

## EXAMINING THE SPATIAL SPREAD OF THE CHINESE METROPOLITAN REGION FROM THE ADMINISTRATIVE DIVISION ADJUSTMENT POINT OF VIEW—TAKING SU-XI-CHANG REGION OF YANGTZE RIVER DELTA ECONOMIC ZONE AS AN EXAMPLE

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**ABSTRACT:** Great concern has been shown in the administrative division adjustment and the expansion and spread of urban land in recent years. Regretfully, present research has failed to connect the two factors and this paper aims to supplement this through an explorative study. In the past 30 years, the Yangtze River Delta Economic Zone, especially the Su-Xi-Chang Region, has been in a stage of rapid economic development and urbanisation. With the emergence of the variation of the administrative division, the rapid spread of urban construction land, and the dramatic changes in land cover, it is indeed a rare object of study. This research found that adjustments of administrative divisions in the Su-Xi-Chang Region had stronger coupling relationships with the sprawl of the urban area based on spatio-temporal analysis. In particular, there was a cumulative-causation-theory-based coupling relationship. Any attempts to resolve the conflicts and contradictions between administrative Governments by means of administrative division adjustment are only stopgap measures and will lead to further dramatic expansion of urban construction land. Only with the transformation of Government functions, dilution of the Government's direct intervention in the economy, and the establishment of a global view and regional cooperation concept, can administrative barriers and division splits be removed, as well as the real development of regional integration.

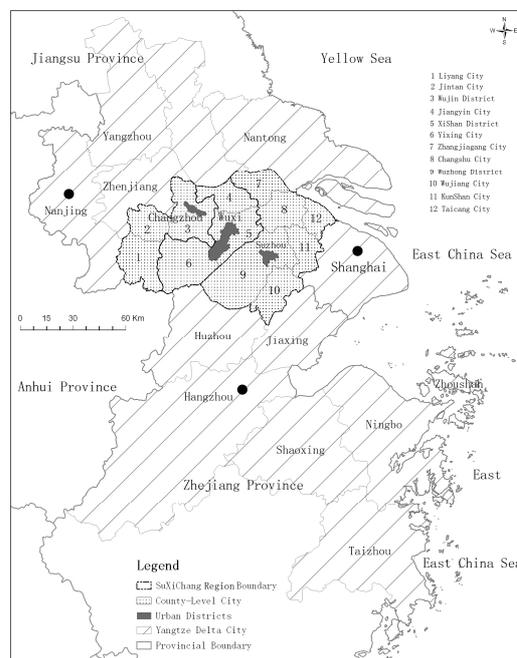
**KEYWORDS:** Administrative Division Adjustment, Yangtze River Delta Economic Zone, Su-Xi-Chang Region, Urban Expansion

### 1 INTRODUCTION

Su-Xi-Chang Region, the study area, refers to Suzhou, Wuxi, and Changzhou – three municipalities situated in the Southern Jiangsu Province. In 2007, the region covered an area of 17,661 km<sup>2</sup>, with a permanent population of 19.17 million. The population density is as high as 10,853 people per km<sup>2</sup>. It is the economic base and most developed area in Jiangsu, with a total GDP of 1144.1 billion Yuan and GDP per capita of 59,694 Yuan. Su-Xi-Chang is also the center of economic growth and technical innovation in the Jiangsu Province. As an important part of Yangtze River Delta Megalopolis, it is strongly influenced by Shanghai City and in the Yangtze River Delta Economic Zone, Su-Xi-Chang Region is of great importance. Among the 16 prefecture-level cities of Yangtze River Delta Region, Su-Xi-Chang Region is the leading group in economic strength and social development. Judging from the major social and economic indexes (NBSC, 2008), the Su-Xi-Chang Region accounts for 16.04% of the total area, 19.66% of the total population, 24.41% of GDP, 28.48% of the industrial output value, 33.58% of the industrial power consumption, 24.58% of the fixed investment, 35.52% of the total volume of imports and exports, and 31.7% of foreign direct investments. This data is sufficient to explain the prominence of the Su-Xi-Chang Region in the Yangtze River Delta Economic Zone, therefore, it is no wonder that region attracts the world's attention and scholar's interest.

There is numerous scientific research concerning the Su-Xi-Chang Region, among which administrative division adjustment and regional governance, urban expansion and land cover changes, as well as regional environmental problems attract special focus. Since 1978, the urban economy in the Southern Jiangsu Province witnessed great growth. The city's comprehensive strength improves significantly, and the population and construction land also went up sharply. However, various "urban problems" subsequently

arise, such as river or lake water pollution, blue algae pollution in Taihu Lake, regional shortage of qualified water, submergence of ground, decrease in cultivated land, urban heat island effects, and environmental deterioration etc. Problems are emerging in an endless stream and the situation is getting out of control. How could a heavenly wealthy place deteriorate to such a degree in only a few decades? There are many reasons, but the rapid increase in urban population, and the increase and expansion of urban construction land are the arch-criminals. As shown in the studies home and abroad, there are several reasons for disordered expansion of urban land, such as the increase of urban population, the population income level, the reduction of transportation costs, large amounts of residential construction, land policy, concentrated poverty, high crime rates, economic globalization, etc. However there is little research on the relationship between urban expansion and administrative division adjustment. This paper discusses the administrative division adjustment and the urban expansion in the last 30 years, trying to reveal the connections between them, and provide new theories for resolving the problem of urban expansion.



**Figure 1** Location of Su-Xi-Chang Region and Yangtze River Delta Economic Zone

## 2 METHODOLOGY

Studies with the Su-Xi-Chang Region and the Yangtze River Delta Economic Zone as the background are favored by scholars and have achieved abundant achievements. Studies relevant to this paper concentrate on three aspects: urban land expansion, regional land cover change, and administrative division adjustment and regional governance. Studies on administrative division adjustment employ summarisation of historical data supplemented by comparative analysis, investigating the historical evolution of administrative division, discerning the sequence of events, causes and effects, and thus achieving a large volume of results. Studies on urban expansion and land use/land cover change employ remote sensing technology supplemented by urban statistical data. Generally speaking, scholars obtain the vector data of regional land-use and land-cover change from the multi-temporal TM (Thematic Mapper) and ETM+ (Enhanced Thematic Mapper Plus) satellite images through human-machine interactive interpretation to guarantee classification consistency and accuracy. Subsequently overlay modeling of multi-temporal land-use and land-cover vector data is carried out with the help of GIS spatial analysis, and achieves the temporal series and spatial distribution of urban land-use and land-cover changes. Compared with administrative division adjustment research, research on urban land use changes are countless. To avoid repetitive work, by arranging and analysing the data of previous research, in this paper we integrate qualitative study with quantitative calculation, and summarise

the spatio-temporal coupling relationships between administrative division adjustment and urban land expansion. Finally, this research discusses how to resolve the conflicts and contradictions between Governments of multi-level administrative units.

### 3 INTRODUCTION OF URBAN EXPANSION IN THE SU-XI-CHANG REGION

#### 3.1 Urban construction land changes in downtown

In 1916, the Su-Xi-Chang Region was composed of three ancient cities, including Suzhou, Wuxi, and Changzhou, with little construction land in downtown. The ancient town of Suzhou was 1,100 ha, and that of Wuxi and Changzhou were about 300 ha. By 1949, the construction land was 1,920 ha in Suzhou, 1,060 ha in Wuxi, and 850 ha in Changzhou. The total construction land of the three cities was 3,200 ha.

**Table 1 urban construction land expansion in the Su-Xi-Chang Region**

City	Area of Construction Land (hectare)			Urban Expansion (1957-1982)		Urban Expansion (1982-2000)	
	1957 Year	1982 Year	2000 Year	Multiple	% / a	Multiple	% / a
Suzhou	1923	2588	8650	0.35	1.2	2.34	6.9
Wuxi	1221	3360	7580	1.75	4.1	1.25	4.6
Changzhou	952	2397	6895	1.51	3.7	1.88	6.0
Total	4096	8345	23125	1.04	2.9	1.77	5.8

Note: Zhang L. C., etc., 2003.

From 1978, the scale and structure of urban land changed significantly and urban construction land expanded rapidly. By 2000, the construction land in urban built-up area in the Su-Xi-Chang Region arrived at 23,134 ha, increasing 14,788 ha compared to that of 1982. The newly increased construction land during the 18 years has greatly surpassed that in 1982, with an average increase rate of 5.8%, twice as fast as that in the 25 years from 1957-1982. The annual expansion speed is 6.9% in Suzhou, the highest of the three cities, Changzhou is 6.0% and Wuxi is 4.6% (Zhang L. C., 2003).

As shown in Table 1, the proportion of industrial land expands quickly in the built-up area, second only to residential land. In 1957, industrial land was only 8.5% in Suzhou, 12.5% in Wuxi, and 19.6% in Changzhou. By 1982, the industrial land of Suzhou, Wuxi and Changzhou increased to 26.2%, 34.6% and 36.5% respectively. By 2000, the proportion of industrial land had continued to increase rapidly along with living land such as residential land and land for public facilities, coming close to or surpassing the industrial land. The proportion of functional land such as intercity transportation land and urban road land also increased.

#### 3.2 Urban land-use / land-cover change analysis

Zhang Jian etc. (2007) carried out study on land-use and land-cover changes in Su-Xi-Chang Region. The result indicates that the land structure in the region changed greatly during 1980-2000. In general, from 1980-1995, the area of paddy fields, dry fields and forested land reduced substantially by 593.88 km<sup>2</sup> and 188.55 km<sup>2</sup>. In contrast, urban construction land increased 386.55 km<sup>2</sup> and rural residential land increased 318.99 km<sup>2</sup>. From 1995 to 2000, the urban construction land and rural residential land kept increasing at a high rate, and construction land such as transportation land saw the most rapid increase.

To work out the mutual conversion rate of various lands in different periods using the transfer matrix method, cropland (paddy field and dry field) is converted into urban land, rural residential land, artificial pond and other construction land. The source of construction land is mainly paddy fields, dry fields, forested land and water areas (Zhang J. etc, 2007)

The farmland in the Su-Xi-Chang Region saw a reduction of 31,462 ha in the four years from 1992 to 1996, among which Suzhou witnessed a reduction of 20,555 ha, Wuxi 6,438 ha, and Changzhou 4,469 ha. The reduced farmland accounts for 4.26% of the farmland in 1992, or 36.44% of the land reduction of the whole province. Undoubtedly, the loss of farmland is serious in the Su-Xi-Chang Region. (Chen N.Q. etc., 1999)

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## 4 COUNTY-LEVEL ADMINISTRATIVE DIVISION ADJUSTMENT SINCE 1978

In 1978, the jurisdictions of the three cities were composed only of municipal districts and suburbs. Suzhou municipality had no suburban Government but a suburban office. Counties and cities at the county level were administered by the Suzhou administrative office and Zhenjiang administrative office. In 1983, the Suzhou administrative office was repealed. Changshu County was upgraded to Changshu City at the county level, Suzhou suburban office was repealed to establish a suburban Government. The urban districts of Suzhou and Wuxi were not adjusted. In 1983, Jiangsu took the lead in carrying out municipally affiliated county mechanisms, with Suzhou administering Changshu City, Shazhou County, Taicang County, Wu County, Kunshan County, and Wujiang County. Wuxi administered Jiangyin County, Yixing County and Wuxi County, while Changzhou administered Wujin County, Jintan County and Liyang County, establishing the domains of current Suzhou, Wuxi and Changzhou.

Since 1983, there are one or two counties in the Su-Xi-Chang Region that have escalated to ‘city’ at the county level. By 1993, all counties except Wu County, Wuxi County and Wujin County had been escalated to county-level cities. Not long after in 1995, Wu County, Wuxi County and Wujin County were escalated to county-level cities, and their seats of people’s Government moved out of central city. In the years after 1996, the administrative division at the county level remained the same. To be more accurate, a great reform was brewing. By the new century, a fundamental and dramatic change took place.

In 2000, county-level Wuxian City was dismantled to establish Wuzhong District and Xiangcheng District, county-level Xishan City was repealed to establish Xishan District and Huishan District. In 2002, county-level Wujin County was reformed to Wujin District, and its villages and towns were also adjusted. From 2003, no county-level administrative division adjustment has been made, but the adjustment of villages and towns was on going.

To sum up, in the 30 years since 1978, the county-level administrative division adjustment in the Su-Xi-Chang Region can be divided into two phases: before 1995 counties were upgrade to cities at the county level; after 1995 cities were dismantled to establish districts, turning county-level cities into municipal districts. However, the changes are fundamental adjustments different in nature. A municipal district is not as independent as common local administrative units in its official authorities. For example, there are no such institutes as the Public Security Bureau and Revenue, but substations. Moreover, the Governmental seat of city and that of county reside in the same downtown prefecture-level city, such as Changzhou City and Wujin County, Suzhou City and Wuxian County and Wuxi City and Wuxi County, thus causing disputes and conflicts. By 1995, Wu County, Wuxi County and Wujin County moved the Government site out of central city and thus escalated to county-level city (He Q.F. etc, 2009).

### 4.1 Coupling relationships based on temporal analysis

On March 5, 1978, the National People’s Congress passed the 1978 Constitution, which resumed the administrative office mechanism before the Cultural Revolution. In the mechanism, the administrative office is the agencies of provincial Government, supervising and instructing the Governments of counties and cities under its jurisdiction. In 1982, the 51st document of CPC central committee, “Notice on reforming prefecture mechanism and implementing municipally affiliated county” was written, approving the municipally affiliated county mechanism in Jiangsu Province, which has been implemented till that time. Although in the meantime counties were upgraded to county-level cities or repealed to establish districts, these can be regarded as an upgrade of municipally affiliated county mechanism.

The mechanism of the municipally affiliated county untied the limits on urban land use by administrative boundaries, and urban land saw a great increase: Since the implementation of municipally affiliated county mechanism in 1983, the urban construction land increased substantially and is now almost out of control. Is this coincidence? Let’s take a look at the original intention of the municipally affiliated county mechanism: to bring along the intra-county economic development with the advanced position of central cities. On one hand, it realised overall urban and rural planning, established the foundation of urban-rural integration, overcome the limits of small urban areas, and bridged the built-up area and the planned area. On the other hand, it broke urban-rural separation to promote the economic integration of urban and rural economies, thus causing the industries concentrated in the urban areas to spread towards rural areas, promoting industrial structure adjustment and the employment of rural labors. In addition, the municipally affiliated county mechanism helped streamline Government sector and improve work efficiency

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(Zhou W.L. etc, 2007). In fact, around 1973, construction land in the Su-Xi-Chang Region accounted for 82.0%, 57.9% and 64.2% respectively, and by 1982, the proportion rose to 87.5%, 79.8% and 82.6% (Xu G. Q. etc, 1986). During this period, the three cities are obviously limited in construction land due to scarce reserve resources in their own region. On the country, the mechanism of the municipally affiliated county expands urban development space for the three cities and the urban land scale expanded significantly. Obviously there is an intimate connection between urban expansion and the municipally affiliated county mechanism. Take Suzhou as an example, the urban construction land was 17,843 ha in the whole urban area (including downtown and Wu County) in 1984; the number increased to 32,812 ha in 1995, 52, 196 ha in 2000, and 90,891 ha in 2003. The proportion of urban land use in the four years is 1:1.8 4:2.9 and 3:5.09.

The implementation of county upgraded to city at county-level stimulates the land requirement of both the county-level city and the municipality-level city, accelerating their rapid urban land expansion: From the establishment of Changshu City in 1983 to the establishment of Wuxian City, Xishan City and Wujin City in 1995, it took the three cities 10 years to complete the work of escalating all counties to county-level cities. Why did the implementation of county upgraded to city receive substantial support from county-level officials? Besides its inherent advantages, this mechanism enlarged administrative authorities of the county-level city<sup>1</sup>, including the authority for approving land use (Zhou W.L. etc, 2007). Without doubt, this mechanism stimulated the land requirement in central cities of the Su-Xi-Chang Region, and accelerated the construction land expansion speed in newly established county-level cities. Take Wuxi City for example; from 1978, the urban construction land increased 242.50 km<sup>2</sup> in urban area (including central city and Xishan City), and accounted for 14.85% of the total land acreage. In the time periods of 1984-1991 and 1991-1995, the land expansion was 70.11 km<sup>2</sup> and 57.24 km<sup>2</sup> respectively. Although the expansion speed reduces during 1998-2000, the increase is still relatively fast. It is worth noticing that the construction land in central city is also increasing at a high speed during the time periods of 1984-1991 and 1991-1995, which coincides with the administrative division adjustment (Tang J.Y. etc, 2004). In 1995, Wuxi County was escalated to county-level city renamed Xishan City, and moved the Government site out of urban center of Wuxi City. The result is a representation of the contradiction between Wuxi City and Xishan City, and the compromise of the two parties. Xishan Government site moved to Dongting Town outside of the central city, providing space for the inner force of land expansion. With the construction of new and high-tech development zones, the urban land scale saw a great increase.

The mergence of a county-level city into the municipality-level city as its new district is the highest form of urban land expansion: From the separation of municipality-level cities and counties, to municipally affiliated counties, to the removal of counties and establishment of cities, the requirement of broadening the urban land plan is being satisfied in the process. But the requirement for urban construction land is insatiable, therefore the maximum form of external urban expansion is carried out, removing counties or county-level cities and establishing new districts. By 2000, Wuxian City in Suzhou, Xishan City in Wuxi and Wujin City in Changzhou had been reorganised to districts, which was helpful to meet the demand to expand their urban construction land. As is known, with economic development and population growth, there is often not enough space for central city to expand the urban area. In other words, any further development is restrained by the surrounding counties or county-level cities. Additionally there are problems such as repetitive construction, resource wasting, and environment deterioration in economic arrangement and municipal construction. Not long after counties or county-level cities moved the Government site out of central city, there is again too little space in the central city, surrounded or half surrounded as it is by counties or county-level cities. Therefore, with the mergence of county-level cities into municipality-level cities as new districts after 2000, the urban construction land in the Su-Xi-Chang Region saw an accelerated increase. For instance, the increase rate of the urban construction land in Suzhou from 2000 to 2003 was obviously faster than the speed in the time periods of 1995-2000 and 1984-1995, the average annual increase rate proportions in the three times periods is 9.48:2.85:1 (Tan M.Z. etc, 2007).

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<sup>1</sup> The additional administrative powers after the county upgraded to county-level city: holding certain foreign exchanges, investigation of entry and exit procedures, setting up customs, running banks (which can be secured for investment or that issue a large amount of loans), direct management of license plates and driver's examination and approval documents, enriching the public security and political work force, increasing the retention of urban construction maintenance, and especially holding the right of approving considerable areas of land. Otherwise, the expansion of authority is also included.

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However, what interests us is that financial interests are the fundamental motive of the change from a county or county-level city to a district. Under the existing cadre appraisal system, the regular assessment of the local Government is liable to be connected to its economic development, and local Government generally prefers to protect their own economic benefit and maximise inner benefits. Therefore, the adjustment of administrative divisions doesn't mean only the expansion of the land and urban space, but also means possession of more and greater development opportunities. For the municipal Government, changing from a county or county-level city to a district will help to enlarge the land area and increase municipal finances (Zhou W.L. etc, 2007). Compared with the "five unchanged policies"<sup>2</sup> implemented by the Wujin District of Changzhou City, there will be a clearer insight into the economic benefits behind the "changing from a county or county-level city to a district".

We can see from the analysis above that, since the expansion of urban construction land is the main motive of the administrative divisions adjustment, the newly added construction land will focus on the new county-level cities or districts, between which there should be a strong spatial correlation. But what is the practical situation in the Su-Xing-Chang Region?

#### 4.2 Coupling relationship based on spatial analysis

It is obvious that the conflict of urban land expansion occurs in the boundary of the central city and the peripheral counties or county-level cities. In other words, the existence of the spatial coupling relationship will undoubtedly produce the result that the administrative division changes are most frequently in places where the urban construction land expands rapidly—they are highly consistent in spatial relationship.

The three counties, Wuxian, Xishan and Wujin lagged behind the other counties in the Su-Xi-Chang Region in the course of county upgrades to city at the county level: Since the implementing of municipally affiliated county mechanisms in 1983, many counties one after another, have upgraded to county-level cities. The three counties (Wuxian, Wuxi and Wujin) whose Government seats lay separately in the urban centers of Suzhou, Wuxi, and Changzhou, upgraded to county-level cities last of all in 1995. They were late in this change because their county seats lay in the same places as their dominant cities (*shi-xian-tong-cheng*), and their dominant prefecture-level cities, Suzhou, Wuxi, Changzhou did not like to let these counties upgrade to county-level cities for their own interests. Contrarily, the prefecture-level cities wanted to merge these counties to districts, making them part of the city. Take the county of Wuxi for example, which lay around Wuxi City. With the expansion of the urban land in Wuxi City, the administrative area of Wuxi County was being constantly eroded. As it didn't have its own independent county site, its construction depended crucially on Wuxi City. For this reason since the 1980s, Wuxi County had been planning to build a new county site in the case of it being swallowed up (changing from a county to a district). Eventually, the county of Wuxi realised its dream of upgrading to a county-level city in 1995, but at the cost of giving a town, 19 villages with 130 km<sup>2</sup>, and some beauty spots such as Eighteen Bay and Gold Bay to Wuxi City (Guo Z., 2000). The new county site lay in Dongting Town in the east of Wuxi City, and was only 4km away from the original department. Currently, the new city is of considerable scale, but there is still a long way to go to it becomes the center of the whole district of Xishan.

Xishan City surrounded Wuxi City, and bore the brunt of the expansion of urban land of Wuxi City. Its land use structure has also changed hugely, overall showing a rapid decline in arable land and a substantial growth of residential, mining, and transportation land. During the 15 years from 1985 to 2000, the arable land in Xishan had decreased by 13,094 ha. Thereafter, from 1990 to 1995 it decreased 8,370 ha, four times that during the years from 1985 to 1990 with a decrease of 2,126 ha, and is 3.3 times that during the years from 1995 to 2000 with a decrease of 2,564 ha. Conversely, construction land including residential, mining and transportation land, increased substantially. During the years from 1990 to 1995, the number was the most significant at 5,736 ha; while during the years between 1985 and 1990, and the years between 1995 and 2000, the growth was 1,677 ha and 2,768 ha (Yu X.X. etc, 2003). There was an affinity between the great

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2. A staff team of four sets of leading cadres in Wujin District remains unchanged (excluding some leaders for exchange); The financial sharing ratio remains unchanged (except new provisions regulated by the province or above); The administration system remains unchanged except for planning and land which are unified management; The current distribution policy and social security system remain unchanged, and; The enterprise assets in the seven excluded villages and towns remains unchanged.

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loss of the arable land and Xishan City's planning to construct, or carrying out construction of the new town and the development zones (including the township-level development zone) and the urban construction. Similarly, Wujin City of Changzhou Prefecture-level City and Wuxian City of Suzhou Prefecture-level City had the same destiny.

The three county-level cities, Wuxian, Xishan and Wujin, moved ahead of the other counties in the Su-Xi-Chang Region when changing from a city to a municipal district: Owing to the strong convergence capability of the city center, various urban elements, such as industry, population, and capital, poured in constantly. Urban construction land continued to expand, and the problem of inadequate land resources again appeared. Appeals to the surrounding county-level cities or counties for land occurred. Coupled with other long-standing conflicts and grievances, the prefecture-level cities were bound to resort to adjustment of administrative divisions, thus causing the change from counties (cities) to districts. It was not difficult to understand that the first to accept the destiny of being adjusted was the county or county-level city that lay around the prefecture-level city. As expected, in 2000, Wuxian, Xishan and Wujin changed from cities to municipal districts. Except for Wujin, Wuxian and Xishan were separately dismembered into two districts. In other words, the expansion of the urban land area and the adjustment of the administrative division area overlapped spatially and connected with each other.

The fundamental motive of merging counties or county-level cities into prefecture-level cities as districts was to resolve the conflict of interests between them, thus hoping to resolve the contradiction and contention for more space for urban development of prefecture-level cities. However, the original external conflicts and contradictions had merely been internalised within the same district where the problems were not truly solved, and new problems simply arose. For example, in April 2002, State Council approved the adjustment from Wujin City to Wujin District of Changzhou City, but there were still many disagreements and challenges between Wujin District and Changzhou City including urban planning, urban construction and management, development zone construction, public facility construction, and major road network layout. Both entities had their own demands. While outwardly they seemed in harmony, the reality was that they were actually at variance because each thought only of themselves (He Q.F. etc, 2009). Contrarily, after the adjustment from a city to a municipal district, the expansion of the construction land of the new district became strongly intensified. Taking the Wuzhong District of Suzhou City for example, according to statistics, from 1984 to 2002, the area of arable land had decreased from 31,711 ha to 22,553 ha meaning a decline of 9,158 ha in 18 years. Thereafter, from 1995 to 1997, the area of arable land decreased 2,851 ha; and from 2000 to 2002, arable land decreased by a further 4,018 ha – the period of fastest reduction of arable land during the 18 years (Qiu H.J. etc, 2006). The lost arable land was mainly converted into water areas and urban construction land. When analysing the reasons for this, the researcher had evidently taken note of the location conditions of Wuzhong District, bordering the ancient city of Suzhou. Influenced by the expansion of Suzhou City as well as the construction of Wuzhong Economic Development Zone, much of the arable lands in the Wuzhong District were occupied for urban construction, of which Changqiao Town lost 1,880 ha of arable lands in 18 years, and 92% were converted into the new city and the developing zone. In June 1995, the original Wuxian County upgraded to Wuxian City at the county level. In February 2001, Wuxian City was repealed and merged into Suzhou City, dismembered into Wuzhong District and Xiangcheng District. Undoubtedly, the adjustment of the administrative divisions provided more possibilities for the expansion of urban land. In fact, the period of rapid loss of arable land coincided with the period of the adjustment of the administrative divisions, which can reveal the notable influence of the administrative division in the rapid loss of arable land.

### **4.3 Coupling relationship based on cumulative causation analysis**

The cumulative causation theory was put forward by Gunnar Myrdal, a famous economist, in 1957. It was then developed and reified as a model. Gunnar Myrdal deemed that, in a dynamic social process, there exists a circular and cumulative causation in every socio-economic factor. The change of a certain socio-economic factor will trigger another and the later change will intensify the former in turn. To the knowledge of the analysis above, there is a circular and cumulative causation (cumulative causation for short) between the expansion of urban construction land in the center zones of prefecture-level cities and the adjustment of the district in the surrounding counties. For example, Wuxi County Government located in center of Wuxi City. After implementation of the municipally affiliated county mechanism, various conflicts of benefits, such as urban construction land, arose. Wuxi City wanted to merge into Wuxi County as its

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district while Wuxi County was rejecting desperately the prospect of being swallowed. Therefore, it can be said that it was the expansion of the construction land in Wuxi City that made the situation of the administrative divisions unstable. In the decade of the municipally affiliated county mechanism, Wuxi City has gradually corroded districts of Wuxi County, making some vicinal villages and towns amalgamate. With decades of efforts and enormous cost, Wuxi County finally upgraded to a county-level city in 1995, renamed as Xishan City and moved the county seat out of Wuxi City. It is the implementation of county upgraded to city that is apparently triggered by the factor of urban land expansion.

As Xishan City was newly established, it would undoubtedly build a new county seat, increase the construction of infrastructure, found new developing zones and the like. The originally strong economic strength of Xishan, gave rise to an even stronger development impulse after its promotion from a county to a county-level city, and the urban land was much expanded. As a result, Wuxi City was given more space to develop. With fewer blocks, it released new power and the urban land rapidly increased. While the demand for urban land is infinite, the urban land itself is finite. Soon, the problem of a shortage of city development space emerged again and naturally the adjustment of administrative divisions was again broached. Explicitly, the former administrative area adjustments stimulated the expansion of urban land, which then incurred a shortage of urban land, and finally the desire of readjusting the administrative divisions reemerged. As expected, the program of changing from a county-level city into a municipal district implemented in 2000, satisfied the demand to extending the urban land more drastically. Disappointingly, the new round of adjustment of administrative divisions still stimulated all administrative units to expand the urban land. So does this fit Myrdal's theory of the cumulative causation?

With cumulative causation functioning, the most serious result is the vulgar usage of the land resource, to the point of waste. The land resource is non-renewable – arable land is depleted, thus forming a threat to the grain supply of region or country, and therefore making the society unsafe and unstable. The unfeasible level of construction in every developing zone of the Su-Xi-Chang Region is evidence of vulgar management and serious waste of land resources, and epitomises the Yangtze delta. Every developing zone is spreading out in vicious competition, decreasing the land price or supplying more revenue benefits to appeal to foreign capital. In Suzhou, the land development cost is about ¥3 million per hectare, and the price of land has fallen to ¥2.25 million per ha. Wujiang City (city-level) in Suzhou City, and Ningbo City and Hangzhou City in Zhejiang Province have decreased the land price to even ¥0.75 million per ha, and Wuxi City has decreased that to under ¥0.3-0.45 million per ha. Even some suburbs in Shanghai City have offered a low price of ¥0.75-0.9 million per ha. Under conditions of such vicious competition, the rapid growth of GDP is most certainly achieved at the cost of enormous land resources (Zeng Z. Y., 2007). According to another investigation, in the whole Yangtze delta, the product rate of industrial land is about only ¥200 million per km<sup>2</sup>, which is only 1/80th of the international product rate. The Caohejing developing zone in Shanghai has a product rate of ¥10 billion per km<sup>2</sup>, which is still ¥6 billion per km<sup>2</sup> less than the international level. The product rate of industrial land in the whole Shanghai is only 1/16th of the international level. It is obvious with these figures how vulgar the land use is in the Yangtze delta! (Liu Y., 2006)

To sum up, the main reason for the formation of a circular and cumulative causation relationship is the frequent adjustments of the administrative divisions. This is because even the old administrative divisions are being adjusted, the new administrative units still contend for benefits, and the contradictions and problems cannot be solved thoroughly.

## 5 CONCLUSION AND DISCUSSION

The above analysis shows that the urban land use changes in the Su-Xi-Chang Region are closely related to the administrative division adjustment in the region in terms of dynamic changes of time-series, the spatial analysis of geographic location, or cumulative causation, etc. Why then, did such a coupling relationship occur?

Firstly, Three prefecture-level cities, Suzhou, Wuxi and Changzhou, have strong advantages of attraction and gathering, which have a powerful attraction in the flow of people, logistics and financial flows

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inside and outside the region, etc, with the result that urban construction land extended progressively from centre to periphery. This means of domain extensions is somewhat similar to contagious diffusion, which is one of the three types of spatial diffusion proposed by T. Hagerstrand, a Swedish scholar, in 1953. The characteristics of this sort of land extension are undulant changes from the inside to the outside, thus the feature of the central city area has an obvious circle structure. Moreover, the frequent adjustments of the administrative division border also facilitates the central city's land expansion by meeting the urgent demand for land, therefore, the central cities spread dramatically.

Secondly, the Chinese land market's unique "duality" of urban and rural land markets and the "dual track system" of the urban land market provides enormous benefits space, and further induces a large expropriation or requisition of rural land carried out by the local Government, so as to contribute to urban land development and construction. It is widely known that Chinese urban land is owned by the state, and the rural land is collectively owned by peasants. The law also stipulates that "the use of the land collectively owned by shall not be sold, transferred or leased for non-agricultural construction." The land between the rural and suburban areas is also typically collectively owned by peasants. The only way to use this for urban construction is by Governmental expropriation or requisition. In other words, in China, only state-owned urban land that meets the requirements is allowed to transfer to the market of urban land, while the rural collective land is excluded from the land market, thus creating the "duality" of urban and rural markets (Hong S. J., etc, 2009). What's more, the system of compensable use of land and a market-oriented land price has been gradually established since 1987. At the same time, the administrative transfer system was not repealed, and there was still a large amount of non-urban development land becoming construction land by means of transfer. In other words, while compensable use and market-based transfer of land were promoted, administrative allocation of land still remained. The so-called "dual track system" of urban land market was consequently formed.

As a result, the scale of the central urban land expanded rapidly and nearly out of control. As the local Government's sole legitimate channel of "state collection or expropriation", rural collectively owned land is transferred to urban state-owned construction land. First, the land (mainly agricultural land) is expropriated from peasant collectives at low prices, and then the land is sold to business users at market price in the city-level land market. Therefore, land remise fund is gained legally. In other words, agricultural land converts to urban land, and differential rent occurs. Differential rent, as the price difference of the expropriation and transfer of land by the Government (on behalf of the owner of collection), provides a huge rent-seeking space, as well as evoking tremendous enthusiasm for the Government to expropriate land. On the other hand, the peasant collectives which are excluded from the interest distribution system of legal land expropriation and transfer, and the state-owned units obtaining land use by transfer, creates different types of land "black-markets" through different channels to transfer or sell land, in order to obtain value-added income of transferring agricultural land to non-agricultural land and the transfer of construction land. These two factors respectively contribute to the expansion of the scale of urban land (Hong. S. J, etc, 2009).

It is easy to understand that when the central city suburbs are too small, or the available reserved land resources (mainly agricultural land) are seriously inadequate, counties or county-level cities will be transferred into the outskirts of cities by means of administrative divisions, so as to expand the geographical scope of suburban areas, and then in turn expand urban land by means of the agricultural land expropriation or requisition mentioned above. To a certain extent, adjustment of administrative divisions is an inevitable prelude and means of urban land expansion, and the administrative division adjustment of the county (city) around the central city is quite frequent.

Thirdly, the system of municipally affiliated counties objectively facilitates the administrative division adjustment of prefecture-level city. When the system of municipally affiliated counties had not been formed, prefecture-level cities and counties (or county-level cities) were two parallel administrative regional units and relatively independent economic interests. As the system of municipally affiliated counties came into practice, a clear hierarchical relationship between city and county has been formed, causing many conflicts of interest and contradictions which were difficult to reconcile. In particular, the prefecture-level cities have a very strong ability to control the county or county-level cities, and the prefecture-level cities occupied social resource of the county or county-level cities by the executive power, which seriously restrain the development of the county or county-level cities. Therefore, prefecture-level cities expand urban land area through the adjustment of administrative division, as well as trying to ease the opposition between the cities and counties by adjustment of administrative divisions (such as merging a county into a municipal district).

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Practice has proved that such efforts are futile. When old conflicts have not been resolved, new ones will be created. In recent years, many provinces in China implement the experimental work of "county (or county-level city) controlled directly by the provincial Government ". By reducing the administrative level, the autonomy of county is strengthened, so as to enhance the county's economic strength. However, many prefecture-level cities are unwilling to give up the interest of the counties, and speed up the pace of merging a county into a municipal district.

In short, in the past 20 years, due to the rapid expansion of China's urban land, large amounts of farmland are occupied, resulting in extensive new land management, serious waste, and shortage of arable land reserve resources, thus endangering national agricultural development and food security. Therefore, such acts must be resolutely eliminated. Currently, city administrative boundaries play an important role in restraining urban land expansion and the administrative divisions should remain relatively stable. It is an expedient measure to solve the interest conflicts between the Government of the city and the county by the adjustment of administrative divisions. The Government should transform Government functions, reform the cadre evaluation system, modify the "Omnipotent Government" into "Limited Government", and thus gradually lift the Government's direct intervention in the economy, establishing an overall concept for regional cooperation, in order to achieve the development of regional integration. Moreover, the economy in the Su-Xi-Chang Region is well developed, the coupling relationship between urban land expansion and adjustment of administrative divisions is quite obvious and universal. Other areas should pay much attention to this phenomenon and take preventive measures.

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#### REFERENCES

- [1] Chen N.Q., etc., Dynamic Monitoring of Land Use by Remote Sensing on Modernization Process of the South Jiangsu—a Case Study of the Region of Suzhou, Wuxi and Changzhou, *Resources and Environment in the Yangtze Basin*, 1999, 8(3):288-293.
- [2] Guo Zhan, On Some of the Problems in the New Town Construction around Xishan City, *City Planning Review*, 2000,24(5):15-18.
- [3] He Q. F., etc., Study on the Innovation of Administrative Division of Changzhou City, *Economic Geography*, 2009, 29(2): 225-230.
- [4] Hong S. J., etc, China's Urban Spatial Growth Based on the Reform of Land Use System: A Theoretical Analytic Framework. *Urban Planning Forum*, 2009,181(3):89-94.
- [5] Liu Junde, Considerations into the Reformation of Subdivisions in the Yangtze River Delta, *Discovery and Discussion(Chinese)*, 2003(6):12-14)
- [6] Liu Yong, The Shortage of Land Forced the Yangtze River Delta Economic Restructuring, *China's reformation(Chinese)*, 2006(7):57-59.
- [7] National Bureau of Statistics of China(NBSC), *The Yangtze River and Pearl River Delta and Hong Kong, Macao and Taiwan Statistical Yearbook 2008*, Bureau of Statistics of China, December 2008
- [8] Qiu H. J., etc., Change in Land Use of Cultivated Land Around Taihu Lake and Its Driving Forces—the Case of Wuzhong District of Suzhou City, *Soils*, 2006, 38(4):390-395.
- [9] She Zhixiang, *Land and Water Resources and Regional Development in the Yangtze River Delta*, Hefei:

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- China University of Technology Press(Chinese), 1997:15-48
- [10] Tan M.Z., etc., RS-and GIS-Based Assessment of Impact of Urbanization on Soil Resources in Suzhou City in the Last 20 Years, *Soils*, 2004, 36(6):621-625.
  - [11] Yang Guishan, The process and Driving Forces of Chang in Arable-land Area in the Yangtze River Delta During the Past 50 Years, *Journal of Natural Resources*, 2001, 16(2): 121-127.
  - [12] Yu X. X., etc., Analysis of Regional land use structure differences in Yantze River Delta, *System Sciences and Comprehensive Studies in Agriculture*, 2003, 19(1):46-49.
  - [13] Zeng Z. Y., etc., On Land Problem in Urbanization Process of Yangtze River Delta, *Journal of Hunan Financial and Economic College*, 2007(5):63-65.
  - [14] Zhang J., etc., Analyzing Land Use Change and Its Driving Forces in SXC Region over the Past 20 Years, *Resources Science(Chinese)*, 2007,29(4):61-69.
  - [15] Zhang L. C., etc., The Characters of Urban Land Expansion in Southern Jiangsu Province and Its Problems, *Progress in Geography*, 2003, 22(6): 639-645.
  - [16] Zhou W. L., etc., Analysis on the Administrative Division Adjustment from the Viewpoint of Political economics, *World Economic Papers*, 2009, 29(2): 82-91.

