

Spatial Strategy for Regional Land Use: A Case Study in Jiangsu Province

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Key words: land management, spatial planning, spatial strategy, sustainable development, Jiangsu province, China

SUMMARY

Land is the basic resource for human society existence and land use is an important link to connect human activities and natural environment. With the rapid promotion of market economy in China, land configurations have gradually become the dominant means leading economy development and land use spatial strategies thus become the important contents of socio-economic development strategy, playing a decisive role in ensuring the socio-economic comprehensive, coordinated and sustainable development. As the typical province in China, Jiangsu has achieved a rapid economy growth in recent years, coming into the mid-term of industrialization and economy development have been facing the new transformation, and significant changes in regional structure, urban-rural structure, industrial structure and diving force for social economic development has appeared. Restricts of land resources have become more and more obvious. In the new period, it is urgent and necessary for carrying out the scientific and reasonable land use spatial strategy. Taking Jiangsu province as an example, explore available approach for promoting regional and urban-rural coordinated development, industrial structure adjustments, ecology and environment construction by virtue of land use strategy design, and supply suggestions for sustainable land use and coordinated development of social and economy. Firstly, based on the status of regional development, the issues and development tendency in spatial use were analyzed; then, land use spatial strategy is put forward, including strategy objectives, strategic pattern, and strategic focus etc. At last, based on land suitability assessments, differentiated land use policies are formulated with the purposes to guarantee the smooth implement of spatial strategy.

摘要

土地是人类社会赖以生存的基础资源，土地利用是联系人类活动与自然环境的重要纽带。随着中国市场经济快速发展，土地配置逐渐成为引导社会经济发展的重要途径，土地利用空间战略因此成为社会经济发展战略的重要组成部分，在促进社会经济全面协调可持续发展中起着重要作用。江苏省是中国的经济大省，经济飞速增长，已进入工业化中后期，经济社会发展进入转型阶段，区域结构、城乡结构、产业结构和经济发展的主导驱动力正在发生重要转变。制定新形势下的土地利用空间战略，显得迫切和必要。本文以江苏省为例，探索通过土地利用空间战略设计，促进区域城乡一体化发展、产业结构优化调整、生态环境建设的有效途径，为经济发达地区土地资源可持续利用和社会经济全面协调可持续发展提供政策建议。首先立足江苏省区域发展现状，剖析空间利用存在的问题和发展态势；其次，开展了江苏省土地利用空间战略设计，提出了战略目标、战略格局和战略重点；最后，基于土地适宜性评价等，进行了土地空间战略分区，并提出差异化的战略保障措施。

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1. INTRODUCTION

1.1 Study area

Jiangsu province locates in the east coast of the China Yangtze river delta (30°45'-35°20'N, 116°18'-121°57'E), administrating 13 provincial cities with 105 counties (cities, districts). Adjoining the china Yellow Sea to its east and locating at the T-shaped intersection of main axis of China's production forces distribution, it has an advantageous location. With developed economy, it is one of the most important economic provinces in China, also is one of the areas with modern high-tech industries and dense cities, at a pivotal position in China's national economy and social development.

1.2 Social and economic development characteristics

At the end of 2010, Resident population of Jiangsu was 77.97 million and the gross domestic product (GDP) was ¥4.14 trillion (\$611.94 billion, ranked 2nd in China); GDP per capita was ¥52840(\$7805.60, ranked 4th in China); the output value proportion of industry, agriculture and services were 6.13: 52.51: 41.36; The total import and export volume were \$465.79 billion, local general financial income was ¥408 billion((\$60.27 billion, ranked 2nd in China); Urbanization rate reached 55.6%, and urban per capita disposable income and per capita net income of farmers reached¥ 22944 (\$3389, ranked 6th) and ¥9118(\$1347, ranked 5th). The land resources of Jiangsu account only for 1.1% in china, however, they carry 5.8% of the china's population, produce 5.9% of the country's food, create 15.7% of the country's total import and export volume, 10.4% of the GDP, 8.7% of total retail sales of social consumer goods and 8.3% of the fixed assets investment. Therefore, it is a typical region with high density population and economy, and study the spatial strategy of Jiangsu province will have referential significance to the eastern coastal areas.

(1) Rapid and stable economic growth, and good development tendency.1991-2010, the average annual growth rate of GDP in Jiangsu was about 13%; GDP per capita exceeded \$ 6000 in 2010, which used 8 years increasing from \$1000 to\$ 2000, but the time were shorted to 4 years and 3 years from \$2000 to \$3000 and \$3000 to \$4000.

(2) Industrial structure was constantly optimized. The output value proportion of industry, agriculture and service industries had changed from 16.8:52.7:30.5 in 1995 to 6.1:52.5:41.4 in 2010. Emerging industry has become a new economic growth point and the proportion of high-tech industry output value accounted for 33% of above-scale industrial output value. Meanwhile, grain output grows for seven consecutive years, and high-efficiency agriculture has reached 1/3.

(3) Export and foreign capital investments grow fast, and open economy develop rapidly. In 2010, Jiangsu province's total imports and exports reached \$ 465.8 billion, including exports \$ 270.6 billion, and the actual use of foreign investment accumulated in five years surpass \$110 billion, maintaining the first place in China. Proportion of foreign capital use in service industry increased more than 18 % than in 2005. Overseas investment by agreement totaled to \$ 4.5 billion.

2. DEVELOPMENT TRENDS ANALYSIS AND DIRECTIONS OF SPATIAL STRATEGY IN JINAGSU PROVINCE

Jiangsu has been stepping into the new stage(Li, 2008). rapid economy development, economic structure optimization and adjustment as well as opening-up economy brings up new challenges to regional spatial strategy and then it should be adjusted at the right time.

2.1 Issues in space utilization

(1)Population and land space configuration are not harmonious, and contradictions between land supply and demand are prominent

With the promotion of urbanization, plenty of rural population migrant to cities, however, because lacking of supporting measures, the land resources occupied by them in countryside have not be released. Migrant workers increase the land demands in urban areas; meanwhile, they earn money and invest rural construction. Then, construction land in urban and rural presents a synchronous growth. The shortage of construction land in urban areas coexists with the idling of rural construction land. And problem in spatial configuration of population and land become increasingly prominent. Rapid urbanization requires more land resources, but under the strict cultivated land protection policy, few of them allowed to be occupied. Traditional model relying on the occupation of cultivated land to meet the shortage of construction land has been not feasible. This has resulted in the contradiction between supply and demand of land becoming increasingly conspicuous, and space reorganization and structure adjustment become the inevitable choice to increase new development place.

(2) Regional development lacks spatial connection

With the strategies of “integrated development of Yangtze River delta”, “Jiangsu coastal development” “Wanjiang cities belt” successively update to national development strategy, Jiangsu province proposes the “Si Yan” (along four development axis)development strategy timely, and strives to change the situation of plate distribution of productive forces and insufficient regional industry association with the opportunity of national development strategy adjustment. However, the present situation is the plate layout of productive forces in southern, central and northern Jiangsu province still exists, and development of three regions still separated. How to adjust the spatial layout of the land use and promote regional socio-economic coordinated development are the important and difficult points in the next development period of Jiangsu Province.

(3) Space requirements in production, life and ecology grow simultaneously, land conflicts in different sectors increased

With rapid urbanization, industrialization and agriculture modernization, especially the implementation of coastal development strategy, construction land demands have a massive growth. Meanwhile, with the promotion ecological construction, the protection of wetlands in Jiangsu coastal area will be enhanced. In 2010, per capita arable land was only 0.06 hectare, lower than the national average of 0.09 hectare. Obviously, cultivated land occupation still will be restricted. At the same time, ecological urban construction and new rural construction need more life space and green space. Under the multi-objective development mode, the tradition land use modes by occupying cultivated land and ecological land to support construction have to be shifted. How to allocate the space of production, life and ecology effectively will become the important content of space strategy adjustment.

2.2 New trends for space allocation

With the process of economic globalization and regional integration, economic and social connection between different regions increasingly widespread, and the pace of regional economic co-development accelerate. Also, with the promotion of the strategy of leading to realize modernization, deepening reform and opening, speeding up the transformation of economic development mode of Jiangsu province, the resource and environmental constraints of economic growth are further strengthen, the contradiction between supply and demand of resources is further highlighted, space use will also be faced with a new situation, land use spatial strategies also need to be adjusted accordingly.

(1) Regional development integration requires adjustment of the land use spatial structure

In 2008, China government put forward the strategy to construct Yangtze River Delta to be the strongest area in China. With the joint efforts of government, enterprises and the public, cities in Yangtze River Delta continue to promote the integration process in economic exchanges, facilities building and platform sharing, Intergovernmental cooperation increasingly close, private capital and personnel exchanges become more frequent, which are making the Yangtze River Delta become a economic zone with tightly integrated economy, information and population, and a advanced area with the fastest and most effective regional integration, Therefore, the regional development trend requires Jiangsu actively adjust land use spatial structure, and coordinate development between different regions.

(2) Urban-rural integrated development requires land use layout optimization

In 2011, Jiangsu Province put forward the development strategy of comprehensively promoting the urban-rural integrated construction, and encourage to explore urban – rural integrated, intensive and highly efficient, low-carbon and ecological, harmony and well-being approach for urban-rural development. This requires the land use strategy to shift from focus on land use indicators control to focus on space planning, optimize the structure and layout of the urban-rural construction land, improve regional overall function, and form the regional function system.

(3) Economy development mode transformation requires land use mode shift

The resource conditions of Jiangsu province determine future economic development and urban-rural construction cannot continue to rely on traditional development mode with space extensive expansion, resources excessive consumption. Economic development mode transformation requires changing the way of resource utilization, implementing the strategy of priority to economization, improving resource use efficiency, choose intensive industrialization and urbanization roads, optimize land, energy and mineral resources supply structure, strengthen green mining construction, alleviate the constraint of the resources , ecology and environment, and promote economic development mode shift by promoting transformation of the way of resources utilization.

2.3 Directions of spatial development strategy

Around the trends of the economic and social transformation development, oriented to regional and urban-rural integration, ecological civilization construction, national food security, modern agricultural development etc. important regional development strategic objectives, take regional spatial development strategy as the breakthrough point, manifest the lead function of land use in regional spatial strategy, optimize space structure and layout, highlight regional advantages and dominant functions, achieve optimized allocation of land resources, enhance the efficiency of resource use, and supply strong support for regional multi-objective development with limited land resources.

3. LAND USE SPATIAL STRATEGY IN JIANGSU PROVINCE

3.1 Spatial strategy objectives

(1) Promote effective flow of regional elements and promote regional integrated development. Optimize spatial overall pattern of the whole province, accelerate the construction of the major function oriented zoning (FAN, 2007), strengthen regional differentiated guidance, and lead regionally differentiated land use. According to the classified guiding principle, “enhancing the development level of southern Jiangsu, promote rapid rise of middle Jiangsu, playing the late-developing Advantage of northern Jiangsu”, continuously improve the level of regional economic cooperation and promote regional co-development.

(2) Strengthen land use spatial regulation, optimize regional development spatial pattern. Strengthen protection of cultivated land and basic farmland, confirm the key regions and scale for protection; strictly control the unlimited sprawl of construction land, guarantee land supply for reasonable demands, especially the major infrastructure construction projects; strengthen the protection of important ecological function areas and construct ecological network to improve the regional ecology and environment.

(3) Formulate differentiated space control policies. Ensure spatial strategy to direct land-use, and land use guide and support regional development.

3.2 Spatial strategy pattern

Based on the land use suitability zoning, following regional spatial development strategy, highlight the advantage of the urban circle as well as development axis along the coastal, river and roads, focus on the “Siyan” development strategy, take new urbanization as an important driving force for regional development, shape the regions along the river, coast and west Longhai railway to be the spatial agglomeration area for key cities and Yixing-Liyang-Jintan-Gaochun region in northern Jiangsu as the space for punctate cities development. By the “region add point” development layout, form the spatial pattern with open hinterland and agglomerated belt-axis(The people's Government of Jiangsu Province, 2013), which is the framework for land resource spatial allocation.

Serve the four axes and three urban circles (“Sanquan and Siyan”) constructions; optimize the land use structure of Suzhou-Wuxi-Changzhou urban circle and Hu-Ning industrial belt, and guarantee to meet the construction land demands along the river, coast and the east Longhai railway. Strengthen the agricultural land protection and basic farmland construction in grain production areas at northern and middle Jiangsu, and pay more attention to protect high quality cultivated land at Lixiahe plain, Huanghuaihai plain, Jianghuai plain and other major grain-producing areas.

3.3 Space strategic focus

According to the regional development spatial pattern, the basic farmland protection strategy, construction space intensive use strategy, coastal space expansion strategy, and ecological space protection strategy are put forward.

3.3.1 Basic farmland protection strategy

Confirm the basic farmland range, protect grain production space. Based on the potential for regional economic development and natural resource endowments, comprehensively determine regional comparative advantage, scientifically delineate basic farmland. The region beyond four axes and three urban circles should distribute basic farmland as much as possible, and implement strict protection, ensuring cultivated land quantity do not reduce and quality do not drop.

Push forward the construction of well-facilitated capital farmland. In order to enhance the production capacity of cultivated land, ensure national food security, the strategic task of construction of well-facilitated capital farmland was put forward by China government (MLR, 2012). The scarcity of cultivated land and reserve resources determines Jiangsu should combine with “Wanqing Liangtian Jianshe Gongcheng”(large scale high-quality cultivated land construction projects), enhance agricultural Infrastructure construction, improve agricultural land quality, lead agriculture structure adjustment, develop the water-saving, high-yield, high efficiency, and facilities agriculture, and promote the development of modern agriculture.

3.3.2 Construction space intensive use strategy

Optimize the spatial layout of construction land. Carry out major function-oriented zoning to realize the functional complementation and coordination of different regions(Xie,2009). Promote the construction land agglomerate moderately, e.g. rural settlements concentrate to the center villages or towns, industrial land concentrate to development zone or industrial parks. Construction land focus on four axes and three urban circles construction and main railway network, highway network, trunk road network, water transport trunk waterway network, port groups, air transport network and major water conservancy projects, and other necessary infrastructure.

Innovate policy for intensive land use to support space replacement oriented to intensive land use. Promote space elements agglomerate by space replacement; Strengthen idle land use; Establish the policy of underground space development and utilization and property management policy to promote land 3-Dimensional development; Increase investment on per unit of space, and raise the threshold for industrial projects access to development zone; Deepen the policy reform of compensation for the land use and promote the land intensive use by market allocation of land resources(Zheng, 2012).

3.3.3 Coastal space expansion strategy

Use coastal resources scientifically and effectively to expand land space. There are plenty of coastal beach and waste salt pan in coastal areas of Jiangsu province. Consolidation, reclamation and space replacement of salt pan (construction land), and coastal mudflats resources development based on ecological security are the feasible approach for Increasing agricultural land. Implement “increasing vs. decreasing balance” land-use policy (Long H., 2012)to push construction land space reconstruction, and enhance the support capabilities of construction land.

Promote the comprehensive land consolidation of coastal areas to expand land space. According to the requirements of regional and urban-rural integrated development, relying on mudflats resources development projects, “increasing vs. decreasing balance” policy, and large scale high-quality cultivated land construction projects, complying with land use planning and urban - rural planning, taking land consolidation projects as platform , carry out comprehensive consolidation of farmland, water, road, forest and village(MLR, 2012), built large scale and contiguous well-facilitied capital farmland, enhance the comprehensive grain production capacity, coordinate urban-rural construction land space, release stock construction land, and ease the resource constraints of construction land.

3.3.4 Ecological space protection strategy

Build ecological security network, confirm ecological protection space. Reasonably arrange ecological land and build ecological conservation spatial structure with “Two pieces, two belts, four gallery, multi-core ”. Among them, “two pieces” are the water area of Taihu Lake and Hongze Lake; “two belts” are the two ecological conservation belts along the Yangtze River and the coast; “four gallery” are four waterways; and “multicore” are series of important ecological function protected areas, e.g. forest park, water conservation district, etc.

(The People's Government of Jiangsu Province, 2013). Based on above spatial structure, strengthen the protection of important ecological function areas, control constructions, and safeguard regional ecosystem steady.

Create eco-friendly land use patterns, and reshape the land- ecology relationships. Combined with regional development characteristics, make the concept of ecological civilization run through all aspects of land use. Promote the coordinated development of the human-land relationship by eco-friendly land use patterns, such as ecological agriculture, tourism agriculture, circular economy, ravine economy, ecological restoration of coal mining subsided land, ecological reclamation of mining waste land, ecological development of mudflats, and construction of ecological shelter forest etc.

Ensure the ecological safety of the ecological function regions. Comprehensively consider land ecology and environment sensitivity and suitability indicators, use the dynamic clustering analysis method to divide the ecological and environmental protection areas (Li, 2008), strengthen the protection and ecological restoration of important ecological function protected areas. Strictly control the interference of human factors on the natural ecology, and safeguard the function of ecological service.

4. SUBTITLE LAND USE STRATEGY ZONING AND DIFFERENTIATED MEASURES

Differentiated space policy guidance will help promote the division of labor between different regions and highlight regional major function (Fan, 2007 and 2010), achieve the maximum efficiency of land use by Playing their respective comparative advantages(Liu, 2008). Also, it is an important guarantee for land use spatial strategy implement. The province is divided into four zones according to space development suitability assessment, ecological and environmental protection zoning, the major function zoning, industry characteristics, and regional development stage etc. They are Tong-Yan-Lian land use zone, Ning- Zhen -Yang -Tai land use zone, Su -Xi- Chang land use zone and Xu- Su- Huai land use zone.

4.1 Land use policy in Tong- Yan-Lian land use zone

This zone include three cities, Nantong, Yancheng and Lianyungang, with unique advantage in location and rich land reserve resources, is the core zone of implementation Jiangsu coastal area development strategy, locate at the intersection of three axis, along the coast, river and Longhai railway, and also the new growth pole of Jiangsu province. With the advance of coastal development, construction land demand surge, contradictions between lands supply and demand are prominent, and intensive use level is low. The land policy in the zone: moderately allocate more land quota, extend construction land supply to ensure land demand for development and gradually enhance urban agglomeration function. And, relax the control of unused land development indicators and intensify the salt field replacement, using idle salt field for industry development and urban construction, or reclaim them to be arable land. Also, adopt comprehensive measures to protect arable and ecological land and show the ecological functions of arable land.

4.2 Land use policy in Ning- Zhen -Yang -Tai land use zone

This zone includes four cities, Nanjing, Zhenjiang, Yangzhou and Taizhou, with advanced economy, dense towns and high urbanization. Around Nanjing and rely on the development along the Yangtse River, the zone turned into concentrated area with heavy chemical industries.

Land resources in this zone relatively tight, the degree of intensive land use need to be improved. The policies in the zone focus on promoting the reasonable use of both new added construction land and idle land, including configuration some new construction land indicator to guarantee key projects, mining idle space, promoting well-facilitied farmland construction projects and strengthening the protection of ecological space.

4.3 Land use policy in Su –Xi- Chang land use zone

This zone includes three cities, Suzhou, Wuxi, Changzhou, with dense population, towns and industries and large foreign population, as the most developed economic regions in the province, locate at Su-Xi-Chang urban circle and urban industry belt along the Yangtse River and Hu-Ning. It has high rate of development and utilization, too large proportion of construction land and too fast consumption of land resources. Also, its land use structure and layout are unreasonable and land use efficiency need be improved. The land policy in the zone focus on promoting regional economic development mode shift by land use modes transformation. Strictly control the construction land incremental, promote construction land secondly development, and lead industry development and urban construction solve the land demands by using stock land. Then, increase the inputs of system and factors, strictly carry out land use standards and promote intensive use. And, optimize the construction land layout, and coordinate the space structure of production, life and ecology. Also, promote land dimensional development, and develop modern agriculture and tourism agriculture, build livable cities.

4.4 Land use policy in Xu- Su- Huai land use zone

This zone includes three cities, Xuzhou, Suqian, Huaian, with lagged economy, lower urbanization and development benefit, is the relatively behind regions. It has preferable agricultural products conditions and its main function is agricultural production. Additional, it has a huge potential for reclamation of rural residential land and mining wasteland. Land policies focus on arable land strict protection and coordinating urban- rural construction land. Improve land quality, promote scale management of agricultural land, and improve production capacity. Ensure to minimize the damage of high quality arable land. Continue to accelerate the new rural construction and mining waste remediation. Strengthen the comprehensive improvement of rural land (Gao, 2011; Yun, 2011), lead population, land and funds flow effectively between the urban-rural areas (Zhang, 2009), and coordinate urban and rural development (Liu, 2009). Meanwhile, combined with the resource-exhausted city transformation, strengthen reclamation and use of mining wasteland, and providing land resource for the development of Xuzhou urban circle and Huai'an new growth pole.

5. CONCLUSION AND DISCUSSION

Implementation of land use spatial strategy in Jiangsu province has a positive role in coordinate human-land relationship, ease the imbalance between land supply and demand, Promoting regional and urban-rural integrated development and enhance ecological civilization construction. Meanwhile, strategy implementation will inevitably lead to division of labor, significant elements agglomeration effect and would widen the regional development gap. Therefore, related measures need to be developed to ensure the smooth implementation of the spatial strategy. Firstly, based on the main regional function, develop differentiated evaluation system suit local conditions. Secondly, establish a long-term mechanism for coordinated regional development, and improve the fiscal transfer payment policy to provide compensation for a particular functional area. At last, provide an institutional guarantee for the elements flow. It is necessary to optimize system environments for population, capital, land, and other elements flowing to achieve the spatial coordination of population, resources, environment and development(PRED) and promote regional sustainable development.

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