

The Advantages and Limitations of Solutions for Sustainable Urban Planning in First-tier Cities of China

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Abstract

A sustainable city is a city that could have a steady development in social, economic and material. Sustainable urban planning is mainly carried out through planning measures, such as appropriate high density, mixed use and optimization of infrastructure organization. This article discusses the problem facing China's first-tier cities and proposes some solutions on how to address them. It will briefly summarize the solutions and give the direction for future research.

Keywords

First-tier Cities; Sustainable Urban Planning; Problem; Solution.

1. Introduction

First-tier city means a metropolis which plays a significant role in the economy and politics of a country; it generally has a large-scale and is a great attraction to people. With the rapid development of modern economy and uncontrolled urbanization, the first-tier cities have faced various kinds of serious problems, including exhaustive exploitation of lands, pollution and ecological devastation. Therefore, sustainable development has become an indispensable part of urban planning field around the world. Sustainable urban planning refers to a type of layout that not only requires planners and the government to plan with a long-range perspective and a comprehensive viewpoint, but also a wealthy knowledge of how to leave adequate room for urban development in the future.

2. The Main Problems in First-tier Cities

There is no doubt that the economic development of first-tier cities is better than that of other cities. However, the rapid development also has caused many serious problems. For example, in order to have a high-quality life, a large number of people work and live in first-tier city. So, the government has to exploit more lands and energy sources, and in this process, the lands and energy are overused by the public, the air and water are polluted and the ecosystem is destroyed. Accordingly, it is necessary for planners and governments to make sustainable urban planning.

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” was stated in the report “Our Common Future” by Brundtland Commission in 1987. In China, it is becoming increasingly difficult to ignore the issues of first-tier cities construction, which have attracted a lot of attention from urban planning professionals. What is more, in order to reduce the negative impact of urbanization, the government has published relevant policies to manage and promote sustainable urban planning.

For example, the state council pointed out a series of basic requirements about sustainability, such as improving the level of natural resources conservation and comprehensive utilization rate of land, strengthening ecological protection and environmental renovation, and firmly establishing the cooperation between the development of energy resources and cities.

3. First-tier Urban Planning Solutions

A The term of sustainable land use is generally understood to establish compact, balanced and multifunctional areas. In the past few decades, the Ecological Society of America (ESA) has published evidence to support that land use plays a key role in sustainable development. In China, in order to achieve sustainable urban planning, enormous efforts have been made to optimize the pattern of land use (ibid). Thus, it could be seen that land use planning is regarded as a core task for sustainable urban planning. In the following sections, there are two key drives for promoting sustainable planning, restoring green space and raising the utilization rate of land use.

According to Zhang, urban green space is an indispensable part of the complex urban ecosystem, so the planning of green landscape has an important impact on the environment, ecology, cultural and economic life. In addition, there is a large volume of published studies describing the role of green space, the view was held that “The planning and management of urban green space development is of significance to urban sustainable development”. There is little scientific evidence that raising the green space rate will bring a great deal of benefits to a city, such as improving the urban environment, balancing the ecological system and providing a relaxing place for the public. And there are two specific actions will be discussed.

An effective method for restoring green space is building green network. As China has a huge population and limited land resources, it is unrealistic to build large areas of public green space, and it will cause great pressure on other functional lands. According to this research, Jim and Chen argued that the green network embedded in the urban area is the most ideal spatial distribution. Through this method, not only the existing green space can be protected, but also new green space can be created. The green network avoids the emergence of large areas of green space, meanwhile, it also strengthens the influence of the landscape on public health. However, there are many other factors that need to be considered in this approach, so it will take a long time to succeed.

Another method to restore green space is vertical planting. In order to save lands, green plants are planted on a limited ground to increase the area of greening. It is the more direct and effective ways if that using the least space to improve the quality of the environment, especially in first-tier cities which have high-density architecture.

In China, there has been a tradition of planting trees around buildings since ancient times, which aims to create a sense of enclosure and pursues a close connection between humans and nature. In addition to beautifying our living environment, a large number of green plants also have other functions, such as dust control, noise prevention, oxygen generation and the adjustment of temperature. For instance, the designers can flexibly use the roofs, walls, window sills, balconies, verandas, sun visors and other parts to plant various kinds of plants. In this way, it will not decrease the green space because of the limited land. In contrast, there is an increase in the area of greening on the vertical facade, which improves the relationship between the artificial environment and the natural environment. Yang Jingwen, a famous Chinese architect in Malaysia, has created many successful examples in vertical planting. The typical masterpiece of his designs is the Merana-Messinian commercial building, where the green plants are sloped from the bottom side, spiraling up the deep platform to the roof. It created a shade and oxygen-rich environment, which allows people to enjoy the nature. Nevertheless, one major drawback of this approach is the technology cannot be widely applied, because it has a high cost and may cause additional energy consumption.

Raising the utilization rate of land use is also an important way for sustainable land use. In China, the conflict between the shortage of land resources and the continuous expansion of the population is quite obvious. Since the reform and opening up, the phenomenon of the low-level construction has caused a low rate of land use in China. Improving land use efficiency has become an indispensable component of sustainable urban planning.

A considerable amount of literature has been emphasized the importance of underground space development. Because utilization of underground space is one of the most effective ways to solve the

problem of low land use efficiency. In October 1997, "Regulations on the development and utilization of urban underground space in China" was published to provide legal basis for utilization of urban underground space in China. In fact, many countries have already begun to pay attention to this issue. For example, the United States mainly built the underground road traffic, and Boston's Central Avenue has undergone the transition from elevated roads to underground roads. In addition, the underground building design has also achieved remarkable results in schools, libraries, office buildings, experimental centers, and industrial buildings in US. The underground characteristics are better utilized to meet the functional requirements. For example, it has solved the problem of the land mixed use and created an open space for the ground.

At present, compared with the United States, the development of urban underground public space in China has been changed from the simple expansion of commercial space into the comprehensive development stage. What is more, internal environmental and safety issues have also attracted much attention in recent year. However, the previously mentioned method suffers from a serious weakness that it is inevitable to destroy the underground environment to a certain extent. Therefore, the government and designers should make a condition assessment before building underground space in order to minimize the damage.

4. Conclusion

To sum up, the purpose of the current study was to suggest two main solutions for developing sustainable urban planning in first-tier cities of China and evaluate the specific actions of each resolvent. This assignment has explained the importance of sustainable land use planning and the application of ecological technology in green buildings. Besides, it provided additional evidence with respect to prove the measures of restoring green space, raising the utilization rate of land use, the use of solar energy, sustainable materials and insulation of buildings, which have a positive impact on sustainable urban planning, although there are still some limitations of these actions.

Sustainable urban planning is a widespread topic, what this paper mentioned above is just a small part of the sustainable development in first-tier cities of China. This article has highlighted some limitations in need of further exploration by the scholars in the planning field. Of course, it is not enough to only rely on the efforts of governments and planners to develop a sustainable urban planning. Establishing individuals' awareness of sustainable development is also a significant task. People should be encouraged to change some of their previous high-energy lifestyles and cultivate a holistic view of the sustainable urban planning.

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