

Ecosystem services research in China: A critical review



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ARTICLE INFO

Article history:

Received 7 April 2017

Received in revised form 17 May 2017

Accepted 24 May 2017

Available online 7 June 2017

Keywords:

Ecosystem services

China

Literature review

Monetary valuation

Policy evaluation

ABSTRACT

Research on ecosystem services (ES) in China has become one of the fastest growing areas in the last decades. A systematic literature review with the establishment of a national ES research database was conducted in this paper. The analysis of the database including 175 studies published in international peer-reviewed journals identified six categories of research focus, among which monetary valuation attracted the most attention. Two approaches in the monetary valuation studies are dominant, unit value based approach and primary data based approach. Challenges of Chinese ES research consist in the lack of internationally accepted frameworks, which leads to the confusing use of terminology for ecosystem type and ES class. Critics also exist in the significance of monetary valuation, because most of the case studies in China were based on the unit value transfer method. In addition, Chinese scholars seem to be unaware of the progress of cultural ecosystem services research and few studies with particular focus on CES are found. This paper concludes with the anticipation of a TEEB country study for China.

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1. Introduction

Although the concept of ecosystem services (ES) has a long pre-history (Mooney and Ehrlich, 1997), it was coined by the book of Daily (1997) and the paper of Costanza et al. (1997) to a great extent. The publication of Millennium Ecosystem Assessment (MEA, 2005) and the more recent monumental efforts of The Economics of Ecosystems and Biodiversity (TEEB, 2010) have attracted broader attention in both of the research and policy communities, leading to an exponential growth of the number of studies in this area (Costanza et al., 2014).

It is time to summarize the existing state of ES research and to identify knowledge gaps for future directions. In the last few years a number of studies at different scales have been published for this purpose: Seppelt et al. (2011) at the global scale, Molnar and Kubiszewski (2012) for the United States and Canada, Schuhmann and Mahon (2015) for the Caribbean, Balvanera et al. (2012) for Latin America, Egoh et al. (2012) for Africa, Pittcock et al. (2012) for Australia, van den Belt and Blake (2014) for New Zealand, Perez-Verdin et al. (2016) for Mexico, and Mastrangelo et al. (2015) for Argentina.

In China, research on ES has also become one of the fastest growing areas in the last decades (Liu and Costanza, 2010). Literature reviews for China have been carried out by Bao et al. (2007),

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Jim and Chen (2009), Zhang et al. (2010) and D'Amato et al. (2016). However, the first review was published in 2007 when few studies on Chinese ES existed; the second review solely considered the ES of urban forests in China; the third based mainly on domestic studies from 1990 to 2008, most of which are inaccessible to the global research community due to the language barrier; and the fourth focused only on monetary valuation studies of forest ES between 2000 and 2012.

With the currently considerable increase of Chinese ES studies published in international peer-reviewed journals, it is necessary to give an updated overview of the research progress in China. Therefore, we conduct a systematic literature review in this paper to examine the rise and tendency of ecosystem services research in China, provide a synthesis of the major achievements, identify current challenges and offer recommendations for future directions.

2. Methods

The literature search was conducted in March 2017. The search strategy for our systematic review consists of three steps. First, we perform a search with the term “生态系统服务” (the translation of ecosystem services) in the topic in the China Academic Journal Network Publishing Database of the China National Knowledge Infrastructure to identify the origin of ecosystem services research. Second, we search Web of Science using the combining sets of (“ecosystem services” OR “ecosystem service”) AND (China OR Chinese) in the topic from 1997 to 2016 to examine the publication trends. Finally, we use the same sets in the title and the same time period for the search in Web of Science, assuming that papers with these terms in their titles exhibit explicit focus on ecosystem services in China. Following the example of Ecosystem Service Valuation Database (van der Ploeg et al., 2010), a database is then built upon the search records for further analysis. The database includes the following information: author, publication year, framework, ecosystem type, ES type, research focus, approach, research scale, location name, and reference.

This approach can avoid arbitrary selection of papers and allow repeated performance, but it excludes book chapters, doctoral theses and commissioned reports that are not involved in Web of Science, papers that refer to individual ecosystem services such as timber provision, water flow regulation or ecotourism, and papers that use other terms like ecological functions, ecosystem functions or ecological services in the title. Nevertheless, we sup-

pose that the existing peer-reviewed papers collected in Web of Science are representative of the Chinese ES research, possibly representing the highest cohort in respect of research quality.

3. Results and discussion

3.1. The rise of ES research in China

The term ES was introduced by an article published in the Chinese academic journal “World Science” in 1997, which was a translation of the seminal paper by Costanza et al. (1997). The first study on ES in China was conducted by Ouyang et al. (1999) for estimating the economic values of Chinese terrestrial ES based on ecological models and economic valuation techniques.

3.2. The publication trends

There are totally 995 papers on the topic of ES in China in the Web of Science Core Collection from 1997 to 2016. The first paper was published in 2000 (Chen and Zhang, 2000), dealing with the estimate for the total value of ecosystem services at the national level following the instruction of Costanza et al. (1997). Fig. 1 shows the number of publication per year searched in the topic with a clearly increasing tendency. The annual publication number exceeds ten in 2006 and fifty in 2011 for the first time, possibly because of the release of the MEA reports in 2005 and the TEEB reports in 2010, respectively. Both of international reports exercise considerable influence on the prevalence of the ES concept and attract great attention of the scholars from different countries, Chinese scholars are no exception. Since then the publications on this subject have seen an exponential increase, exceeding 100 in 2013, 150 in 2014 and 200 in the last two years.

The search in the title results in totally 175 records (two duplicates are removed) for further analysis. With a few exceptions, e.g. no publication selected in 2005 and fewer publications selected in 2009 than in 2008 (Fig. 1), these records generally reflect the publication trends, thus are valid and appropriate to represent the state of the art of ES research in China.

3.3. Findings through the database analysis

Six categories of research focus are identified among 175 studies: monetary valuation, policy evaluation, quantitative

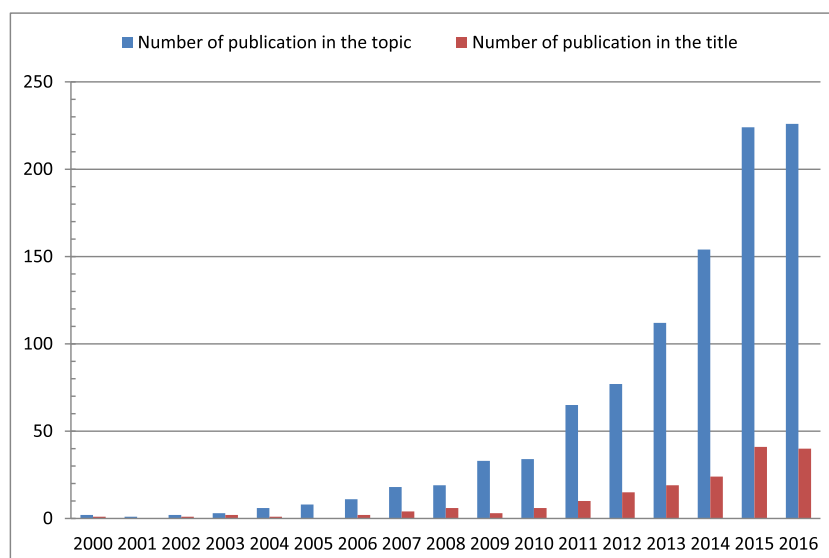


Fig. 1. Number of publications on ecosystem services in China searched in the topic and title, respectively.

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