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Promoting regional sustainability by eco-province construction in China: A critical assessment

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ABSTRACT

The regional level has been recognized as a good scale for implementing actions towards sustainable development (SD). An important pathway to improve regional sustainability is to locally carry out long-term ecological planning. In order to reduce environmental impacts from fast economic growth, several eastern provinces of China began Ecological Province Construction (EPC) at the end of 1990s. This paper presented a case for analyzing the progress of EPC in China via both qualitative and quantitative methods. We studied Shandong Eco-province Construction (SEPC) and evaluated its outcomes with its pre-set indicators in 2003–2010. A further evaluation with eco-efficiency and de-linking indices was conducted. The results indicated the pre-set indicators could not effectively reflect of the ecological province construction. It was recommended to introduce an evaluated framework combined with eco-efficiency and de-linking indices to indicate ecological planning at the regional scale.

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1. Introduction

China has been undergoing a rapid economic development since the beginning of 1980s, especially in its eastern provinces. Such achievements have also brought a number of serious environment issues which may affect the future sustainability for this country. Environmental crises such as large scale of smog strike the eastern region of China more and more frequently (Lin et al., 2014). To pursue regional sustainability has become increasingly urgent for the policy makers both in provincial and national governments of China.

The regional level has been recognized as a good scale for implementing actions towards sustainable development (SD) (Mascarenhas et al., 2010). In the 1990s, China's government started many environmental initiatives or strategies aimed to enhance regional sustainability, of which the Eco-province Construction (EPC) was a significant one. The idea of EPC originated from the National Ecological Demonstration Zone Construction (NEDZC) by the Ministry of Environmental Protection (MEP). It was long term eco-planning of China from 1996 to 2050 (MEP, 1995). NEDZC only included the city and county level at the beginning, and then in 1999, Hainan Province had its EPC proposal approved by China's central government (MEP, 1999). Then several other provinces also started their practices in EPC, and caused China's central government to further encourage its provincial governments to plan their eco-province construction.

Scholars have contributed much effort in developing the theory of EPC in China in the last decades. As stated above, EPC in China was originally from NEDZC. In the 1980s China began with different scales of "Eco-construction" demonstration all over the country. According to Hu and Wang (1998), eco-construction refers to the implementation of ecological principles to achieve regional sustainability, which contains three dimensions: ecological engineering, ecological restoration, and ecological cultural remolding. It started from the construction of eco-villages, eco-counties, and ecopolis, and then expanded to eco-provinces. According to Li (2004), EPC is a major and innovative move in China which contains systematic thinking and aims to achieve regional sustainable development. Compared to the ecopolis scale, EPC may have the advantages of its large scale, where the ecosystem can be more completely included in planning and the economy can be reformed and redistributed on a geographical scale. EPC can also contain eco-villages, eco-counties, and ecopolis constructions as its components. Moreover, Command and Control Policy (CCP)

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still dominates as China's environmental policy tools. CCP has played a very important role in environmental protection in China (Wang et al., 2011). However, centralized environmental policy may reduce the autonomy of the regional governments in environmental protection especially when there is a lack of consideration of the different characteristics among different provinces. Thus, EPC in China has been regarded as a platform and breakthrough at the regional level to implement a sustainable development strategy, which could combine with the other scales of eco-constructions and become a comprehensive experimental area for different scales and levels of sustainable development. Moreover, the outcomes from the studies of EPC in China also contribute to the understanding of sustainability science (Li, 2004). However, in English literature, there are surprisingly only a few articles reporting the theory and practices of EPC in China. Thus, it will be interesting to explore and study the progress and outcomes of EPC in China. The results may contribute to other emerging economies when it comes to implementing regional sustainability initiatives.

Many studies have shown that to design and implement an eco-indicator framework it is very crucial to ensure true improvements of regional sustainability (Mascarenhas et al., 2010; Ramos, 2009; Shi et al., 2012; Yin et al., 2014). From the beginning, the government of China has had its emphasis on establishing a series of indicators for measuring and targeting the progress of sustainability. In 2003, MEP of China released a governmental document of the indicators framework (a trial version) of Eco-County Construction, Eco-City Construction and EPC in China (Table 1), and required the provincial governments to formulate their planning of EPC according to this national indicators framework and also with consideration of local characteristics. This document was the first document which clearly showed the targets of what EPC should achieve in the expected period. It also emphasized the importance of implementing an ecological indicators framework when it comes to long term regional sustainable planning and initiatives. Although China's government and its provincial governments have set up the indicators for EPC, the performance of those pre-set indicators is not clear, which leads us to explore whether those indicators can holistically ensure the improvements of regional sustainability.

In this study, we chose Shandong Province as the case province since Shandong Province is one of largest provinces in population and economy in China as well as one of earliest provinces that participated in EPC. Both qualitative and quantitative methods were employed in this paper. In Section 2, we studied Shandong Eco-province Construction (SEPC) and evaluated its outcomes with its

Table 1
The EPC indicators (EPCI) in China.

Indicator categories	No.	Indicator	Unit	Targets value
Economic development	1*	GDP per capita		
		East and central area	Yuan	≥33,000
		West area		≥25,000
	2*	Local financial revenue per capita		
		East and central area	Yuan	≥5000
		West area		≥3800
	3	Rural net income per capita		
		East and central area	Yuan	≥11,000
		West area		≥8000
	4	Urban disposable income per capita		
		East and central area	Yuan	≥24,000
		West area		≥18,000
	5	The proportion of environmental industry	%	≥10
	6	The proportion of third industry	%	≥40
Environmental protection	7	Forest coverage rate		
		Mountain area	%	≥65
		Hilly area		≥35
		Plain area		≥12
	8	Protected area proportion of total land area	%	≥15
	9	Degraded land recovery rate	%	≥90
	10	Species diversity index	%	≥0.9
		Endangered species protection rate		100
	11	Water consumption of main rivers		
		River in the province	<40%	
		Trans province river	Less than national allocation of water resources	
	12	Groundwater overdraft rate (plain area)	%	0
	13	Emission intensity of main pollutants[a]	kg/(10,000 Yuan GDP)	
		Sulfur dioxide		<6.0
		COD		<5.5
	14	pH year average of rainfall	pH	≥5.0
		Frequency of acid rain	%	<30
	15	Air environmental quality	Meet the functional zone standard	
	16	Water environmental quality		
		Near shore water environmental quality		
	17*	Environmental compliance rate of tourist area	%	100
Social progress	18*	Natural growth rate of population	‰	Comply with national or local policy
	19	Urbanization level	%	≥50
	20*	Engel's coefficient	%	<40
	21	Gini co-efficient		0.3–0.4
	22*	Environmental protection publicity and education	%	≥90

[a] Less than the national total emission control targets.
[b] *Sources*: ⟨http://www.zhb.gov.cn/image20010518/6301.pdf⟩.
* The indicators which have been removed in the revised version.

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