also encompasses continuity, ecological diversity, quantity, and the interaction of landscape and other disciplines.

This study combines theoretical knowledge of landscape ecology into the landscape design of the suburban rural complex based on the underlying ecological composition of the suburban rural complex, and finds that the design of the suburban rural ecological landscape should focus on the following factors.

1. The suburban rural complex's terrain is made up of bases, skeletons, and nodes. The bases are large-scale rural landscapes, and the skeletons are landscape axes that connect different functional sectors. These axes may be rivers, green belts, the chronic road system, or numerous activity areas linked in series; their goal is to construct a visual corridor of the landscape, increasing the expanse of the landscape, and the nodes are the distinctive landscape gathering locations in each area. Such nodes could be activity projects, squares, sculpture, architecture, and so on. Their job is to break up the long landscape strip and provide a visual experience of scattered heights.

2. The suburban rural complex's landscape also requires integrity, not only to protect the original landscape's integrity, but also to integrate the landscape of each functional part in the construction process into the original landscape, forming an ecological coordination of various functional landscapes with rural scenery as the background unique landscape system.

3. The suburban rural complex's terrain and environment are diversified, not only in terms of rich vegetation kinds, but also in terms of different spatial levels of landscapes such as distance, distance, and height. The architectural and environmental layouts are likewise varied, with spatial layout and functional layout being two examples. diversity. The suburban rural complex adheres to basic landscape ecology theory, fairly planning and designing the integrity, structural function, and diversity of the suburban rural environment, so that the three can play their respective roles in order to build a good recyclable ecological suburban rural complex landscape.

4 Planning and design principles and strategies of suburban rural complex

In recent years, suburban rural complexes on the outskirts of the city have sprung up like mushrooms after a rain, with various forms and distinctive features. Each complex will form a suburban rural complex with distinctive characteristics according to the geographical location, base conditions and the distribution of various resources, as well as the industrial composition of the suburban rural complex. In order to better study the planning and design of suburban rural complexes on the outskirts of the city, we need to make a basic classification of the existing suburban rural complexes, and then carry out detailed planning and analysis according to different types.

4.1 Institutions and technical tools dealing with issues of suburban rural complex in China

Under the current material and cultural reality gap, China's rural modernization develops independently by villages, and there are significant constraints in presenting a positive development condition. We have seen that many rural communities are dying under the ideology of disorder, helplessness, and dispersion because it cannot automatically have favorable development components such as skills, funding, and organizational models. Based on the existing situation in China, China advises attempting to go through this process using suitable technique. Discuss how, in the current climate, firms and financial institutions can engage, join government and villagers' groups, and contribute to the development of the rural economy and society through overall planning, development, and operation. The government takes a leading role in resource identification and capitalization, while firms take a leading role in the process of financialization. "Market-dominant and government-guided" planning stimulates villagers to participate in rural revival^[1].

^[1] Li,W.;Zhang,Z.;Zhou,Y. Policy Strategies to Revive Rural Land in Peri-Metropolitan Towns: Resource Identification, Capitalization, and Financialization. Land 2021, 10, 132. <https://doi.org/10.3390/land10020132>

First, the government should take the lead in master planning and assume responsibility for coordinating the attraction and stimulation of varied stakeholders to participate in rural revival. Since the Rural Complex concept was suggested in 2017, China has yet to adopt a national policy on this type of mode. At the moment, most regulations are normative documents issued by various Chinese ministries, including the Ministry of Finance of China and the Ministry of Agriculture and Rural Affairs of China. Provincial governments create construction laws based on national normative documents and local situations^[1]. The government develops a number of planning programs, including master planning series, rural planning, and urban upper-level planning. Some academics have disclosed the "creating a new countryside" and "growing vs. diminishing balance" planning policies. As a result, land-use policy has had a significant influence on rural spatial alterations. With China's unique political and land-use system background, there is little doubt that the government must take the lead in creating multifunctional land-use goals during master planning. Second, bottom-up activities such as rural cooperation and collective organizing must be harmonized and integrated into the overall coalition. Rural restructuring is a dynamic and mixed process that is heavily influenced by local power and villagers. Local stakeholders' strong "voices" are a vital aspect of master planning^[2]. Third, enterprises in the manufacturing, service, and real estate sectors should be encouraged to establish practical strategies. Firms are high-efficiency market actors that connect governmental and social forces. To summarize, integrating top-down and bottom-up techniques into rural revivals entails coordinating multiple stakeholder groups from the government, businesses, and villages toward the accomplishment of multifunctional sustainability goals.

^[1] Shulin Chen, Noriko Akita. International review for spatial planning and sustainable development A: Planning Strategies and Design Concepts, Vol 9 No.1 (2021), 93-106.

^[2] Li, Y.H.; Westlund, H.; Zheng, X.Y.; Liu, Y.S. Bottom-up initiatives and revival in the face of rural decline: Case studies from China and Sweden. *J. Rural Stud.* 2016, 47, 506 – 513.

4.2 Basic classification of suburban rural complex

The growth of suburban rural complexes on the city's periphery is often influenced by the surrounding cities. It not only has a better transportation position, but it also has a traditional farming culture, a magnificent natural environment, and a rich history and culture. Different conclusions can be drawn based on various circumstances. Classification.

The rural complex in the city's outskirts is based on the various needs of customers of various ages, and rationally puts industries suitable for the major age group around the core agricultural industry, forming a rural complex including activities of a certain age group. Children's education ecological popular science farm, youth activity experience farm, middle-aged leisure resort farm, and elderly health care base are some of its subtypes.

Rural complexes in city suburbs are classified into numerous sorts based on their geographical location and industrial structure. In suburban regions, for example, family farming is the mainstay, but collective agriculture is the mainstay in distant villages. The industrial makeup of suburban rural complexes is closely related to the variation in production methods. The proportion will be greater, while the outer suburbs are primarily based on modern technology agriculture, with primary and secondary industries as the main industry, so suburban rural complexes can be divided into suburban urban agriculture mode, outer suburban leisure experience mode, and remote characteristic agriculture. model based on geographical location.

In the city's outskirts, numerous agricultural producing methods exist. One example is small-scale family farming. It maintains traditional farming practices, renews the functions of residential dwellings, creates distinctive farmhouses, and innovates family farming by using scientific management methods and operating models, establishing a suburban rural complex with innovative leisure agriculture. Another type of communal agriculture in rural cooperatives involves the employment of scientific farming methods to develop a crop across a broad area, the introduction of high-tech processing

workshops, and the sale of the products to the outside world. It is a suburban rural area with distinctive agricultural parks. Finally, agriculture is the principal producer, with large agricultural households being the main producers. The government manages the general situation, establishes various social funds and companies, expands agricultural scale, integrates secondary and tertiary industries to enrich agricultural content, organizes a cooperative production force, and provides employment possibilities for neighboring farmers. Construct a sophisticated agricultural tourism suburban rural complex.

The rural complex around the city introduces secondary and tertiary industries, stimulates industrial vitality, and innovates industrial models based on its fundamental agricultural type.

Different classification standards can be classified into many sorts. This study examines suburban rural complexes both at home and abroad and summarizes its basic model. The suburban rural complex is classified into the following groups based on the features of the agricultural industry on the city's outskirts and the development mode of the suburban rural complex: large typeface

4.2.1 Characteristic agricultural zone

The suburban rural complex of the typical agricultural industrial area type is typically built around specialized agricultural production zone. By introducing modern agricultural science and technology as well as new crop varieties, the industrial park's content will be enriched by vigorously developing characteristic agricultural production, research and development of characteristic products, technological innovation, agricultural exhibition education, and activities such as agricultural experience. This model's suburban rural complex has the following properties in general.



Fig4.1 Longwu tea garden in Hangzhou,China.(by VCG)

From website:

http://inzhejiang.com/Travel/attractions/201908/t20190820_10843771.shtml

(1) Agricultural industry specialization. In general, one crop or one agricultural product is used as the basis for production, and professional agricultural science and technology research and product research and development are carried out with the goal of improving product quality and generating high-end brand items.

(2) Leading by characteristic industries, developing other peripheral products with characteristic products as the mainstay, forming characteristic product series, and taking production, sales, and exhibition integration as the core, introducing other related industries to form a characteristic industrial value chain.

(3) The location is excellent, and transit is simple. Tourists may be drawn to the area because of its excellent position for leisure and vacation. Because of the easy transportation, the products may be sold fast all throughout the country.

For example, Longquan Peach Valley in Chengdu, Sichuan, China, relying on the local traditional forestry - peach trees, adopts professional planting and cultivation methods to produce new ornamental or planted peach tree varieties, scientifically manage peach forests, and specialize in research and development, production, processing and Selling peach series products,

relying on advantageous peach forest resources to introduce forestry experience, sightseeing, leisure, tourism and other related industries, forming a characteristic agricultural industrial park integrating the three industries and the integration of production, exhibition and sales.

4.2.2 Cultural creativity drives the integration of the three industries

The integration of tertiary industries is driven by cultural inventiveness. The suburban rural complex is based on agriculture, relies on local traditional culture and folk customs, and integrates secondary and tertiary industries, introduces new industries, and innovates and upgrades the original industries to boost rural ecology. Leisure tourism is part of an interconnected and interactive complex that includes industry, ecology, and tourism. Development models are classified into two groups.

Through innovation and transformation, publicity and inheritance, traditional humanistic culture elevates the cultural industry to the centre of the suburban rural complex. Introducing new creative cultures or industries, focusing on the creative industry, integrating modern culture and industry through artistic creation, cultural display, handmade, and other methods, attracting young people to start businesses, artists gathering for cultural and artistic creations, and celebrity-artist exchanges. Discussion, cultural integration, and the development of a creative industry gathering complex with a blending of old and new cultures and a strong artistic atmosphere.

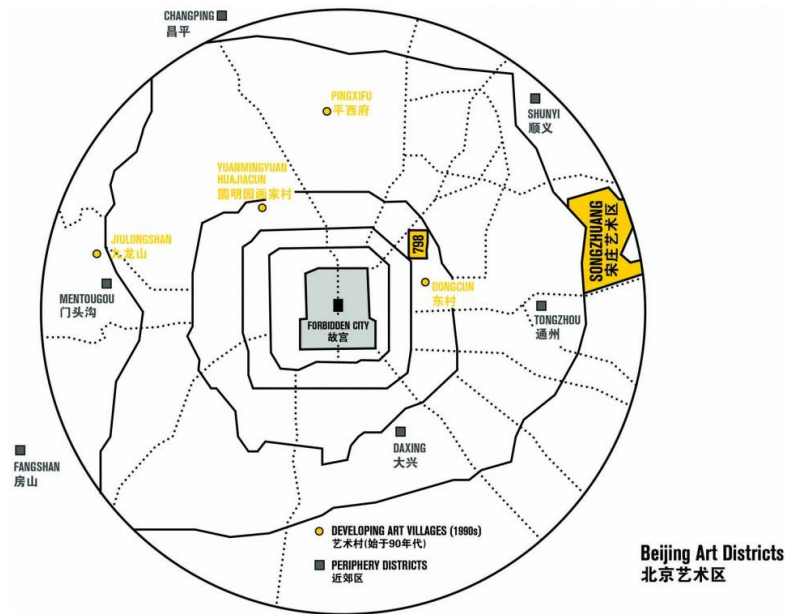


Fig4.2 Artist districts in Beijing,China.(by crossboundries)

From website:

<https://www.goood.cn/songzhuang-micro-community-park-crossboundaries.htm>

Beijing Songzhuang Cultural and Creative Industry Cluster, for example, not only retains the original rural style and suburban rural environment, but also adds new oil painting culture and other creative cultures to create a cultural meeting place(Figure4.2,4.3).

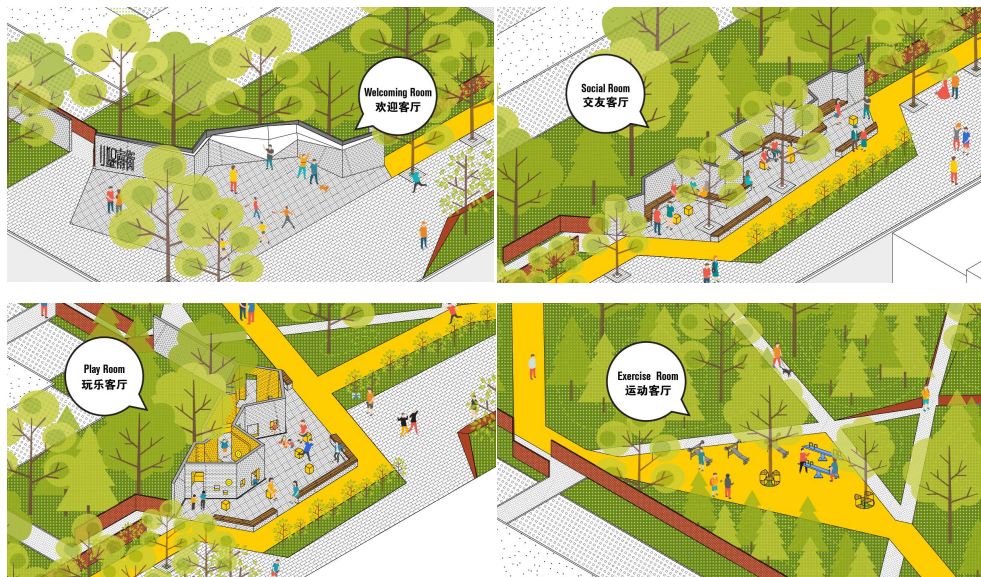


Fig4.3 Analysis of 4 rooms of Songzhuang in Beijing,China.(by crossboundries)

From website:

4.2.3 Modern agricultural sightseeing and experience

The suburban rural complex of the modern agricultural sightseeing experience type takes advantage of urban and suburban locations, based on suburban rural scenery and ecological environment, and introduces modern agricultural high-tech and technology to create various types of agricultural sightseeing bases, farming civilization, and suburban rural experience activities, forming a suburban rural complex for leisure, sightseeing, and learning. They are grouped into the following categories based on their various types of agricultural experience.



Fig4.4 Agriculture tourism in Tonglu,China.(by Author)

(1) A modern agricultural complex centered on sightseeing, showcasing modern agricultural technology, novel seedling cultivation, crop planting bases, and traditional farming culture.

(2) suburban rural complex focusing on agricultural experience, relying on local agricultural ecological natural resources and traditional cultural customs, innovating the concept of rural construction, preserving the essence of local culture, integrating into modern tourism, leisure, service, and other industries, with cultural and agricultural experience as the core, developing new industries and new formats, and creating travel destinations. The creation of this type of complex can not only draw urban residents for leisure and vacation, but also encourage young entrepreneurs to start businesses in the countryside and well-known corporations to invest in building, thereby achieving the goal of urban and rural integration.

4.2.4 Eco resort farm

The suburban rural complex of the type of ecological vacation farm is based on a superior geographical location, relying on local advantageous natural resources, a beautiful rural environment, and basic agriculture, guided by ecological design theory, protecting the ecological balance of the environment, and developing leisure vacations as the primary farm industry. This mode is classified into three categories.



Fig4.5 XY Yunlu Hotel in Guangxi, China. (by XY Yunlu Hotel)

From website:

<https://www.lonelyplanet.com/articles/xy-yunlu-hotel-architecture-award>

(1) Eco-tourism resorts, relying on the beautiful suburban rural environment, develop suburban rural agriculture as the development object, developing leisure agriculture, green agriculture, and ecological agriculture, as well as introducing tourism, real estate, and service industries, and creating a comprehensive ecological agriculture based on ecological tourism. body, enticing people to visit for a vacation.

(2) Natural resource tourism, which involves utilizing local characteristic natural resources, fully exploiting the value of resources, combining ecological design concepts, rationally planning the industrial structure, developing distinctive tourism products and high-end resort hotels, and attracting tourists to visit for leisure and vacation.

(3) Build specialized characteristic agriculture, produce and process characteristic agricultural products, and develop a series of peripheral products and activities to entice people to experience, leisure, vacation, sightseeing, and tourism.

4.3 Principles of planning and design

The planning and design of the rural complex on the city's outskirts focuses on the creation of the countryside while also emphasizing the protection of the ecological environment. It should adhere to natural and economic rules in order to evolve into a sustainable and recyclable economic organism as well as an integrated urban-rural complex. As a result, the following principles should be followed in the planning, design, and site selection of suburban rural complexes.

4.3.1 Culture

The rural complex on the outskirts of the city is planned and designed with a continuous spatial sequence in mind. On the one hand, it is a transition zone between the city and the countryside. It must not change too quickly, and there is no buffer period between the complex metropolis and the peaceful countryside; on the one hand, the gap between the various functional partitions ensures continuity. Because of their distinct functions, the various components of the urban suburban suburban rural complex have significant regional differentiation. The distinction between diverse functional spaces is lessened through landscape and environment design, and a nice viewing route and attractive space experience are generated.

When planning and developing the suburban rural complex, keep the original communities' temporal and spatial continuity in mind, as well as the region's demographic distribution in mind. A reasonable choice should be made between demolished buildings and preserved buildings based on the distribution of buildings in the village, planning and designing where the demolished villages will be relocated, what purpose the demolished area is used for, how to restore the preserved buildings and whether to replace their functions, and so on. According to population distribution and the psychology of people who love their families and land, scientifically integrate the labor force and then redistribute it fairly to ensure that the population distribution in each area is relatively even, reflecting the humanization of suburban rural complex planning and design, which is conducive to harmonious development.

4.3.2 Ecology

Varied natural environments provide these resources, and the use of different resources can stimulate different sectors, drive economic development, and create distinct values. For example, if there are rivers in the area, plan the industrial structure rationally based on the width of the river, the speed of water flow, and the number of fish species in the water, and use the smaller rivers as landscapes to improve the quality of the living environment. The larger rivers support fishery production, aquatic agriculture, and recreational enterprises like as fishing, cruise ships, and so on.

Rural areas on the fringes of towns frequently have convoluted terrain and complex landforms in terms of topography. Flat parts may be used as urban development reserve land, while the remaining areas with varied topography will be used by farmers to cultivate fruits and vegetables and develop into tiny pieces of family agricultural land. When planning and designing the suburban rural complex, fully consider the topography in the area, conform to the topography, protect the topography, reasonably divide the larger buildings or areas so that they can be integrated into the landscape environment, and use the topography to derive different industries, according to local conditions, forming an environmentally friendly suburban rural complex.



Fig4.6 Pleasant environment in Tongxiang,China.(by Author)

The rural complex on the outskirts of the city was built with rural landscape in mind, enticing the urban inhabitants to come here for leisure and holiday. The overall principle of the rural environment necessitates that suburban rural complexes be built with the following considerations in mind: (1) the protection of the suburban rural complex's natural environment and the minimization of damage to its original ecological environment during development; (2) landscape design and the original environment. Integrate, but don't be too dramatic or abrupt. (3) The building should retain as much of the original architectural style as feasible and be unified with the original building's style and style. The building should not be too tall, nor should the volume be too huge, and the surrounding environment should be introduced in order for the building to adopt the environment as its own. (4) When carrying out modern agricultural production, employ the ecological planting method rather than large-scale vegetable greenhouses to grow vegetable types at the appropriate time and place.

4.3.3 Space

The planning space structure should be adapted to local conditions, combined with the terrain; the open and central area is suitable for planning as a comprehensive service area; the residential area is built on the original village land or a relatively quiet area on the complex's outskirts; and the central mountainous area is suitable for the development of forestry and fruit industry or agriculture. Make yourself into a mountain landscape that fits the terrain.

The architectural design should be tailored to the local environment. To obtain a good landscape surface, slope hotels or mountain villas will be created using mountain slopes. Waterfront commercial streets and waterfront villas will be created with the help of rivers and waterfronts to establish a building group with the creative concept of Jiangnan water town. The most

important thing is to preserve as much of the old building's plan and architecture as possible while minimizing damage to the natural surroundings.

The landscape environment is tailored to the local environment. The suburban rural complex's large landscape is the countryside. Re-planning and design integration will build different landscapes and develop better environmental value using modern ecological design methodologies. Diverting water to develop gardens and building houses on mountains, for example, all demonstrate the notion of tailoring solutions to local conditions.

4.3.4 Carrier

Modern agricultural production is adapted to local conditions, and the types of local crops and the climatic environment of planting must be considered in the industrial planning of the suburban rural complex, and as much as possible, timely vegetables and fruits that are adapted to the local soil and climate should be planted.

Various industries can be tailored to local conditions. Mountain areas, for example, might establish enterprises that are inextricably linked to their landscape, such as animal husbandry, picking, mountaineering, or mountain hotels. Waterfront enterprises, such as fisheries, water entertainment ventures, and waterfront hotels, can be developed. It is to fully exploit the existing benefits of various natural resources in order to build various enterprises.

4.4 Strategies of planning and design

The suburban rural complexes are urban-rural complexes that combine

agricultural industry, leisure tourism, and suburban rural community. It has a complex internal functional composition, a challenging spatial organization, a diverse spatial layout, and a complex traffic flow. This study delves into the interaction between its many functional aspects by interpreting and researching the case of a rural complex in the suburbs of cities both at home and abroad. The complex's location is critical to attracting industrial clusters and tourists. There are five functional zones in the suburban rural complex. To construct a rural region, each functional zone is arranged spatially, interconnected, and coordinated. The complex's "meat and blood" are linked by the road system to form the complex's "skeleton." The ecological landscape planning is also a focus of the suburban rural complex's construction. Ensure the ecological environment and collaborate on the development of an ecological and organic suburban rural complex.

4.4.1 Site selection and positioning

The creation of suburban rural complexes requires careful site selection, clear aims, a thorough understanding, and precise positioning. Varied elements will have different effects, and some will even have an impact on the future development path. As a result, different elements should be evaluated extensively, and in-depth study and inquiry should be carried out to define the suburban rural complex's site selection, building aims, and development path.

(1) The first consideration in deciding where to build the rural complex in the city's outskirts is its geographical location. The outstanding geographical location is the key to the complex's speedy development. The city and the base are connected by convenient transit, and access is good; second, the infrastructure and cleanliness are excellent. Infrastructure, including energy, communications, and other infrastructure, must be completed in order to give fundamental guarantees for industrial production, processing, sales, tourism, and people's life and living. Furthermore, a good natural environment, including mountains and forests, water for fish farming, and farming fields,

the environment breeds industries, a beautiful natural environment, and a profound cultural milieu, are still important in attracting tourists. Finally, a basic economic basis is required to develop the local area. Agriculture that is distinctive, bringing leisure tourism and other sectors, organizing farmer participation, and driving the economic growth of adjacent areas

(2) Services and service objects scope, primarily to research and analyze the market in the region, grasp the trend of the market in the province, determine market demand and future development trend, and deeply analyze the age level, customer needs, interests and hobbies of the source market, seasonality and competition among peers, the positioning of high-end suburban rural complexes also needs to consider the market trend of the entire country or even the world, and the needs of foreign tourists. The service objects are determined based on the findings of market study, which can generally be split into: children, youth, middle-aged, and old according to age; and individuals, couples, families, schools, companies, and so on. The spectrum of services can be split into local, city, provincial, national, and even global categories. However, different types can be divided according to different classification standards: (1) the driving time, the driving time of the urban suburban suburban rural complex is generally within two hours; (2) the product characteristics and quality, the product quality is based on local Products produced according to product quality standards may be sold within the province. Products manufactured in accordance with national standards are sold within the country, and those created in accordance with international green product requirements have a global service scope. Lavender field in Provence, France, and tulip fields in the Netherlands are two examples. (3) Regional location, the best regional location offers convenient transportation that can reach multiple neighboring provinces and cities, if not the entire country.

4.4.2 Function zoning and layout

The suburban rural complex is based on the ecological base and

characteristic elements, adheres to the ecological concept, develops ecological agriculture, green agriculture, and is supported by the agricultural industry, integrates secondary and tertiary industries, leisure tourism, and rural communities, and is supported by the agricultural industry. Complex. Explore the mechanism of interactive development among the three, build diverse functional divisions, and form a cooperative suburban rural complex by excavating different land qualities of water area, agricultural land, and construction land.

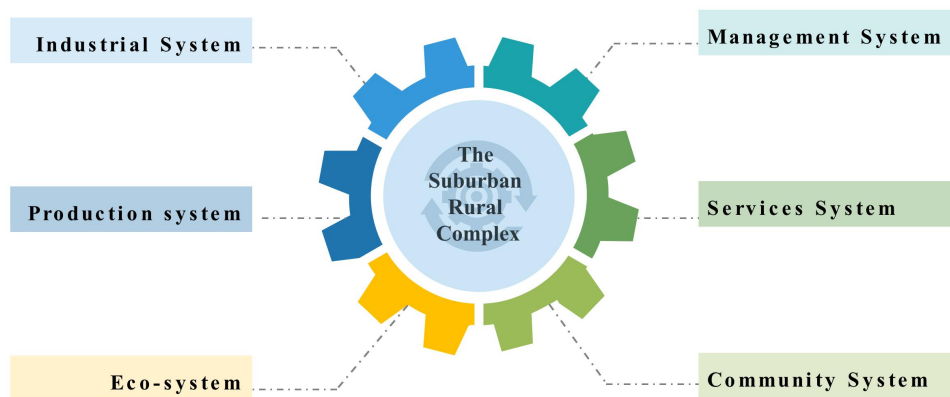


Fig4.7 Suburban rural complex structure.
Source: Drawn by the author

The suburban rural complex is divided into five functional areas: agricultural production area, living and residential area, cultural landscape area, leisure gathering area, and comprehensive service area.

The following principles should be followed while designing a functioning space: (1) The urban and rural spaces are organically interspersed, and production, life, and ecology are logically integrated and symbiotic; (2) suburban rural view + core industry + ecological link + Organic integration; (3) Land respect, nature respect, urban-rural integration, environmental ecology, and organic growth. The functional layout can be classified as scattered type, line type, plane type, and combination type based on the layout principle.

The interaction between the many functional divisions and elements of the

suburban rural complex is extremely complicated, and the various functional systems intersect and connect with each other through the ecological and industrial chains to build an organic rural construction system.

4.4.2.1 Agricultural production area

Agricultural production land and industrial processing and storage land are the two main components of the agricultural production area. Other auxiliary functions make up a minor fraction of the total. Internal functions include agricultural production, agricultural product processing, scientific research presentation, experience sales, and other functions, all of which are integrated and work together to promote the development of the agricultural industry. Crop planting is the core of the agricultural production area, with agricultural product processing industry and leisure agriculture as the starting point, and the three-industry linkage, agriculture and tourism complex are formed through the introduction of highly educated talents, capital, high-tech technology, high-quality service industry, real estate, and other industries. Industrial chain to construct a green industrial suburban rural complex that is sustainable.



Fig4.9 Agriculture area of Mogan valley in Huzhou,China.(by Sunac)
From website: <https://mp.weixin.qq.com/s/YG1r7WSWeiZzGHjdZKg4Fg>

Agriculture can be divided into four major production areas: technology research and development, high-quality agriculture, agricultural product processing, and agricultural tourism. Simultaneously, service areas and

management office spaces should be examined. Perfect service and scientific management are the keys to connecting various areas, forming production, processing, and processing, sales, display, experience, and service integration of the industrial chain, in order to create a multi-functional, multi-value high-tech modern agricultural industrial zone.

4.4.2.2 The living and residential area

The living and residential spaces are developed and laid out in accordance with the various service groupings, with residential structures serving as the primary focus. The suburban rural complex's residential buildings are mostly single-family homes. To arrange supporting service facilities and living public service areas, choose locations with high convenience and accessibility. Consider creating public activity areas adjacent to the administrative office space. The number of locations is determined by the scale and environment. It's both comfortable and pleasantly sized. As an example, consider the Baisha Bajiao Farm in Hainan Province, China. It is situated near a lake in a pleasant setting. It is built on the shores of a lake. It's peaceful and relaxing.



Fig4.9 living area of Mogao valley in Huzhou,China.(by gad line+ studio)
From website: <https://mp.weixin.qq.com/s/YG1r7WSWeiZzGHjdZKg4Fg>

4.4.2.3 Cultural landscape area

The distribution of the natural and human environments in the area informs the internal spatial layout of the cultural landscape area. To transform the rough and rough rural areas, the rough and refined are integrated, re-planned, and designed, cultural and creative industries are introduced, tradition and modern culture are integrated, and a modern ecological landscape design strategy is adopted. Scattered environmental landscapes with characteristic landscapes as nodes, combined with the landscape pattern inside and outside the area, form the cultural landscape axis and natural landscape axis within the complex, and the axis is used to drive landscape planning in the functional area to form an ecologically recyclable landscape system.

The method of succession and integration is used in the design of the cultural landscape, which maximizes the value of the cultural landscape within the suburban rural complex through investigation of the original appearance of the site, design and transformation, construction and use, and investment and

operation. The combination of natural landscapes and modern inventiveness has the potential to spur the development of new industries and landscapes while also increasing the value of existing landscapes. The natural landscape layout focuses on adapting measures to local conditions, with rich levels and diverse contents.

4.4.2.4 Leisure gathering area

The leisure gathering area includes a variety of functions such as a leisure vacation, a hotel, a restaurant, shopping, entertainment, and so on. There is a public reception service area as well as a leisure agricultural experience area. There are two primary types of internal layout. The public reception service area is one example. The service scope radiates throughout the leisure agglomeration industrial area, and a variety of leisure and entertainment industries are distributed around it, sharing public reception services. The other is the design of leisure and holiday projects, with leisure agriculture serving as the regional focal point. The service area is normally placed at the entry and exit, and the subject of the area is leisure experience agriculture, with related entertainment activities such as farming experience, suburban rural homestays, farmers markets, and so on. On the foundation of agriculture, various industries extend leisure, entertainment, experience, sightseeing, tourism, and vacation, and create a leisure industry gathering location with agricultural features.

4.4.2.5 Comprehensive service area

Foreign tourists and local inhabitants are among those served by the comprehensive service area. Its primary responsibility is to serve individuals in a timely, convenient, and thorough manner. As a result, it should be placed in a space with a wide spectrum of radiation and a simple and quick streamlining. It is primarily divided into two configurations. Method: First, residential services, tourist services, and industrial services are separated,

each area is divided into zones, and services are specialized and targeted. The other advantage is that all service areas are consolidated in one spot, with a centralized layout, powerful comprehensive service capabilities, and a wide radiation range.



1. Culture Museum 2. High-tech Agricultural Experience Hall 3. Reception and Exhibition Center 4. Farmland Entertainment Area 5. Resort Hotel 6. Sightseeing Train 7. Wedding Center 8. Hilltop Manor Club 9. Ecological Restaurant

Fig4.10 The layout of the comprehensive service area.

Source: Drawn by the author

The functional layout of the comprehensive service area varies depending on the type of suburban rural complex, which has different topography and landforms. The distribution of resources and resources is also one of the variables influencing the functional structure of the comprehensive service area, as does the area's geographical position.

4.4.3 Network system planning

4.4.3.1 Traffic system layout

The network system should be reasonably laid out in accordance with the traffic circumstances and development patterns outside the complex, as well

as the topography within the area. There should be a rapid traffic system and a slow traffic system in the area, and the two should be separated as much as possible to avoid mixed flow. The rapid transit system connects several major functional sectors in the complex, but the slow transit system is primarily oriented on leisure travel routes, enriching the system's internal transportation modes, and the road scenery is colorful.

Each functional area, such as the transportation system in the leisure gathering area, should have its own transportation system in addition to the rapid and slow transportation systems. Increase the width and landscape design of non-motorized vehicle lanes and sidewalks appropriately, and sometimes even add special transportation methods to enhance the tourist experience, such as horseback riding or horse-drawn carriages, bullock carts, small trains, and so on, and additional dedicated road systems must be established.

4.4.3.2 Road grade

The road grade in the suburban rural complex should be defined by the number of fixed inhabitants and floating population in the complex, as well as the number of planned future population. It is divided into categories, and there are a large number of tourists in the leisure gathering area. Off-site parking is defined as four lanes and huge parking lots. For a limited number of tour buses, there are two lanes. Large trucks are commonly employed in agricultural and industrial locations, and the roads should be broader than regular highways, with two lanes put up. In order to accommodate the return of large vehicles to the parking lot, the living and residential zones normally have two lanes that are safe, comfortable, and beautiful.

4.4.3.3 Type of transportation

The suburban rural complex has a wide range of transportation modes

because it is an urban-rural complex that integrates primary, secondary, and tertiary industries, has a complicated industrial composition, and must deal with various topography and complex internal functional structures. As a result, a basic traffic system cannot solve the suburban rural complex's complicated traffic concerns. Only by systematically structuring traffic at each level and implementing a range of traffic modes will we be able to meet people's requirements in the complex and enrich people's lives. The mode of transportation boosts the enjoyment and desire to travel.

The transportation modes and types of suburban rural complexes are mainly shown in Table 4.1 below:

| Type | Transportation Type | Number of passengers | Velocity (km/h) | Recommended speed (km/h) | Road Conditions |
|-------------------------------------|---------------------|----------------------|-----------------|--------------------------|---|
| General Transportation Type | Bus | 30-60 | 60-100 | 40-80 | level wide road |
| | Car | 4-7 | 60-120 | 40-60 | level wide road |
| | Bike | 1-4 | 10-25 | 10-20 | Plastic bike lanes, asphalt road |
| | Walk | / | 5-12 | 5-8 | Hard paving, wooden plank road, scenery |
| Specific Transportation Type | Carriage | 2-4 | 15-20 | 15-20 | Field road or asphalt road |
| | Sightseeing train | 20-60 | 50-60 | 40-50 | Railway, beautiful scenery |
| | Cruise ship | 40-80 | 40-60 | 30-50 | Deeper waters, slow water flow |
| | Mountain bike | 2-4 | 60-120 | 60-80 | mountains, beautiful scenery |
| | RV | 1-3 | 60-100 | 40-60 | flat road, good environment |

Table 4.11 Transportation types.
Source: Drawn by the author

The general method of transportation merely addresses the fundamental problem of travel, and the types are also common, such as cars, buses, bicycles, and so on. One of the key components of the suburban rural complex is the traffic flow lines, which are convenient, fast, flat, and comfortable.

The unique mode of transportation is intended to enhance the suburban rural complex's experience and enjoyment. In the suburban rural complex, there are numerous unique experience initiatives and entertainment tourism

enterprises. Special traffic experience might also be regarded as one kind. A mode of transportation like this can not only increase people's enjoyment. Experience can also be used to improve the building of a suburban rural landscape within the complex, resulting in some economic benefits.

4.4.3.4 Entrance and exit

The positioning of the suburban rural complex's entry and exit is mostly governed by the major direction of its external vehicles and the road conditions around the base. The following points should be considered when designing the entrance and exit: (1) The entrance and exit must be clearly marked, the placement must be appropriate, and the characteristics and brand of this suburban rural complex should be reflected. (2) suburban rural complexes on the outskirts of the city, the bases can be broadly classified as follows (Figure 4.2). Expressways or urban expressways typically divide three or four sides. It is preferable to arrange entrances and exits on expressways rather than highways. (3) The location of the entry and exit should be selected by the direction of the greatest traffic flow. The traffic flow of the rural complex on the city's outskirts may come from numerous cities, and there will be county roads or urban roads connecting to the rural complex, with the road with the most traffic being chosen. Establish the main entryway. (4) The number of entrances and exits is determined by the size of the suburban rural complex to guarantee the safe passage of fire and police vehicles and the timely evacuation of personnel. The secondary entrance can be offset suitably, but it must also be visible. (5) There is an open space on the outskirts of the suburban rural complex. Other borders, aside from the necessary entrances and exits, may be farmland or natural biological environment, which serves as natural definition and protection while also reserving area for future development. .

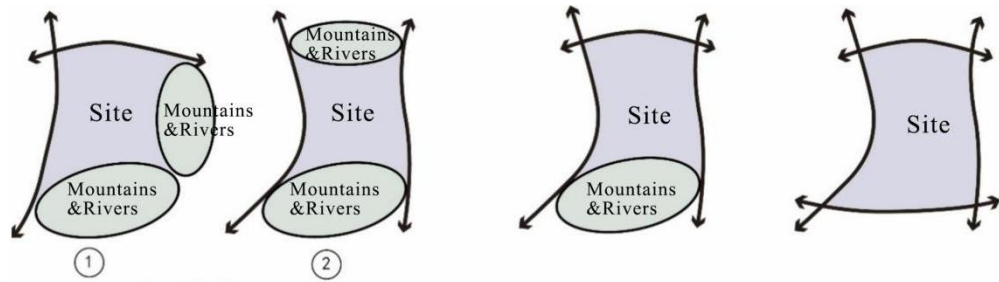


Fig4.12 Type of site.
Source: Drawn by the author

4.4.4 Ecological landscape planning

The suburban rural complex's ecological system is an important component of the suburban rural complex's layout, which includes not only the ecological industry, but also ecological tourism and ecological landscape. cognition; and (3) the self-discipline ecological cycle.

The landscape design The suburban rural complex's layout should begin with a comprehensive landscape pattern that includes not only the landscape within the region, but also the neighboring scenic sites and natural landscapes. Outline the plan's initial concept briefly. The natural ecological underpinnings of suburban rural complexes are primarily as follows, based on the case of suburban rural complexes and theoretical knowledge of landscape studies. Appropriate options for rearranging the entire area can be made based on the distribution of biological grounds and landscape patterns of suburban rural complexes. ecological foundation

The creation of the primary structure is the second stage of ecological landscape planning. The position of the core landscape in the base is determined by the link between the surrounding scenic spots or landmarks

and the landscape in the base, and it resonates with the outside landscape to generate one or more separate landscapes. Landscape nodes can be planned at the intersection of each axis or at the point where distinct landscapes merge. The fundamental landscape structure of the entire suburban rural complex is comprised of the landscape axis and landscape nodes.




| Ecological Base of Suburban Rural Complex | | | |
|---|---|--|---|
| Type | Field | River&Lake | Mountain&Forest |
| Characteristics | Grid structure Sheet layout | Line structure Interspersed | Flat structure |
| Image |  |  |  |

Table 4.13 Ecological base of suburban rural complex.
Source: Drawn by the author

Finally, characteristic landscapes must be planned inside each ecological base and used as nodes to connect through slow traffic systems such as trails, bridges, corridors, tunnels, and so on, in order to establish a characteristic ecological landscape system.



Fig4.14 Wuxi "Tianyuandongfang" Ecological Landscape Structure Map.
 Source: Drawn by the author

Using the ecological structure planning of the "Tianyuandongfang" suburban rural complex in Wuxi, China as an example, first design the main axis of north-south landscape line of sight that runs through the middle of the base, connecting Dayang Mountain and the core of the main suburban rural landscape by combining the surrounding ecological environment. secondly, railway planning The east-west display landscape belt connects various themed types of agricultural and ecological town landscapes; then builds the rural town landscape core in the middle and the lake landscape core on the west side; then builds the base resources and locations based on wetlands, fish ponds, peach forests, and so on. The benefits of configuring several landscape nodes.

5 Conclusion

Based on the overall background of urban and rural areas, this study proposes some new planning and design concepts, as well as new trends of suburban rural complexes, in the planning and construction of suburban rural complexes, using relevant theoretical research on suburban rural complexes and an analysis of existing suburban rural complexes. The suburban rural complex is analyzed and investigated from the four aspects of culture, ecology, space and carrier, in conjunction with the theory of symbiosis, in order to gain some basic theories and design methodologies for the planning and design of the suburban rural complex, as well as some attention to the planning and design of the suburban rural complex. questions, as well as some principles to follow.

The suburban rural complex is a new idea in China that was initially introduced in 2017 by the Central Document No. 1. It is proposed as part of the rural revival strategy and encourages overall urban and rural planning as well as a new model and sample of rural development for future urbanization. In recent years, cities in China have conducted practical explorations of suburban rural complexes, but related theoretical research has been lacking, resulting in a lack of effective support and guidance at the theoretical level for the creation and development of suburban rural complexes. As a result, it's critical to fill in the gaps in relevant studies.

This study's research content is based on existing Chinese and worldwide suburban rural complex theoretical research. Using planning and design theory, architectural theory, industrial theory, and other sources, summarize and refine the concept, connotation, and type of suburban rural complex; on this foundation, investigate the suburban rural complex symbiosis system; and present the principles and main points of suburban rural complex symbiosis planning. The following are the findings of the study:

(1) Suburban rural complex theory's evolution:

Urban diseases, rural concerns, urban-rural imbalance, and suburban rural complexes are all hot topics these days. A coherent theoretical foundation for suburban rural complex planning and design is currently lacking. This study organizes the theoretical framework of suburban rural complexes. To begin, the concept of suburban rural complex is presented using the sorting and summary of current research resources. It will be distinguished from related concepts such as modern agricultural parks, urban complexes, and tourism complexes at the same time. Furthermore, it is stated that the suburban rural complex has a complex role in which numerous subjects collaborate and comprises of six key production, industry, operation, ecological, service, and operation systems. The suburban rural complex is crucial for agricultural modernization, developing new driving factors for rural agricultural development, and speeding up the urban-rural integration process. The theories and key points of suburban rural complex planning and design are put forward by collecting and summarizing many practical cases of suburban rural complexes around the world and in China, and extracting the essence, in order to provide data support for future theoretical research and practice of suburban rural complexes.

Second, the suburban rural complex's development model is divided into four types based on its core industries, leading functions, and important construction contents: A distinctive agricultural zone, The integration of the three industries, Modern agricultural sightseeing and experience, Eco Resort Farm, and evaluate the features of each mode type, and explain with typical projects as examples, is driven by cultural innovation.

(2) Suburban rural complexes' planning and design ideas and techniques:

this study proposes to build a symbiosis system for suburban rural complexes based on symbiosis theory and related research in the field of planning and design. First, the suburban rural complex's development model is divided into four categories based on its main industries, leading functions, and

important construction contents: Characteristic agricultural zone, Cultural creativity drives the integration of the three industries, Modern agricultural sightseeing and experience, Eco resort farm , is driven by cultural creativity, which analyzes the features of each mode type and illustrates the usual project as an example. Make it symbiotic within the system by considering the four design principles of culture, ecology, space, and carrier, and eventually develop a planning scheme that constitutes a perfect symbiotic system of suburban rural complexes. The strategic substance of suburban rural complex planning, comprising placement, functional zoning and layout, ecological and traffic planning, is put forward based on the created suburban rural complex symbiotic system.

For the research on the suburban rural complex, which is a comprehensive subject, it is not possible to fully explain it in a thesis. As a result, there are still numerous issues in the planning and design of the suburban rural complex in this study. The primary issues are as follows:

The suburban rural complex's planning and design idea lacks systematic generalization and summary. Because the suburban rural complex is still in its early stages, its planning and design approaches vary, as do the theoretical concepts used by different types of complexes. The direction of planning and design concept can be investigated further in the following steps.

Since the vastness of China's rural areas and the diversity of its realities, the growth of large cities is likewise diverse. The author's knowledge structure level and expressive abilities are weak, making it impossible to convey the deep rationale behind suburban rural intricate planning and design. The planning and design concepts of suburban rural complexes, as well as the architectural and environmental design concepts of suburban rural complexes proposed in this study, must still be tested through time and practice.

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