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Review article

The development of ecological impact assessment in China

Xuehua Liu [a,b,*], Zhouyuan Li [a,b], Chenghao Liao [b], Qing Wang [b], Annah Zhu [c], Dong Li [b], Yajun Li [b], Zhuo Tang [b]

[a] State Key Joint Laboratory of Environment Simulation and Pollution Control, China
[b] School of Environment, Tsinghua University, Beijing 100084, China
[c] Department of Environmental Science, Policy, and Management, University of California, Berkeley, USA

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ABSTRACT

The balance between economic development and ecological conservation in China has become a critical issue in recent decades. Ecological impact assessment (EcoIA) was established beginning in the 1980s as a component of environmental impact assessment (EIA) that focuses specifically on human-related changes in ecosystem structure and function. EcoIA has since been widely applied throughout the country with continuous refinements in theory and practice. As compared to EIA, EcoIA is often performed at a larger scale in the long-term, and thus requires more advanced tools and techniques to quantify and assess. This paper reviews the development of EcoIA over the past 30 years in China, with specific consideration given to refinements in legislation and methodology. Three stages in the development of EcoIA in China are identified, along with their achievements and limitations. Supplementing this qualitative analysis, the paper also provides a quantitative bibliometrics review of academic publications concerning EcoIA in China over the three identified stages. Lastly, general trends in the development of EcoIA are summarized with the aim of conveying potential future trajectories. This review is intended to introduce the EcoIA system to scholars interested in the growing field of environmental management in China.

Contents

1. Introduction

Environmental impact assessment (EIA) was established in China at the end of the 1970s in response to the rising dilemma of securing both environmental protection and economic development. Since its establishment, EIA legislation and methodology have become increasingly specialized within China and the practice now comprises one of the country's foremost environmental management policies (Geng, 2008). Indeed, the current practice of EIA is more advanced in China than in most developing countries in Asia (Briffett, 1999).

Ecological impact assessment (EcoIA), a key component of EIA, aims to describe and forecast ecological impacts from human activities. As a subset of EIA, EcoIA mainly focuses on the change in structure and function of larger-scale natural ecosystem processes as a result of human disturbance (Zhang et al., 2004). Thus, while EIA often analyzes more

* Corresponding author at: Room 903, School of Environment, Tsinghua University, Beijing 100084, China.
E-mail addresses: xuehua-hjx@tsinghua.edu.cn (X. Liu), zhouyuan.li2009@gmail.com (Z. Li), wangq221@tsinghua.org.cn (Q. Wang), annah@berkeley.edu (A. Zhu).

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easily quantified and immediate environmental impacts, such as pollutant emissions, noise disturbance, or socioeconomic indicators, EcoIA analyzes impacts at the ecosystem level in the long-term. Despite its broad application, the scope of EcoIA in China is becoming increasingly refined (Yang, 1999; Cheng et al., 2010).

This paper reviews EcoIA in China over the past three decades. Given the diversity of applications of EcoIA in China, we classified EcoIA cases according to three levels of specification (I, II, III) based on project spatial range and the ecological sensitivities of the region (MEP, 2011). Table 1 provides a matrix indicating the characteristics representative of each level. Environmental reporting requirements decrease in stringency from level I to level III assessment. Level I assessment requires the collection of biomass and biodiversity data from field sampling or a remote sensing survey, along with the presentation of a list of the dominant species as well as their comprehensive survey data. In level II assessment, biomass and biodiversity data can be inferred from previous studies and verified by less exhaustive representative field sampling. In level III assessment, biomass and biodiversity data is typically taken from previous field studies and references.

In order to visualize patterns of EcoIA over space and time, we mapped each of the EcoIA cases by date and location (Fig. 1). The cases of EcoIA examined indicate that although China has been late to adopt the practice of EcoIA compared to some other countries, EcoIA in China has undergone robust development in the past three decades. Fig. 1 suggests that during earlier stages many EcoIAs concerned projects located along the Yangtze and Pearl River basins, while more recent EcoIAs have spread out to include projects along the Yellow River basin and other areas in northern China.

China has experienced significant urbanization and industrialization over the past sixty years, with a particularly sharp increase since the country's Reform and Opening in 1979. During the 1980s and 1990s, compounding pollution and large-scale ecological degradation escalated in both the well-developed eastern provinces of China and the lesser developed areas in the west (Sun, 2005). In the face of this rapid development, various methods for ecological monitoring and assessment were introduced and widely applied (Wei and Ni, 2001; Zhang et al., 2010). As a part of this process, EcoIA laws, methods, and implementation strategies have been established and expanded over the past 30 years. EcoIA has since become a national regulation required for most development projects in China.

National EcoIA laws and their development over the past three decades demonstrate increasing ecological awareness among the Chinese public and government (Zhang et al., 2010). From academic origins, EcoIA methods as theoretical tools have been developed into workable techniques that are now commonly employed by Chinese environmental authorities (MEP, 2004). These techniques, along with the broader EIA framework, now constitute the primary system of environmental management in China. At the interface of environmental policy, science, and technology, assessment systems have been increasingly applied to EcoIA for national and regional development projects.

Analyzing the evolution of EcoIA in China since its introduction in 1979, we identified three stages of EcoIA development: 1) 1979–1997, the initial phase of establishing an environmental legislative framework in China and specifying ecological assessment criteria; 2) 1998–2003, the intermediary period of popularizing EcoIA as a comprehensive assessment technique; and 3) 2003–present, the most recent stage of accelerating the application of EcoIA throughout the country (Fig. 2). The remainder of this paper reviews the evolution of EcoIA in China over these three stages, using both a qualitative literature review and quantitative bibliometrics review. The paper concludes with a discussion of the future prospects of EcoIA in China and abroad.

2. Legislative framework of EcoIA in China

EcoIA began in China as a component of the comprehensive EIA system established under the *Environmental Protection Law of the People's Republic of China* in 1979. Under the umbrella of this landmark law, a number of resource-specific laws have been developed that form the legal base of EcoIA implementation today (Table 2). Ranging from ocean protection to sand control, these more specific laws indicate the relevant resource areas and potential impacts on which EcoIA analyses have focused to date. Table 2 identifies the provisions of these laws relevant to EcoIA and their latest year of revision.

In addition to laws governing specific resource areas, China has also developed regulations regarding specific development activities. One set of regulations in particular — *Regulations of Environmental Protection and Management for Construction Projects*, promulgated by the State Council of China in 1998 — became a keystone administrative statute guiding EIAs for construction projects in China. Under this regulation, the institutions and personnel qualifications for EcoIA are explicitly stipulated. In the same year, the State Environment Protection Agency of China announced *EIA Guiding Techniques*: *Non-pollution EcoIA* (HJ/T19-1997), a professional standard of environmental protection intended to guide institutions and personnel involved in the EcoIA process, revised and updated in 2011 (MEP, 2011).

3. Methodologies of EcoIA in China

In association with the legislative developments described above, as well as increasing social demand for assessing the impacts of China's rapid development, EcoIA methods and techniques have undergone considerable refinement over the past three decades. Table 3 provides a list of common methods utilized in EcoIA and their implementation over the three stages of development. As shown in the table, a number of methods utilized in the first stage were not used in the second stage, while other new methods emerged. All methods, however, have been implemented in this most recent stage of EcoIA development starting in 2003.

Many of the well-established methods listed in Table 3 have been combined and adapted during this latest stage in order to develop a new generation of interdisciplinary methods based on the integration and refinement of more traditional assessment techniques. For example, the systematic assessing method was established by integrating the AHP method, the comprehensive index method and other related semi-quantitative model methods (He, 2010). Similarly, some EcoIAs have integrated both geographic and economic data derived from spatial analysis and market accounting, respectively, in order to provide guidelines and recommendations for future urbanization plans (Wang, 2009). Such newly emerging methods are intended to foster a more integrated assessment process and its application to a wider set of development projects.

As a result of the broadened legal framework that now encourages comprehensive and long-term ecological analysis, assessment methods are no longer confined to the measure and evaluation of ecological *status*, but instead include analyses of ecological *process* as well. This widening

Table 1
Categories of EcoIA in China (MEP, 2011).

	Project spatial range (including waters)		
	Area ≥ 20 km^2 or length ≥ 100 km	Area = 2–20 km^2 or length = 50–100 km	Area ≤ 2 km^2 or length ≤ 50 km
Special ecological sensitive region	Level I	Level I	Level I
Important ecological sensitive region	Level I	Level II	Level III
Ordinary region	Level II	Level III	Level III

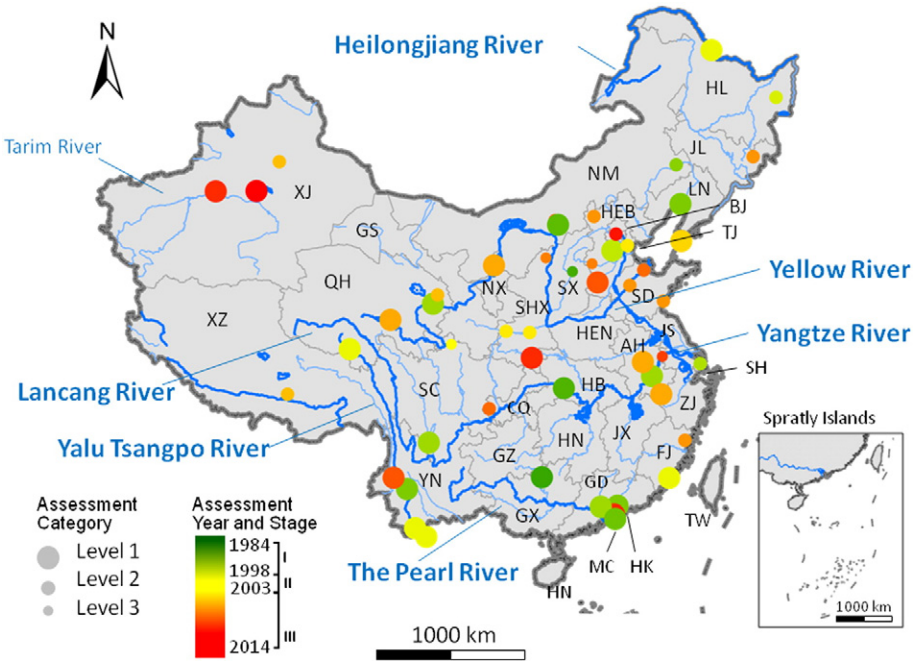

Fig. 1. Spatial and temporal patterns of different levels of EcoIA cases in China from 1984 to 2014. Descriptions of assessment categories are provided in Table 1 Abbreviations for the provinces and regions of China: XJ = Uighur Autonomous Region (AR), GS = Gansu, NM = Inner Mongolia AR, HL = Heilongjiang, XZ = Tibetan AR, QH = Qinghai, NX = Ningxia Hui AR, SHX = Shaanxi, SX = Shanxi, HEB = Hebei, BJ = Beijing City, TJ = Tianjin City, LN = Liaoning, JL = Jilin, SC = Sichuan, CQ = Chongqing City, HB = Hubei, HEN = Henan, SD = Shandong, AH = Anhui, JS = Jiangsu, SH = Shanghai City, YN = Yunnan, GZ = Guizhou, HN = Hunan, JX = Jiangxi, ZJ = Zhejiang, GX = Guangxi Zhuang AR, GD = Guangdong, FJ = Fujian, HN = Hainan, MC = Macao, HK = Hongkong, TW = Taiwan.

spatio-temporal focus has fostered the development of new EcoIA methods, such as the ecological mechanism method, health and risk assessment method and the ecological footprint method (Liu et al., 2008a, b; Peng et al., 2008; Zhang, 2008).

It should be noted that the most recent impact assessment methods in China often contain more avenues for economic assessment than strictly environmental assessment (He et al., 2012). Likewise, methods for EcoIA have also heavily integrated economic practices, and over time, they have become deeper and more diversified within the framework. Economic valuations — such as ecosystem services analyses (Hein et al., 2006) or injury and damage estimations based on cost–benefit accounting used to establish an "ecological compensation mechanism" (Engeman et al., 2004; Deng et al., 2011) — directly demonstrate the connection between economic and ecosystem costs and benefits. Further demonstrating this connection, China's recently revised *Law of Environmental Protection* (Standing Committee of the National People's Congress, 2015) now includes a mandate for establishing an ecological compensation system (Article 31). By incorporating ecological compensation into the national financial accounting system, this landmark revision is expected to promote the development of more quantitative assessment techniques, thereby enabling the EcoIA process to become better incorporated into the country's overall decision-making calculus.

4. Stages of EcoIA in China

In light of the legislative and methodological developments described above, this section provides a schematic periodization of the development of EcoIA in China. From the introduction of China's *Environmental Protection Law* in 1979 to the law's most recent revision and implementation in 2015, three stages of EcoIA development are identified and characterized: the beginning stage (1979–1997), the popularization stage (1998–2002), and the acceleration stage (2003–present).

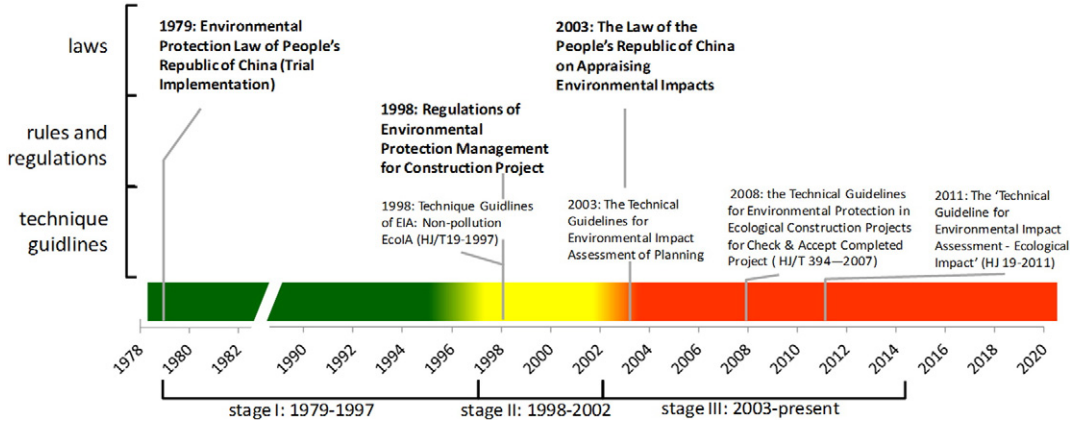

Fig. 2. Timeline of EcoIA development in China from 1979–present.

Table 2
Environmental laws, their applicable provisions and their years of announcing, updating, and implementation.

Law	Applicable provisions	Year of announcing	Year of updating	Year of update implementation
Ocean Environmental Protection Law	21–28	1982	1999	2004
Forest Law	4, 18, 31	1984	1998	1998
Grassland Law	18–20, 42, 46	1985	2002	2003
Fish Husbandry Law	2, 32	1986	2000, 2004	2004
Land Management Law	31, 34, 43	1986	1998, 2004	2004
Mine Resource Law	20, 21, 29–34	1986	1996	1996
Water Law	21–29, 37–40	1988	2002	2002
Wildlife Protection Law	2, 8–10, 12	1989	2004	2004
Water and Soil Conservation Law	18–19	1991	–	–
Regulations on Nature Reserves	2–3	1994	–	–
Sand Control and Management Law	2, 21, 22	2002	–	–

4.1. The beginning stage (1979–1997)

As noted, China's *Environmental Protection Law* provided a legal umbrella under which more specific environmental laws were promulgated throughout the 1980s. Laws covering specific resource fields such as wildlife, water, forests, and grasslands were gradually enacted under the rubric of the *Environmental Protection Law*, ultimately providing the formative legal base for the development of EcoIA in China (see Table 2 for a list of these laws). Thus, the beginning stage of EcoIA in China is marked by the creation of these resource-specific laws throughout the 1980s and extends until their eventual revision and updating in the late 1990s.

EcoIA methods during the initial stage were largely imported from abroad with limited application and experimentation throughout China (Hou, 1988; Yuan, 1988). Predominantly qualitative, these methods gradually attained quantitative facets as they were increasingly employed. Consequently, from the beginning of the 1980s to the late 1990s, most EcoIA publications remained relatively simple. EcoIA was limited to major national infrastructure construction projects, mostly in regard to the geological and hydrological environment and local species. EcoIA publications at this stage focused on suggestions for national construction and qualitative warnings regarding certain development activities (Xu et al., 1981; Yuan and Zhang, 1987). This rudimentary frame has since been greatly elaborated in the subsequent popularization and acceleration stages of the development of EcoIA in China.

4.2. The popularization stage (1998–2002)

During the late 1990s, in the face of increasingly severe problems concerning the coordination of local environmental protection and economic development, principles of sustainable development were increasingly incorporated under Chinese state policies (Wang, 2001). Environmental laws initiated in the 1980s were revised and augmented, permitting the scope of impacts considered under EcoIA to include a more diverse range of ecosystem functions over a longer period of time. Professional standards guiding EcoIA implementation were also promulgated under *Techniques Guiding EIA*: *Non-pollution EcoIA* (HJ/T19-1997), which created a uniform standard for EcoIA practitioners throughout the country (MEP, 1998). This combination of a newly refined environmental legal system and a newly defined professional standard marked the beginning of the formalization of the EcoIA system in China, thereby unifying and coordinating practices of EcoIA that had previously been fragmented and uncoordinated (Liang and Zhao, 2011).

The refinement of these foundational regulations set the stage for further development of EcoIA methods and techniques. Spatial information technology such as geographic information systems and remote sensing were more widely introduced into the EcoIA process during this stage, permitting the implementation of the map overlay and landscape ecology method (Wang et al., 2001; Li et al., 2002). Gradually, assessment methods shifted from monotonous to synthetic and from qualitative to quantitative (Table 2). For certain ecosystem characteristics

Table 3
EcoIA methods implemented in China at each developmental stage ("√" indicates implementation during that stage).

Categories	Methods	Stage 1: 1979–1997	Stage II: 1998–2002	Stage III: 2003–present
General methods	Table checklist method*	√	√	√
	Analogy analysis method*	√		√
	Expert consulting method	√		√
Mathematic methods	Single factor method*	√		√
	Integrative indices method*		√	√
	Euclidean spatial-distance method	√		√
	Matrix method	√		√
	Analytical hierarchy process (AHP) method	√	√	√
	Fuzzy comprehensive judgment method	√		√
	Gray relational projection method		√	√
Spatial analysis methods	Map overlay method*		√	√
	Landscape ecology method*		√	√
Ecological survey methods	Biodiversity assessment method*	√	√	√
	Ecological mechanism and risk method*		√	√
	Ecological footprint method			√
Multidisciplinary methods	Soil erosion assessment method*		√	√
	Maritime and aquatic biology assessment method*			√
	Productivity assessment method	√	√	√
	Tourism distance method		√	√

* These methods are specifically recommended in the latest national EcoIA technical guidelines HJ 19–2011 (MEP, 2011).

especially difficult to quantify, however, qualitative methods such as the table checklist method were retained (Zhang, 2001; Guo et al., 2003). Further methods were also developed by combining quantitative methods with more qualitative impact characteristics. For example, the statistical analysis method and tourism distance method were put forward to specifically assess impacts from tourism-related activities (Liu et al., 2001; Zhang et al., 1999; Chen et al., 2000).

EcoIA in this intermediary stage of development was deeply influenced by the central government's *Ninth Five-year Environmental Protection National Plan* (1996–2000). This plan emphasized air pollution control and water quality protection, specifying an investment proportion of 46% and 40% for each priority, respectively. In accordance, EcoIA during this period was often applied to water quality and water conservation projects (He et al., 2001; Fu et al., 2001; Zhang, 2001; Du et al., 2002). The five-year plan also discussed the prevention of geological disasters, resulting in the development of EcoIA for projects concerning soil erosion and mountain mining (Zhang et al., 1999; Xue and Liu, 2002).

International progress in impact assessment, and environmental management more generally, also influenced the development of EcoIA in China during this stage (Bartell, 1998; Bojorquez-Tapia et al., 2002). Conformity with the Convention on Biological Diversity augmented the application of EcoIA in China as a means to determine impacts to threatened and endangered species throughout the country. New aspects for EcoIA advanced at the global level — such as ecological security, ecological risk, ecological service function, and ecosystem health — were also increasingly applied in China during this stage (Wang, 2000; Liang et al., 2002). Supported by a solid legal framework and significant advances in technique at both the domestic and global level, EcoIA was refined during this stage and popularized throughout China as the preferred method for assessing the ecological impacts of increasing human development.

4.3. The acceleration stage (2003–present)

The official promulgation of *The Law of the People's Republic of China on Appraising Environmental Impacts* in 2003 marked the point at which China formally included environmental impact as part of its comprehensive decision-making process in all spheres of governance (SEPA, 2006). Also implemented in 2003, the *Technical Guidelines for Planning Environmental Impact Assessment* permitted EcoIA in China to extend from local level project assessment to wider and more comprehensive strategic assessment at the national level. With these guidelines, EcoIA (as well as EIA more generally) could now influence planning processes at the macro-spatial and temporal scales, as opposed to only localized development projects.

Elaborating upon the 2003 guidelines, the *Technical Criterion for Eco-environmental Status Evaluation* (*HJ/T 192-2006*) specifically defined the methods of impact determination, the choice of factors and weights for calculating the eco-environmental status index, and the criteria for evaluating the results. One year later, the *Technical Guidelines for Environmental Protection for Acceptance of Completed Ecological Construction Projects* (*HJ/T 394-2007*) normalized EcoIA procedures at the national level by stipulating general requirements — including a plan of implementation and an investigative report — for verification and approval of construction projects. Most recently, the *Technical Guidelines for Environmental Impact Assessment — Ecological Impact* (*HJ 19-2011*) revised the contents of the earlier professional standards released in 1998. The 2011 guidelines integrated more recent ecological concepts, such as measures of environmental and biological effects and plans for nature reserves (Kong, 2000; Tursun, 2005), thereby addressing some of the problems and limitations encountered when implementing EcoIA under the former standards (Liang and Zhao, 2011).

The trajectory of this latest stage of EcoIA development demonstrates the gradual integration of EcoIA methods across a range of disciplines and institutions. The new interdisciplinary techniques that have resulted demonstrate a trend from static to dynamic analysis, allowing EcoIA to not only assess the present situation but also predict future trends. Assessment methods are no longer confined to the measure and evaluation of ecological status, but instead are able to focus on long-term strategic analyses of ecological process. Methods have been also broadened and adapted to accommodate assessment of a much more diverse group of development projects.

From 2003 to present, alongside the promulgation of legislation and the standardization of assessment methods at the central level, the practice of EcoIA has increasingly infiltrated lower level decision-making processes management, such as ecological red line zoning in China (Liu et al., 2010). In the face of rapid urbanization and the development of China's western regions, local governments have adopted requirements for becoming an “ecological city” or “ecological province” (Song, 2008; Luo, 2009). These recent classifications to which Chinese cities and provinces may now aspire demonstrate the degree to which ecological awareness has permeated Chinese society. EcoIA provides a vehicle through which local governments may administer quantitative accounting of ecological carrying capacity for regional planning (Huang et al., 2010). Moreover, EcoIA for emergent environmental incidents or disasters have been brought into environmental crisis management and the emergency planning of local governments.

Public participation and media coverage have also become more prominent features of EcoIA in this most recent stage. As a result of increased stakeholder engagement and media reporting, the EcoIA process has increasingly served as a platform for various groups to oversee and participate in the management of development projects and environmental incidents. Environmental non-government organizations (NGOs) in China play a particularly important role in public participation, increasingly through their social media campaigns. Participating in the process of EcoIA, NGOs typically review documents from mandatory information disclosures and attend public hearings concerning development projects and their ecological assessment. These NGOs range in specialty from species and landscape conservation, ecological restoration, environmental pollution control supervision, sustainable agriculture, environmental legal assistance, eco-tourism, education, and community conflicts coordination. Often with direct ties to local communities, NGOs assume a crucial role in representing public stakeholders throughout the EcoIA process. Similarly, with connections at the international level, NGOs also frequently introduce advanced techniques in EcoIA from abroad in order to promote the effectiveness and openness of EcoIA in China (Wang, 2006). These participatory developments facilitated by the heightened role of NGOs within the EcoIA process demonstrate an overall increasing public awareness and societal concern for environmental quality in China.

5. Bibliometrics review of EcoIA in China

Following the qualitative discussion provided above, this section provides a quantitative summary of the development of EcoIA in China over the past 35 years (1979–2014). Employing bibliometric methods, we performed a comprehensive search of China's Knowledge Resource Integrated Database (www.cnki.net) for academic publications involving EcoIA. Our quantitative analysis considers publication type (doctoral theses, master theses, and journal papers, as shown in Fig. 3), research organizations involved (central government, universities, etc., as shown in Fig. 4a), funding sources (central government, local governments, etc., as shown in Fig. 4b), relevant subjects (mining, forestry, fisheries, etc., as shown in Fig. 5a), and study type (policy study, popular science, etc., as shown in Fig. 5b) for each EcoIA case examined.

Fig. 3 illustrates the growth of EcoIA studies in China according to publication type. This growth is mainly due to legislative developments in EIA, which mark two key points of acceleration, ‘a’ and ‘b’. The figure demonstrates that, most recently, the combined proportion of degree theses on EcoIA is similar to the proportion of journal papers, indicating

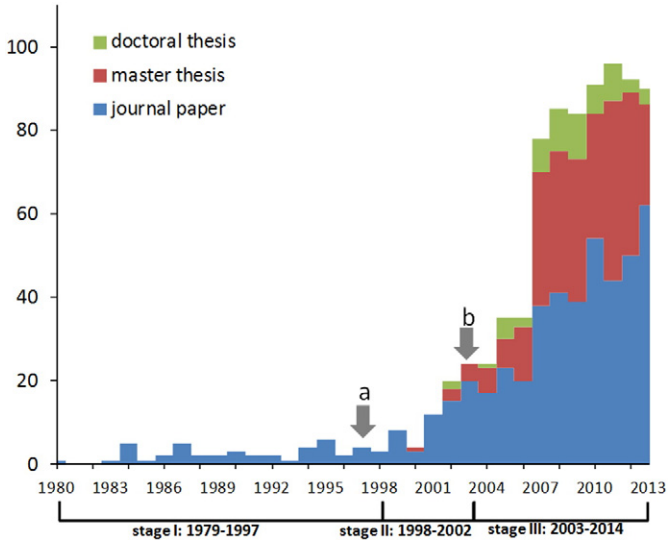

Fig. 3. Number of EcoIA publications in China, 1979–2014.

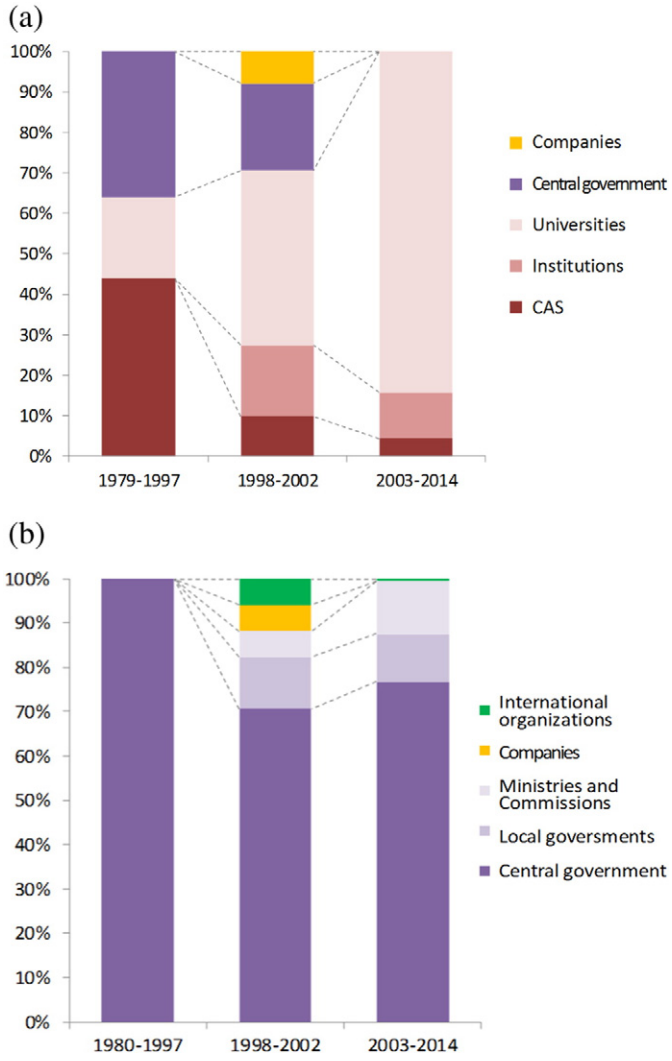

Fig. 4. (a) Changes in the proportion of research organizations involved in EcoIA publication, and (b) changes in the proportion of funding sources supporting EcoIA publications, throughout the three stages of EcoIA development.

an increase of academic involvement in EcoIA. Fig. 4a confirms this finding, demonstrating a consistent increase in the proportion of universities publishing EcoIAs, matched by a consistent decrease in the proportion of government and Chinese Academy of Sciences (CAS) EcoIA publications. This reveals a trend in the spread and the movement of EcoIA, shifting from the central level to more decentralized venues throughout China. Academia in particular has undergone increased involvement with EcoIA, allowing the practice to ally more closely with theoretical innovations in the ecological sciences. Changes in funding sources (Fig. 4b) are also associated with changes in the organizations and institutions involved with EcoIA in China.

EcoIA has also undergone significant changes in the subject matter considered. Fig. 5 maps EcoIA subjects (as classified by the publication database) according to the three stages in EcoIA development, demonstrating that the practice over time has become increasingly interdisciplinary. Fig. 5a indicates increasing diversification of subject matter over the three stages. It also shows that animal science has become a much more prominent topic of investigation since the second stage. Fig. 5b reveals that the types of studies (policy study, popular science, etc.) performed through EcoIA have also diversified over time, albeit to a lesser degree. The figure also demonstrates that popular science as a study type decreased and nearly disappeared over the three stages, while policy studies for EcoIA emerged only in the third stage.

These quantitative statistics confirm the qualitative trends in EcoIA discussed above. Throughout the three stages of EcoIA development in China, one sees a notable shift toward increasing academic practitioners and more comprehensive local involvement and away from the strictly central implementation characteristic of the early stage. EcoIA has also undergone a clear diversification of subject matter and study type as a consequence of the increasing interdisciplinarity of the practice.

6. Summary and future prospects

Since its introduction in 1979 with the *Environmental Protection Law of China*, to its most recent technical guidelines established in 2011, EcoIA in China has transformed from a set of rudimentary ideas imported from abroad to a comprehensive and strategic approach to development planning at the macro-spatial and temporal scales. Based on our literature review and bibliometric analysis, three specific observations concerning the development of EcoIA in China over the last three decades seem especially pertinent as we look forward. (1) Increasing NGO involvement has markedly improved public participation in the EcoIA process. Such participatory developments reflect growing environmental awareness throughout Chinese society more generally. (2) Chinese universities are likely to continue expanding their contribution to the theory and practice of EcoIA, especially due to professional training and innovations from increasing interdisciplinarity throughout academia. (3) Perhaps most importantly, the recently revised *Environmental Protection Law of China* is anticipated to enhance the connection between EcoIA methodologies and China's nascent ecological compensation system, implicating EcoIA as not only a tool for ecological assessment, but also a key consideration for any proposal regarding regional socio-economic development.

In order for EcoIA to reach its full potential, however, significant work remains to be completed. The most immediate challenge facing EcoIA in China involves aligning the robust but largely fragmented spheres of law, methodology, and practical implementation. Specific assessment methods and the designation of assessment responsibilities need to be brought into the legislative process. Moreover, comprehensive implementation of the various national policy guidelines that have been so rapidly developed in this latest stage of EcoIA must be achieved at the local level. This proves difficult, however, given that specific responsibilities, institutions, and measures of examination and supervision remain indeterminate or only superficially defined.

Despite these shortcomings, the development of EcoIA in China has established the conditions for the gradual internationalization of the

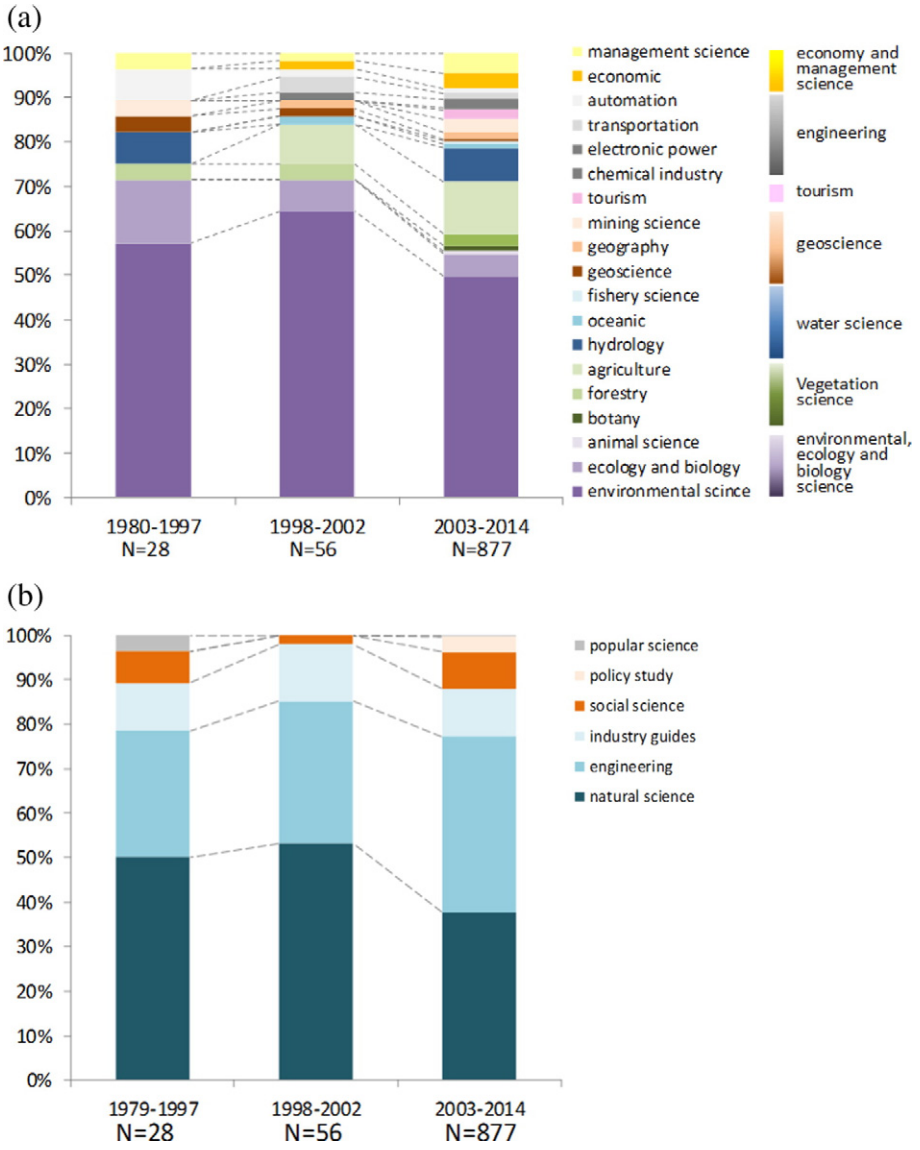

Fig. 5. Changes in proportion of (a) subject matter applied to EcoIA, and (b) study types classified from the publications of EcoIA in China throughout the three stages.

country's environmental management institutions (MEP, 2010). Because developing countries often face the conflicting pressures of ecological conservation and economic growth to a greater degree than more developed nations, EcoIA in China may eventually come to serve as an appropriate model throughout the developing world. The evolution and experience of EcoIA in China could, for example, be applied to other countries in Asia, Africa and Latin America that face similar conditions of vast natural resources and rapid development. Moreover, as the assessment process develops, practitioners might also look forward to the application of EcoIA to transboundary environmental issues that implicate multiple countries, or even to global environmental issues that concern all nations. Through its transnational application, EcoIA has the potential to foster a shared responsibility for environmental protection at the international level, ultimately contributing to the alleviation of some of our most pressing global issues, such as climate change mitigation and biodiversity conservation.

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