Exploring how to Lead the Transformation of Small and Medium-Sized Cities by Integration of Multi-Planning:
Case Study of Jieshou City, Anhui Province, China

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Abstract: This paper focuses on the integration of multi-planning in the widespread small and medium-sized cities in China, which are now facing embarrassment in the process of urbanisation. As the basic executors within the three-level administrative system, small and medium-sized cities are being trapped in the multifaceted dilemma of population loss, constrained spatial and natural resources and less positive policies. In order to find an optimized approach to achieve urban transformation while responding to these practical problems, this paper proposes spatial planning that collates and integrates all of the current plans completely, eliminating their discrepancies and forming one blueprint for the city. This is a new approach leading the transformation of small and medium-sized cities. This approach must be comprehensive, multi-tasking, highly exercisable and localised, and balanced between economic growth and environmental improvement in order to better the urban and rural life of these numerous small and medium-sized cities.

1. INTRODUCTION

Spatial planning, or multi-planning integration, has been a hot topic in China in the past few years. While big cities have been the main focus of this trend, there are still numerous small and medium-sized cities which have been neglected (Neo & Pow, 2015). As spatial planning is introduced into these cities, planners have observed huge differences, beyond that of scale, between big cities and small cities. Compared to big cities, small and medium-sized cities are at a much lower level of economic development, and they face more limits and restrictions, especially on their spatial resources. Spatial planning in these cities requires more work at the local and foundational levels, where it may be used as a tool to solve practical problems.

This paper focuses on how to promote spatial planning in one such small city and to lead the city’s transformation by reorganising the spatial resources through the integration of dozens of current plans. To plan the city
holistically, as a whole, rather than separating it into divided areas, will provide a more efficient approach for the city’s development.

1.1 Spatial planning system as a national strategy: the origin of spatial planning and its characteristics

In 2013, Xi promoted the "spatial planning system" at the Central Work Conference on Urbanization (2013). This event was significant in recognising that the spatial planning system has become an important tool for reforming the urban and rural planning system, regulating spatial resource management and promoting the urbanisation process in an orderly manner. Spatial planning is the integration of urban and rural planning, land use planning and all the other current planning. Therefore, it has been the focus of close attention from the central government departments, such as the Ministry of Housing and Urban-Rural Development (referred to as MOHURD), the National Development and Reform Commission (referred to as NDRC), and the Ministry of Land and Resources (referred to as MLR). “One plan, one blueprint” is considered to be more efficient to implement.

Based on the experience of multiple-plan integration in Guangdong, Shanghai and Zhejiang, the MOHURD, NDRC and MLR selected 28 pilot cities/counties and two pilot provinces for spatial planning.

One thing should be noted, that the ongoing spatial planning system is very different from traditional spatial planning in western countries. The latter is attempting to bridge land-use models and planning with new approaches, tools, and techniques (Albrechts, 2006; Couclelis, 2005), whereas in China, several administrative plans coexist and conflict with each other. Spatial planning is designed to change this situation, and in some cases spatial planning also overlaps with strategic planning.

1.2 The practical problems: Small and medium-sized cities are facing more dilemmas

The multiple-plan integration has been a focus area since 2010. Both the big cities, such as Guangzhou, and the coastal developed cities, such as Yunfu and Deqing have been working on how to integrate urban and rural planning, land use planning and other plans related to urban, social and economic development. In general, the big cities enjoy a high level of civilization and a good planning foundation. More importantly, these cities have precise knowledge of their goals and strategies, which have already become common views around the city. Therefore, the multiple-plan integration — in other words, the spatial planning in these cities — mainly works on the comparison of different plans and the elimination of discrepancies through a negotiation system and agreed principles. Spatial planning in other coastal developed cities, which are close to and have advantages similar to those of the big cities, would benefit from a similar experience to big cities.

In China’s vast interior, there are hundreds of small and medium-sized cities and counties. Spatial planning in these areas is more demanding and challenging than in the developed cities. First of all, limited by their stage of economic growth, they lack planning experience, where the concept of planning is often misunderstood beyond the basic meaning of the arrangement and management of urban activities. Therefore, the future development of these cities would benefit from clarification. The current
plans, especially the plans which focus on the counties and towns, are more difficult to integrate. Secondly, one aspect of spatial planning is a process of forming and popularising the urban development consensus. Making this planning easily understandable is as important as making it insightful. Third, these cities have more restrictions than the developed cities. Their available land resources are restricted by their higher-level government, however, they are under equivalent time pressure to complete all of the prescribed tasks. The population in these cities is continuously being attracted to big cities, making it relatively more difficult to strengthen their economies. How to find a way through all of these constraints is the essential question for spatial planning in these cities.

The numerous small and medium-sized cities are the most important parts of Chinese cities. The case city of Jieshou is a typical small city in central China, which this study uses as a lens to provide answers to this essential question during the planning formulation process, and a representative and propagable conclusion.

2. METHODOLOGY: REGIONAL PERSPECTIVE AND HOLISTIC PLANNING

2.1 The ‘Survey-Analysis-Plan’ work pattern is the main framework for spatial planning

In the planning process of this case city, the classical ‘Survey-Analysis-Plan’ work pattern, promoted by Sir Patrick Geddes (Geddes, 1915), is applied. This method, which is widely used in regional planning, is appropriate in spatial planning.

Since spatial planning aims to integrate all of the current plans and potential projects, it is very important to thoroughly investigate throughout the city to discover a wide range of possible factors that may impact the city’s construction. The survey is used to gain a deep understanding of the city’s situation, while the analysis of the investigation materials presents and selects amongst the possibilities in order to make the plan.

2.2 Problem-oriented

The case city is now facing several severe problems. Its industrialisation requires more land and labour, but land shortage is the main constraint. Roads, rivers and green land need to be improved, but because of the conflicts between different plans, the infrastructure has not been built yet. The towns also have their own development strategies, which do not coincide with the city’s. These problems are urgent. Therefore, the spatial planning in this city is expected to be a problem-oriented one.

2.3 A necessarily regional perspective

The process takes a regional perspective to research the city’s characteristics. Based on a comprehensive understanding of the city, it is evident that planning the city holistically, as a whole, is the best method, not only because spatial planning requires the planners to consider all aspects of the city simultaneously, but also because the small city is highly restricted by its land resources and it has limited options. The following parts of this
paper will analyse the city’s situation, including its foundation in the past, problems at present and its opportunities in the future. Then the planning strategies aiming to lead the transformation of the city by spatial planning are introduced. Three conclusions are drawn from this case and it is hoped they would be useful in the spatial planning of other small and medium-sized cities.

3. THE CURRENT OPPORTUNITIES AND CHALLENGES OF JIESHOU CITY

3.1 The city’s status and opportunities

Jieshou lies in the northwest of Fuyang city, and it administers three urban districts and 15 towns with a total area of 668.69km² and a population of 0.8 million. With mild climate and clear seasons and more than 60% of the land used as farmland, the city is a major grain producing area.

The past decade was a critical period for the city’s economic development. In recent years, the recycling economy has become the main industry of the city and brought more than 10 national recognitions. Recycled plastic, reused lead batteries and other recycling have created a 10.5% annual economic growth and a 13.5% annual industry growth. After 20 years’ absence, Jieshou re-entered the top 10 industrial economies in China.

Figure 1. The location of the case city

The alteration of China’s macroeconomy has created more opportunities for the city. The city is located at the junction of several economic zones, including the Yangtze River Delta Economic Zone, the Beijing-Tianjin-Hebei Economic Zone, and the Central Plains Economic
Zone (Figure 1). In 2012, the State Council responded to the Planning of the Central Plains Economic Zone (referred to as PCPEZ), signifying the inclusion of the central plains city clusters as part of the national strategy. Jieshou city was proposed as a node city of Zhengzhou-Hefei urban belt. The new high-speed railway along the belt being built will enhance its connection to Shanghai and Beijing.

3.2 Limitation and challenges

3.2.1 The constraint of land shortage

The land resources in Jieshou city are highly restricted. The small administrative area is only 1/3 to 1/4 of the size of the neighbouring county’s area. Although land resources are scarce, 88% of the farmland was classified as basic farmland by the MLR and its subordinate administration, which means land available for development was made much scarcer (Figure 2). However, although the economic strength of Jieshou and the size of the urban population is greater than its neighbours, the following urbanisation and modernisation, including environmental enhancements, increasing public spaces and infrastructural improvements, is currently limited by the land shortage.

Figure 2. The farmland (yellow) in Jieshou city
3.2.2 Insufficient and unbalanced distribution of well-built spaces

Although Jieshou has a relatively high urbanisation rate, the quality of its urbanisation is at the average level for central China. Little of the urban area is of high quality, including public spaces along the streets, waterfront spaces along the river and the green spaces near the forest. The well-built spaces are all located in the central urban area or the comparatively well-built township, which coincides with the spatial structure of the whole city.

Jieshou has two major rivers flowing through the city, which benefits the central urban area, and four towns along the rivers. Other towns and counties have extremely little waterfront space, and even the current pools and streams are under pressure due to lack of maintenance. The forest and green parks are also concentrated in the central urban area.

3.2.3 Lack of guidance or constraints on land use

One result of the unconstrained land use is that the farmland is very inefficiently used. Although the ratio of farmland in Jieshou is quite high, the land is badly segmented by the villages, which makes it more difficult for the small city to promote mechanized farming. In 2012, there were 1,106 villages scattered across the city and some of them had already become disused (Figure 3). The superfluous villages caused another problem because many of them were built along the national highway and provincial roads. From the comparison of the villages and the roads, it is evident that more than half of the roads had over 20% of their length occupied by villages without planning. Some of the roads were even occupied along more than 40% of their length. The current chaotic development pattern should be transformed into smart and efficient growth in order to best utilise the limited resources of Jieshou city.

Figure 3. The villages in Jieshou city and their relations to the roads
3.2.4 Integration of development concepts with existing plans

There are problems with the existing planning for Jieshou. First, the planning goals of towns and counties do not match the city’s planning. The population and urban size are the main points of conflict. The towns have all planned to become bigger and stronger, but the strategies and routes are very similar to each other, so they are in competition. Secondly, the development plans of the various departments are not unified, which can be clearly observed in their spatial overlap. For example, the water system planning conflicts with the forest planning as well as the road planning, and almost every plan conflicts with land use planning. Therefore, these plans are difficult to execute, and one unified blueprint is necessary to integrate the concepts of both the towns and the higher-level departments.

4. PLANNING STRATEGIES: HOW TO LEAD THE TRANSFORMATION

From a historical perspective, the urban population percentage of China has just passed 50%. Broadly, at the national scale, populations and resources are accumulating in big cities and the cities’ clusters. At the regional scale, people prefer to live and work in urban areas rather than small towns and villages. According to the macro trends and current situation of Jieshou city, the four major strategies and the framework of spatial planning are determined.

4.1 Take the whole situation into account and concentrate on the dominant resources

4.1.1 Plan the entire city holistically and clarify the targets

Given the constraints on land resources, the city needs to coordinate its spatial resources through unified planning of the city in order to achieve a significant outcome. In recent years, the industries in Jieshou have made continuous progress and the population has also reversed the trend of outward population flow, with both the permanent and registered populations recovering. These vibrant industries and the population need to be supported with sufficient space, which is the main constraint.

Therefore, in terms of the city’s identity, its foundation and favourable conditions have been reassessed and the city’s position and several development goals suitable and realisable for the city have been prioritised.

The city will be defined as a strong industrial city with recycling as the dominant industry, a featured commercial city in the Central Plains Economic Zone, and a liveable garden city on the riverside. Correspondingly, the goals of urban development would be building a national identity as a city with a strong recycling economy, a demonstration of new industrialization in the Central Plains Economic Zone and be one of top ten comprehensive competitive economies in the province’s counties.

4.1.2 Integrated access to land condition

A comprehensive evaluation of the city’s land condition was made, based on the landform, the important farmland, population distribution, road
accessibility and other natural and social factors. The suitable development area is mainly concentrated in the central urban area and the 15 towns and counties, with a total area of 210 km², within which the basic suitable development area is mainly concentrated in the surrounding area of the towns, with a total area of 132 km². The rest are restricted development areas, including important agricultural areas, wetland parks and major river systems. This spatial distribution is the basis of the division of the production space, living space and the ecological space, and forms the basic urban space framework.

4.1.3 Concentrate the dominant resources to form primary and secondary urban systems

Based on the above urban space framework and the characteristics of present urbanisation, the main functional area is clarified in order to make full use of the spatial resources. The central urban area and the township of Tianying is the core of the integrated urban space, which will have the most important function of urbanization. The synchronous development of the industrial park of Tian Ying Town and the central city is one effective measure for balancing jobs and housing. The two town-level cities and their clusters form the two subcentres and the central areas of urbanisation on either side of the central urban area. On the northern side, the pillar industry is recycling, while the south is mainly a commercial economy. There should be a provincial road, which runs north and south through the city, connecting the main core and two subcentres. This provincial road would form the economic development zone, with other towns, counties and villages ensuring a convenient connection with the main core and subcentres and forming their own characteristic industries and culture. The main core and two subcentres comprise the main (primary) area of urbanisation, while the other areas would be small but with excellent, distinctive features and fill out the urban spatial network with local characteristics (secondary).

4.2 Optimise spatial resources and equalise according to demand

Corresponding to the insufficient and unbalanced spatial development mentioned above, a two-step solution is proposed. The first step is to improve spatial quality by creating more high-quality spaces, and the second step is to determine the distribution principle of these public spaces in streets, waterfront spaces along the river, and the green spaces near the forest. Citizens of central urban areas, towns and villages would have equal access to these high-quality spaces. Road traffic, forest ownership and water surface area are selected as three core factors to assess spatial quality.

4.2.1 Improve the road network and the quality of roads

The total length of existing roadway is 911 km, but only 10.7% of it is secondary roads or grade one highway. The external capacity is deficient and the traffic pressure is concentrated on highway entries and exits. The provincial roads within the city have not been connected to the neighbouring provinces. The internal roads are fishbone shaped, rather than connected as a network. Combining this present condition and the rapid transport system planning from the Department of Transportation, the plan improves 38.8% of the current roads over the next 20 years. Transportation planning, urban and
rural planning, and central village planning should be integrated, and the conflicts eliminated to make sure that the road network is designed in accordance with the urban settlement system. The central urban area is at the core of urban transportation. There are at least two provincial roads intersecting in the key towns. All towns and counties are connected with the surrounding residential areas through at least one provincial road. All central villages should be located in the transportation network formed by county roads, and all villagers are within 30 minutes of the central urban area, forming a half hour urban life circle.

4.2.2 Reconsidering the water system

The present water volume per capita in Jieshou is 300 m$^3$, which is far below the average of 2,500 m$^3$ in China. Although the city has surrounding rivers and several rivers and streams through it, the present water system is too poor and fragmented to conserve water; it particularly suffers from the encroachment of cultivated land. Due to the small surface area of water, only two rivers are available for citizens to enjoy. The existing water system plans aiming to solve this problem are in conflict with the basic farmland operations.

Therefore, the current water system should be reserved as much as possible to preserve the city’s unique characteristics. The rivers, pools and wetland, which were occupied by the farmland, should be recovered, forming a stronger water network. The towns and villages are connected to the Shaying River and Quanhe River, ensuring that there are more than five trunk rivers in the central urban area and more than 10 waterfront parks. The two town-level cities would have more than two trunk rivers and more than one waterfront park. There should be more than one trunk river and more than one waterfront park in the key towns. All towns or counties should have at least one waterfront park and every central village at least one river. The riverside spaces would be reserved for public spaces, open to all citizens, in order to enhance the urban value of the water (Table 1).

![Table 1. The water system planning principles](image)

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<tr>
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<th>Number of trunk rivers</th>
<th>Number of waterfront parks</th>
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<tr>
<td>Central urban area</td>
<td>≥5</td>
<td>≥10</td>
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<tr>
<td>Town level city</td>
<td>≥2</td>
<td>≥4</td>
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<td>Key towns</td>
<td>≥1</td>
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<td>Towns</td>
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4.2.3 Increase the forested area

According to statistics from the forestry department, the forest coverage rate of Jieshou city has reached 20.66%, but the forest and garden land from the land and resources department is merely 26 km$^2$, which means the forest coverage rate is only 4%. The conflicts between the forest planning and the land use planning are striking.

In order to take full advantage of all of the forest in the city, a forest ecological network should be constructed, relying on both the water and traffic corridors. The existing forests south of Shaying River are planned to
be the core of this network and the main forest park of the whole city, while the forest resources would be arranged with full consideration of balance. The central urban area would have more than two forest parks and more than 30 gardens and street squares, while the town-level cities would have at least one forest park within 500 m and more than 10 gardens and five squares. The key towns should be less than 1 km away from forests and have more than five gardens and two squares. No town or county is farther than 2 km away from forests and they should all have more than two gardens and one square. The central villages should all be located within 2 km of forests (Table 2).

4.3 Analyse the current land use and reorganise more efficiently and intensively

The distribution and organization of land use in Jieshou City is relatively poor and land use efficiency is not evident. In order to reorganize the land use in a more efficient and intensive way, three aspects are considered.

First, the current proportion of construction land is high, accounting for 22.52% of the total area of the city, with wasteful land use. Judging by the current population of Jieshou city, by the trend of the population growth, and by the capacity for better land use efficiency in the future, the proportion of construction land could be limited up to 18%. Therefore, the key concept for Jieshou land use is "reduction", and urban land uses should be reorganised in an intensive manner.

Secondly, the proportion of land used for different types of construction is not well-balanced. The ratio of the central urban construction area to town construction area to rural construction area is 1: 0.66: 4.36. The rural construction land area accounts for 72.46% of the total construction land area, which is 4.36 times larger than the central urban construction land area and 6.64 times the town construction land area. This ratio is not only contradictory to Jieshou’s urbanisation rate, but also does not match the urban system, showing the low efficiency of land use. The urbanisation rate of Jieshou city is 50.22%, exceeding the average level of the cities and provinces where it is located.

In rural construction areas, many unauthorised village developments are located close to the prefectural highway (mentioned above). At the same time, there are lots of “hollow villages” where few people live. Therefore, in combination with the urban system planning and the future population distribution, the scale of land for construction in central urban areas, towns and central villages is adjusted so that the central city, the towns and the central villages meet the future needs of their populations respectively. The proportion of these lands has been adjusted to a ratio of 1: 0.85: 0.67, as a
guide for land area for future construction concentrated in the central city, towns and other areas of intensive development. After the prevention of unauthorised construction and the removal of “hollow villages”, and the repurposing of this land for farmland, the scattered farmland can also be linked together as one, which is conducive to building a better agricultural landscape system and avoiding the vicious cycle of unauthorised village developments on occupied farmland and the encroachment of farmland on forest and water areas.

Thirdly, the share of land use for transport facilities, rivers, lakes and forests in the city is considerably low. In combination with the planning concept, the proportions of these land use types have been increased through this spatial planning to create a better living environment. By considering and planning all the important spatial elements and factors within the entire city area, a city-wide traffic system, waterway system and forest garden system could be achieved.

4.4 Integrate concepts of development and use one plan for all spatial elements of the city

A unified classification of land use is used (Department of Housing and Urban-Rural Development of Anhui Province, 2017), putting the land use plan (which used to be classified by independent standards made by MOHURD, Ministry of Land and Resources, 2017), the urban and rural master plan (which used to be classified by independent standards made by MLR 2011 edition (Ministry of Housing and Urban-Rural Development, 2011), and many other plans (made by towns and other departments, etc.) on the same data platform with shared coordinates. Through this, there are a large number of discrepancies, each of which shows that there are different planned uses on the same land. For two major plans, due to the differences in planning period and editing dates, the number of discrepancies reached 7,489, amounting to 43.4 km², and accounting for 6.5% of the total area of Jieshou. Other important spatial plans also have major conflicts with basic farmland.

The discrepancies can be classified as follows: discrepancies occupying small areas or discrepancies only caused by different land use standards are an immaterial discrepancy; discrepancies caused by different planning concepts or occupying larger areas that need to be coordinated, are considered substantive discrepancies. Based on this planning strategy, three principles for dealing with discrepancies have been identified.

The first principle is to incorporate holistic planning (something that is not easy to accomplish in China), long-term planning and rational coordination. Improving the urban-rural system is the fundamental basis for handling discrepancies. In turn, the demand for construction land in central urban areas, key towns, and other towns and central villages will be guaranteed to promote intensive development and to support the construction of beautiful villages. For the discrepancies that are difficult to achieve in the near future, long-term control and guidelines are introduced to manage these areas and an effective collaborative management platform is established to ensure long-term control.

The second principle is to ensure that the total amount of basic farmland must not decrease and that its spatial distribution is more contiguous. There is great pressure on the protection of basic farmland in Jieshou. Given unified allocation of spatial resources, the total amount of basic farmland
must be retained as a precondition, and the current scattered basic farmland should be adjusted to be as contiguous as possible.

The third is to ensure ecological security while forming urban and rural characteristics. Following guidance from defining urban, rural and ecological spaces, the space within the ecological red line must be strictly protected from construction, while the water system, important ecological network construction and important infrastructure construction in the whole region should be promoted.

These three principles underlie the final land use plan for Jieshou’s spatial planning.

5. CONCLUSION

In summary, three main points and characteristics of the spatial planning in this paper are summarised, providing reference for the spatial planning of other small and medium-sized cities.

5.1 Activate spatial resources through holistic planning

Compared with mega-cities or large cities in China, the characteristics of small and medium-sized cities are limited in three ways - limited resources, limited space and limited policies. In such a situation, to make a breakthrough in urban development, limited resources of the whole city should be pooled to form large-scale agriculture and ecology, broad landscapes, and large-scale industrial parks, creating an overall advantage for the city.

5.2 Propose intensive development of high efficiency and rational reduction of developing areas

Due to the late start of urban planning in parts of China, it has been common to have disorderly and wasteful development and construction in small and medium-sized cities. Land use in villages is dominated by farmland, which also affects the country landscape. Considering these conditions, land use in the construction areas (except for characteristic or historical villages, which should be preserved) should be intensive and efficient, which would be not only beneficial to the management of urban land but also to forming large-scale agricultural land.

5.3 Equalise high-quality spatial recourses in the city

Compared with big cities, the infrastructure and urban landscapes of the small and medium-sized cities is relatively poor quality. High-quality resources are concentrated in a few areas, such as the central urban area, which makes towns and villages less competitive, causing the loss of population in less-developed areas. In this plan, the distribution of high quality resources, including transportation facilities, rivers, parks, schools and other public utilities, is balanced and equalised across the entire area of the city. By enhancing overall quality and competitiveness, the city can not only forms its unique characteristics, but also enable the residents to enjoy the benefits of city development.
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