

Accessibility and Population Density in the Linpan Landscape:
A Study of Urbanization in the Chengdu Plain, Sichuan, China

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Abstract

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Rural area in China is rapidly changing and developing under the New Socialist Countryside policy. To take a careful study on village construction is very important for the future planning of China's modernization. The accessibility and commuting behaviors of rural areas to a higher level of communities play an important function on the social and economic development. The influence of higher level communities to villages concerns the future redevelopment model and the industrial structure of local villages, as well as the lifestyle of local villagers. The linpan landscape is a wonderful case study because Chengdu has a relatively high population density with the scattered linpan landscape. Lots of local planners was seeking for a redevelopment planning model which can increase the accessibility of villages to outside without density

increase quickly, as well as to protect the valuable linpan traditional landscape. There is a contradiction between high intensity neighborhood and the traditional high density population and scattered linpan landscape. The case studies were four different development model of villages in Pi County. I used three factors, commuting features, population density and accessibility to test the four different development model in linpan landscape. Through the data analysis and evaluation, I got the results that the commuting behaviors in linpan landscape are different based on different patterns of four villages and the transportation network does not determine the accessibility and the new concentration model does not make the transit easier. Accessibility plays an important role of villages' industrial structure and lifestyles of local people. In comparing alternatives, the accessibility of Zhanqi village is better than other three but it deviated the most from the linpan structure.

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CHAPTER 1: INTRODUCTION

1.1 Problem Statement

Since the 1980s, the reform and opening-up policy has injected an unprecedented vigor and vitality to Chinese economic development in the thirty years. Economic and social development is rapidly running, making the whole world watching the country. The rapid economic development in China has greatly promoted the city urbanization process and tremendous changes have taken place in urban and rural areas. From the planned economy system to a market economy system, people's ideas, values and behavior patterns have undergone a profound change. China is being in a historic period of change.

At present, the rural area is relatively poverty. Agricultural surplus labor is prominent and the farm income is declining and it has a large population pressure. A large number of rural population swarm into cities to earn a living and create wealth. However, due to the urban and rural household registration system, they can only return home to build new homes, which causes the separation of people and houses and long idle rural houses. In recent years, rapid development of transportation network bring people living rural area convenience to go out of their living village and have a access to go out for work or travelling and they can come back to take care of their parents and children usually. Surplus labor has more and more demands to go out and bring wealth and information back. They are not closed as before. In addition, the transportation accessibility has been more and more important relating the development of a village. Convenient road network can bring tourists and other commercial activities to the rural area and promote villagers to go out of their own village more frequency.

Through the linpan case study, I wanted to do some research on the characteristics of the traditional landscape pattern through accessibility and commuting features to evaluate the intensity and density of the linpan landscape in order to compare current redevelopment alternatives and give some reference for future planning. Planning problem coming up with rapidly development of Chinese urbanization is that contradictions are always existing among planning goals to both economic development and environmental protection. Another contradiction is that, form one hand, the population pressure of urban area makes center cities cannot accommodate excessive external population from rural area and on the other hand, the agricultural surplus labor has nothing to do in villages and they want to go out for seeking a job to earn money. In interviews of 2014, villages were still not satisfied with the income level and the redevelopment planning of their villages. Traditional villages have no other land use expect residents and agricultural land. Local planners also expressed that the concentrated villages were more efficient on road network and infrastructure services. The dispersed landscape model was wasteful of land.

To address these issues, I argue that redevelopment planning should consider the liquidity and density of each kind of villages that may influence the settlement form and economic development in the future. I do the commuting analysis and accessibility based on linpan spatial structure by comparing several alternative redevelopment models that I observed during fieldtrip in 2014. These data analysis may help local planners to quantify the actual vigor and commuting features under different redevelopment models and have some thinking in the future planning.

1.2 Research Question

This thesis addresses the following research questions:

- How does the accessibility of linpan landscape?
- What about the commuting features in the four different model of villages?
- What factors influence the commuting behaviors in linpan landscape?
- What do these factors reveal about characteristics of the traditional landscape spatial pattern? How do alternative redevelopment models function for future planning?

1.3 Scope and Limitations

In the summer of 2014 I conducted fieldwork in four administrative villages in Pi County (Pi Xian), each village representing a different kind of redevelopment model. In this thesis, the field sites included Anlong CURA Village, Anlong SEMI Village, Jiangan Village and Zhanqi Village. We did a lot of interviews with local government officials, local residents, local rural planners and scholars. Through them we would like to understand local perception of the redevelopment situation and planning policy implementation. We talked with local villagers and got their thought and opinions on the development and planning of villages and their own household situation, and what about their ideas for future planning. We also did data collection with GPS to get some spatial data and confirm some infrastructure equipment and transportation services. We did questionnaire survey in four villages, with a total amount of over 160 households and over 300 people. The second time questionnaire survey happened on March of 2015. I asked some Sichuan University students to help me did another questionnaire

in the four villages which mainly focused on the commuting characteristics to analyze commuting and accessibility features. Please see subsequent chapters for a more detailed methodology.

Due to time and resource limitation, this thesis cannot cover every aspects of commuting features in linpan landscape. And it does not provide a detailed description of history, cultural, political and social conditions of each villages. Some pictures and sketches show a rough existing situations and give the future planners a guidance for the future planning.

1.4 Outline of thesis

Chapter 2 provides background and policy for planning in the linpan landscape in Sichuan Province in China. It has a brief description of national and local rural redevelopment policy which is called New Socialist Countryside Policy (NSC) and Chengdu “Three Concentration” Policy. Then provides a brief overview of linpan landscape natural environment, context and history, as well as particularity of Chengdu Plain Rural Settlement Form.

Chapter 3 explains two basic theoretical framework used in this thesis. The first one is the central place theory which explains the spatial structure of linpan landscape and how the different level of areas connect with each other. The second theory is about the relationship between the intensity and the density of different order level of areas. It explores how this unprecedented space-time condition enables the emergence of intensity across low density areas compare with the city center with high density. This chapter helps us establish the theory foundation and basis to evaluate the accessibility and commuting of different level of linpan landscape in China.

Chapter 4 returns to the village sites and linpan landscape chosen for study. It describes the current spatial structure and population density situation of the four villages. And it explores the population density, transportation network and commuting features in villages based on the social survey we did on the summer of 2014 and the second social survey on March 2015. The accessibility condition also be analyzed here to reflect the intensity of linpan landscape.

Chapter 5 describes the results of the commuting features and accessibility of the chosen four villages and how they influence and change the linpan landscape development. I also describe the different problems we meet in different model of development plan and give some suggestions for continued development on traditional linpan landscape.

CHAPTER 2: BACKGROUND CONTEXT

2.1 National Policy: New Socialist countryside construction

In building a harmonious society and urban and rural development in the overall socio-economic program, rural areas have become one of the key problems to be solved. Per capita income, people living environment and social security mechanism are far behind in the rural city than urban cities. The wealth gap increased between urban and rural areas caused social unrest gradually increased, threatening social stability and long-term stability. In early 2006 the Central Committee thus issued the first document on the construction of a new socialist countryside proposal. They provided “production development, affluent life, rural civilization, clean and tidy villages, democratic management” as the overall policy objective of the new rural

construction. The specific measures included planning economic and social development in urban and rural areas as a whole and pushing forward the construction of a new socialist countryside; promoting modern agriculture and strengthening the support of socialist new rural construction; facilitating farmers' income and strengthening the economic basis of the socialist new rural construction; strengthening rural infrastructure construction and improving the material conditions of new socialist countryside construction; accelerating the development of rural social undertakings and cultivating new farmers; deepening rural reform and improving the socialist system to protect new rural construction. The policy of new socialist countryside construction provides policy and financial support for the development of urban fringe villages and a variety of flexible working space for the development and orientation of villages.

2.2 Chengdu “Three Concentration” Policy

Under the guidance of the general policies in early 2004, the Chengdu municipal government issued the suggestion documents of economic and social development in urban and rural areas and how to speed up the implementation of urban and rural integration process. They also issued 17 supporting documents, which including urban and rural planning, construction, management, education, healthcare, labor employment, social security, hukou and other aspects to make a comprehensive policy adjustment and initially they set up a new institutional framework. On the specific measures, they proposed “three centralized planning” approach. The three focuses refer that industrial park should be concentrated in collective development areas, agricultural lands would be concentrated to achieve more efficient economies of scale, and farmers would be concentrated to towns and cities. By 2020, the city's urbanization rate should be more than 70%, more than 50 percent of administrative villages’

residents incorporated new towns and rural communities. "Three concentration" policy is in line with Chengdu's inevitable trend of development of the rural economy in a long view. Such intensive development not only reduces industrial costs, but also in favor of restricting the use of land and increasing output units, which do a good job in favor of centralized infrastructure, saving the cost of investment.

"Three concentration" policy is a development idea putting forward by the government from the top to down. From the Government's point of view, the policy helps the government provide convenient, efficient public services and social management. It is also conducive to rapid implementation of plan. However, many scholars provided queries for the Chengdu's centralized policy. In their completed and the focus of community, they investigated the farmers and there is the following disadvantages: the disconnection between industry and settlement patterns makes the villagers difficult to adapt some concentrated community housing. The gradual disappearance of the traditional architectural style is happening and they are losing regional characteristics. Excessive land acquisition resulted in a large number of farmers losing their land. In the future the formation of new slums may come out in the city.

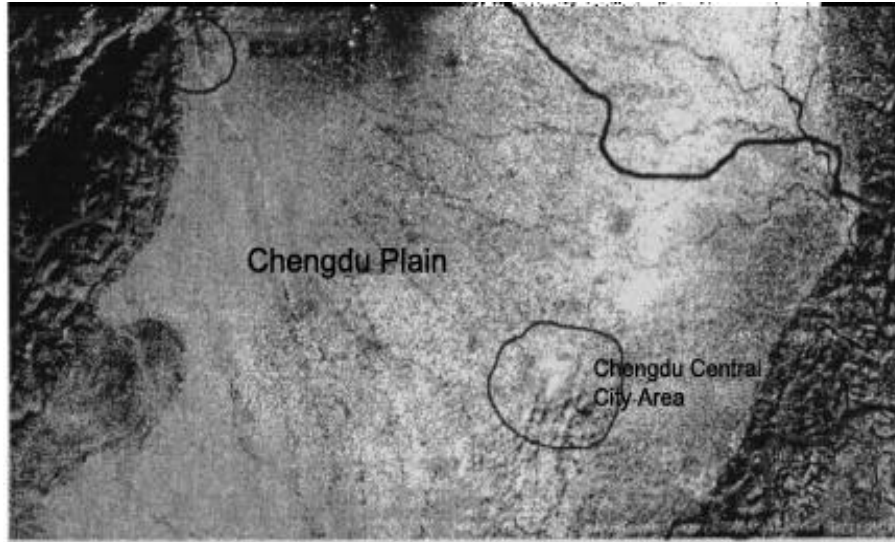
"Three concentration" policy restricted and defined the direction of village planning in Chengdu and affected the commuting frequency and distance in daily life, which is one of the key issues of I research after a field investigation and study, and analyzed and summarized the "three concentration" policy is really suited to this stage of Chengdu fringe production and living standards in rural areas, as well as its outlook for the village, commuting style, household settlements and other aspects.

2.3 Chengdu Plain Context and History

In this thesis the selected study area located in the western Chengdu Plain, also known as Pen West Plains (Penxi Pingyuan) or chuan West Plain (Chuanxi Pingyuan). It located in the western Sichuan Basin. The generalized Chengdu Plain is between Longquan Mountain, Longmen Mountain and Gongjia Mountain. The north is from Jiangyou and south to Le Mountain and Wutong bridge, including the northern part of Mianyang City, Jiangyou City, and alluvial flat in An County, Min River, alluvial plain of Tuo River, Qingyi River in south and alluvial plain in Dadu River. There are terraced hills between the three flats, and it is a total area of 23,000 square kilometers.

The altitude of Chengdu Plain is about 450 to 750 meters from the northwest to the southeast. The tilting average slope compiled only 3 ‰ to 10 ‰ and the relative elevation of surface is under 20 meters. The terrain is flat and the whole plain surface is loose and has thick sediments. Good soil structure makes it become the most fertile land in Sichuan Province. Dujiangyan Irrigation Project which built in Qin Dynasty in 250 BC led the surging river and fanned irrigation canal network, spread in the vast Chengdu plains. Each year the Dujiangyan Irrigation Project uninterruptedly irrigates the plain and makes the Chengdu Plain become “Heavenly State”. Within the thousands of years, the farmland of Chengdu Plain were concentrated and made 90% of land become paddy field by generations. While the central plains are all paddy fields, because of this, Chengdu Plain is also called “Land Sea”.¹

¹ Qibing Chen. “Sichuan Linpan Jingguan Ziyuan Baohu yu Fazhan Moshi Yanjiu”. 1998.

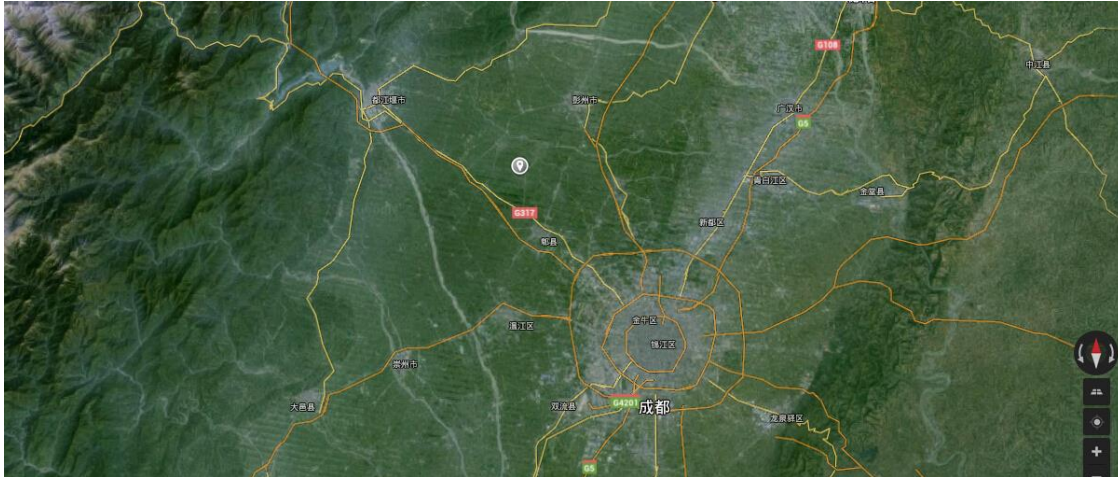


Source: "Chengdu Plain Development" 2014.

Fig. 2.1 The Distribution of the linpan landscape in Chengdu Plain

2.4 Particularity of Chengdu Plain Rural Settlement Form

The villages of Chengdu Plain, usually it refers to a zoning administrative village, but in the natural settlement, there is no obvious boundaries of the village group. One of the most representative, as well as the share of highest number is linpan layout model, which means forest basin in Chinese. This kind of layout model is not only unique in Chengdu and Sichuan Province, but also very special in many rural landscapes throughout China. Villages were dispersion as a separate settlement, single family with small rivers in front of house. Every house is agreeable surrounded by bamboo and tress. Village in linpan landscape is a scattered type structure typically in southern villages.



Marker is for Pi County. Source: Google Map 2015.

Fig. 2.2. Satellite Image of Chengdu and Region

The biggest difference between these villages and other regions is that the yard (bazi) replaces the public space of the kind of street-style villages, which makes no obvious single village center position. There is no relationship between the general village building clusters. In the entire village, settlement cluster points are much more dispersed than in other Chinese landscapes that are intensively farmed. These independent linpan landscape are connected through the market on the fringe of Chengdu Center city. The space systems can be seen as Central City (Chengdu) ---- city that is similar to Garden City area, town center---- linpan that is similar to neighborhood units of communities, and scattered villages.



Left is a concentrated housing form in Pansihuan, Sichan. Right is a single unit house in Jiangan Village in linpan. Source: Photo by Prof. Stevan Harrell and Jennifer Tippins.

Fig. 2.3. Different Kinds of Settlement Forms

In the wide field of Chengdu Plain there scatters clusters of trees, in layers of greenery, there shades some houese with gray tiles and white walls. The winding ridge roads extend to

the depths of the forest. People stay in their own house in the tree-lined open cool air taking a leisurely life. When the busy season comes, they toil in the fields on the edge of the forest, as if living aloof chaotic life, this is the region's villages form----“linpan landscape”.

In the village consisting of linpan landscape, the space between neighborhoods is the natural form of farmland, which provides sufficient space for epitaxial growth of each household. Households have become an independent natural cell organization. Linpan is a concentrated area of rural households, generally ranging from a few families to dozens of families, and becoming different settlements. All settlements are nestled in the forest and the family houses are hidden in the forest. Linpan has three layers of structure. The core layer of lanpan cells is buildings and Yuanba entities, which are the villagers’ private place to rest. The protective layer of cells is the woods, which shade the wind, retente water, as well as providing safe shelter and nutrients for the core layer, such as a suitable temperature and fresh oxygen . The outside layer is streams surrounding the woods, exchanging life energy with the outside world. The entire linpan landscape is a circular structure with diffusion layers in Topology.

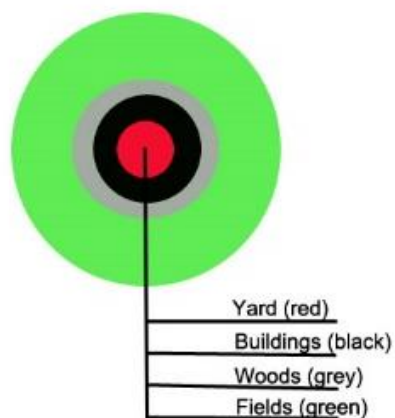


Fig. 2.4. Internal Hierarchy in linpan Landscape

From the macroscopic scale, the spatial structure of Chengdu Plain can be divided into four levels. The first level refers to the Chengdu center city and the second level refers to the second circle (Longquanyi District, Pi County, Wenjiang, Shuangliu County, Xindu, and Qingbaijiang) and the third circle (Xinjing County, Pujiang County, Dayi County, and Chongzhou County). The third level is the market town and the fourth level is linpan. They have a certain rule of distribution between four levels. Lower-level units are organized by the upper-level units as the heart or central gathering space. With the rapid development of city and fringe area, cities and towns have formed intersecting roads network and the water system is dense in space, emerging checkerboard pattern. Center cities, counties and market town can be seen as the nodes in the network structure and they are connected by roads and water system, showing a certain topology relationship. Numerous of Linpan landscape scatter among the mesh, and arrange around a network node, it is the largest number of elements in the quaternary structure hierarchy.

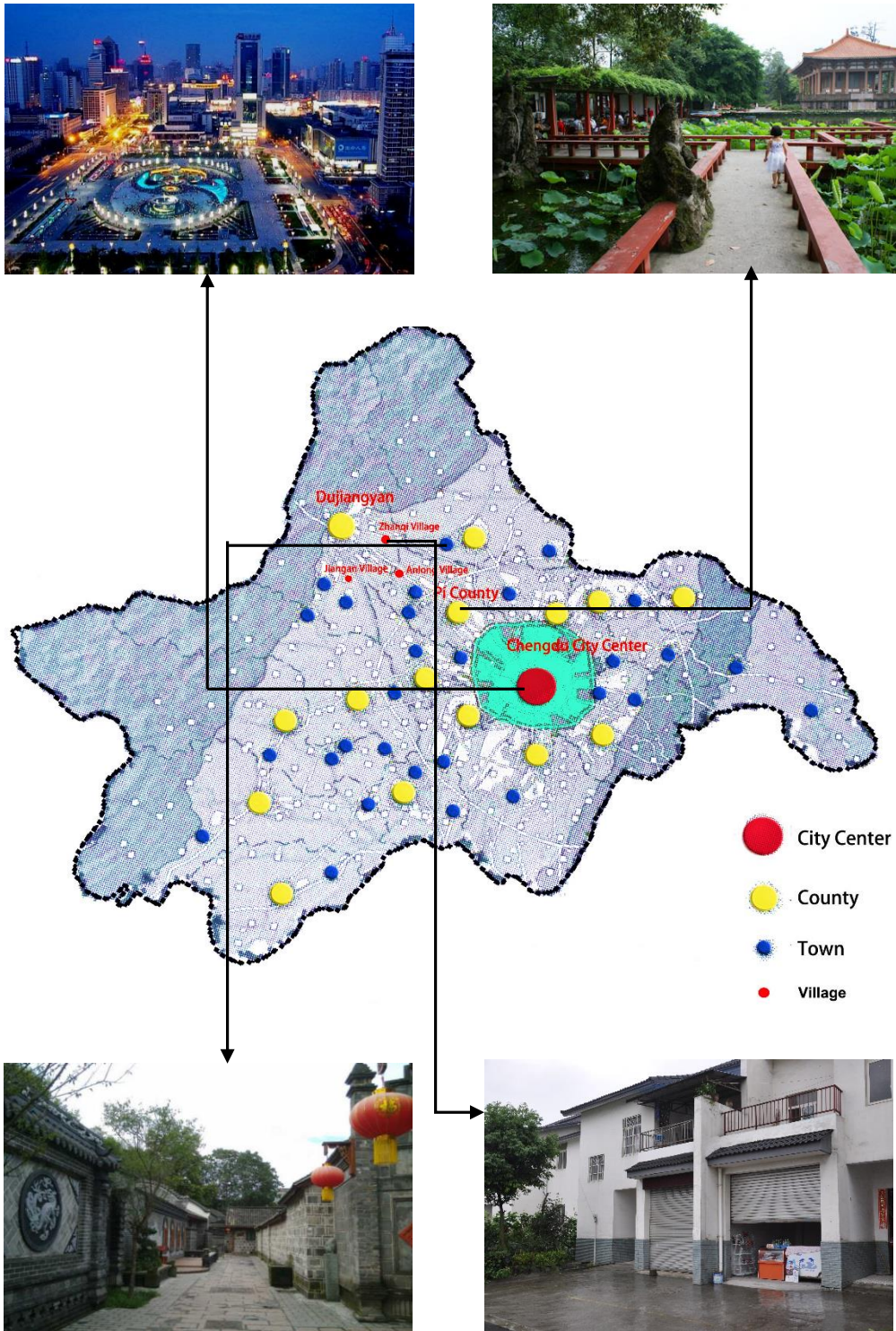


Fig. 2.5. Four levels of Rural and Urban Spatial Structure in Chengdu Plain

From the figure below we can find that linpan settlement is a system consisting of Chengdu center city, counties and districts, market town and linpan. The structure is called Pyramid. The characteristics of this structure is that the center of linpan settlement is Chengdu center which belongs to the highest level. From the town level, the linpan settlement does not have the spatial characteristic of uniformly scattered and shows gathering, but it is still remaining the spatial distribution features of linpan in the higher level. From the spatial combination figure we can see that the city, town and linpan have strong similarity. Cities and counties around Chengdu center city, market towns surrounding cities, linpan surrounding towns are showing radially distribution.

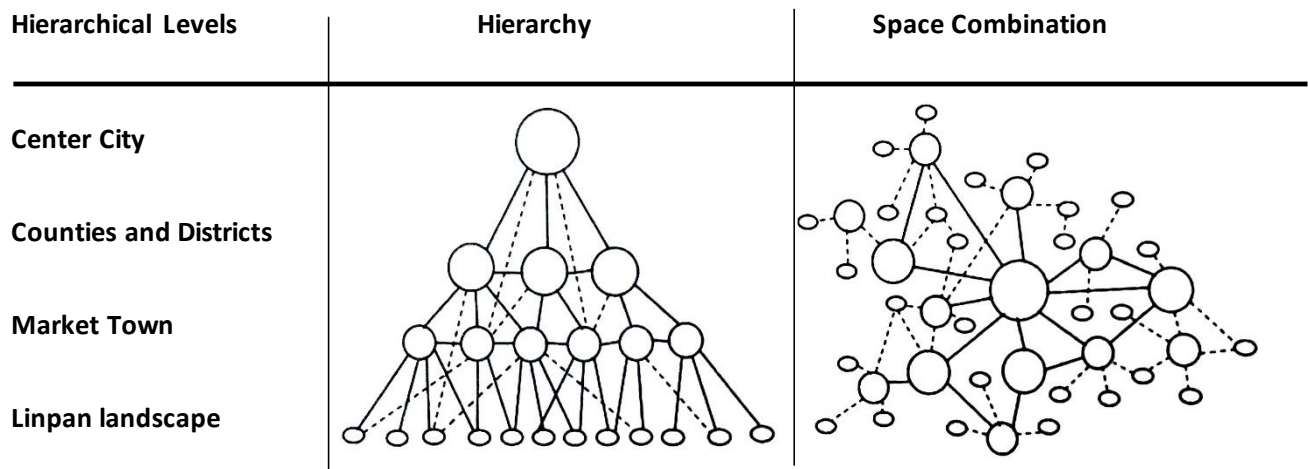


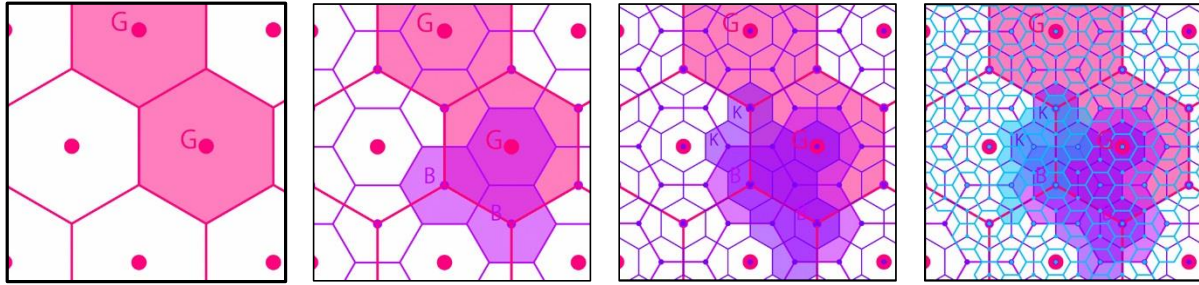
Fig. 2.6. Different levels of Rural and Urban Spatial Structure in Chengdu Plain

Chapter 3: Theoretical Framework

In this chapter I will describe the theoretical framework I used in this thesis to evaluate the intensity and density of linpan landscape about the commuting features and accessibility of this area and the alternative redevelopment models for future planning. There exist two major theory. The first one is about the central place theory applied to China by G. William Skinner to help us understand the spatial structure of linpan landscape and its development form. This theory is a kind of location theory concerning the size and distribution of central places. This provides a theory foundation for the spatial characteristics of linpan landscape. The second theory section describes the intensity beyond density theory by Elena Porqueddu. This provides the method to evaluate the intensity of an area in micro-scale and spatial-scale.

3.1 Central Place Theory

Central places are a generic term for cities, towns, and other nucleated settlements which have central service functions. The Central Place Theory is created to explain the reasons behind the distributions of different level of cities, counties, towns and villages and their economic and society operation. The theory was first developed by Walter Christaller in 1933 and Losch's modified his theory, in addition, he thought it was too rigid because it only focused on the location and ignored the maximizing consumer welfare. He thought the central place should be a place where creating an ideal consumer landscape where it is the nearest location for getting goods and profits.



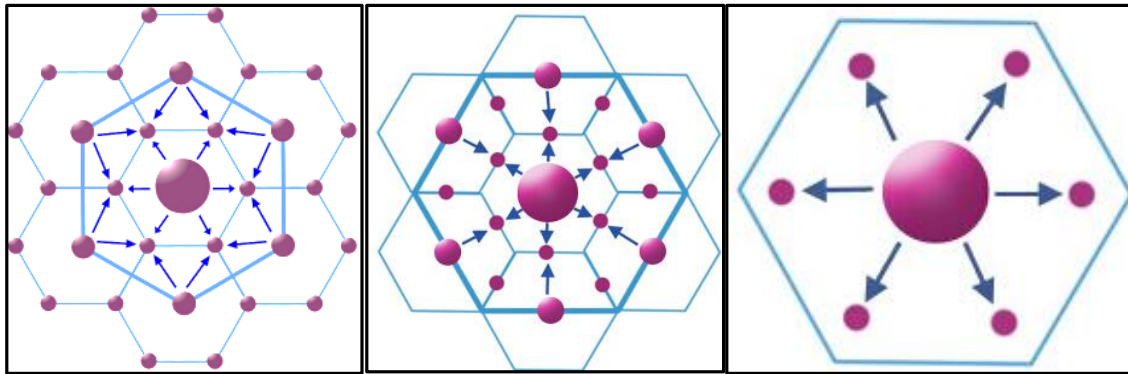
Source: Wikipedia. Central place theory.

Fig. 3.1. Central Place Theory by Chris taller

Christaller made a lot of assumptions to develop the theory. The area should be an unbounded all flat with evenly distributed population and resources. All settlements should be equidistant with distance decay mechanism and exist in a triangular lattice pattern. Based on the theory, there is only one type of transport and have access in all direction. There exists five sizes of communities within the central place system, hamlet, village, town, city, regional capital. In addition, Chris taller predicted three orders or principles by K-values which shows how much the Sphere of influence. The first principle is the marketing principle and it is shown as $K=3$ (K is a constant). It means that the market area in the central place hierarchy is three times bigger than the lower one. With the move up or down of the order of the place, the number of the levels goes up or down three times. For example, if there are three towns, there would be nine villages, 27 hamlets and one city. The second principle is the transportation principle ($K=4$), which means that the market area of a higher-order place includes a half of the market area of each of the six neighboring lower-order places, as they are located on the edges of hexagons around the high-order settlements,² which produce the most efficient transport network. The third principle is the administrative principle ($K=7$) which means that settlements

² "Crental place theory", Wikipedia, November 2008, URL: http://en.wikipedia.org/wiki/Central_place_theory, Archived at <http://www.webcitation.org/6ZZBnt607> on June 26, 2015.

are nested according to sevens. In the central place system, the higher order trade area completely covers the lower order and serves a relatively larger area.



First one is the K=3 Principle, the middle one is K=4 Principle and the right one is K= 7 Principle.

Source: Wikipedia. Central Place Theory

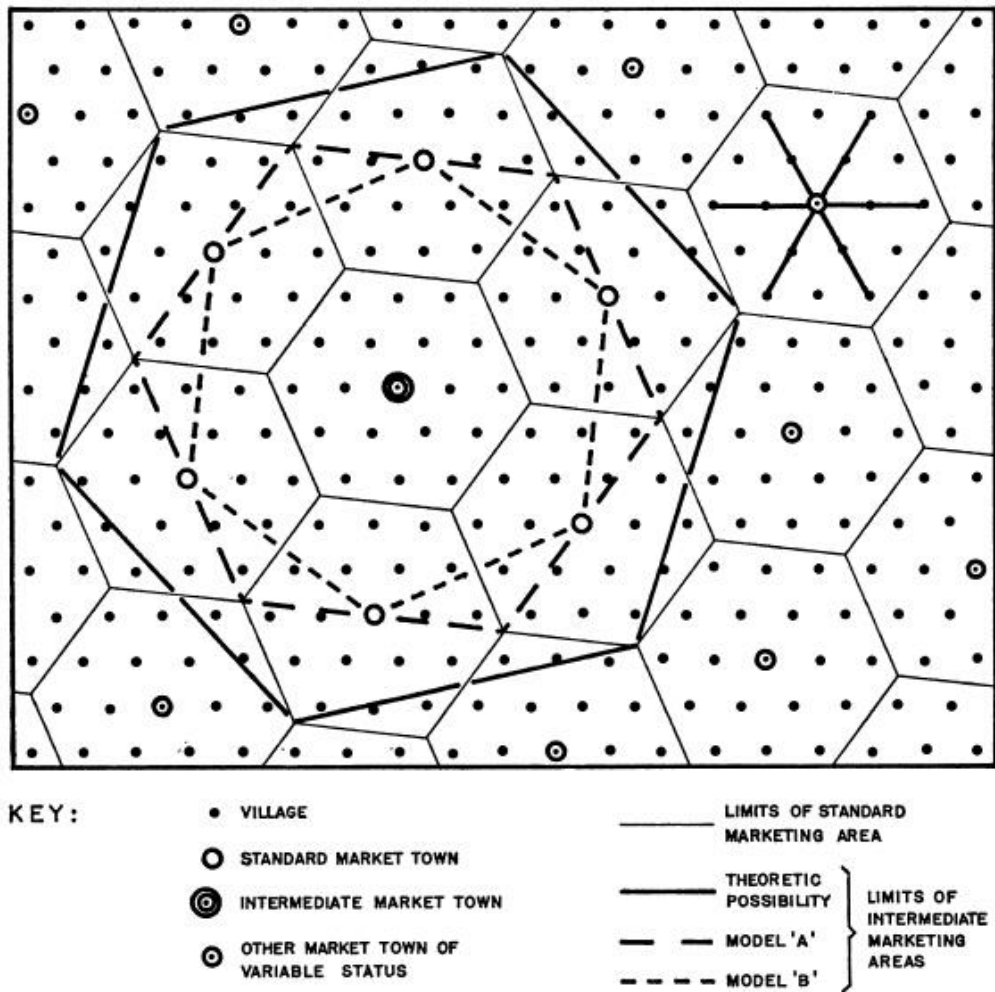
Fig. 3.2. Three Principles of the Central Place Theory

G. William Skinner's approach taken follows the lead of Christaller and Losch³. Skinner tells us that in China's most traditional agrarian societies, the rural markets were normally periodic rather than continuous: they convened every few days.⁴ The traditional consumption norms made periodicity advantageous peasants concentrating demand on certain specific days. He created simple models based on the assumption that the landscape we research is an isotropic plain that all economic and social resources in this plain are uniformly distributed. Such an assumption made market towns distribute on the landscapes and at the apexes of space-filling equilateral triangles. Each regular hexagon presents a service area and each market has a definite and recognizable area, which fits for anywhere, no matter in rural China or anywhere else in the world. G. William Skinner assumed that the standard marking areas are in

³ The two classical studies are: Walter Christaller, *Die zentralen Orte in Suddeutschland* (Jena, 1933). August Losch, *Die räumliche Ordnung der Wirtschaft* (Jena, 1944); page references are to the English translation: *The Economics of Location* (New Haven, 1954).

⁴ G. William Skinner. *Marketing and Social Structure in Rural China Part 1*. 1964.

the ideal case discrete and hexagonal in shape. Villagers are shown as dots at regular intervals. There are several basic models shows an integral number of complete rings around the town, one ring (6 villages) or two (one of 6 and one of 12) and three rings (one of 6, one of 12 and one of 18), or still more. Finally he found that the two-ring model with a total of 18 villages around one market town best fits for Chinese rural area based on lots of scholars researched before.



Source: G. William Skinner. Marketing and Social Structure in Rural China: Part I

Fig.3.3. A model of Chinese Standard marketing area as a stable spatial together with three possible models in intermediate marketing areas

The central place theory can be used in the linpan landscape to evaluate its transport network and accessibility. Poor accessibility can limit the extent of a center's market area and the central place theory may vary with the land use and population density.

3.2 Intensity without density

In our traditional thinking, urban density has a very close relationship with urban intensity and maybe it should be one of the main conditions. However, Elena Porqueddu explored how this unprecedented space-time condition enables the emergence of intensity across low density areas. Jane Jacobs (1961) firstly explored this idea that a concentration of people is one important conditions for developing a city. According to Jacobs, urban intensity emerges in the immanent, improvised interaction between subject and object in space and time.⁵ Jacobs also thought that even a small town can become a complex realm because it encompassed in a metropolitan orbit and is related to mobility, time cycles and event geographies. Jacobs' description of intensity gave us a new view to see the actual and potential relationships between scattered settlements in urban fields and detect the potential for intensity to emerge.

A kind of tool for empirical investigation was given to understand the emergence of intensity is related to the density of this area, which is called a multi-scale atlas. The approach is a combination of the micro-scale of a single building and the macro-scale of the city region. The Atlas tools helps us combine quantitative and qualitative methodologies and the existing flows, developing on a metropolitan scale, match up with local, street life under the social-spatial analysis.

⁵ Elena Porqueddu. "Intensity without Density". 2015.

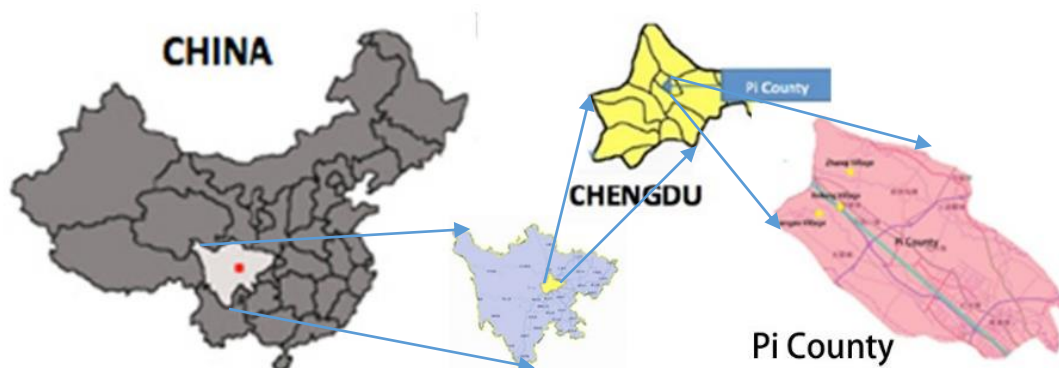
To understand this intensity & density relationship, it is useful to study somewhat comparable regions. In this article, the Lombardia Plain around Milan, Italy, is also a flat, agriculturally rich irrigated plain that has supported urban culture for centuries and is still economically vibrant and developing industrially as well as agriculturally. The author used the Atlas combines quantitative and qualitative methodologies to analysis the Lombardia Plain whether its existing development scale and coalescence is related to density. The author selected six heterogeneous 1.5 km² sites and did interviews and data-analysis there. Within the observation area the author found that the major center is Voghera and it is called the density of inhabitants and activities which attracted new distributed activities. A new name “Old-New Assemblages” shows how the potential for a highly intensity in community without high density and how it connected different network of flows and made every point to become a node on multiple scale. In this article, the author used Atlas in different scales to analysis this area about its intensity and density, and explore that it is possible to develop an assemblage just like that.

Chapter 4: Accessibility Analysis and Evaluation on the Alternatives

4.1 Identify Alternatives

Pi County lies to the northwest of Chengdu city and in Chengdu’s second circle. It is one of the most representative counties of Chuanxi linpan. The linpan distribution is more concentrated and more complete and large linpan body here. The county has a total land area

of 437.5 square kilometers with a total population of 756,047 people. There are 13 towns in this region and the population density is about 1,730 people per square kilometers. Pi County is a periurban mainly agricultural area and is popular as a birthplace of Nongjiale, a style of agricultural tourism which has spread across the country. When we visited Pi County in September in 2014, we visited four villages in Pi County, Jiangan Village, Zhanqi Village, Anlong SEMI and Anlong CURA village. Four villages have different characteristics and each of them represent one kind of village model. In recent years, with the rapidly development of country construction and urban development, the rural people in Pi County have the new living styles. Some of them continue to focus on agricultural production and some people found a new way to make sustenance. More and more rural people are seeking for Dagong to make sustenance not only agricultural production. The commuting between villages and towns has become more and more important. The migration patterns of household members and employment in Pi County influence the upgrading and modernizing of housing and infrastructure layout. The population and commuting exchange directly influence the future development of the County and other surrounding places.



Source: Modified by Jennifer Tippins's thesis.

Fig.4.1. Context map of Chengdu and Pi County

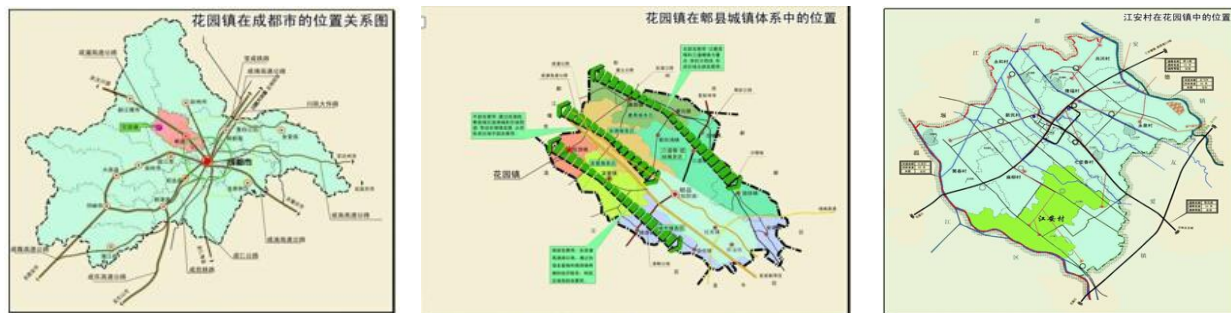
Table.4.1. Chengdu Plain Second Circle Linpan Distribution

County	Household Amount	Rural Population	Rural Area	Linpan Amount>10	Linpan area>10	Residents Population	Area per farmer	Linpan Density	Linpan Residents Gather Degree
Pi County	107818	340408	437.44	879	8404096	56169	149.62	2.01	16.50
Longquanyi District	106342	343230	571.10	755	6833707	39960	171.01	1.32	11.64
Wenjiang District	58572	182356	221.03	51	801662	4769	168.10	0.23	2.62
Shuangliu County	88132	312094	533.30	81	1003180	9033	111.06	0.15	2.89
Xindu District	136162	455411	486.32	795	9184925	78842	116.50	1.63	17.31
Qingbaijiang District	81029	280578	321.70	293	5083129	34223	148.53	0.91	0.91
Total	578055	1914077	2570.89	2854	31310699	222996	144.14	1.04	8.65

Source: Chengdu Rural Construction Committee

4.1.1 Jiangan Village

Jiangan Village (Jiangan Cun 江安村) is located in Huayuan Town (Huangyuan Zhen 花园镇) in Pi County. It is still an intact linpan landscape model preserved well. I visited Jiangan in summer 2014 with my professor, some urban planning students in University of Washington and Sichuan University students. In Pi County, many villages were already undergoing reconstruction but Jiangan has not been redevelopment and is still a traditional linpan village.



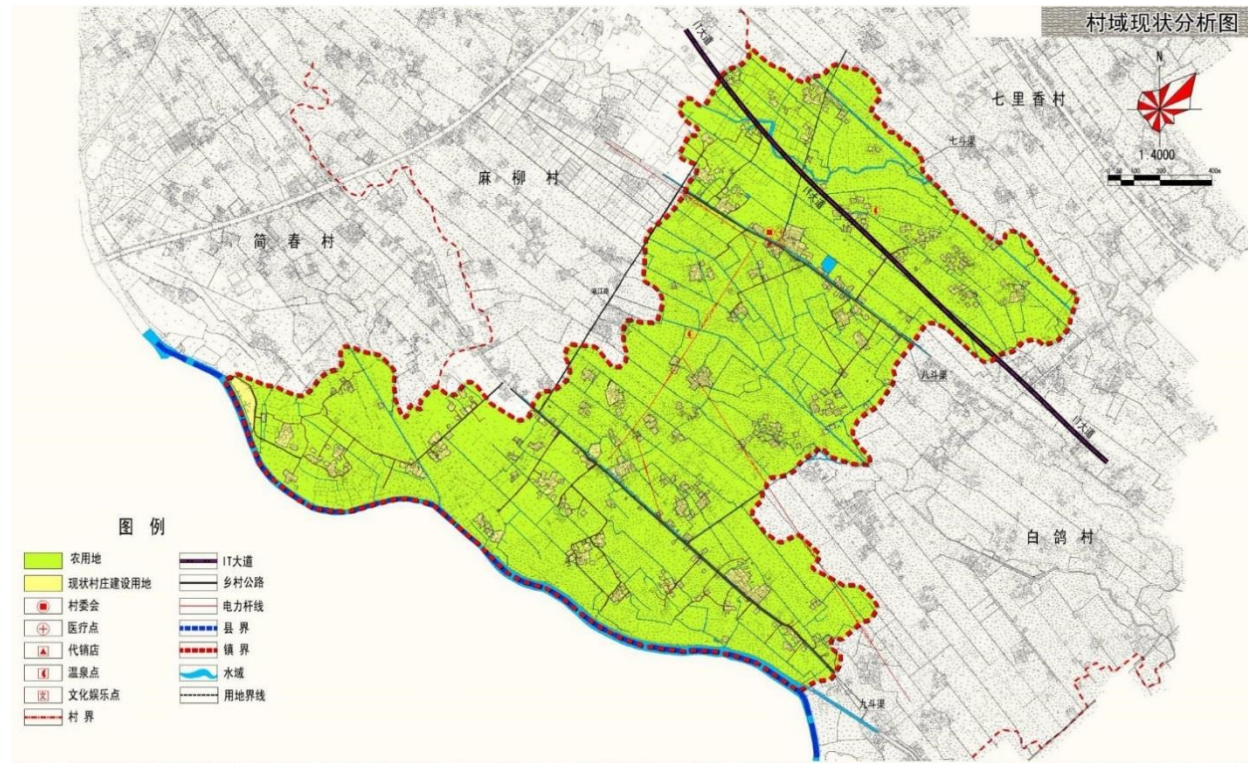
Left one showing the location of Huanyuan Town in Pi County. The middle one showing the location of Huayuan Town in the Pi County Urban and Rural System. Right one showing Jiangan Village in Huanyuan Town. Source: Huanyuan Town Planning Document.

Fig. 4.2. Maps of Field Site Locations

According to the local planning documents, Jiangan Village is currently within a total area of 3.12 square kilometers with 2697 residents in 838 households. In 2010 year, the average

income in the village was 8066 yuan. The transportation in Jiangan Village is convenient. IT Road goes from west of Dujiangyan to east of Youai Town. In the village region there are Jianbai Road, Mabai Road from west to east and Jiangbai Road and Unicom road go through the village fields from north to south. While there are also numbers of tractor roads criss-crossing. The east-west link road to the village is 4 meter's asphalt road. It is very convenient village production, outside contact and living. The north-south link road to the village is relatively narrow and it is gravel road with low road quality. The transportation is relatively poor through north to south.

During the visiting in Jiangan Village in 2014, we had a chance to talk with a town planner. He told us that the land use in Jiangan is not concentrated and the residential layout is not quite reasonable. The fields are small in scales and the land use is inefficient and wasteful. The foundation of agriculture is weak and the agricultural production developed slowly. They lacked the characteristics of large-scale monoculture agriculture. There is a large proportion occupied by traditional small family and small production. There is no industrial land use in Jiangan and the development of tertiary lagged behind and inefficient.



Source: Village Planning of Jiangan, Huanyuan Town, Pi County (2011-2020)

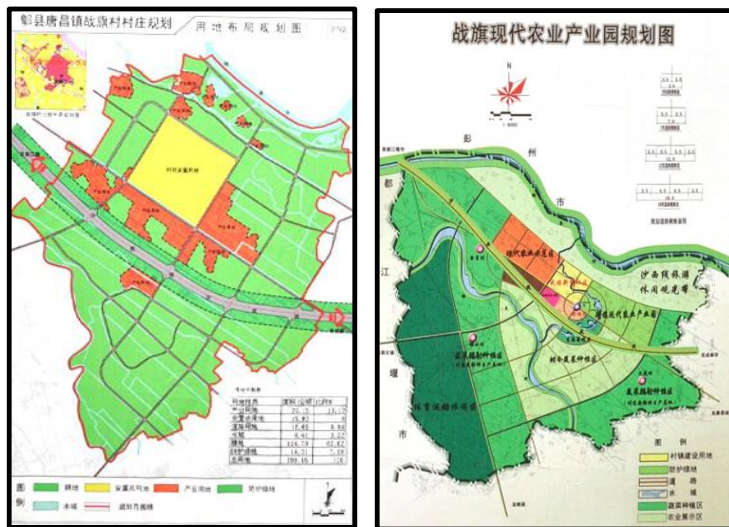
Fig.4.3. Land Use Map of Jiangan Village

4.1.2 Zhanqi Village

Zhanqi Village (Zhanqi Cun 战旗村) is located in Tangchang Town (Tangchang Zhen 唐昌镇). It is a very good model of an extreme Concentration village in China. I visited Zhanqi in last summer and did a lot survey with local residents and some officials, and also some investment representatives of Mamanongzhuang. Zhanqi has a total land area of 2.1 square kilometers and about 1700 residents. Zhanqi began reconstruction in 2008 and it adopted the “there concentration” policy prevalent at that time. Zhanqi constructed the new unified communities which consisted of 469 household. Some household would like to live in the new townhouse SEMI-detached units and others would like to move in apartment-style units. Farmers change their living styles from traditional linpan scattered to the concentrated community

neighborhood. Farmers can sell their land use rights (720 yuan per mu) and modern agriculture companies can help farmers to do the collective.

Zhanqi Village also created a new land use type in traditional linpan. They constructed a tourist area with lavender fields (and Dutch-style windmill), vacation bungalows and a luxury hotel in hopes of attracting urban tourists and earn more income. They also built an industry produce Doubanjiang which is very popular in China. A lot of farmers do not continue to do the farming and they began to do wage job to increase their income. Nongjiale, industry and other restaurants which breed because of the tourists and vacationers not only bring vitality and various culture to this village but also exchange the style of living and increase their household income.



Source: On-site Exhibit of Planning for Zhanqi Village, photographed by Daniell Abramson September 2012.

Fig. 4.4. Zhanqi Village Planning Map

Visiting Zhanqi Village gave a deep impression on the new concentration rural village model that I have never seen before. It looks a little like the American neighborhood I saw in the two years' living in Seattle. Each household have their own Bazi and garden and all of the multi-families' houses have the same dwelling style. Villagers have public community services



Source: Photo by Daniel Abramson

Fig. 4.6. Zhanqi Village Street View

4.1.3 Anlong CURA Village

Anlong CURA Village locates in Ande Town (Ande Zhen 安德镇), which locates in the west of Pi County, the central zone of Chengdu Plain. It is 32 kilometers far from Chengdu center and the transportation network is very convenient, the national road 317, Chengguan Highway, second level belt expressway and Chengqing Subway are across Ande Town from southeast to northwest. The region has an excellent location and it belongs to the “half-hour economic circle” of Chengdu.



Source: CURA 2012

Fig.4.7. Anlong Location Map

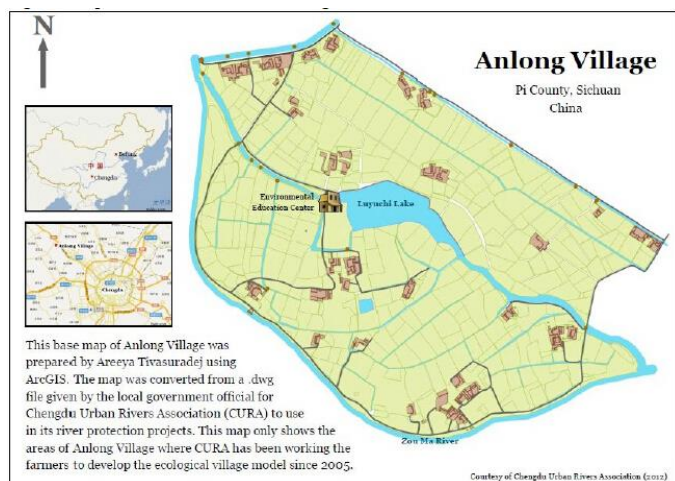


Fig. 4.8. Map of CURA Area within Anlong

Anlong Village, a small unknown village on the Chengdu Plain, but it is one of many environmentalists, volunteers, college students' "required" arriving village, and many international NGO organizations are regarded Anlong Village as a research paradigm. In 2005, an organization started this rural ecological pilot project by the NGO, including pollution reduction, promotion organic agriculture and rural environmental education. They worked with 20 households who expressed interest in implementing organic farming methods. Today, after seven years, the food safety issues are emerging and exploring the village of Anlong becomes increasingly valuable.

4.1.4 Anlong SEMI Village:

Anlong SEMI Village locates in the west of Pi County and is beside Zouma River. Ande Town center is located north of Anlong Village. It has a favorable condition of natural environment and linpan landscape is scattered distribution. It is a typically kind of Chuanxi rural village which has a total area of 3.0 square kilometers, including 18 groups with 1125 households of 3399 villagers.

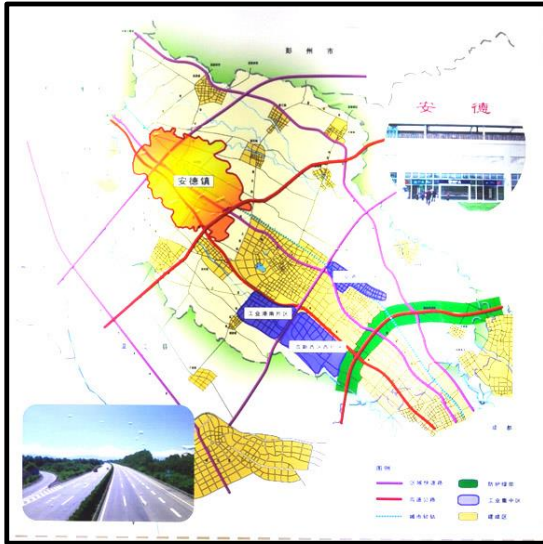


Fig.4.9 Location Map of Anlong SEMI



Fig.4.10 SEMI-Concentration Development Plans

Table.4.1. Population and Area Data in SEMI Village

Group #	Area (mu)	Area (sq meters)	Number of Households	Total Population
1	21.8	10062.06	55	209
2	3.3	1979.26	11	41
3	7.8	3765.36	20	79
4	29.14	14483.42	88	303
5	53.27	26220.97	160	534
6	37.66	16754.74	103	359
7	42.89	19852.69	128	409
8	36.4	17571.01	106	358
9	14.37	6890.68	44	151
10	24.56	11116.37	71	239

Source: Edited from original photo taken by Daniel Abramson in Anlong Village Museum in 2013.

Anlong is a second round of redevelopment and it is undergoing and almost completing. Anlong Village is planning to be a model village of a SEMI-concentrated redevelopment approach deciding by the local government and planning policy. This time local planners want to meet not only the rapid development of rural area to increase economics and construction of new villages, but also need to protect the environment and ecological planning according sustainability resource and planning policy. Adhere to the basic principle "should gather it together, should lose the loose", maximizing the protection and use of "farmland, water, forest, road" and other natural resources of original state of the linpan landscape, we should in

accordance with the principle of miniaturization, groups, ecological to do planning and construction. Arable land scatter naturally surrounding the thick and thin center courtyard, which provides a full protection of the beautiful linpan landscape and environment, displaying the concept of "everything is in there. Some is hidden and some is displayable, and the connection is transparent coherent and having winding streets ", which is the unique charm of linpan landscape.



Source: Original photo taken by Daniel Abramson

Fig.4.11. SEMI-concentrated settlements model



This model is located Anlong village Museum. From the picture we can see the CURA area. Source: Original photo taken by Daniel Abramson

Fig.4.12. Model of Anlong after Redevelopment

4.2 Identify the evaluation factors

This section I will describe the evaluation factors I used for the accessibility and commuting behavior study in linpan Landscape. From the former chapters we learn the basic background of Chengdu Plain and the alternatives I choose in the study. Before the indicators are identified, a brief description of accessibility and density should be defined first.

Accessibility refers to the amount of services and jobs people can access within a certain travel time. When people want to reach some activities, the time and money they must devote to transportation, especially in linpan landscape where people live in scattered settlements. Lots of factors can affect accessibility in different ways. The first one is the transport network connectivity. The transportation condition of rural area in China has a rapidly development but there is still lots of inconveniences for the rural people. There is a limitation of bus routes, travel time, numbers and accessibility to bus stations. The density of paths and roadway connections also influence people's commuting. The second one is that rural people has a bad motor vehicle travel conditions. Only a few of villagers have their private motor vehicle because they cannot afford it. Other modes such as walking, cycling, railway, they all have different service speeds, convenience, and difficulties for rural villagers.

The four different villages we research have four different kinds of redevelopment model. Zhanqi is an extremely concentrated villages and the public transit is relatively convenient for all villagers. Jiangan is a traditional scattered linpan system and the villagers are not concentrated in a certain small communities. They have a difficulty access to the nearest bus station. Access is the goal of most transit activity. In the area of Pi county, for rural people,

walking, cycling and public transit are the most common and useful. Some of local government and planners have a limit perspective on transit planning only focus on economic development. But we should also consider the commuting features of local people and the resilience of linpan landscape, and how heavy transportation accessibility the linpan landscape can support.

Table.4.2. Summary of Factors Related to Accessibility

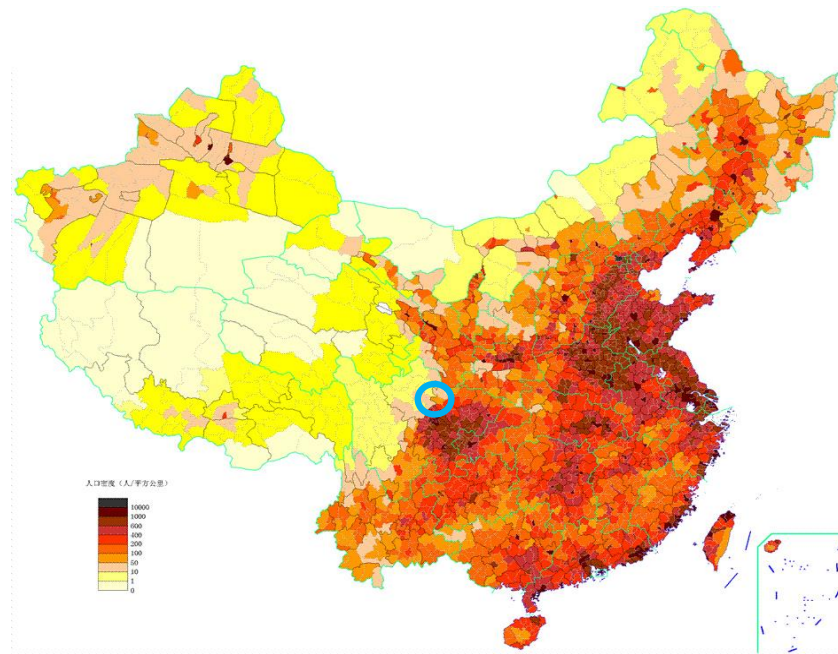
Name	Description
Transportation Network Connectivity	Density of roads and railway, and directness between destinations. Current transportation network and the future planning.
Commuting Demand and Activity	Commuting features of four villages, different industrial structure of villages has different commuting features on commuting time, distance, frequency.
Mobility	Travel speed and distance
Transportation Options	Different transport options have different speed, convenience, safety comfort. Options are also determined by living conditions, economic situation and weather condition.
Land use and spatial structure	Land use density and mix, different spatial development model, settlements distribution.

From the table we can find that there are five factors which influence the accessibility in linpan landscape. In the alternatives identify I have briefly described the land use situation and spatial structure of each villages. Transportation network and the commuting demand are the most important factors which influence the accessibility of this area. Because of the commuting demand, we need to explore the accessibility to outside world and according to the industrial structure of some villages, we need to explore more efficient way to attract tourism and visiting as well as protecting the traditional linpan landscape of some other villages.

4.3 Population Density

Pi County is located in a corridor of Chengdu, is also the center of the western town of Chengdu, jurisdiction 14 towns, with a total population of 50 million people. This area has very good agriculture development foundation. From the diagram of China population density we

can explore that Pi County is in the relatively high population density district of China and the population density is about 1730 people per square kilometer. ⁶ The population density of Chengdu Metro is about 1143 and Pi County is much higher than that. It locates in main agriculture production area of China and has Du Jiang Yan irrigation system.



Source: baike.baidu.com

Fig.4.13 Population Density in China

We did interviews in four different villages in Pi County, Jiangan Village, Zhanqi Village, Anlong CURA village and Anlong SEMI village. The basic database I got from census 2010 explain the population density situation in four different levels of communities. Chengdu Metropolis includes 10 districts, six county and four cities. It has a total area of 12390 square kilometers and 14.17 million people. The population density of the whole metropolis is about 1143 people

⁶“PiXian”, BaiduBaikē, May 18, 2015, URL: http://baike.baidu.com/link?url=vu5uwQvSY7BXalzOOKgPEHwbtJcSLyqWPLGDsMkqmNM2-mVFxHcB6RuGe2QhH5Hiu82riJeCxowMyBl2ND74Q_, archived at: <http://www.webcitation.org/6ZZBBt1yV> on June 26, 2015.

per square kilometer. The central area of Chengdu city has a total population of 4971500 and the total area is about 598 square kilometers. The population density is about 8313 and it is one of the largest cities in China. The population density of Pi County is 1728 and the three towns Huayuan, Tangchang and Ande is about 910, 1244 and 1282 people per square kilometer.

Table.4.3. Population Density in Different Areas

Data Locations	Population (people)	Area (km ²)	Population Density
Chengdu Metro	14170000	12390	1143
Chengdu Central Area	4971500	598	8313
Pi County	756047	437.5	1728
Huayuan Town	20936	23	910
Tangchang Town	36700	29.5	1244
Ande Town	50000	39	1282

Source: Census 2010

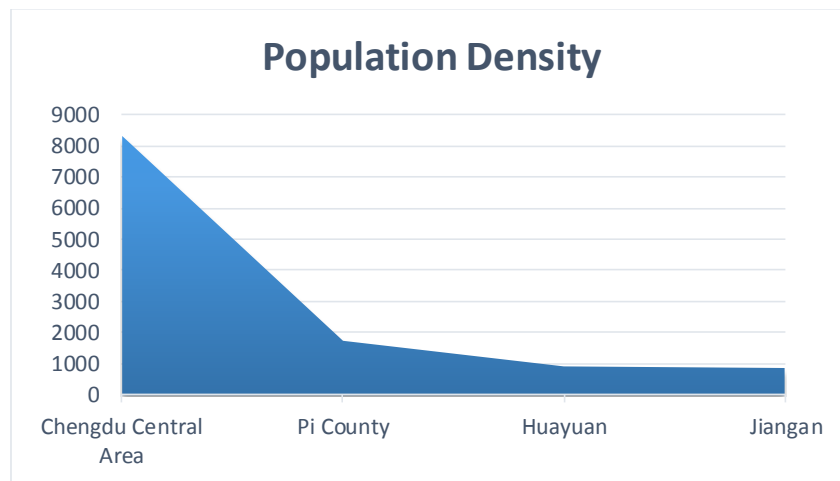


Fig. 4.14 Population Density in different level of areas

Jiangan Village locates in Huayuan Town, Pi County. It has a total area of 3.12 square kilometers and the population is about 2697. Anlong village is a little smaller than Jiangan and it

is about 3 square kilometers but the population is 3399 by the end of 2000.⁷ The population density is about 1133. Zhanqi Village’s population density is similar to Jiangan village which is 809 people per square kilometer. But Zhanqi Village is smaller than the other two villages as well as its population.

Table.4.4 Population Density in Different Villages

Location	Data	Population	Area (km²)	Population Density
Jiangan Village		2697	3.12	864
Anlong Village		3399	3	1133
Zhanqi Village		1700	2.1	809

Source: Census 2010

4.4 Transportation Network

4.3.1 Transportation Network in Pi County

Rural road network is an important infrastructure of social and economic development in rural areas, and its main function is to explore the rural market, strengthen urban and rural commuting and communication, promote local farmers to improve the quality of life, promote the implementation of the new rural construction. Pi County’s rural road construction is mainly to improve network, strengthen outreach, strengthen capacity and improve service and achieve interoperability of rural roads. In the construction of rural roads, we should try to make the town and village roads to combine with nature and form harmonious beauty at the same time. Through the central place theory, there are about four sizes of communities, including villages, market towns, counties and cities.

⁷ Pi County 2010 Census.

In "Pixian National Economic and Social Development Twelfth Five-Year Plan "(2011-2015), our goal is to build efficient and fast external transport network. As well as construct structured, and rational structure of the county transportation system. Public transit should be the orientation and it is a convenient and smooth county traffic network.

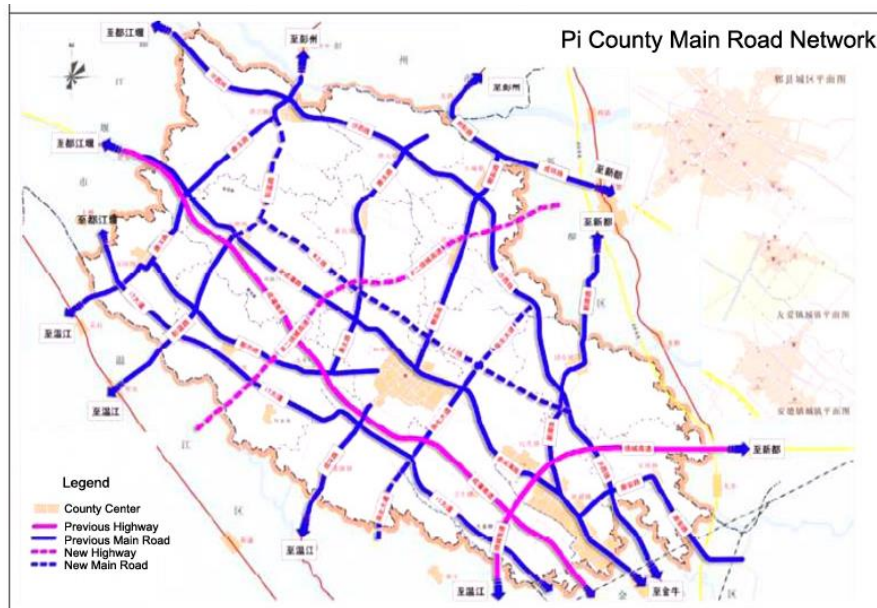


Fig.4.15 Pi County Main Road Network Planning

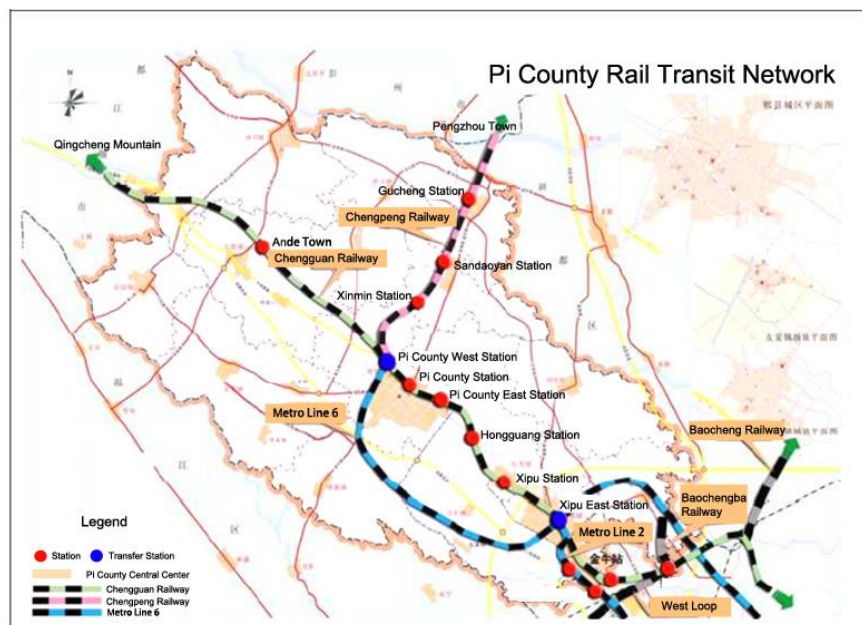


Fig.4.16. Pi County Rail Transit Network Planning

From the figure 4.15 and 4.16, we can see that on the road transportation network, Pi County has formed a kind of "5 vertical 4 horizontal" three-dimensional traffic system. Shaxi line, old Chengguan Road, Western Avenue, Chengguan Highway, North South Avenue, the beltway, the third ring road and other main roads have connected Pi County and Chengdu main city as a whole. Pi County has been completely integrated into Chengdu "a half-hour economic circle". On the railway transportation network, Chengguan fast train has been opened from Chengdu North Railway Station leading to one of the tourist destination, Qingcheng Mountain. In the middle of Xipu station, redguang station, and Pi station can greatly facilitate commuting throughout the whole area residents. Metro Line 2 West Extension line will be leading in Xipu station. Therefore double railways will be here to form a "zero exchange", which will be more convenient for travelers.

From figure 4.24, the Chengguan Highway goes across from Chengdu city center to Dujiangyan, which provide a very convenient arterial traffic for Pi county center and surrounding villages and achieves that it only takes 15 minutes from Pi County to Dujiangyan and Chengdu city, vastly cut the commuting time between Pi County and Chengdu city center, as well as Dujiangyan tourism area. It is benefit for surrounding villagers' commuting demands. We can directly explore the relationship between highway and our researched villages from figure 4.24.

Anlong village is located nearby Chengguan Highway and the villagers here have a relatively more convenient commuting transportation than other three villages. Zhanqi Village have some distance from highway but town roads are directly connect highway to village center.

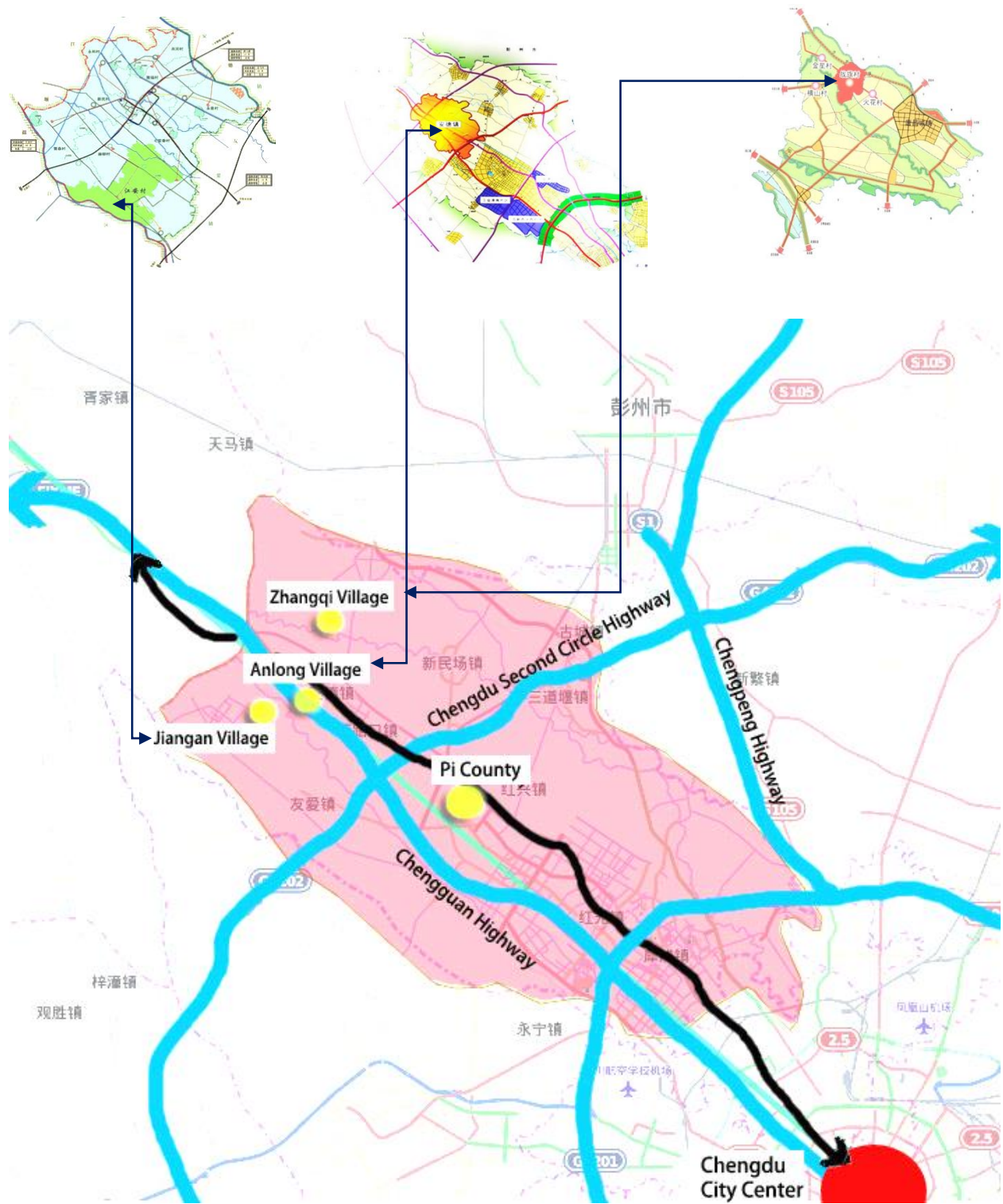


Fig. 4.17. Transportation Network in Pi County

Considering the commuting time, figure 4.25 is a Chengdu transportation same time circles. From the figure we can found that Pi County is located in Highway Half Hour Circle and Metro Half Hour Circle. But accounting the public transit time, Pi County locates in the Public Transit One Hour Circle. Most local Pi County villagers cannot afford private vehicle. The commuting time for them to go to the Chengdu City center is mainly by the public transit which may cost them more than one hour. However, for tourist who want to go to Zhanqi to enjoy the new settlements of village or go to Mama Nongzhuang for a trip. It only takes them half an hour get them by private vehicle or railway. The rapidly development of transit network can bring lots of tourism and opportunities for Pi County which has its traditional linpan landscape and unique village features.

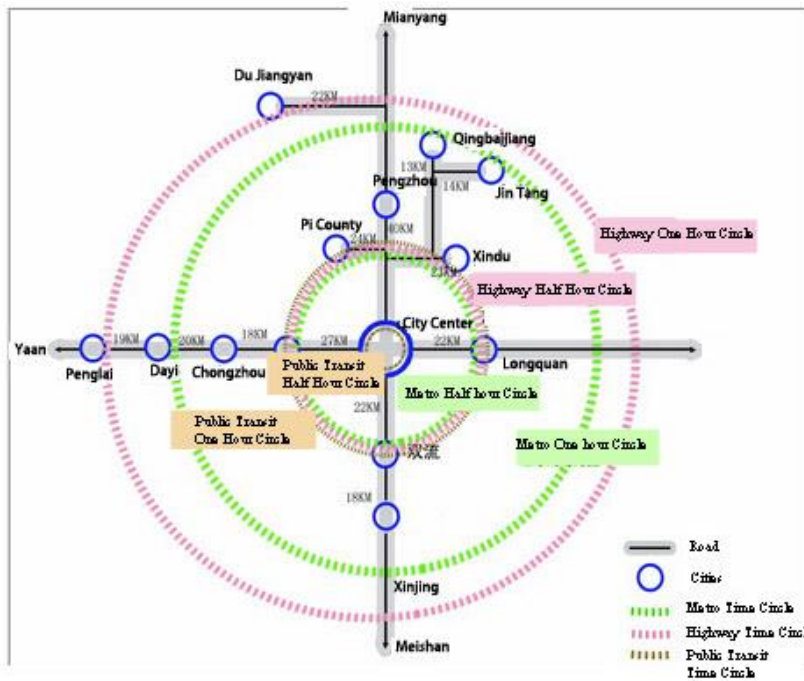


Fig. 4.18. Chengdu Area Transportation Time Circle

4.3.2 Transportation Options and Mobility

Transportation options refers to the transport modes which people choose in a particular situation. Different transportation options provide different demands for different people in diversity situation. For example, in their home village and wage job location around, villagers prefer to choose walking and cycling because they are convenient and save money. For a longer trip, if they would like to go to Pi county center or Chengdu city or other major urban corridors, they prefer to public transit. If they would like to go some dispersed destinations and automobiles are most appropriate but precondition is that they have a private car.

Mobility refers to physical movement which we concerns about the speed and the distance. We can easily get the conclusion that if the mobility increases, the accessibility will increase.

Different transportation options can provide different speeds and different scales of accessibility. In the four different model of villages, the same transportation options have different scales of accessibility.













In my research, I use Baidu Map to measure the commuting time for each village's people to go to different level of communities in their activity area. Baidu Map is a Chinese version of Google Map and it can be used to calculate the speeding time between two locations by different travel options. For the public transit, I choose all of the beginning time is about 11 in the morning in order to have a regular bus schedule. From the data we get below we can evaluate the difference influence of transportation options and mobility. The surveys we made did not gather data on travel choice of villagers. However, from anecdotal evidence in interviews I conducted in the Zhanqi and Anlong CURA sites, I do some sense of villagers' preference for different modes of travel to different destinations.

Zhanqi village is a relatively extremely concentrated village, which villagers live in a communities and very close to each other. Most of villagers take 5-15 minutes' walk to the village center to do some public activities. And the distance between village and Tangchang Town is about 4.2 kilometers and it takes 25 minutes by bike and 17 minutes by bus. From the interviews, villagers prefer to by bike because they think it is more convenient and save money. It takes a long time waiting for bus to come.

Table. 4.5. Zhanqi Village Travel Options

	Walk	Bike	Bus	Car
Village Center	15mins	6mins	NA	2mins
Tangchang Town (4.2km)	56mins	25mins	17mins	8mins
Pi County (22.6km)	5hours	2.26hours	2hours 10mins	36mins
Chengdu City (44.5km)	9 hours 54mins	4hours 28mins	3hours 20mins	1hour 7mins

Table. 4.6. Zhanqi Village Travel Map by Different Travel Options

	Walk	Bike	Bus	Car
Tangchang Town				
Pi County				
Chengdu City				

Source: Baidu Map

From the data analysis and survey we find that the walk route from village to one destination is similar to the bus route because in this area, there is no specific bike route from

people who go somewhere by bike. The walk route can be used for bike. The villagers live around village center has a relatively small distance and they can go to the village center in different routes so I did not use Baidu Map to show that. From the route map we can see that the travel route for bus and car between Zhanqi Village and Tangchang Town is very similar because the distance is relatively short and there is no other choice but when the distance becomes longer, the bus route and car route appear something different which gives villagers and travelers more choice and convenience, which can increase the commuting efficient.

Jiangan Village is closer to Pi County than Zhanqi Village but it is a little from to Chengdu City. It takes about one hour and three minutes to Chengdu city center by car and three hours and thirty minutes by bus. It is not a long distance but commuting by bus costs lots of time and lack of efficient because it coats lots of time for waiting a bus to come and it goes lots of tortuous path. Compare Jiangan villagers’ commuting time with Zhanqi Villagers we could find that the efficient and convenience of commuting by bus in Zhanqi is much better than in Jiangan. It only takes about 17 minutes for 4.2 kilometers from Zhanqi Village to Tangchang Town. But in Jiangan, the distance from village to Huayuan Town is shorter than Zhanqi but it need to take about 50 minutes to get to Huayuan Town, which means that the concentrated village is more convenient for people to get to bus station and easy to go out. The traditional linpan structure is difficult to make full advantage of public services.

Table. 4.7. Jiangan Village Travel Options

	Walk	Bike	Bus	Car
Village Center	18mins	8mins	NA	3mins
Huayuan Town (3.6km)	46mins	21mins	50mins	8mins
Pi County (18.6km)	4hours	1 hour 48mins	2hours 30mins	31mins
Chengdu City (47.1km)	8 hours 53mins	4hours 42mins	3hours 30mins	1hour 3mins

Table 4.8. Jiangan Village Travel Map by Different Travel Options

	Walk	Bike	Bus	Car
Huayuan Town				
Pi County				
Chengdu City				

Source: Baidu Map

Table 4.9. Anlong Village Travel Options

	Walk	Bike	Bus	Car
Village Center	15mins	5mins	NA	5mins
Ande Town (2.7km)	31mins	16mins	30mins	6mins
Pi County (14.1km)	3hours 8mins	1 hour 24mins	1hours 50mins	26mins
Chengdu City (38.9km)	8 hours 12mins	3hours 54mins	2hours 40mins	54mins

Table 4.10. Anlong Village Travel Map by Different Travel Options

	Walk	Bike	Bus	Car
Ande Town				
Pi County				
Chengdu City				

Source: Baidu Map

From the data analysis in Anlong village, we can find that the commuting time between Anlong village and Ande Town by bus is about 30 minutes for 2.7 kilometers, which is the same efficient and convenience in Zhanqi village. Anlong village has some part in traditional as well as some in concentrated.

4.3.3 Conclusion

From the transportation network and the transportation options analysis I can explore that there is relatively little variability among the case villages in accessibility. Therefore differences in development patterns do not seem to be attributable to accessibility. From the analysis from villages in different development models I find that transportation does not determine the development model of villages, concentration or traditional. Whether a village should be planned to concentrated develop or it should remain its original pattern has little connection with transportation situation in Chengdu Plain because in this area, the transportation network has great developed and there is little or small diversity on transportation accessibility and experience between different villages. On the other side, concentration does not make transit noticeably easier compared with traditional scattered villages. Whether a village should be planned to develop a concentration village or remain traditional scattered village have not much connection with transportation in linpan landscape in Chengdu Plain.

4.4 Commuting Demand and Activity

4.4.1 Data Sources

In September 2014, I went to Pi County with my Professor Daniel Abramson, urban planning students from University of Washington and some Sichuan University students. We did the first time survey at that time in Pi County. And at the second time I requested Sichuan University students do the questionnaire. We divided people into four groups according to the different types of villages where they live.

The main questions from questionnaire include basic residential information, basic household situation, and employment, commuting situation and employment aspirations. I select samples in Jiangan Village, Zhanqi Village, Anlong CURA Village and Along SEMI Village, which include different kinds of village types. We send questionnaire as a total of 140 households, and about 510 residents participate in the survey. A total of effective questionnaire is 485. Among them, there are 173 from Jiangan Village, 103 from Anlong CURA, 112 from Anlong SEMI and 97 from Zhanqi Village.

Since "Athens Charter", the relationship between housing, employments, transportation has become a core concern of the world issues in urban planning. Since the reform and opening up, China's urbanization process has accelerated. Some of the larger population cities and large metropolitan cities plan and construct numbers of large communities in the original urban periphery in order to evacuate the population pressure of center city. In Shanghai, for example, as early as 2003 and 2004, Shanghai planned two piece of land area about 25k m² each to build affordable housing in large residential communities.

With the rapidly development of rural and urban areas these years, more and more farmers would like to do wage job rather than only agricultural production. The Statistics survey data from National Bureau shows that the number of a new generation of migrant workers who birth after 1980 reached 90 million, accounting for the total proportion of migrant workers more than 60%, and becoming the subject of migrant workers. Compared with the first generation of migrant workers, wages are not the only objective for them to go out of work. The new generation of migrant workers pay more attention to self-development and to be respected. Stay in villages of agricultural production cannot satisfy their demands. When we did the field interviews in Pi County last summer, we found that most of young villagers would like to go out for a wage job, the remaining people are almost children and old people. A theory named “push-pull” can explain the motives of migrant workers. The income gap between urban residents and rural farmers provides a push-pull effect. Urban high income produces attraction and low income in rural area produces thrust. Since the income of farmers primarily depends on the rural land, including the amount of land areas and productions, which have become an important factor of whether migrant workers would like to go out for work.

From our social survey in 2014 summer, “Dagong” has become a common choice for most of the villagers, which stimulates more and more frequency and long-distance of commuting and increase the communication between villages and outside. From the figure 4.14, we can find that more than 70% responders of each villages go to “Dagong” to get more money. Zhanqi has about more than 95% of villagers go to “Dagong” in and out of villages. With the redevelopment of Pi County, more and more convenient transportation provides local villagers an easier way to go out and come back. Because of the hukou policy and other limitation, most

of them cannot directly move to cities. Whether the commuting is convenient has been more and more important to local villagers.

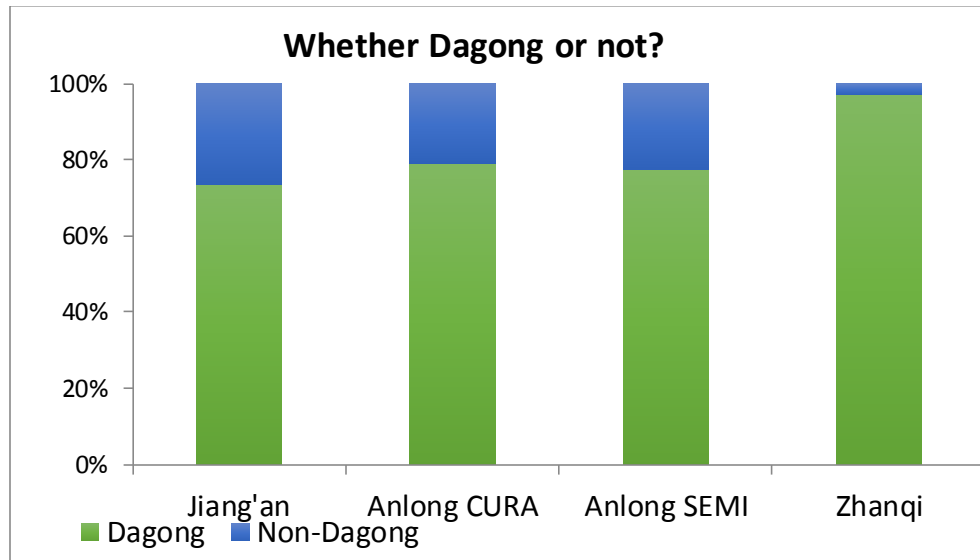


Fig.4.19. the proportion of Dagong in Responders

Spatial distribution of the place of employment is the basic components of the features of employment location. Pi County's residents' employment location is mainly concentrated in the area of Pi County and surrounding areas. Outside Pi County, job location is mainly in downtown Chengdu, only a small number of people works in other cities in Sichuan and other provinces.

4.4.2 Commuting Distance

Commuting distance is the most fundamental elements of the three elements on commuter, which plays a decisive role on commuting time and selection of commuting mode. Commuting distance is also one of the core indicators to measure the commuting behavior.

The data I got from four villages is that I divided the location of employment into seven different levels according to the distance from their home village. And then made the

questionnaire to let people choose from zero to six about how far they go to do wage jobs.

Here is the data I got.



Fig.4.20. the Amount of Dagong in different locations

Compare the employment location of different villages, we find that the near town areas are the most locations where people choose to select. The distance from surrounding towns to their village is fit for their current transportation style and life rhythm. From the figure below we find that in Anlong SEMI village, there are about 30% of responders do their wage job in home location and about 20% do their wage job in other town in the Pi County. But in Anlong

CURA there are only 18% of responders choose to work in their home village which means that there are not many work chance here. In Jiangan Village, about 25% of responders do wage jobs in their home village. But there are about 15% of people would like to choose other counties to work in Chengdu which is much more than other villages. And there is less people than other villages would like to do wage jobs in other villages in their own town, which means that Huanyuan Town has not supply other opportunities for their villagers to work so that people who want to make more money have to go farther to do wage jobs.



Fig.4.21. Distribution of local villages with wage jobs by location of job

Zhanqi Villagers also have polarization of job locations. 30% of responders choose their home village as their work place because of the industrial and commercial development. Zhanqi village has a tourist area with lavender fields (and Dutch style windmill), vacation bungalows and a luxury hotel in hopes of attracting urban tourists and vacationers. They need some employees to work here. It also has a food industry that made a local specialty chili bean paste

called Doubanjiang which is very popular in China. There is also a biotechnology company beside Zhanqi Village which provides some employments. There is a little more people would like to go farther for wage job than other villages because farmers sold their land use rights and more idle labor force outputs outside Pi County and even outside Sichuan Province.

Most of Jiangan and Zhanqi villagers choose their own villages as their primary job locations and other nearby towns. They do not want to go farther out of their county. The proportion of villagers who go to “Dagong” out of Pi County and other cities is very small. They had an intense willing to make more money but most of them do not want to leave so far from their villages. For Anlong CURA villagers, Dagong locally is their secondary choice. A large number of villagers would like to go other towns in their county and other counties. There is not enough work opportunity provided surrounding their own villages. For Anlong SEMI villagers, “Dogong” in other towns and other counties took the same proportion as in their own villages.

4.4.3 Commuting Frequency

During our social survey, we invest how many times in every month villagers commute to four different level of distance. From the figure 4.17 we can see that the most frequency commuting destination of four villagers is near town which is a very comfortable distance and the near towns are their higher order of central place which is called market town in rural area in China. For villagers, the town nearby can provide their basic living goods and productions which should be the most economic and convenient. It is obviously that the nearby towns are the most frequency locations to commute. There is not much diversity between commuting times to near county and near Chengdu expect Anlong SEMI villagers. They have a relatively

highest frequency commuting near town and a relatively lowest frequency commuting near Chengdu.

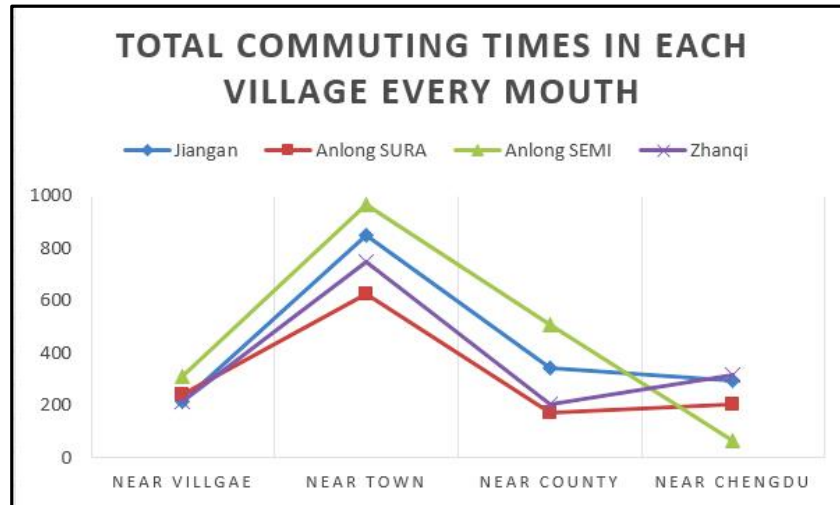


Fig. 4.22. Commuting times in different level of communities

These figures below represent the frequency for different wage job locations visit different locations. In the axis of abscissa, the number from zero to six represents wage job location is in home village, other villages in home town, other towns in home county, other county in Chengdu, other places in Sichuan province and other province. From the data analysis we can explore that Jiangan villagers who work in their own villages is actively commuting the surrounding villages and towns but they rarely visit surrounding counties and Chengdu because the market town and other nearby villages can satisfy their living and social activities. The most frequency people are who work in near towns, near county and other places in Chengdu. These villagers work in the middle-order central places and they would like to commute to lower communities because they came from there and they also commute very frequency to the same size of communities around them.

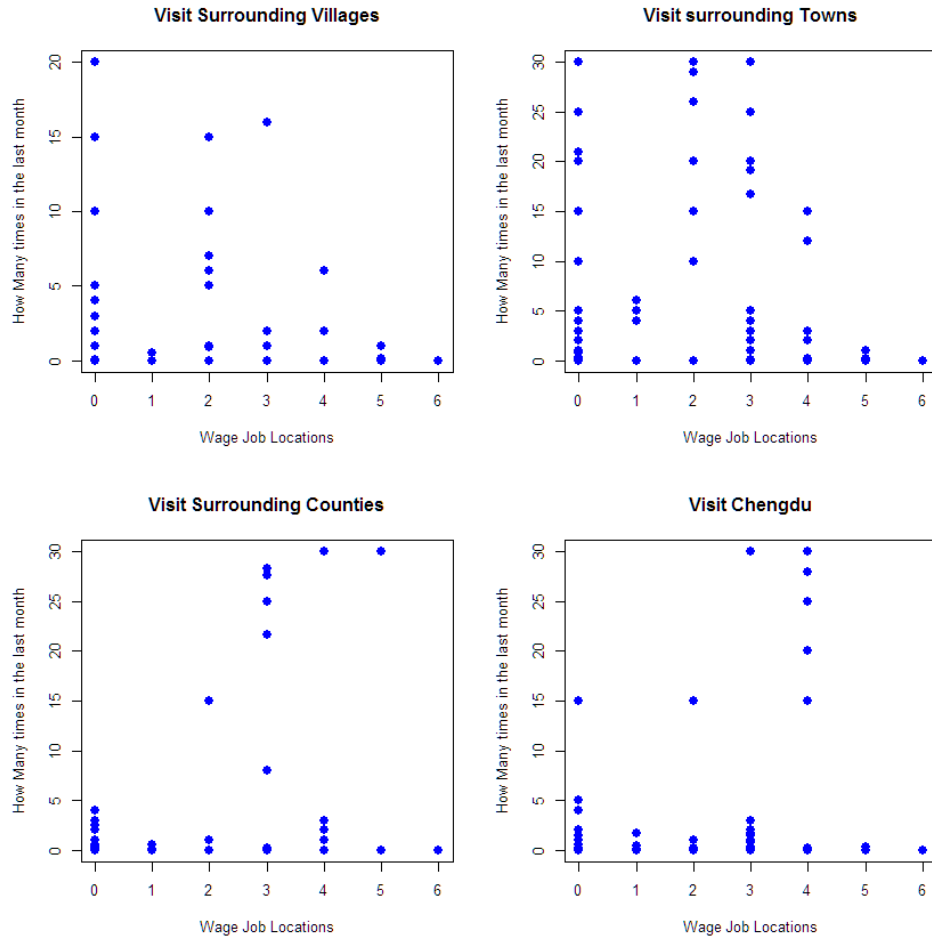


Fig.4.23. the Frequency of Jiangan Villagers on commuting

Anlong CURA villagers generally would like to visit their surrounding towns no matter where their job location are. It means that the economic and activities level of the surrounding towns can support their daily life. Anlong CURA villagers rarely Chengdu or farther areas form the data analysis which means that most of them have no demands or needs to go out of their counties or the demands is very slow.

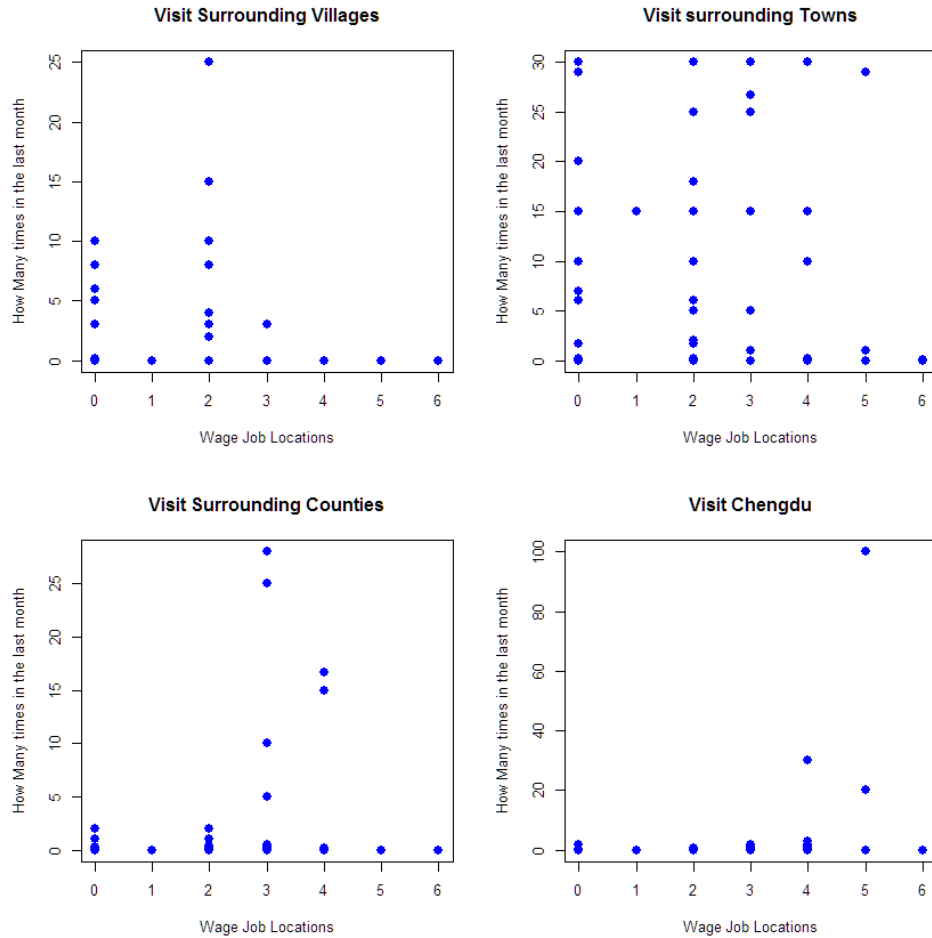


Fig.4.24 The Frequency of Anlong CURA villagers on commuting

Anlong SEMI villagers working in their town visit surrounding villages more frequently than CURA villagers. SEMI constructed a SEMI-concentrated redevelopment model, but CURA villages maintain an original linpan landscape. They rarely visit surrounding towns, no matter where they work. Towns have no attraction for them. People who get wage jobs in other towns and other counties would like to commute to the higher size of communities rather than their most familiar towns. They also would like to commute to Chengdu, the highest level of central place than other villagers.

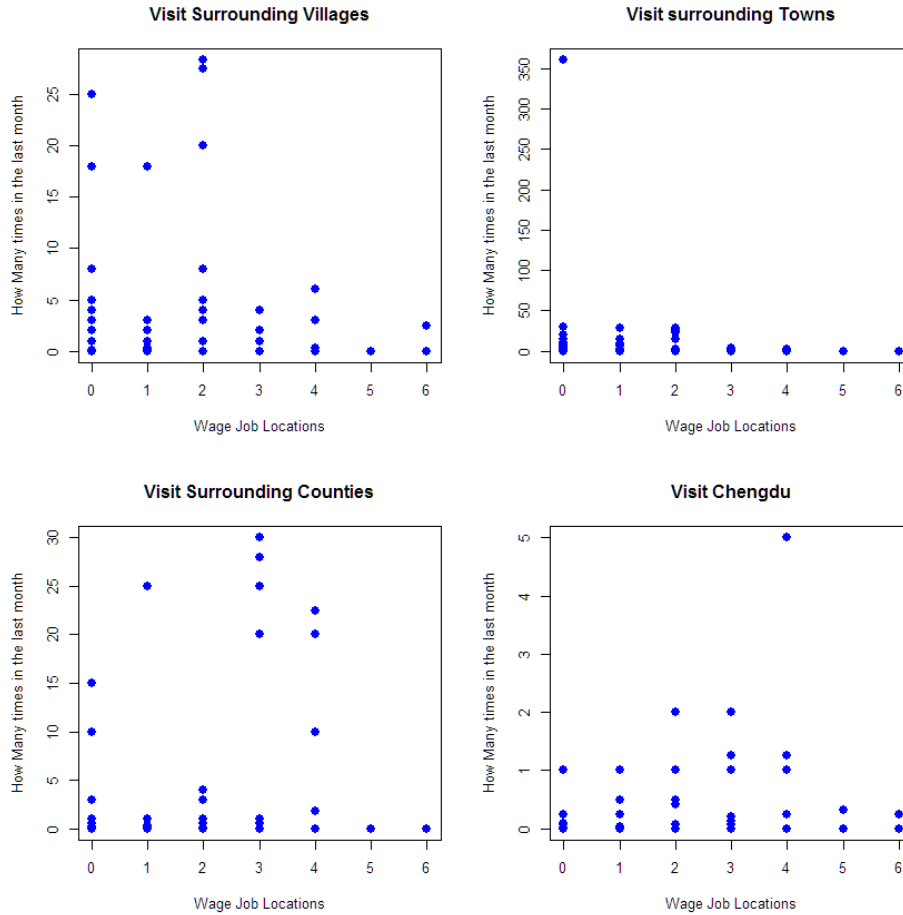


Fig.4.25. the Frequency of Anlong SEMI villagers on commuting

Zhanqi Village is an extreme concentration model for redevelopment rural area in linpan landscape. Most of Zhanqi villagers get wage job in their home villages. The commuting times from home village to surrounding villages, towns, counties and Chengdu center city are more than other villages. The vigor of Zhanqi is relatively higher than other three villages and the connection and communication between Zhanqi village and other sizes of communities are more frequency.

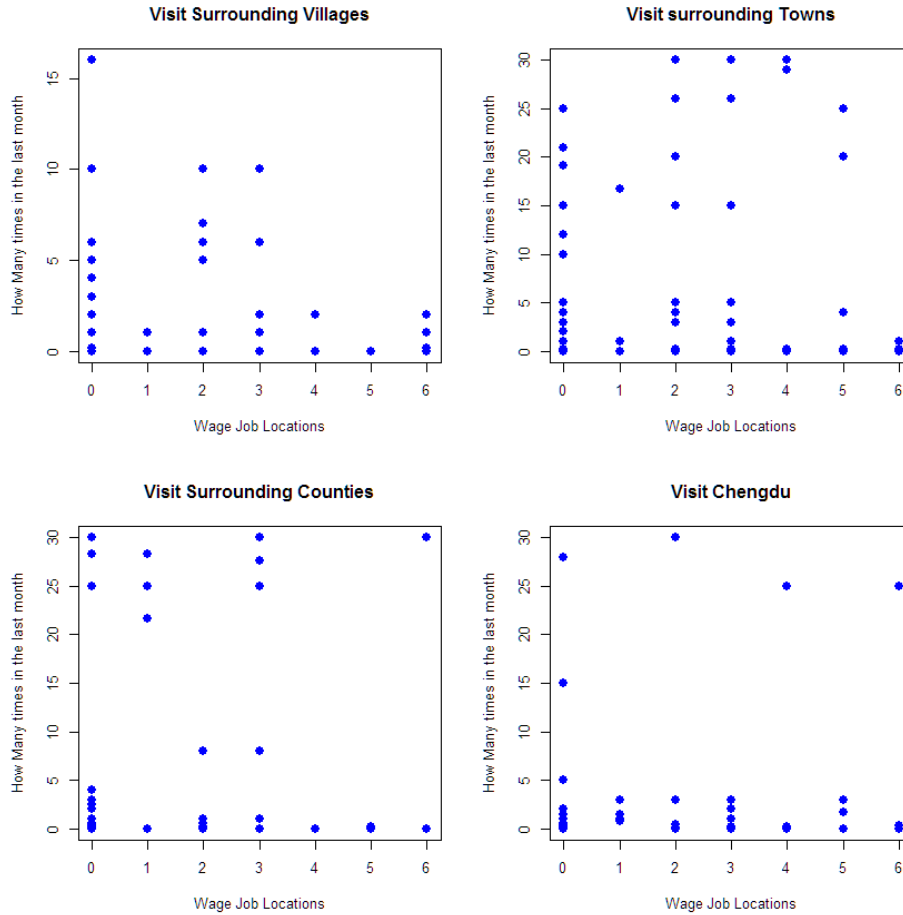


Fig.4.26. the Frequency of Zhanqi villagers on commuting

4.4.4 Conclusion

From the data we interviewed in summer 2014 and March 2014 and the social data analysis we did, we explored that four different model of villages have their unique commuting features. There isn't directly relationship between the concentration level and the intensity level. But the land use situation and employment of each villages influence the commuting characteristics. Zhanqi village and Jiangan village are a relatively evenly distribution of commuting distance and frequency to different level of central place. Anlong SEMI villagers has less commuting with its surrounding towns no matter where they work because they do not

have much attraction for SEMI villagers. But the rate for SEMI villagers visit their near town is the highest of the four villages. From these data analysis and evaluation we found that Zhanqi village has a better accessibility than other villages but it deviated far from traditional landscape. There are still other factors such as land use structure, redevelopment model, and the economic development of higher level size of communities co-influence the commuting features of villagers.

Chapter 5: Reflections

5.1 Reflections on Methodology

The social survey and field test we did in September 2014 gave me a very intensive impression of traditional linpan landscape and the characteristics of four different kinds of villages in Pi County. During the field trip in two weeks we talked with local rural planners, residents and tourist which let me learn more about their history and culture of the landscape. In the two weeks, we observed the environment, settlements, commuting situations and land use directly by our own eyes not only the basic description and images on literature and pictures. The actual conditions are changing without prediction so we need to learn how to deal with any difficulty situation and the data would be much realer. Our research is on the foundation of Jennifer Laura Tippins who went to linpan in 2013 and finished a thesis “Planning for Resilience: A Proposed Landscape Evaluation for Redevelopment Planning in the linpan

Landscape” in 2014. This article gave me lots of help to let me understand the basic situation and what research we have done and have not done on linpan landscape. She compared these villages’ resilience to explore which kind of development model can best support resilience and found that the eco-village model in Anlong best meets traditional linpan landscape and Zhanqi village deviated the most from traditional landscape structure.⁸ I continue her research in linpan landscape but in a new view to explore the accessibility and commuting features in four different kinds of development models to find the relationship between village models and its accessibility.

The weakness of the methodology is that some transportation data and commuting indicators are difficult to get and we have not enough time to achieve a relatively ground data. I asked two students in Sichuan University help me to do the second social survey and tried to get some useful data about accessibility features. Some of the planning data of small villages are not applied and the prediction of the situations is hard. We did not have GIS data in China on this area so that some analysis are based on qualitative and no accurate data can be used in small area.

5.2 Reflections on Accessibility of linpan landscape

This thesis shows the accessibility of linpan landscape in Sichuan China urban the rapidly urbanizing society and environment. Chinese governments are glad to see the economic development no matter in big city or rural areas. But as a planner in the future, we should

⁸ Jennifer Tippins. “Planning for Resilience: A Proposed Landscape Evaluation for Redevelopment Planning In the Linpan Landscape.” 2014. Master Degree Thesis.

consider the resilience of linpan landscape and the carrying capacity of rural area without so much support in economic and infrastructure service like cities. More and more people go out for “Dagong” and leave a hollow villages behind may hinder the development of rural areas and makes a lot of resource waste. At the same time, more and more convenience transportation not only for going out but also bring a lot of resource and business opportunities for Pi County nearby Chengdu central place. It should build enough capacity face the increasing tourism and opportunities from outsides since the accessibility goes well, at the same time, we should consider the flow lobar of villagers to go out and leave villages without vigor and productivity.

5.3 Future Steps

Firstly we should analysis the labor distribution of villagers and find out the balance between go out for get wage job or stay in their hometown. We should also do some survey on transportation options in details by interview to explore which kind of transportation option is the mainly that we should promote and improve the transportation ability to enhance the accessibility of villages. Development of urban fringe villages is a dynamic process, accelerated urbanization exacerbates the change. The implementation of planning will take some time. Planners should face issues with a dynamic vision and reflect in the planning and design. For the "long-term" urban development future planners should pay attention to make the combination of effective use urban resources, urban opportunities and accessibility. In the recent we should focus on the current situation, different villages have their unique features and we should plan individually. Not only satisfy the current situation but also consider the needs of long-term development.

Accessibility is a double-edged sword for the rapidly development of rural areas in China. On one hand, it can bring a lot of urban sources and opportunities for rural area and drive the economic development and bring wealth for villagers. On the other hand, it may break the balance and resilience of rural area which originally on their own rhythm. If they do not have enough capacity and experience about the economic, industries, population flooding. It may lose its own resilience.

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