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Measuring sustainability at the community level: An overview of China's indicator system on National Demonstration Sustainable Communities

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ABSTRACT

In order to pursue sustainable development, appropriate sustainability measurement at the local scale is critical. However, few efforts have been made in this regard. This paper aims to fill such a gap by introducing the development of China National Demonstration Sustainable Communities (CNDSCs) and reviewing its indicator system. Research findings indicate that the current indicator system did provide valuable guidance on help different communities to move toward sustainable development as it reflects political tendency and evaluates effectiveness of public policies. However, this system is insufficient to evaluate the holistic nature of sustainable communities because it lacks integration among different aspects, such as the adequate consideration on regional disparity, lack of universal methods on data collection and calculation, as well as the linkage with local officials' performance. Further improvements should be made by involving more stakeholders so that their different concerns can be addresses. In addition, region-specific Indicators should be developed with clear official guide on how to implement them in the realities.

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1. Introduction

Sustainable development (SD) has now been recognized as a priority by most countries. The concept of SD appeared in the context of environmental concerns in the World Charter for Nature (UN, 1982), which was primarily an ecological concept. The Brundtland Report defined it as “development that meets the needs of the present generation without compromising the ability of future generations” (WCED, 1987). It was deemed to be an attempt to reconcile the lasting economic growth and the protection of environment as well as natural resources. With the development of SD, the concept became multi-dimensional. For instance, the US National Research Council addressed the concerted benefits of economic growth, environmental protection and social prosperity (US National Research Council, 1999). More attention was conveyed

to the social dimension by the Rio+20 outcome document “The Future We Want” in 2012 (UN, 2012). Recently, at the UN Sustainable Development Summit 2015, a set of 17 global Sustainable Development Goals (SDGs) were adopted by the heads of 193 states to set up the 2030 agenda for SD (UNSD, 2015). Among the 17 UN Sustainable Development Goals, one goal is concerned with cities and communities: to make cities and human settlements inclusive, safe, resilient and sustainable (UN, 2015).

By shifting the concept of sustainability to the local level, the sustainable community emerged. In the mid 1980's, the Brundtland Report raised a consciousness that many environmental issues have a local origin and inextricably often manifest at a local level. Therefore, to achieve global sustainability, acting at the local level is important (Finco and Nijkamp, 2001). The multi-dimensional objectives of sustainability (economic, environmental, and social aspects) might be effectively realized by acting locally and in particular the urban context (Scipioni et al., 2009).

There is no currently theoretical consensus on the definition of sustainable community (Qin et al., 2013). Bridger and Luloff (1999) stated that the ideal typical sustainable community can be defined

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Table 1
Characteristics of sustainable communities.

Component	Description
Social and cultural	Vibrant, harmonious and inclusive communities
Governance	Effective and inclusive participation, representation and leadership
Environmental	Providing places for people to live in an environmentally friendly way
Housing and the built environment	A quality built and natural environment
Transport and connectivity	Good transport services and communication linking people to jobs, schools, health and other services
Economy Services	A flourishing and diverse local economy A full range of appropriate, accessible public, private, community and voluntary services

along five dimensions: increased local economic diversity, self-reliance, reduction in the use of energy and improved management and recycling of waste products, protection and enhancement of biological diversity and careful stewardship of natural resources, social justice. According to Egan (2004), sustainable communities are defined as follows: “Sustainable communities meet the diverse needs of existing and future residents, their children and other users, contribute to a high quality of life and provide opportunity and choice. They achieve this in ways that make effective use of natural resources, enhance the environment, promote social cohesion and inclusion and strengthen economic prosperity.” This review has identified seven key components of sustainable communities, which are showed in Table 1.

Many countries have set up their own pilot projects on sustainable communities or similar projects. The Local Agenda 21, approved in Rio 1992 as part of Agenda 21, has involved local authorities and community groups to establish sustainable development. It addresses the participation of local communities in achieving sustainability (Bayulken and Huisingsh, 2015a). Joas and Grönholm (2004) carried out a comparative assessment on 144 European cities which are active in LA21 or similar policies and the case studies revealed remarkable progress in their establishment of the collaborative processes. The initiatives varied from urban renewal to low carbon community, from water conservation to waste management, from top-down decision-making to bottom-up commitment. With regard to the definition of sustainable communities, eco-town was one of the ideas that were introduced under the LA21 initiatives (Bayulken and Huisingsh, 2015b). Eco-towns refer to a development with multi-use properties and eco-friendly planning, implementation and innovation of urban systems and technologies. They claim to provide a better quality of life for their residents as making extensive use of the existing urban infrastructure and the broader urban eco-system (Kyvelou et al., 2012). Europe has initiated many eco-town demonstration projects to promote a learning, experiential process for stakeholders. For instance, the Netherland designed and implemented high-quality eco-developments in Heerhugowaard and Amersfoort. Sweden’s Green Welfare State (Lundqvist, 2000) created sustainable programs, such as Augustenborg in Malmö and Hammarby Sjöstad in Stockholm. Germany has initiated similar projects like Vauban and Rieselfeld in Freiburg, Hafen City in Hamburg and Kronsberg in Hannover. In the Asian context, Japan inaugurated the Eco-Town Program in 1997. Despite the similarity to sustainable communities, Japan’s Eco-Town focused on the integration of innovative waste management with the application of industrial symbiosis and urban symbiosis (Van Berkel et al., 2009).

China’s National Demonstration Sustainable Communities (CNDSCs) program is one of early Asian SD projects. In the mid-

1980s, China sought an innovative approach to balance the rapid economic development and the ineffectiveness of environmental protection and depletion of natural resources. In this context, the CNDSCs Program was set up in 1986. As an experimental pilot program, the original approach was to select some representational communities to test the concept of sustainable communities. In China, a sustainable community refers to a community with more developed economy, social stability, beautiful environment, advanced science and education, sound legal system and social well-beings. It addresses the concerted benefits of economy, society, resources and environment and the coordination among different stakeholders. Through the establishment of CNDSCs, the local community gains experience on SD. The prominent benefit is that through this pattern, it is feasible to evaluate the applicability of proposed SD strategies and policies. Then, it could be helpful to derive political objectives and serve for policy making at the state level (ACCA21 and MOST, 2007). By the end of December 2014, 186 national sustainable communities had been identified across the whole country. Meanwhile, a set of indicators were set up to measure their performance.

The CNDSCs program is an important step to promote sustainable development in China. However, to date, there have been no studies to introduce the evolution and experience of CNDSCs. Consequently, it is critical to depict the relevant experiences and lessons so that other developing countries can learn its experiences and lessons. Under such a circumstance, this paper aims to review the development of CNDSCs. Particularly, this paper introduces and evaluates the national indicator system of CNDSCs and provides valuable implications on measuring sustainability at the community level. The whole paper is organized as below: After this introduction section, sustainability indicators at the community level are detailed in Section 2. Section 3 presents the history, different types, policies, administrations and current development of CNDSCs. Section 4 discusses the indicators of CNDSCs. Section 5 identifies the benefits and challenges of such indicators. Finally, Section 6 draws research conclusions.

2. Sustainability indicators for communities

Indicators are useful to help set clear and measurable goals, while the progress could be regularly tracked. The evaluation research on sustainability first appeared in the UN Conference in Rio 1992 (Ness et al., 2007). In its final document Agenda 21, it states that commonly used indicators such as the gross national product (GNP) and measurements of individual resource or pollution flows do not provide adequate indications of sustainability. Moreover, methods for assessing interactions between different parameters (environmental, demographic, social and developmental aspects) were not sufficiently developed or applied (UN, 1992). In order to improve this situation, Sustainable Development Indicators (SDIs) need to be developed to provide a solid base for policy-making and to measure progress towards political objectives.

In order to set up applicable and feasible indicator system, it is important to develop a framework for SD indicators. Lundin (2003) proposed two distinctive main approaches to develop a framework and select the SDIs:

- The ‘top-down’ approach: Experts and researchers define the framework and the set of SDIs.

The ‘bottom-up’ approach: Different stakeholders participate in the design of the framework and the SDI selection process together. These two approaches are also named “expert-led” and “citizen-led” approaches and are well documented in the literature. The first

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