URBAN-RURAL CONSTRUCTION LAND TRANSITION: A REVIEW OF RESEARCH IN CHINA

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Biographical Notes

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Abstract

Sustainable utilization and management of urban-rural construction land in the process of new-type urbanization has become one of the hot issues in China’s land use. It becomes scientific problems to explore comprehensive research approach of urban-rural construction land change from perspective of land use transition, evaluate urban-rural construction land use changes reasonably, and probe into the coupling relationship and interaction mechanism between urban-rural construction land transition (URCLT) and social-economic development. For the purpose of catching the development of URCLT, we give a comprehensive description of the research on URCLT by using the summary and comparison approaches. In the past few years, great progress has been made in URCLT, and it’s summarized at the following aspects: research perspective of land use transition, the main research
contents and methods of URCLT. The existing research presented the following features: a diversity of research perspectives and contents, positivism methodology. At last, it is suggested that the following aspects should be further studied: comprehensive research on process of URCLT, and the coupling relationship between URCLT and social-economic development at various analysis scales, in which urban-rural construction land is regarded as a whole.

**Keywords:** land use transition, urban-rural construction land, coupling, management-control, literature review

**JEL Classification:** R30, Q15

1. **Introduction**

Along with the acceleration of industrialization and urbanization, the construction land space expansion induced by land and economic & social pressure has become one of the main characteristics of land use/cover change (LUCC) in China, and increasingly become a hot issue in China’s land use (Liu et al., 2005; Tan et al., 2005; Huang et al., 2007; Jiang et al., 2006). As seen from the existing researches, many scholars have carried out plentiful fruitful researches on construction land expansion based on multiple time and space dimensions, mainly surrounding the time-space characteristics, driving mechanism, simulation prediction, expansion effect and control, etc. of construction land expansion under the basic framework of LUCC research. However, LUCC is a very complicated phenomenon, and in order to avoid the one-sidedness of research, we should constantly bring forward new research topics, develop new research methods, and look for new ways of comprehensive research (Cai, 2001). As a LUCC research method integrating the time dimension and historic background of social and environmental changes, land use transition research belongs to the main scientific problems involved in Global Land Project (GLP), and has been introduced to China and developed quickly by combining with the characteristics of China’s society and economy in recent years (Long, 2003; Long, 2012; Long and Li, 2012). The comprehensive research way which exploring the changes of construction land from the visual angle of land use transition has improved the present pattern of researching the expansion, allocation efficiency or intensive utilization of construction lands from simplex visual angle, deepened the systematic research on construction lands, and enriched the contents of research on land use transition.
At present, China has stepped into the new stage of fast promotion of new urbanization, and the period of obvious conflicts mainly featured by greater restriction of resource environment. China’s fundamental realities of big population and little land have induced the increasingly prominent conflict between construction land expansion and cultivated land protection. According to the statistical data of the Ministry of Land and Resources, in 1999-2011, China’s net agricultural acreage reduced was 7,991,400 ha., including more than 2,800,000 ha. occupied for construction, with annual occupation of more than 210,000 ha. in average. The Central Government has brought forward implementing the strictest farmland protection system and economical & intensive land use system, but driven by the benefits such as economy, benefit, and political performance, etc., local government fails to effectively solve the problems such as “superior requisition with inferior compensation”, treasuring expansion and scale, but belittling potential tapping and efficiency in terms of land use method, and failure of the “linkage with the change of urban-rural construction land” policy, etc. (Zhao and Huang, 2012; Chen et al., 2012; Dai, et al., 2010; Lin, 2009). Especially, according to the requirement of “using resources in a saving and intensive way, and promoting the fundamental transition of resource utilization method” clearly brought forward in the Report of the 18th National Congress of the CPC, it has become an important task in urban-rural construction land planning management to break through the “bottle-neck” of development through the transition of resource utilization method, and promote the transition of development method. Therefore, analyzing the transition trend and difference of urban and rural construction lands in different periods and regions, and exploring the mechanism and rule of URCLT may provide a decision-making evidence for making reasonable policies for construction land planning management.

The research on changes of land use from the visual angle of land use transition has aroused more and more attention. The existing researches have analyzed the transition of forest land, cultivated land, and homestead, etc. by introduced many research methods and means, and obtained research findings with insights. Meanwhile, spatial expansion, allocation efficiency, and intensive gradient change, etc., which are closely related to URCLT, have even attracted the attention of
plentiful scholars from different fields, and have become hot spots in geographic research. This paper looks back upon related contents of research on land use transition, and summarizes related researches on the field of urban-rural construction land change based on the visual angle of land use transition, in order to lay a foundation for promoting the research on URCLT, and thus provide a scientific evidence for promoting the high-efficiency and reasonable utilization of urban-rural construction lands during the new urbanization.

2. Visual Angle of Land Use Transition

2.1. Origin of Land Use Transition

Land use transition was initially brought forward by Grainger from the University of Leeds when researching national land use giving priority to forestry (Grainger, 1986; Long and Li, 2002; Long, 2003); later, this research direction attracted much attention of Europe and America, and was introduced to China by Prof. Long Hualou at the beginning of 2000.

Foreign researches on land use transition, as one of the expression forms of land use change (Long, 2012), mainly concentrate on forest transition, namely the trend transition of national or regional forest land area from net decrease to net increase along with the development of economy and society (Mather, 1992). In recent years, many researches have proved the forest transition in some European, American, and Asian countries or regions such as Scotland (Mather, 2004), America (Yeo and Huang, 2013), Mexico (Bray and Klepeis, 2005), China (Li and Zhao, 2011; Mather, 2007), India (Mather, 2007), Viet Nam (Mather, 2007), and Korea (Bae et al., 2011), etc., and explored forest transition theory surrounding occurrence mechanism, typical route and driving factor, etc. (Lambin and Meyfroidt, 2010; Barbier et al., 2010).

However, domestic researches on land use transition mainly involve the concept (Lu et al., 2006), theory (Long, 2006) and hypothesis (Li, 2008) of land use transition, the transition of overall land use model and structure (Yang and Yang, 2009; Kong, 2012), the transition of single land use type (Long and Li, 2002; Li and Zhao, 2011; Long, 2006; Long et al., 2007; Long and Li, 2005; Long and Li, 2012), and the relationship between land use transition and related economic & social
activities (Long, 2012; Long, 2003; Long and Li, 2006), etc. Wherein, Long Hualou et al, based on theoretical analysis, have deeply explored the transition and coupling mechanism of cultivated land and homestead in typical strip transect along the Yangtze River of China (Long and Li, 2002; Long and Li, 2005; Long and Li, 2012), and obtained abundant achievements. Land use transition research provides a comprehensive research way for more systematically discussing the problem of construction land expansion during fast industrialization and urbanization. However, the present research on construction land change based on the visual angle of land use transition is only limited to the analysis on the transition of rural homestead, and it’s necessary to develop comprehensive discussion on more construction land types.

2.2. Concepts of Land Use Transition and URCLT

Land use transition was initially understood as the change in macroscopic trend of some land use type. Along with the constant deepening of research, the concept of land use transition has been further expanded; namely, it is the process that a land use form (including dominant and recessive forms) in a region and a period is transited to another land use form under the driving of social and economic change and innovation, and it is generally corresponding to the transition of economic and social development stage (Long, 2003).

According to the connotation of expanded land use transition, the URCLT could be understood as a transformation process that a form of regional urban-rural construction land use is transited to another form under the driving of social and economic transition. As shown in figure 1, an urban-rural construction land use form at a certain time is not only the consequence of last period of transition, and the beginning of the next period of transition. So, it is not formed a fixed or the ultimate form of land use, it is a process that urban-rural construction land use form evolve continuously.

Although research perspectives are different, Plentiful researches have theoretically deduced or proved the trend change of construction land. To a certain extent, they can be understood as a kind of exploration research on URCLT. For example, some scholars consider that, as spoken from the objective rule of economic development and construction land expansion, construction land cannot
be expanded endlessly, and along with the growth of GDP, the area of construction land will keep growing, but the growth rate will keep decreasing (Liu, 2008); around the upcoming 30 years, the expansion of construction land in China will reach the extreme time point (Li et al., 2011); along with the development of economy and society, the proportion of rural homestead in the total increased construction land will gradually drop, until that this proportion tends to be a fixed value (Long, 2006), and this theoretical hypothesis has been verified in the research on the transition of rural homestead in strip transect along the Yangtze River.

**Figure 1. The conceptual schema for URCLT**

However, restricted by the abovementioned macroscopic transition rule, how are the medium- and micro-cosmic URCLT and its coupling relation with the development of regional economy and society? How are the interaction mechanism and interactive effect between the trend change of dominant forms such as area and structure, etc., and the recessive forms such as property right, operation method and input-output, etc. of urban-rural construction land? The abovementioned research on urban-rural construction lands from macroscopic scale lays a good foundation for answering these questions, and the research on URCLT from medium- and micro-cosmic scale
becomes a comprehensive way for promoting the continuously deepened research on construction land change.

3. Research Content of URCLT

According to the theoretical connotation of land use transition, the contents of research on URCLT are mainly embodied at the following aspects: (1) the change of dominant forms such as area, structure and spatial pattern, etc. of urban-rural construction land; (2) the change of recessive forms such as ownership, operation method, input and output, etc. of urban-rural construction land; (3) the coupling relation between URCLT and economic & social development; and (4) management-control of URCLT.

3.1. Change of Dominant Forms of Urban-Rural Construction Land

The research on the change of dominant forms of urban-rural construction land is mainly embodied at the research on the time-space characteristics of construction land expansion, especially the research on urban construction land. The time-space process of construction land expansion is not only an important content of research on urban development, but meanwhile, a basic content of research on global environmental change (Turner et al., 2007). Some scholars have predicted that, the urban construction land area of global developing countries will increase from 300,000km² in 2000 to 770,000km² in 2030, until 1,200,000km² in 2050 (Angel et al., 2011). Asia and America are generally considered as the regions having the quickest construction land expansion (Wang and Fang, 2011; Schneider, 2008). At present, the analysis is mainly developed from two aspects. The first is to carry out analysis based on the statistical data based of time series; the second is to carry out overlay analysis by selecting the spatial data of construction land at different time points, extract the changed area at different time points and its source and whereabouts, and construct related indexes to describe the characteristics of changes in dominant forms such as area, structure and spatial structure, etc. Generally, it’s easier for the latter to obtain a conclusion with spatial connotations. As some scholars have pointed out, different time-space modes of construction land expansion may be classified into
spreading, filling, and jumping types, etc. from the angle of topology (Xu et al., 2007). However, different land use structures and types can result in obvious differences in spatial mode. For example, in 1982-1997, urban land expansion of Beijing was featured by circle spreading, but wherein, industrial land had noticeable spatial discreteness and axial concentricity (Liu et al., 2002). Meanwhile, it’s also an extremely effective way to survey the area growth, spatial difference and development model of regional or urban construction landing a period of time by constructing “landscape pattern index”, “urban growth pole core” and “urban growth pole zone” models (Li et al., 2007; Liu et al., 2009; Buyantuyev, 2010). In addition, the issues like the quantity of land used, pattern change, and village hollowing, etc. of rural residential areas all over the country, and in the regions like the strip transects along the Yangtze River, and Three Gorges Reservoir region, etc. have aroused much attention (Long et al., 2007; Li et al., 2010; Zhou et al., 2011; Tian et al., 2003; Liu et al., 2010). On the whole, there are extremely abundant cases about the change of dominant forms of urban-rural construction lands at home and abroad, and the research methods are relatively mature, but little attention is paid to the structural changes of urban-rural construction lands, namely the structural changes of lands for different functions such as residence and industry, etc. inside urban construction lands, as well as the change in the portion of the lands for towns, villages, industry and mine, etc. among the whole urban-rural construction land, etc. Such change of structure and portion is not only the deduction of time series, but meanwhile, it is more embodied at the spatial form of urban-rural construction land use. Some scholars have analyzed the structural changes of construction land with entropy of information, etc. (Zhang et al., 2010; Wang and Cao, 2004), or carried out relatively deep-going research on the structural evolvement trend and mechanism of urban-rural construction land (Lin, 2009), but there is relatively few research which organically connects the two dimensions, namely structural optimization and spatial allocation. As seen from the visual angle of land use transition, such time-space change of structure and portion possibly has close relation with deeper-layer recessive form change, economic and social development, and it is an important foundation for exploring the mechanism and rule of URCLT. Especially, the change of urban-rural nature inside urban-rural construction land has become more and more important and worthy of
attention, but it is not specially mentioned in the existing researches on urban expansion and land non-agriculturalization, etc. (Li et al., 2012). These are just the issues that the future researches are worth paying attention to.

3.2. Change of Recessive Forms of Urban-Rural Construction Land

The change of purpose, ownership and operation method among the recessive forms of urban-rural construction land is generally embodied at the expropriation and transfer of croplands and the circulation of rural collective construction lands during non-agriculturalization of croplands, while the change of input and output, etc. is embodied at the change of the utilization rate and intensive degree of urban-rural construction lands.

The change of recessive forms such as the rights & interests and operation method, etc. of construction land involved in the expropriation and transfer of croplands and the circulation of rural collective construction lands in China has aroused the attention of plentiful scholars at present (Hu, 2012; Qu and Tan, 2010). Some scholars have discussed the urban-rural nature change in construction land change, and the enhancement of land use efficiency arising from hereof from the visual angle of land urbanization (Li et al., 2012). But the present researches give priority to social and economic fields, pay more attention to analyzing the benefit driving of each party participating in land expropriation and the potential social problems aroused by the damage of landless peasants’ benefits (Li et al., 2012), and lay particular stress on the discussion at the layer of policy and system (Li et al., 2012), and there are short of comprehensive researches at regional scale. Land use transition occurs within the three correlative and interactive frameworks such as natural system, economic system and institution system anytime (Long, 2012; Li, 2002). Especially, each region has different resource endowments and development resources, and will possibly present widely different changes in the dominant forms of construction land, so that there are possibly great changes in the change background, demand and direction of its recessive forms, for example, the practice model of Yixing collective construction land usufruct circulation spontaneously explored and developed at certain stage and under certain territorial environment (Chen et al., 2012). Therefore, discussing the change and mechanism of recessive forms such as property right and operation method, etc. based on
the practical changes of dominant forms of regional urban-rural construction lands and combining with the country’s fundamental realities has become an important content to be expanded in the research on URCLT.

The research on the change of urban-rural construction land utilization rate and intensive degree involves extremely abundant contents. Many domestic and overseas scholars have carried out plentiful discussions on the efficiency index, element efficiency and area differentiation of regional construction lands, the industrial comparison and spatial differentiation of intensive utilization level, etc., as well as the land use intensivism change of cities, development zones, and villages, etc. (Taleai et al., 2007; Sun et al., 2012; Chen and Feng, 2011; Oh et al., 2005). As seen from content, the evaluation and change of utilization efficiency and intensive degree, and their influential factors, effect and control ways, etc. are all involved, but comparatively speaking, there are abundant researches on influential factors and evaluation, but few researches on the mechanism, process and effect of change in the utilization rate and intensive degree of urban-rural construction lands. As we all know that, the change in the utilization efficiency and intensive degree of urban-rural construction land has complicated interaction effects with industrial structure adjustment, urban-rural planning, regional land market, resource consumption, and ecological environment, etc. Regional land utilization transition analysis provides a feasible comprehensive way for deeply researching such change process and interaction, and becomes an important content that the future researches are worth paying attention to.

3.3. Coupling Relation between URCLT and Economic & Social Development

The research on the coupling relation between URCLT and economic & social development is mainly embodied at the relation of construction land with economic development, urbanization, urban-rural transition, and rural development transition. Plentiful researches have pointed out that, construction land expansion has visible and close relation with economic development (Deng et al., 2010; Zhong et al., 2010; Wu and Zhang, 2012). When making important contributions to the growth of the secondary and tertiary industries, the change of construction land has given different responses to economic development at different stages (Jiang and Qu, 2009). Most scholars identify with this rule,
only that the concrete degree of contribution and response will possibly be different due to different research regions and data sources. Meanwhile, economic development is embodied at not only the input and output of production factors, but also the different lateral sides of economic development mode, such as enterprises’ ownership structure, capital source, and production organization, etc. (Ye et al., 2011). As seen from this angle, it’s not enough for the existing researches to only pay attention to the correlation between construction land and economic growth. On this basis, we should further deeply explore the time-space coupling and interaction relation between the transition of various typical urban-rural construction lands and the change of economic development mode by means of quantitative analysis.

Some researches analyze the dynamic mechanism of mutual influence at different stages of urbanization and construction land, and consider that, the two are balanced at long-term scale, and the expansion of construction land area is an inevitable result of urbanization promotion, but the enhancement of urbanization level in a short term is not a direct factor inducing the expansion of construction land area (Wu et al., 2009). Some scholars have constructed the “process – relation – mechanism - coordination” theoretical analysis framework for and by combining urban-rural transition and cropland non-agriculturalization (Hu, 2012). Meanwhile, various social and economic problems exposed in the course of rural transition and development may be reflected in land use. Rural transition and development promotes land use transition, and conversely, the result of land use transition acts on rural transition and development; and the land use transition and rural transition & development have mutual influences, and a coupling relation in a sense (Long, 2012). Especially, the policy of “linkage with the change of urban-rural construction land” issued for protecting the red line of cultivated lands, relieving the conflict between the supply and demand of construction lands, and promoting the construction of new countryside is deeply changing rural land use form, and accelerating China’s rural transition and development through reconstructing rural grass-roots organization, rural industry and development space (Long, 2012). It should be pointed out that, the existing rural collective construction land use system and urban-rural split binary land market mechanism are the key factors restricting the change in the recessive forms of urban-rural
construction land, and deeply affect URCLT. Obviously, the coupling relation between URCLT and economic & social development is extremely complicated; we should take urban-rural relation as breakthrough point, select a typical type of territory, and reveal the mechanism of mutual feedback between the transition of various typical construction lands and the main control factors such as industry, population and employment, etc. in regional social and economic transition, as well as the dynamic mechanism inducing the transition from the visual angle of regional nature – ecological structure, technology- economic structure, and society- policy structure (Long, 2012), and this has become an important way for exploring the coupling relation between URCLT and economic & social development.

3.4. Management-Control of URCLT

URCLT will bring about various complicated effects to economy, society and ecological environments, etc. Especially, it has become an issue arousing much attention of all social circles, namely how to prevent orderless expansion of construction land and relieve the occupation of agricultural land and important ecological environment land for construction land. Foreign related researches mainly start from regional ecological background, and establish urban growth boundary or divide governance zones by classifying lands and delimiting environment-sensitive regions as limited development areas, in order to control the orderless spreading of urban construction land (Couch and Karecha, 2006). These planning methods controlling the orderless spreading and guiding the reasonable growth of urban construction land are mainly represented by American “urban growth boundary (UGB)” and British “green belt” policy (Lin, 2009). On the other hand, economists urge controlling the orderless spreading in transition of urban-rural construction land by means of market regulation & control and financial & tax policies, etc. It is deemed effective to affect land market with direct land use regulation policy (Munroe et al., 2005) or integrate traffic planning and land use planning, and limit the transition of agricultural land into construction land (Sun et al., 2011), etc. It could control the use of construction land through development influence tax, tax preference, and graded tax rate, etc., but as considered from the view points of actual effect and operability, the combined policy of land use planning, industrial planning, traffic planning, public investment and
financial & tax policy will possibly be more effective (Feng, 2011). Implementing the control of aggregate construction land, the two-way adjustment of supply and demand, and differential management has become an inevitable choice for promoting the transition of development method, and realizing double win of guaranteeing development and protecting resources through the reform of resources utilization method in China at present. As spoken from the control of URCLT, the key is to make reasonable decisions on the time-space allocation of urban-rural construction land in terms of regional economic growth rate, fair development of urban-rural different regions, the interexchange of different land use structures and exchange value, and protection of ecological environment, etc. Therefore, it has become an important direction of exploring the control of China’s URCLT, namely to summarize and abstract the model for optimized control of URCLT in fast industrialization and urbanization, and to actively fulfill the model by combining with the policy means such as national land planning and land use planning, etc., as well as the construction of urban-rural uniform land market mechanism, based on the achievements of research on the coupling relation between URCLT and economic & social development.

4. Research Methods and Means

It may be discovered from the documents grasped that, the research means and methods involved in URCLT mainly include the following:

The first is data procurement based on remote sensing technology. The advantage of remote sensing image rests with that, it can provide regional large-scope continuous observation data, directly reveal the change in dominant forms of construction land, and make related map. However, it is generally restricted by spatial resolution, time resolution, and acquisition cost.

The second is spatial analysis and system simulation based on GIS. Through GIS spatial analysis, it may realize graphic data correction, spatial query and measurement, and spatial data interpolation, overlay analysis, and buffer zone analysis of urban-rural construction lands; and through integration of GIS with multiple econometric models, it may realize the spatial modeling of URCLT and various influential factors.
The third is statistical analysis and econometric analysis. Among the existing researches, the time-space characteristics, trend, and relation with economic & social development of urban-rural construction land change are researched with multiple analysis methods, including canonical correlation analysis, variance analysis, regression analysis, co-integration analysis, decoupling analysis, discriminant analysis, principal component analysis, grey correlation analysis, and spatial autocorrelation analysis, etc.

In addition, the integration of remote sensing, GIS and peasant household investigation, the multi-subject modeling method, IGBP strip transect sampling, horizontal comparison method and deduction method, etc. have been applied to related researches on URCLT. However, the research on URCLT involves the crossing of multiple disciplines, such as geography, economics, management, ecology, and sociology, etc., so it’s still necessary to strengthen the exploration of methods for researching the coupling relation between the time-space process of transition and the economic & social development, and especially, it’s necessary to strengthen the integration of material space layer and economic & social layer of URCLT through the combination of GIS spatial analysis method, econometric analysis method, and system analysis method, finally forming a method system for the analysis of URCLT.

5. Comment
At present, related researches are mainly featured by the following:

The first is the diversification of research visual angles. In the research of urban-rural construction land expansion, scholars are not limited to analysis from the visual angle of geography any more, but instead, they carry out systematic investigation from multiple angles, such as society, economy and ecological environment, etc. The research on land use transition provides a comprehensive way for the researches integrating multiple visual angles. However, the research from the visual angle of land use transition was initially understood as only on the macroscopic trend change of some land use type. However, along with the constant deepening of research, the concept
of land use transition is further expanded, and related analysis thought and research content will also be further deepened.

The second is the wide range of research contents. Scholars have carried out deep-going analysis on the transition of multiple land use types, such as cultivated land, forest land, and homestead, etc., and widely discussed the change of various dominant and recessive forms, such as area, structure, property right, and operation method, etc. of urban-rural construction land, as well as their driving mechanism and management-control measures, etc. However, scholars have only analyzed the transition of rural homestead at present, and it’s necessary to develop comprehensive discussions on more construction land types. Especially, the existing researches most conduct analysis from a macrocosmic scale, but other contents are to be further expanded, such as the medium- and micro-cosmic URCLT and its coupling relation with the development of regional economy and society; the trend change of dominant forms such as the area and structure, etc. of urban-rural construction land, and the mechanism of its interaction with recessive forms such as property right, operation method and input-output, etc.

The third is the demonstration of research methods. Scholars pay more attention to the combination of theory and demonstration, especially, they pay attention to acquiring and processing related data by means of remote sensing and GIS, etc., and carry out empirical analysis through constructing measurement model.

Obviously, existing achievements have not only enriched the research content of URCLT, but also provided analysis thought and method reference for future related researches. Still, the research on URCLT need to be deepened. Especially, for China in the period of economic and social transformation, the present related researches seem to be slightly scattered, lay particular stress on discussing related problems of urban-rural construction land change from multiple different lateral sides, and are relatively lack of the analysis from medium- and micro-cosmic layers. Obviously, along with the deepening of China’s land use transition research in latest years, scholars have begun to pay attention to the use transition of individual typical land types such as homestead, etc. However, there is few comprehensive research which discusses URCLT by taking urban-rural construction land
as a whole at present, while the change of urban-rural construction land is an interactive process, and the research should still be strengthened on the construction land transition during urban-rural transition and its coupling relation with economic & social development at various scales.

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