



Introduction to land use and rural sustainability in China

Yansui Liu^{a,b,*}

^a Faculty of Geographical Science, Beijing Normal University, Beijing 100875, China

^b Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China



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ABSTRACT

This themed issue on *Land Use Sustainability in China* builds on the papers presented at an international conference (Pre-International Geographical Union 2016 Conference) on “Land Use and Rural Sustainability”, convened by the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences in Xi’an, China on August 17–20, 2016. The conference set out to review the impacts of the transformation of human socio-economic activities on land-use change and associated policy making from both a Chinese and a global perspective. The contributions to this themed issue provide conceptual-theoretical and empirical studies on the topic, covering five themes: key issues of land use and sustainability, urbanization and farmland protection, rural transformation and reconstruction, urban-rural interaction in a changing society, and land resources engineering and land use policy. China has undergone intense socio-economic transformations during recent decades which has affected all sectors of the country’s economy. The rapid urbanization has seriously affected rural areas, leading to the intensification of “rural disease” issues and farmland losses, and the implementation of rural revitalization in China is imperative. In view of this, the papers make a compelling call for more systematic research on land use sustainability and emphasize the challenges for further research on land use and rural revitalization in China.

Land use is one of the key aspects which has highly supported the socio-economic development of human beings. Urbanization is one of the major land uses and land cover changes sweeping the globe. In this process, land conversion from its natural state to human use becomes the most permanent and often irreversible effect of human interaction with the natural environment. The transformation of human activities in turn, exerts further impact on land use change and associated policy making. Despite numerous benefits originating from urbanization, a rapidly urbanizing world is facing intensified resource scarcity and environmental degradation (Liu et al., 2017). Rural decline is a global issue and has inevitably been accentuated through increasing global levels of urban development. There is no doubt across all countries in the world that there has been migration of people from the countryside into the cities. As a result, the development capacity of villages has fallen and threatened their sustainability and resilience. So it is of great theoretical value and practical significance to study relevant land use policies and mechanisms which may help adaptations to the transformation of socio-economic development and strategic change. A rural revitalization is also needed to counter urbanization across the globe (Liu and Li, 2017).

As the most populous nation, China has undergone rapid and intense socio-economic transformations since the economic reforms of

1978, referring to a process that has been accompanied by rapid land use changes and modifications affecting all sectors of the country’s economy. Besides, rapid development of industrialization and urbanization has boosted economic development and improved international competitiveness while also deeply influencing its vast rural areas and has affected China’s transformations of regional rural-urban relationships and industry-agriculture relationships. Rural areas are being abandoned for reasons that include mobility and technology, poverty, biased policy and inadequate land management (Long et al., 2010; Liu and Li, 2017).

In the face of globalization, climate change, food security concerns and development inequalities, the better understanding of key questions related to land use and rural sustainability, and putting forward countermeasures favouring sustainability are becoming crucially important to the world. What are the connections between land use and rural sustainability? How to revitalize rural decline? How to improve land use productivity whilst achieving more sustainable development? How to implement rural restructuring and improve rural transformational development? Bearing these questions in mind, the Institute of Geographic Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS) took the initiative to organize the International Conference on *Land Use and Rural Sustainability* held in

* Corresponding author at: Faculty of Geographical Science, Beijing Normal University, Beijing 100875, China.
E-mail address: liuys@igsnr.ac.cn.

Xi'an, China on August 17–20, 2016. This conference was also co-organized by the Key Laboratory of Degraded and Unused Land Consolidation Engineering, The Ministry of Land and Resources of China; Beijing Normal University; Shaanxi Normal University; and the journal *Land Use Policy*. It established a platform for academic communication and exchanges, and it also set out to review the impacts of the transformation of human socio-economic activities on land use change and associated policy making from both a Chinese and a global perspective in order to explore directions and approaches for land use and sustainable development. This themed issue focuses on land use sustainability in China to understand key questions related to land use and rural sustainability, and puts forward countermeasures emphasizing sustainability's crucial importance to the world. The papers in this themed edition are selected and recommended based on the authors' presentations at this conference. This general theme was rendered through five specific foci, namely: key issues of land use and sustainability, urbanization and farmland protection, rural transformation and reconstruction, urban-rural interaction in a changing society, and land resources engineering and land use policy, which has gone further into the issues of land use and rural sustainability both in China and abroad.

1. Key issues of land use and sustainability

Sustainable land use, as an important basis for economic sustainable development, is a key research focus from regional to global scale, especially against the background of global change and greater international economic integration (Robinson and Carson, 2015). Yet, irrational development activities have generated serious negative effects, such as land deterioration, contaminated land, land abandonment and rural decline, etc. With the development of industrialization and urbanization, emerging issues such as rural depopulation and exodus, rural poverty, industrial recession, culture decline, problems of agricultural security and abandoned land have swept both developing and developed countries (Chen et al., 2014; Liu, 2010; Liu et al., 2014; Long et al., 2011) while urban problems, such as congestion, air pollution, property bubbles, high cost of living, and waste management issues, have proliferated with the overexpansion of urban areas (Bai et al., 2014; He et al., 2008; Yao et al., 2009). This themed issue assembles a set of papers that probes current land use issues, environmental pressures and fiscal security toward land use sustainability in China. Land use policy reforms and challenges are analyzed including land use planning, the 'three rights separation' policy, rural land registration, and the 'plus and minus hook' between urban and rural construction land.

2. Urbanization and farmland protection

Urbanization is an irreversible trend worldwide. In particular, China has experienced rapid urbanization at an unprecedented rate since the 1978 reform and opening-up of the economy (Bai et al., 2014; Liu et al., 2008; Liu and Yang, 2015; Zhong et al., 2011). Accelerated urbanization associated with significant political, economic and cultural developments has profoundly altered land use patterns and structure, and also changed environmental and ecosystem services. The growth of urban expansion has resulted in the depletion of arable land and the loss of rural settlements in peri-urban districts (Jantz et al., 2005; Liu et al., 2010), which has brought great changes to farmland protection and food security. In 2014, there were 112 million landless farmers, and the yearly rural-out migration of 13 million people has produced 2.6 million landless peasants. In the same year, a national report stated that there were 50 million mu (3.3 million ha) of national arable land unsuitable for farming due to their moderate and severe pollution. Protecting farmland is a fundamental guarantee for China's sustainable agriculture development. These related papers measure and model the dynamic spatial pattern of urban landscape associated with the rapid

urbanization process and explore potential driving factors in typical regions, such as Beijing, Xi'an, Chongqing, Guangzhou, and the Pearl River Delta. Some quantitatively evaluate the effect of urbanization on agricultural land quantity, quality, and carbon budget; some discuss the difficulties and problems between rapid urbanization and farmland protection, and also explore the way for more harmonious development between rapid urbanization and farmland protection.

3. Rural transformation and reconstruction

The twentieth century constituted a period of massive change—from the introduction of automobiles to commercial air travel to the development of computer technologies, we have seen technology bring about shifts which have dramatically influenced the course of human life. However, few changes have been as significant as the dramatic shift of population from rural to urban areas globally. Being the origins of human society, especially early civilized society, rural areas have undergone enormous transformations accompanying rapid urbanization and industrialization processes during the twentieth century (Liu et al., 2008). Depopulation, the "hollowing out" of the countryside, abandoned and inefficiently-used land, industrial recession and degraded environments are growing concerns among scholars regarding rural decline in both the developed and developing countries. These concerns and research questions pose further challenges to notions of creating optimum and/or sustainable land use.

China is a nation with strong rural roots, but where rural transformation, as a hybrid and contested process, is arguably unique in scale and speed (Liu and Li, 2017; Long et al., 2012). Outward migration of rural population has resulted in many empty dwellings, creating a phenomenon commonly known as the "hollowing village". In terms of analysing this and other transformation processes, it is urgent to make a breakthrough in the theory and practice of social systems and rural space reconstruction. Hence, this themed issue focuses on the process, response and mechanisms of rural transformation and reconstruction, and the consolidation of "hollowing villages". Topics including land transition, rural land regulation practice, rural community remediation, land allocation, and land transfer are discussed and researched here-with. Some papers also reveal rural socio-economic changes and spatial characteristics, and explore the mechanisms of changes affecting rural areas in transitional China.

4. Urban-rural interactions in a changing society

Urban-rural transformation has been an important social and economic phenomenon worldwide since the eighteenth century (Li et al., 2014), which refers to a complicated human process of transformation, strategy change and element transfer between urban and rural areas (Liu and Yang, 2015). Strong mutual links between urban and rural areas have taken place through flows of production factors such as labor migration, capital, goods, technology and information (Long et al., 2011; Li et al., 2015), which is quite different from the traditional isolation of urban and rural areas. Coordinating urban-rural development strategy aims to solve both urban and rural issues from the viewpoint of urban-rural integration with the overall goal of realizing a well-off society in an all-round way. Moves towards equalized development across urban and rural areas should be beneficial by gradually eliminating the dual-track structure of urban-rural development, bridging the development gap between urban and rural, and creating more harmonious urban-rural interactions (Liu et al., 2015). The ideal goal of implementing an urban-rural development strategy is to realize urban-rural equalized development. The research papers in this issue present how urban and rural areas interact with each other in the face of rapid change and they also research urban-rural land conversion, the urban-rural income gap, rural-urban integration, new countryside construction, rural-urban migration, and rural-urban integration.

5. Land resources engineering and land use policy

The transformation of human socio-economic activities has exerted great impacts on land use changes and rural decline, such as farmland loss, land use inefficiency and abandoned residential land. Agriculture is the foundation of China’s national economy, and its development depends on water and land resources. Currently, desertified land in China makes up 2.64 million km², accounting for 27.5% of the national land; and salinized land is more than 100 million hectares. Thus, it needs the theory and method innovation of land science to realize sustainable land use.

The enhancement of land capacity plays an important role in coordinating the human-land relationship and sustaining rural development and food security globally. Generally, land capacity refers to a collective term covering land potential, capacity and function, which is a comprehensive embodiment of natural potential, economic value, ecological function, social security and technical contribution of land in a given region. Land capacity construction aims to create high standard farmland, guarantee sustainable land utilization, promote agricultural security and sustainable rural development using land engineering technology. It will provide the scientific basis for related planning decision of land use and sustainable development from typical cases and key areas at national and even global scale. Meanwhile, traditional agricultural geography and land research need to embrace modern land engineering technology and big data to establish scientific, technical, strategic and policy systems, respectively. Issues-oriented land engineering provides an effective way to discover, adapt and recreate the new function of sustainable agricultural land-use system in the new-era, and it is an important guarantee to solve the obstacles facing agricultural development and to move towards more sustainable development. In China, four research stations have been established aiming at degraded-land improvement, gully land consolidation, hollowed village consolidation, poverty alleviation and county development. The theme focuses on land consolidation experiences in improving land use efficiency and changing people-land relationships. Realizing the importance of land resources engineering, the International Geographical Union Commission on *Agricultural Geography and Land Engineering* (IGU-AGLE) was formally established in December 2016. The ambition of IGU-AGLE is deeply embedded in the changing socio-economic, environmental and climate conditions which have posed great challenges to global food security and poverty reduction through land engineering technology. Related papers study the land consolidation of hollowed villages, remediation of contaminated and damaged land, land consolidation effects, soil property changes, soil and water conservation, land tenure adjustment in typical research areas like the Loess Plateau and the Mu Us sand region.

In conclusion, current unbalanced spatial structures between urban and rural areas have resulted in many land issues that have hindered land use sustainability. It is urgent to implement corresponding land strategy adjustment to solve these issues. In the process of developing new types of urbanization, China must focus on implementing a rural revitalization strategy, deepening the reform of the rural land system. Rural revitalization refers to a major strategy and process for accelerating rural transformation and urban-rural integration development by solving the principal social contradictions and prominent problems faced by rural development in a specific period. With the impetus from activating the endogenous motivation of key factors within the rural population, land and industry, it aims at enhancing moves towards greater the sustainability and competitiveness of rural regional systems. Its core is to systematically construct the coupling pattern and innovation system of population-land-industry and scientifically promote coordination and sustainable development among the rural economy, sociology, culture, education, ecology and technology systems. Along with the strategy of rejuvenating the country through science and education, the strategy of innovation-driven development must deal with the issues concerning agriculture, the countryside and farmers’

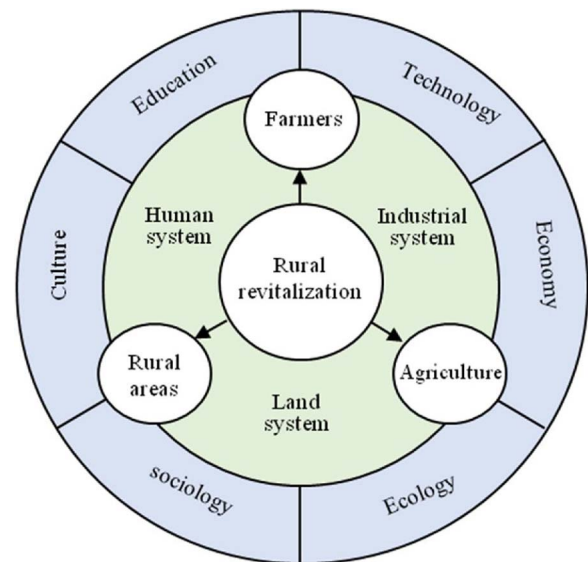


Fig. 1. Concept of rural revitalization strategy.

livelihoods by establishing a harmonious rural revitalization mechanism (Fig. 1). Considering that agriculture and land use are complex systems, it is necessary to widely integrate multidisciplinary theory and practice including geography, management, sociology and engineering to establish scientific, technical, strategic and policy systems based on big data and observation research (Fig. 2).

6. Concluding comments

This themed issue of *Land Use Policy* has succeeded in compiling conceptual-theoretical and empirical studies and evidence to highlight key issues of land use and sustainability, urbanization and farmland protection, rural transformation and reconstruction, urban-rural interaction in a changing society, and land resources engineering and land use policy. The papers make important conceptual-theoretical and empirical contributions to the growing literature on land use and rural sustainability in China. China has undergone intense socio-economic transformations during recent decades which has affected all sectors of the country’s economy. And rapid urbanization has also had profound impacts on rural areas. In view of this, the themed edition makes a

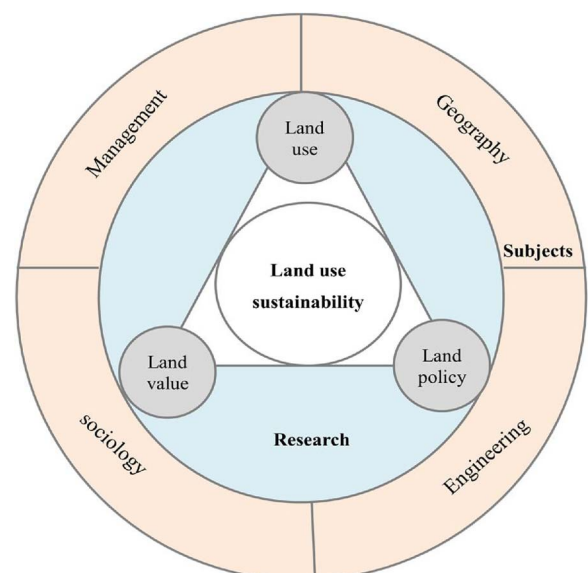


Fig. 2. Frame of land use sustainability.

compelling call for more systematic research on land use and rural sustainability and emphasizes the challenges for further research on land use and rural revitalization in China. Facing the great challenges to land use and management under the economic transformation, strategic adjustment of land use policy and deepening reform of rural land system are urgent, and it is also necessary to widely integrate multi-disciplinary theory and modern land engineering technology based on big data to establish scientific, technical, strategic and policy systems to achieve greater land use sustainability.

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