

## The Working Mechanism and Barriers for Greening Vacant Properties in Shrinking Cities in China

Shuangjin LI 1 , Sa MA 2 , Shuang MA 3\*

1 College of Resources and Environment, Henan University of Economics and Law, Zhengzhou 450046, China

2 Country Garden Holdings Company Limited, Guangdong, 510000, China

3 School of Architecture, Tsinghua University, Beijing 100084, China

\* Corresponding author: Shuangjin L

### ABSTRACT

Chinese old industrial cities are major types of cities suffer from depopulation in China and desperately hope green reclamation because of ecological, social and economic blight and physical space decay in citywide. However, few studies in China offer systemic and instructional analysis of the institutional framework of green infrastructure and the working mechanism of regulatory institutions that lead to current outcomes of greening vacant properties. In this article, the author will shortly introduces the shrinking conditions in Chinese old industrial cities and then introduce the institutional framework, the working mechanism of green infrastructure and the barriers for greening vacant properties in shrinking cities through green infrastructure in China caused by institutional framework.

**Keywords:** Shrinking City, Old industrial City and Green Infrastructure

Date of Submission: 09-08-2018

Date of acceptance: 24-08-2018

### I. INTRODUCTION

Urban shrinking offer opportunities in citywide to solve vacant problems by greening strategies. There are challenges and possibilities to change vacant area in community assets. As Keil, & Desfor (1996) suggested, "It needs to have strategies that could complete economy, social equality and environment development. Methods like clean abandoned industrial land and abandoned properties....could create new space to attract capitals inflow, product green urban features and reduce cost for resident living and commercial operation". Many shrinking cities, such as Rochester, Philadelphia, Flint, Cleveland, Pennsylvania, Lawrence, Massachusetts and Leipzig, have been trying to use green infrastructure to address their vacancies caused by population loss. However, in China, there is no practices for greening vacant properties in shrinking cities. According to the demographic data from China's fifth national census (2000) and the sixth national census (2010) in the Chinese towns and sub-district scale, 180 cities have experienced depopulation among the 654 cities (Ying, Wu, & Wang, 2015). The shrinking cites already been a problems in China, whilst few studies in China offer systemic and instructional analysis of the institutional framework of green infrastructure and the working mechanism of regulatory institutions

that lead to current outcomes of greening vacant properties.

### II. THE INSTITUTIONAL FRAMEWORK OF GREEN INFRASTRUCUTRE (UGSS)

In China, green infrastructure is a new concept and strategy to satisfy the contemporary development requires. Until now, there is neither law nor regulation especially for green infrastructure construction in China, to support green infrastructure implement had to rely on urban green space planning and complete in the context of urban green space system (UGSS). Studying the institutional framework of UGSS and implement policies in China is beneficial to better understand Chinese system of green infrastructure and to explore why current system is inefficient to greening vacant properties for population shrinking cities and how these policies work to guide the instructions.

#### 2.1. The legalization & regulation of urban green space system (UGSS) and green infrastructure

The planning of urban green space is based on China Urban and Rural Planning Law (cheng xiang gui hua fa) and Urban Greening Space System Planning Compilation Schema (cheng shi lv di xi tong gui hua gang yao). These

provide a legal framework for urban green space planning and design.

According to People's Republic of China Urban and Rural Planning Law and Urban Greening Space System Planning Compilation Schema, urban greening system planning is a specialized planning in urban master planning and is a important part of urban planning system, and is the imperative evidence to lead urban greening establishment. It has both independence and coerciveness.

Apart from this, compilation schema firstly issued by Ministry of Construction (MOC) in 2002 also suggested that "the main target of UGSS is that on the basis of in-depth research, according to urban property, development target and land layout regulated by urban master planning, scientifically draw up urban greening index, reasonably arrange the space layout of urban gardens and virescence." Guide by the regulation, the urban green space's planning structure, spatial layout, types, function, planning principles and indexes are decided. There are three main indicators to evaluate urban green space, they are: green space rate, green coverage rate, and public green area per capita. However, these three indicators only raise claim for the quantity of green space rather than quality, spatial layout and ecological effects.

## 2.2 A horizontal structure

There is a horizontal structure amongst ministries and agencies. In China, the most accepted green infrastructure definition comes from American Conservation Fund and United States Department of Agriculture. "Green Infrastructure is our nation's natural life support system - an interconnected network of waterways, wetlands, woodlands, wildlife habitats and other natural areas; greenways, parks and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources, and contribute to the health and quality of life for America's communities and people."

In this concept, green infrastructure elements mainly include waterways, wetlands, woodlands, greenways, parks and conservation lands, working farms, ranches, forests and wilderness. The horizontal structure of urban green space management in China was stated by Huang, Lu, & Wang (2009) before. Considering the element of green infrastructure focus more on the green space that present the function of

infrastructure, we demonstrate the planning and management of green infrastructure in Table1.

It is clear that Ministry of Construction as well as subordinate garden and urban planning agencies are mainly put in charge of planning, construction and management of green infrastructure. This work also involves other agencies such as Bureau of Water Resource, Bureau of Forest, Bureau of Agriculture, Marine & Fishery and Bureau of Environment Protection. Ministry of Land & Resources and its subordinate agencies, Provincial Department of Land & Resources, Bureau of Land & Resources are also responsible for green infrastructure elements planning. It complicates and organizes the overall planning of land use, land reclamation development planning, mineral resources planning and mine remediation. It also works for urban working farms and cultivated land planning and construction. For greening vacant properties, land & Resources department is important to collect quantitative information of vacant properties and wilderness for industrial cities. However, information collection of every vacant property is very hard work and even the best government cannot receive the accurate data. The data lacks become a difficult for rehabilitation of old industrial cities.

Different from green space, green infrastructure emphasizes the integrity and continuity of a greening system. Considering the structure characteristics of grey infrastructure, such as an urban water grid or electricity grid and it is easy to understand the requirement of a network in green infrastructure. The planning, maintain, construction and management of green infrastructure are fragmented by different departments which lead green vacancies by green infrastructure in Chinese shrinking cities more difficult. A green infrastructure network divides the ecological components into three types: hubs, links and sites (Figure1). Hubs refer to large green spaces, links are wide and long and tie the system together. They provide the road for wildlife immigration and landscape links are good for humans' health, lifestyle and recreation. Sites are relatively smaller than hubs and have ecological benefits and social values. The connections are the benefits in protecting the biodiversity, decreasing the urban heat island effect, dropping the urban temperature and purifying the air quality. Connectivity also positively controls storm water runoff, retreats the urban material spatial space and improves the urban ecological system.

Table 1. A Horizontal Structure in GI Plan and Management

Departments			Element									
National	Provincial	City	Waterways	Wetlands	Woodslands	Greenways	Parks	Conservation lands	Woodslands	Ranches	Forests	Wilderness
Ministry of Construction	Provincial Department of Construction	Bureau of Urban Planning Bureau of Garden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ministry of Water Resource	Provincial Department of Water Resource	Bureau of Water Resource	<input type="checkbox"/>									
State Bureau of Forest	Provincial Department of Forest	Bureau of Forest			<input type="checkbox"/>						<input type="checkbox"/>	
Ministry of Agriculture	Provincial Department of Agriculture	Bureau of Agriculture, Marine & Fishery							<input type="checkbox"/>	<input type="checkbox"/>		
Ministry of Marine	Provincial Department of Marine			<input type="checkbox"/>								
Ministry of Environment Protection	Provincial Department of Environment Protection	Bureau of Environment Protection						<input type="checkbox"/>				
Ministry of Land & Resources	Provincial Department of Land Resources	Bureau of Land & Resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Source : Adapt from Huang, Lu, & Wang, 2009

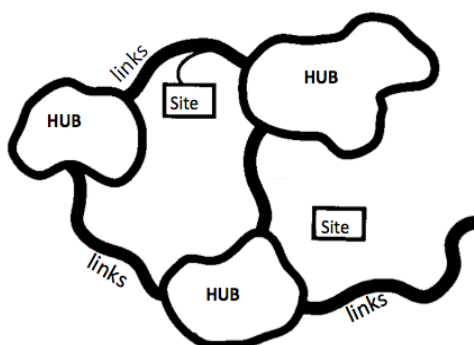


Figure1: A green infrastructure network including hubs, links and sites  
 Source: Benedict & McMahon, 2012

**III. BARRIERS FOR GREEN INFRASTRUCTURE PRACTICES IN CHINA CAUSED BY INSTITUTIONAL FRAMEWORK TO GREENING VACANT PROPERTIES IN SHRINKING CITIES**

**3.1 The conflicts between goals in greening vacant properties caused by hierarchical power structure:**

Firstly, under the hierarchical power structure, because of the goals for all government levels could be different, local government could be in the pursuit of their goals and deviated from the central government's goal. The conflicts between goals reflected in vacant properties greening and shantytowns regeneration. The central government in recent years pays high attention to sustainable development, residents' social welfare and industrial transform in old industrial cities as well as the improvement of living condition, environment condition and greening quality for shantytowns' residents. However, for the local sectors, managers give priority to economic growth in order to get more promotion. De, & Jiao (2010) argued that in the vertical power structure in China, using economic growth performance as core in political assessment, mobilizes the enthusiasm of local officials to develop economy and greatly promote Chinese economic growth, however, it ignore social welfare and city living environment.

### **3.2 The fragmented plan& construction of green infrastructure caused by horizontal power structure:**

As mentioned before, in a horizontal structure, the plan, construction and management of green infrastructure elements are fragmented. The elements of green infrastructure are managed by different agencies. In addition, a few overlapping of duty of agencies and fragmented plan of green infrastructure. Further, for green infrastructure, related agencies could not get benefits directly for related agencies and thus the implement could be delay. Therefore re-sizing the shrinking industrial cities through green infrastructure system need a united institution or a working group that include professionals and staffs in related government agencies and government to plan and management the green infrastructure implement in greening vacant properties and solve the problems that responsibility for different government department is not clear. Because the land & resource department in city level cannot collect all information of vacant properties and code them in shrinking cities, the efforts from smaller scale are required.

### **3.3 Current urban greening system planning lacks the safeguard of implementation in shrinking cities:**

Greening the vacancies still lacks support in the current UGSS planning. It can be reflect in three aspects. Firstly, according to Urban Greening System Planning Compilation Schema, "urban greening system planning is a specialized planning in urban master planning and the main purpose of this plan is to further deepen and refined the urban green layout and macroscopic requirements that already decided by urban master plan." It means that the location and area of various types of urban green space have arranged by urban master plan. Thus urban green system planning is at a passive position to deal with greening space layout and amount and types. In addition, urban master plan are edited by urban planning department and approved by local government, however, the planning period of urban master plan is always 10 to 20years. In shrinking cities, during these two decades, there would be a large amount of vacant lands. Although these vacancies could transform to green space, the urban greening system plan cannot lead the greening activities because the land function and amount of green space are be enslaved to the requirement of urban master planning. Thirdly, UGSS plan guided by urban master plan that has two levels: greening system master plan and district greening plan. However, the district is very disordered. It could be divided by development period, such as old city and new city,

or by district function, such as industrial district or residential district, or by administrative region in different projects. Neither these industrial district greening planning nor the old city greening plan cannot cover the whole vacant areas and they also overlap with other. As Xin argued that in Chinese urban greening system planning, the space level is quite monotonous and the plan should noted the coordination of different scale and considered the green relation between different districts (Xin, 2013).

### **3.4Current urban greening system planning lacks the safeguard of function in shrinking cities:**

Greening the vacancies in shrinking cities should have the comprehensive efficiency to accelerate the urban economic development, protect ecological safety, beauty urban landscape, attract external workers and offer community place. Especially for Chinese old industrial shrinking cities where the environmental condition is contaminated after heavy industrial production and job opportunities were cut with national industry reform. But how these functions are reflected in greening practices by green infrastructure are still lack evidence.

The firstly reason for monotone function of current greening space is the monotone evaluation criteria. The evaluation criteria in UGSS include green space rate, green coverage rate, and public green area per capita. All of them only focus to the greening amount in city. As a result, the quality and multi-function of urban green space are ignored. The second reason is that in contemporary China, the urban greening approach is still very easy. For example, in China, the general greening elements used as green infrastructure in American such as rainwater gardens to collect rainwater and decrease surface run off, wetland for wildlife habitats, urban farming to create job opportunities and offer convenient food as well as urban forest are not popular in China. Current planning of urban greening system lacks the types of vacant greening. In addition, in China, urban green space is classified into five types: parks, production green space, protection green space, attachment green space and other green space (Ick, 2013). They are the classification and design basis for urban master plan and urban green space's planning. However, vacant properties are not individual listed and belong to "other green space". It is not efficient in greening vacant properties and in Unite Kingdom, one of the urban green space types is abandoned land and polluted land ecological restoration.

### REFERENCES

- [1]. Benedict, M. A., & McMahon, E. T. (2012). *Green infrastructure: linking landscapes and communities*: Island Press.
- [2]. De, S.W., & Jiao, R.P. (2010). Chinese-style decentralization and vertical management of government institutions. *World Economic Papers*, 1, 92-101.
- [3]. Huang, D. X., Lu, C.T., & Wang G.X. (2009). Integrated Management of Urban Green Space-the Case in Guangzhou China, 45<sup>th</sup> ISOCARP Congress.
- [4]. Ick, S. S. (2013). The characteristic of laws on the kind of urban green spaces and the legal requirements for the green space of urban habitat in China. *Journal of the Korean Institute of Landscape Architecture*. 41(3),1-11.
- [5]. Keil, R., & Desfor G. (1996). Making Local Environmental Policy in Los Angeles. *Cities*, 13, 303-13.
- [6]. Long, Y., Wu, K., & Wang, J. (2015). Shrinking Cities in China. *Modern Urban Research*, 09, 14-19.
- [7]. Xin, B.X. (2013). The discuss on the perfection of green space system planning in China-thinking on green infrastructure. *Journal of Beijing Jiaotong University*, 04, 15-20.

Shuangjin L "The Working Mechanism and Barriers for Greening Vacant Properties in Shrinking Cities In China "International Journal of Engineering Research and Applications (IJERA) , vol. 8, no.8, 2018, pp 65-69