Environmental Management (2008) 42:717–733
DOI 10.1007/s00267-008-9123-5

Context and Systems: Thinking More Broadly About Effectiveness in Strategic Environmental Assessment in China

Olivia Bina

Received: 7 December 2007 / Accepted: 17 March 2008 / Published online: 18 April 2008

Abstract China is an illustrative—and extreme—case of the difficulties of balancing the pursuit of economic, social, and environmental objectives. In 2003 it adopted a form of Strategic Environmental Assessment (SEA) for its plans and programs (referred to here as PEIA) with the aim of moving towards greater environmental sustainability. The literature has explored primarily the issue of methods and legal procedures. This research contributes to the analysis of PEIA through a different set of interpretative lens. Drawing on recent developments in the theory and practice of SEA, I propose a conceptualization of SEA effectiveness that combines direct and incremental impacts, and a need for context-specific systems as a way to focus on the relationship between assessment, planning, and their context, and thus maximize effectiveness. This framework underpins the analysis of China's experience, which I explore with the help of interview material and the literature. The result is an evaluation of the strengths and weaknesses of PEIA in terms of its purpose, assessment concept, process, and methods. The detailed analysis of six aspects of the context helps explain the origin of such shortcomings, and identify opportunities for its improvement. I conclude defining elements of a context-specific system for SEA that seeks to maximize the opportunity for incremental, as well as direct, effectiveness in China.

Keywords Strategic Environmental Assessment · Effectiveness · System · Context · Purpose · Strategy · China

O. Bina (✉)
Centro de Filosofia, Faculdade de Letras, Universidade de Lisboa, Alameda da Universidade, 1600-214 Lisboa, Portugal
e-mail: o.c.bina.92@cantab.net

O. Bina
Centre of Urban and Regional Systems, Instituto Superior Técnico, Lisboa, Portugal

O. Bina
Geography and Resource Management, The Chinese University of Hong Kong, Shatin, Hong Kong, SAR, People's Republic of China

Introduction

China is making its way out of poverty and underdevelopment at an unprecedented pace. Its success has lifted hundreds of millions out of poverty (Liu 2007), but it has also led to significant environmental degradation (Day 2005; Economy 2004). The resulting challenges impose a sense of urgency to integrating environmental concerns into development choices, and searching for improved environmental governance (OECD 2007). It is in this context that Strategic Environmental Assessment (SEA)—an increasingly popular mechanism for environmental policy integration and the strengthening of environmental governance (Sheate and others 2001; Wallington and others 2007)—is attracting attention in China (China Daily 2007; Xiuzhen and others 2002). SEA is defined as a "tool," and a process, for the systematic analysis of the potential impacts of programs, plans, and policies (PPPs) on the environment (Sadler and Verheem 1996; Thérivel and others 1992). Since the mid-1990s there has been a rapid uptake of this assessment mechanism throughout the developed and developing world (Dalal-Clayton and Sadler 2005). In line with this growing trend, China's State Environment Protection Administration (SEPA) and State Council's Environmental and Natural Resources Committee (ENRC) began negotiating the text for an EIA Law in 1998, so as "to address the failure of development policies

and plans in assessing the environmental consequences of government actions" (Zhu and Ru 2007). Five years later, the new EIA law of China (NPC 2002) included provisions for an SEA-type procedure: the environmental assessment of plans (hereafter, SEA refers to international practice and PEIA refers to China's experience, after Tao and others 2007).

The requirement entered into force in 2003 and experience is therefore still limited, however, scholarly debate on this new field of environmental policy mechanisms is growing rapidly. The analysis has focused on the nature of legal requirements (Bao and others 2004; Gu and Sheate 2005; Wang and others 2003) and on case reviews and methodologies (Bao and others 2004; Lindhjem and others 2007; Tao and others 2007; Xiuzhen and others 2002). In terms of the literature on PEIA in Chinese, Che and others (2002, cited in Zhu and Ru 2007) note that "[m]ost of [the] research (on SEA in China) has been focused on the concept, theory, and method of SEA." A similar trend can be seen for Taiwan SEA studies (Liou and others 2006). The contribution by Tao and others (2007) introduces a new level of in-depth analysis from a sectoral perspective: that of landuse plans, which is a traditional area of application for SEA around the world.

Overall, this initial focus on regulatory and technical aspects follows the same pattern of inquiry that characterized research in Europe, the United States, and elsewhere during the early 1990s (see two prominent examples: Sadler 1996; Thérivel and others 1992). Although most of the authors mentioned above, notably Bao and others (2004), list a number of PEIA examples "successfully carried out" in China since the 1990s, the country's experience with PEIA is still in its early days. Zhu and Ru (2007) remark that "[t]opics such as the adaptation of SEA concepts, the motivation and politics underlying legally mandated planning EA [environmental assessment], and the implications of current institutional arrangements for the effectiveness of planning EA have yet to be examined" in China's context. Their analysis of the political and institutional dimensions underlying the EIA Law and its implementation marks a shift in scholarly debate on PEIA in China. The shift is in line with discussions that have characterized the SEA discourse since the late 1990s (Bina 2003; Brown and Thérivel 2000; Caratti and others 2004; James and others 2003; Owens and others 2004; Partidario 2000; Wallington and others 2007), arguing for a better understanding of how the context of SEA—politics, culture and society, and the organizations and institutions therein—can influence the effectiveness of assessment, as well as how SEA can itself influence (improve) the context.

In fact, the SEA discourse has changed significantly since the early idea of SEA as a development of project-EIA (Petts 1999; Sadler 1996; Thérivel and others 1992). It eventually evolved into a much wider range of approaches and methods, but perhaps most importantly, it moved from the so-called technical and rational domain of assessment and evaluation, to embrace the diverse realm of good governance, social and policy learning (Bina 2007; EC 2005; Hertin and others 2007; Vicente and Partidario 2006; World Bank 2005). Two decades of practice have shown that good information alone—though essential—will not necessarily lead to better planning or better choices (Jasanoff and Wynne 1998; Owens and others 2004). It is the context within which planning and assessment occur, and especially all the qualities that are commonly recognized under the framework concept of "good governance" that makes the difference. Hence, the growing attention to the context, and the institutions and organizations therein (Audouin and Lochner 2000; Hilding-Rydevik and Bjarnadóttir 2007), which Zhu and Ru (2007) and Gu and Sheate (2005) have contributed to unpack in relation to China.

The purpose of this research is to contribute to the analysis of China's experience to date through a different set of interpretative lens. While China is still new to SEA, it may need to move rapidly to learn and adapt to the new ideas and innovative approaches if it wants this mechanism to help deliver more sustainable plans. Thus, I propose to explore the purpose and practice of PEIA from a systemic and context-specific perspective, and to suggest ways to strengthen the effectiveness of practice—including its strategic dimension—as it evolves. This article develops in five sections: a conceptual proposition linking effectiveness of SEA to its context and to the idea of SEA systems; a critique of China's PEIA experience to date; an analysis of key aspects of China's context influencing the shape and effectiveness of the current PEIA regime; the proposal of a context-specific system for SEA in China; and conclusions.

I base the analysis on a range of sources. In addition to recent literature on the subject, I use primary data, in the form of semi-structured interviews: 22 held with senior bureaucrats from a Ministry responsible for a *part* of China's transport systems (hereafter referred to as "transport ministry"), bureaucrats from SEPA and its Appraisal Centre for Environment and Engineering (ACEE), technical experts from specialized government agencies in the field of transport (transport and economic planning) and environment (often translated as "design" or "research" institutes), and representatives from consultancies; four interviews with academics; and ten with foreign consultants and officers of international organizations. The interviews were conducted between 2005 and 2007. Some were carried out as part of my on-going research into China's environmental governance capacity, and some as part of a project into ways of institutionalizing SEA within

the "transport" Ministry. Only a selection of the interview material has been used for this article. To respect confidentiality, all interviews have been coded: "CG" refers to informants working within a Chinese government organization, "A" refers to academics, and "I" refers to informants working for nonChinese agencies. I also refer to comments made by experts during the *International Conference on Strategic Environmental Assessment* (organised by SEPA, 3–4 November 2007, Beijing), and a training course on *Public Participation in EIA and SEA* (organised by ACEE and SEPA, Guiyang, China, 3–6 April, 2006).

Effectiveness and Context-Specificity of SEA Systems

Effectiveness and Context

The issue of effectiveness is central to debates on analytical systems. SEA is meant to improve the environmental quality of strategic initiatives, such as policies, plans, and programmes (PPPs), so as to contribute to environmentally sustainable development. The common understanding of an effective SEA is one where the object of the assessment (a PPP) will avoid damaging the environment, and will contribute to sustainability (Dalal-Clayton and Sadler 2005; Owens and others 2004; Sadler 1996; Wallington and others 2007; World Bank 2005). Runhaar and Driessen (2007) suggests that this form of "*direct*" effectiveness is expressed through changes in the decision-makers' understanding or awareness of environmental and sustainability issues, and in the extent to which such issues are considered throughout planning and decision-making linked to the PPP under scrutiny.

However, SEA's capacity to influence PPPs is often constrained (Runhaar and Driessen 2007). The persistent failure of planning and decision-making to deliver environmentally sustainable development is closely linked to the limited environmental governance capacity of the machinery of government, and ultimately, it is this capacity that needs to be strengthened (Jordan and Lenschow 2008; OECD and UNDP 2002). For this reason, a second conception of SEA effectiveness has been proposed: the idea of an *incremental* change in mindsets, in the level of awareness, the institutional and organizational setups, and the culture that drives planning (Bina 2003, 2007; Hilding-Rydevik and Bjarnadóttir 2007; World Bank 2005). As Nykvist and Nilsson (submitted) explain: "to enhance the potential for integrating sustainability concerns, it seems less fruitful to develop more advanced and complex assessment frameworks and models than strengthening institutional arenas for social learning." Learning and changes in mindsets are more long-term impacts that refer to the context in which SEA is applied. Here the object of SEA moves beyond PPPs, to include the environmental governance capacity of institutions and organizations. As a result, in this analysis, "context" refers to a set of dimensions that (1) can enable—or constrain—SEA's direct effectiveness on PPPs, or (2) can be considered the complementary object of SEA—with the aim of promoting incremental effectiveness. The latter case focuses on the potential of repeated applications of SEA leading to a virtuous circle of enhanced environmental governance capacity within the different dimensions of context.

But what are the contextual dimensions involved? Initially, the interpretation of context in SEA literature was rather narrow, focusing on aspects of planning procedures and of policy and decision-making processes (see, for example, Brown and Thérivel 2000; Clark 2000; ERM 1998; Partidario 2000; Sadler 1996b). Here I wish to include the factors that define and influence such procedures (rules and regulations) and processes. Thus, context "includes the organization and institutional location of the decision-making process…, which are themselves situated within and influenced by a given society and its broader social, cultural and political values" (Bina 2007). The political and cultural dimensions are effectively the backdrop to all other contextual elements (see Fig. 1, right). For example, the political dimension of policy-making processes is recognized as an often-definitive influence over SEA's effectiveness. The tendency to try to isolate (even ignore) this dimension and favor a more technocratic interpretation and analysis of the process, has shown its limitations, not least in the policy analysis tradition. Politics plays a key role in defining the purpose of instruments such as SEA. The cultural dimension is also critical in determining how key activities are conducted in practice. Most aspects, even if legislated for, will still be open to context-specific interpretations: assessment, for example, can be viewed as a bureaucratic phase of an administrative procedure or as a dynamic process, and other aspects—such as participation, consultation, co-operation, co-ordination, and knowledge management—are all subject to cultural nuances, different constructions of reality, social relations, and rationalities (Bina 2003).

The administrative dimension refers to the way all elements of planning and policy-making are managed on a daily basis, including politicians' interaction with civil servants, and all procedures for data gathering, assessment, planning, and decision-making. The institutional dimension is interpreted to refer to legal and policy systems in place in a particular context, which are of direct or indirect relevance to the PPP being assessed, and to the SEA process in particular. But it also can include the concept of ideology, as a set of beliefs that "reflect and explain 'reality'" (Jordan and Greenaway 1998 after Kuhn), of culture, as the "pattern of basic assumptions which a given group has

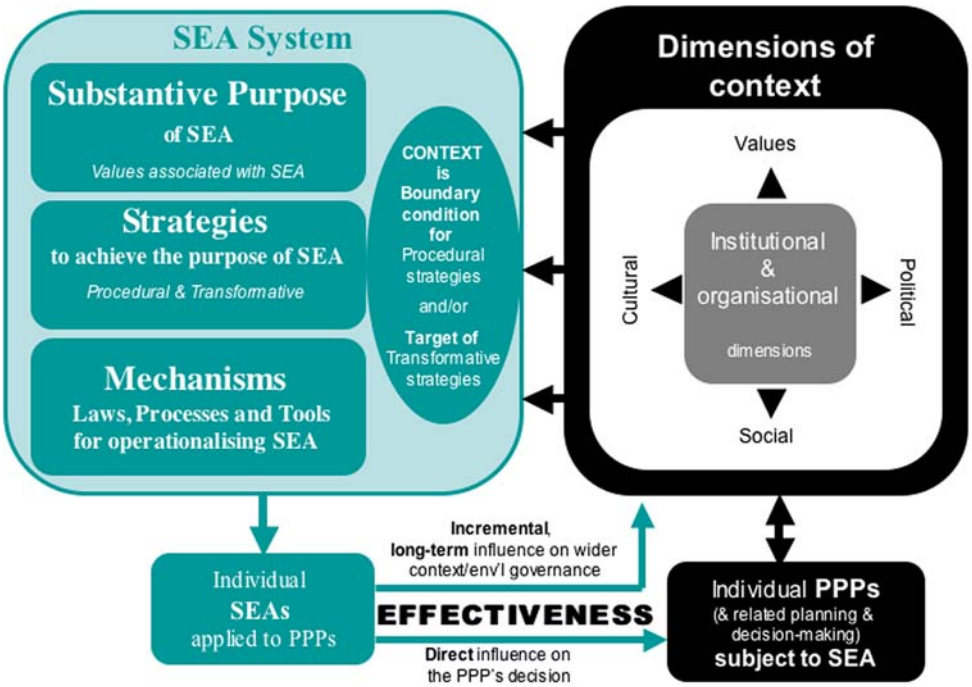

Fig. 1 SEA as a context-specific system for direct and incremental effectiveness

invented, discovered or developed in learning to cope with its problems of external… and internal adaptation" (Bate 1994 in: Cannibal and Winnard 2001). Thus, in practice there is a strong dynamic interaction between contextual dimensions, and it is the combination and relationship between these dimensions that determines the capacity for environmental governance, which in turn, influences the design and effectiveness of assessment instruments such as SEA.

SEA as a System

I maintain that the *combination* of direct and incremental effectiveness (or impact) underscores the strategic nature of SEA, and that for this *strategic* dimension to be upheld, it is essential to adopt a systemic approach to the introduction of SEA: one that goes beyond the setting of legal requirements, processes, and tools ("mechanisms" in Fig. 1). Typically, bureaucrats and experts will introduce SEA laws, processes, and tools drawing on existing examples and notions of good practice. However, there are limits to the transferability of notions across countries and cultures. Conceptualizing and exploring SEA as a *system*, permits us to focus on the relationship between assessment, planning processes, and the context in which both are shaped and implemented, and thus to maximize the potential for direct and incremental effectiveness (Fig. 1, bottom). Such focus is currently weak or absent. As a result, assessment laws, processes, and tools are not designed to actively pursue incremental-type effectiveness such as social and policy learning. Instead, as Hertin and others (2007) argue: "policy learning occurs despite, rather than because of the instrumental design of the new assessment procedures, which tends to act as a barrier to open deliberation and knowledge utilization" (but see Owens and others 2004 for a comprehensive discussion).

To define SEA's systemic dimension, I draw on the recent theoretical framework proposed by Wallington and others (2007) who structured the ongoing discourse on SEA theory and the basic assumptions underlying practice in terms of three vital elements: "the substantive purpose and values associated with SEA, the strategies chosen to achieve that purpose, and the mechanisms for operationalizing SEA" (Fig. 1, left).

The first element sets the *substantive purpose*, "the broad, long-term reasons for institutionalizing a system of SEA within a legal framework, a planning context, and/or a particular organization" (Bina 2007). It reflects the system of values that is to be upheld through the application of SEA, and Wallington and others (2007) define the substantive purpose of SEA as "a recovery of the original intention of environmental assessment: to promote change by inducing ecological rationality into systems of governance." Here, "ecological rationality" is borrowed from Dryzek's (1987) work describing a fundamental type of reason whereby "the preservation and promotion of the integrity of the ecological and material underpinning of society… should take priority over competing forms of reason in collective choices with an impact upon that integrity." The second element, *strategies*, refers to the different assumptions made about the values and rationalities that inform the context, and thus the formulation of

PPPs, the process of decision-making, and of SEA itself. It highlights SEA's context-specificity: the idea that an SEA system is influenced by—and can influence—the context in which it is conceptualized and applied. Wallington and others (2007) suggest two extremes in a continuum of possible strategies (Fig. 1, centre). *Procedural* strategies, "which depict SEA as a systematically 'rational' process which seeks to influence the formulation of a specific PPP [policy, plan or programme]," and for which the context normally sets boundary conditions to which SEA strategies adapt. At the opposite end are *transformative* strategies, "which depict SEA as an intentionally 'political' process intended to change the way decisions are made, and to induce learning about environmental values in institutions, organizations and civil society" (Wallington and others 2007). Here context becomes a target that SEA strategies seek to improve. Thus, "strategies" echo the direct and incremental conceptions of effectiveness discussed above. Finally, the third element concerns the *mechanisms* recommended to operationalize SEA. Owens and others (2004) and Wallington and others (2007) describe the methods and tools used in SEA as a heterogeneous group including political, dialogical and participatory methods, as well as more traditional techno-rational instruments. Both contributions recommend that the SEA community should seek to maximize synergies between the "political" and "technical" methods (Wallington and others 2007), abandoning any attempt to polarize the debate and the practice, since the most appropriate methods are often likely to combine both typologies. The idea, as illustrated in Fig. 1, is that mechanisms could be *shaped to serve* the purpose and strategies. Together, these three components capture the systemic and strategic dimension of SEA.

This interpretative framework emphasizes the importance of the relationship between assessment (as a system), planning, and their "context"—and the implications it has for effectiveness. However, the details of such a relationship are rarely defined in explicit terms: instead, the link tends to underlie and influence SEA regimes, *implicitly*. Wallington and others' (2007) concept of a strategy changes this, placing the relationship at the heart of SEA discourses. The introduction of an intermediate step (strategies) between the definition of *why* it is desirable to introduce SEA (the purpose) and *how* to do so (mechanisms)—create the opportunity to reflect on the relationship with the context and on the type of outcomes (and thus effectiveness) expected of SEA.

On the basis of this interpretation I now turn to analyze the case of China: the strengths and weakness of its current SEA experience, the way assessment and planning relate to each other. The analysis reveals important problems, and highlights the constraining effect of various dimensions of context on the direct effectiveness of assessment. Contextual aspects (including those that can enhance effectiveness) are discussed in the subsequent sections.

China's Experience of SEA: PEIA

For this analysis I focus on three aspects of the PEIA regime considered critical in SEA literature: (1) purpose of assessment, (2) quality of the process: timing, consideration of alternatives and public involvement, and (3) methods and expertise. These aspects relate primarily to the first (purpose) and third (mechanisms) element of an SEA system, as illustrated above.

Purpose and Concept of Assessment

Understanding the purpose of an SEA regime allows us to define effectiveness. Article 1 of the EIA Law (NPC 2002) defines "purpose" as: "realizing sustainable development strategy, preventing adverse impacts on the environment from implementation of plans and construction projects, and promoting coordinative development of the economy, society and environment."

Thus, PEIA is intended to help implement sustainable development, by coordinating its three pillars and preventing negative effects. This common generic statement is in line with international trends (Sadler and others 2008). However, its interpretation in practice is more akin to Bao and others' (2004) definition: "[t]he purposes of SEA" is the "prevent[ion] and mitigat[ion of] negative environmental effects caused by the policy, plan and to control environmental degradation from the sources." This view focuses on one aspect of Article 1: to prevent impacts. It is a view supported by the analysis of practice to date (for example, Liou and others 2006; Tao and others 2007) and by the majority of practitioners I interviewed between 2005 and 2007 (though with notable exceptions: CG9, CG34). But preventing impacts (and coordinating socio-economic and environmental interests) is a means to an end—it does not represent a substantive purpose (Wallington and others 2007). This affects the framing of PEIA's effectiveness: it becomes exclusively linked to direct impacts on decision-making, ignoring incremental improvements in the capacity for coordination, as well as in wider environmental government practices (Fig. 1).

The remainder of the Law explains why Chinese practitioners focus on adverse impacts. Chapters 1 ("*General Provisions*") and 2 ("*Environmental Impact Assessment for Plans*") of the EIA Law explain the concept of "assessment" itself, which is also crucial in understanding effectiveness. The Chapters reveal elements typically associated with concepts of project-EIA: the rational objective discourse and the impact assessment mindset.

Assessment is defined as an "analysis, projection and evaluation [of] the potential environmental impacts" resulting from the plan (Article 7) or project, and the proposal of "countermeasures and measures to prevent or alleviate adverse impacts" (Article 2); it is intended to provide "objective, open and impartial" information, and "thus provide scientific basis for the decision-making" (Article 4). The Law therefore, like many others, supports an impact assessment mindset centered on traditional prediction and evaluation ideas, and a search for solutions in terms of prevention, mitigation and compensation.

This differs with principles of good SEA practice (for example: IAIA 2002). Preventing and mitigating environmental degradation should be seen as a mechanism of last resort, once all else—including the shaping of objectives and alternatives—has been tried. The need to strive for objectivity and impartiality is acknowledged and shared in many countries. However, there is also a need to engage with the very significant body of work that highlights the limits, as well as the desirability, of such objectives—and points to the inevitable need to balance rationality with power, to take into account values as well as data, and to acknowledge uncertainty as an inevitable aspect of strategic-level assessment (Hildén and others 2004; Owens and others 2004; Sadler and others 2008; Vicente and Partidario 2006). Chinese experts and practitioners involved in early PEIAs repeatedly acknowledge such needs and difficulties (interviews CG9, CG22, CG23, CG34, CG35, I5).

Quality of the Process: Timing, Alternatives, and the Experts

SEA literature is replete with recommendations for the need to start the assessment tasks as soon as possible and in close interaction with planning (for example: Caratti and others 2004; EC 2005; Partidario 2000). Put simply, starting SEA once a draft plan is already in place (even if still preliminary) is tantamount to no *strategic* assessment (Bina 2007). In China, current practice tends to focus on the prediction and evaluation of impacts, and this is done on a full draft or, not uncommonly, on a plan which has already been approved by the designated authority (for example, the Municipal People's Congress), (interview CG3, CG9, CG23, CG34—recently confirmed by the presentations at the SEA Conference, Beijing). The analysis of land-use master plans by Tao and others (2007) confirms the late start of PEIA, and its implication for the definition and analysis of alternatives (the second distinguishing character of strategic-level assessments):

> "[g]iven that SEA is started after a draft plan has already been prepared, the identification of environmental status and analysis of environmental impacts would be separated from the planning preparation process, and hence comparison of alternatives is practically impossible. When SEA is initiated after key decisions on the plan have already been made, it is difficult to significantly influence the plan."

The same is true for the transport sector, where PEIA is limited to the discussion of alternative routings of predetermined transport solutions: it can advise on sensitive areas that should be avoided and on mitigation, but not on the strategic choices that led to select a particular transport mode, or infrastructure instead of demand management (interview CG13, CG20, CG22, CG23, CG40, CG41).

The problem lies with the legal requirements, as well as with the purpose of assessment reviewed earlier. On the one hand, Article 7 of the EIA Law, establishes that PEIA of several plans, including land-use master plans, "should be conducted 'during the preparation of a plan'" (Tao and others 2007). However, for other types of plans, the law establishes that PEIA will start "after the draft plan is developed and before it is submitted for review and approval" (Tao and others 2007). The difference is of little consequence in practice: interviewees point out that PEIA almost invariably starts once a full draft of the plan is completed. Moreover, experts argue that given the current cultural, political, and institutional context it is unlikely that PEIAs will be initiated before a draft plan is completed, except in limited cases (interview CG9, CG34), probably coinciding with sufficient political leadership to do so. Thus, practice suggests that elements of the context are constraining PEIA's direct effectiveness (see next section). Perhaps for this reason, SEPA is discussing the possibility of extending PEIAs' scope beyond plans, to policies (and legislation) in an attempt to tackle the more strategic layers of policy-making (comments at the recent SEA conference in Beijing, see above, author's own notes).

A third aspect of process is that of public involvement. Article 11 of the Law (2002) refers to the need to "hold expert meetings and public hearings" and invites those responsible to give the resulting comments "serious" consideration, and to provide an explanation of how these were adopted or rejected. Zhu and Ru (2007) argue that "Chinese laws and regulations have yet to fully address the three prerequisites for meaningful public participation, that is, access to information, public participation in decision-making processes, and access to justice." Here again, timing is problematic. In terms of current project-EIA practice, public consultation tends to occur at the late stages of the EIA process and if it influences the decision, it tends to be in terms of mitigation measures, the same has been true for the limited PEIAs completed to date (interviews CG23, CG28, and interventions at the training course in Guiyang, 2006—mentioned above). Even if the above

problems were less frequent, contextual characteristics including bias towards top-down directives and the tendency is to "lectur[e]" the public on the need to protect the environment, instead of informing "the public on problems and solutions" and creating space for dialogue (Michalak 2005), remain an obstacle.

Methods and Expertise

Having examined the purpose and process of PEIA, I turn to the third critical aspect of this regime: methods—the aspect on which scholars have focused most to date (Bao and others 2004; Tao and others 2007; Xiuzhen and others 2002). The choice of methods is influenced by most of the issues raised above, especially the techno-rational interpretations of the purpose of assessment. The literature and fieldwork data show that there is no clear understanding of the difference between EIA and PEIA. This, was also common amongst practitioners in Europe in the 1990s. However, the fact that in the Chinese system SEA is an EIA of plans, may not be helping matters.

When asked about the biggest challenges they were facing in applying PEIA**,** experts (interview CG18, CG20, CG24) express confusion in "deciding what technological [methodological?] background to use," and admit that they "tend to do SEA as we [experts] do EIA." Decisions typically taken during scoping are posing the biggest challenge: "what depth [of analysis] to aim for… EIA is very specific and detailed… including issues of air and noise pollution", instead PEIA "is at a much higher level," requiring consideration of a larger number of projects, more issues, and the focus on a "wider scope." A senior bureaucrat from a transport-related ministry (interview CG3) considered PEIA "very difficult," due to the high level of "uncertainty" in planning: it was difficult to know enough about the likely projects and thus produce sufficient "baseline data" to "quantify" things. Another expert (interview CG18) explained that there was a "need to learn how to quantify ecological impacts and other external factors" and that they did not "have the skills [to do] economic studies [analyses]" in PEIA.

Discussions with the experts suggest a gap between the essence of strategic-level assessment and the way PEIA is understood and practiced. SEA requires experts to prioritize strategic questions and issues, reducing complexity and highlighting the key factors on which planning decisions should be taken. To do so, it requires close collaboration between planning and environmental actors—something very difficult in the current Chinese context (discussed below). Instead, experts are struggling to apply project-EIA concepts to fully drafted plans, and in doing so they are confronted with the limits of data and intrinsic levels of uncertainty. Many informants are uneasy about the lack of detail in PEIAs (and SEA examples), viewing them as "a very simple description of EIAs" (interview CG23). The hard science background of many practitioners makes it difficult to accept even semi-qualitative methods (such as for example matrices using simplified symbols to show trends rather than exact changes), and reassurance that these practices are widely applied internationally does not reduce skepticism. These concerns characterize the challenges of moving to strategic-level assessments. Experience with SEA in Taiwan reveals similar difficulties: there are problems relating to the unfamiliar character of the methodologies, and crucially, to the incompatibility between existing "administrative frameworks" and requirements for SEA's implementation (Liou and others 2006). Most administrations and experts have struggled with them during the initial stage of transition from EIA to SEA.

However, the "licence system" that characterizes China's PEIA regime could be making things especially difficult. Based on this system, "quasi-government institutions" (Gu and Sheate 2005), consultancies and universities already certified to prepare project-EIAs, are nominated as the technical agencies uniquely entitled to perform PEIA (for details see: Gu and Sheate 2005; Zhu and Ru 2007). The choice has its strengths. The institutes have built significant technical, scientific, and sector-specific expertise on environmental impact concepts and methods. However, the risk illustrated by discussions with the directors of several such agencies (CG3, CG9, CG18, CG20, CG22, CG23), is that such institutionalized continuity will encourage a narrow interpretation of PEIA, essentially as an extension of EIA. In terms of expertise, there is an urgent need to address the current bias in favor of natural sciences and engineering. The strategic and sustainability agenda underpinning PEIA's purpose demand a wider range of skills (especially in the social sciences) and greater access to decision-makers than currently available. It will otherwise be difficult to deliver better environmental, social and economic coordination, as per Article 1 (discussed above).

There is a further problem with such designations. The nature of the agencies can ensure independence and greater transparency to PEIA; however, by being external agencies they do cannot facilitate close process integration (of planning and assessment), nor the benefits of social and policy learning which results from carrying out most of the work in-house. Experts from these agencies typically have limited opportunities to engage, analyze, and openly discuss strategic options with planning authorities: most experts explained their work focused on the search for technical solutions to the environmental problems, often narrowly defined (interview CG9, CG18, CG20, CG22, CG23, CG34). In the transport ministry, for example, the rigidly hierarchical structure, combined with a culturally

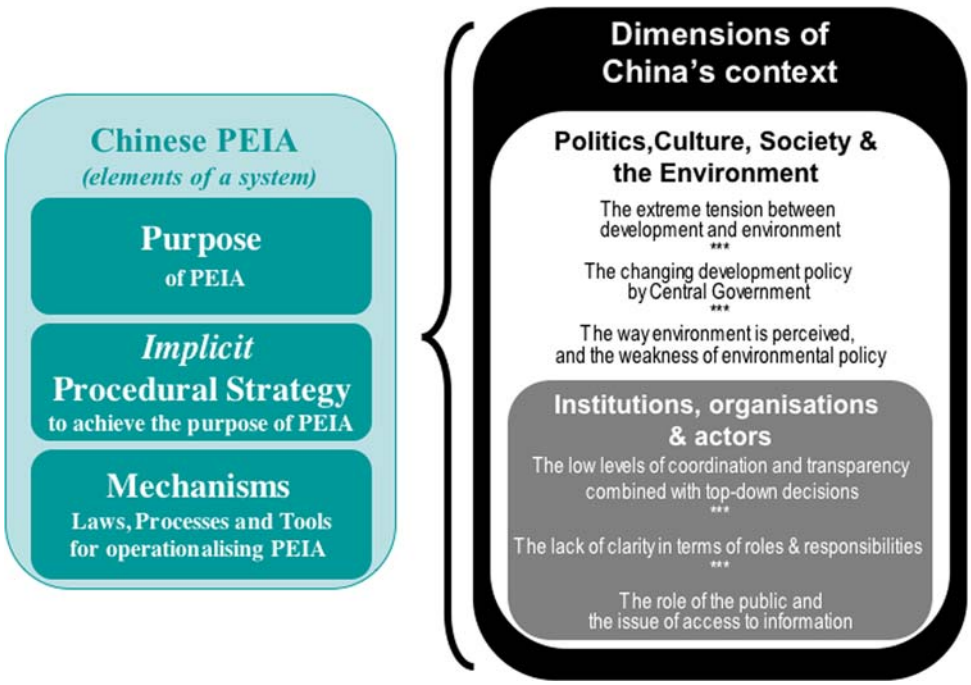

Fig. 2 Critical aspects of PEIA's context

and institutionally embedded divide between technical experts, bureaucrats, and senior leadership limited the quantity and quality of information being disseminated from the top down. This could explain why in several instances informants had limited capacity to see the bigger picture in which certain measures, for which they were responsible, would fit.

The Experience Thus Far

The overview of three key aspects of SEA-type practice (purpose, process, and methods) produces a less-than-bright picture. The purpose in the legislation is vague and arguably not a purpose but a definition of means; the related concept of assessment is essentially identical to project-EIA; the quality of the process reveals important weaknesses; the choice of methods reflects the previous problems and is compounded by the choice of experts. It can be concluded that the implicit concept of effectiveness is a narrow (mainly due to the late start of PEIA) version of direct impact, and that—based on the ideas of Wallington and others (2007)—the existing mechanisms seem to be inspired by an implicit procedural strategy (see Fig. 1). Thus, the design and operation of all three elements of what could be a PEIA system (purpose, *implicit* strategy and mechanisms) are constrained by the context.

As I have repeatedly acknowledged, this is neither surprising nor unique to China, which is still new to this field of assessment. Most countries have encountered similar problems, and have slowly progressed on a learning-by-doing basis, and few—if any—stand up to the combination of international good practice principles (IAIA 2002). Following the framework proposed above, I now examine in greater detail the characteristics of the context in which PEIA is being applied so as to further illuminate the reasons for current difficulties, and possible ways forward—based on the idea of a context-specific system.

The Chinese Context: Challenge or Opportunity?

The idea of context is based on the four, closely interrelated dimensions, illustrated in Fig. 1 above. In Fig. 2, I summarize the aspects of the context that informants identified as particularly relevant to PEIA. This is not a comprehensive list, but its significance is confirmed in the literature and by my own observation at seminars and meetings (especially those taking place during my work on the institutionalization of SEA/PEIA within a transport-related Ministry).

Politics, Society, and the Environment

China is an illustrative—and extreme—case of the difficulties of balancing the pursuit of economic, social, and environmental objectives. This is the most striking aspect of the context in which PEIA is operating. In per-capita terms, China has limited resources, and the extent of depletion, pollution, long-term or irreversible damage affecting all vital resource bases in China is increasingly

well documented (see for example: CCICED 2005; Crawford and others 2006; Day 2005; Economy 2004; Liu and Diamond 2005; World Bank 1997; Worldwatch Institute 2006). The conflict over resources has social justice implications (Paavola 2007) that are increasingly evident in China: there is rising inequality between the poor and increasingly rich Chinese (the "Gini coefficient of inequality in household income rose by 7 percentage points (18%) between 1988 and 1995," [Liu 2007; see also: Pei 2006]), and growing inequality between urban and rural incomes (the ratio is now 3:1). Pan Yue (Pan and Zhou 2006), SEPA Vice Minister, has been warning that environmental problems are becoming one of the major factors triggering social conflicts.

Ironically, the main cause of environmental degradation is rapid economic growth that is being driven by the need to lift hundreds of thousands of people from poverty, but also—it is argued (Liu 2007; Pei 2006)—by the link between growth and the legitimacy and future of the current autocratic regime. The Government's overarching objective to build a moderately prosperous and harmonious society does little to resolve tensions, as it calls for efficient and fast economic growth to narrow the income gap, while aiming to conserve energy and reduce energy consumption and pollution (Hua 2007). These aims are not easily reconcilable, and are bound to increase the already critical levels of pressure on the environment. Given China's limited endowment of natural resources, the continued pressure (and planned increases) poses major risks which PEIA practitioners are asked to confront (often late) in the planning stage.

A second aspect is the changing development policy underpinned by fears of social unrest and scarce resources (Cheng 2007). Top leaders have made frequent references to China's ecological crisis, and the worsening situation has been cited as one of the drivers behind the new agenda for the country's growth model, whereby *efficiency* would replace speed as the priority: "China should take substantive measures to shift its focus from pursuing speed to improving the quality and efficiency of economic growth" (President Hu Jintao in: Xinhua 2006). Efficiency and "scientific development" discourses are driving the modernization of the State (People's Daily 2004). Efficiency is the essence of China's circular economy concept: the full and efficient use of resources and the minimization of waste discharge—leading to "low consumption of energy, low emission of pollutants and high efficiency, through its 3-R principle: reduce, reuse, and recycle" (Xinhua 2006). After more than two decades of high growth of the Chinese economy, an unfair social policy and a looming series of severe economic problems, started coming to the fore, leading to the proposition—at the 16th Congress of the Communist Party of China in 2002—of a "scientific concept of development" combining the need to consider the effects of development for Chinese people, and the promotion of coordinated and sustainable development. Scientific development is central to Hu Jintao's (2007) message at the 17th CPC Congress (October 2007), where he links development with the need to improve environmental management:

> "[w]e must adopt an enlightened approach to development that results in expanded production, a better life and sound ecological and environmental conditions, and build a resource-conserving and environment-friendly society… harmonise… economic growth with the population, resources and the environment, so that… our economy and society will develop in a sustainable way."

However, the capacity of the Government to implement its policies has produced mixed results. It is argued (interview I11) that there is a specific "linearity" and "rationality" in the way the Chinese machinery of government operates, providing an efficient mechanism for policy implementation. Yet this is often a misconception (Liu 2007; Pei 2006). One of the intractable problems affecting central Government's environmental policy implementation in China is precisely that Central Government has limited leverage over Provincial Governments and municipalities (OECD 2007), and this makes it difficult for PEIA practitioners to integrate such policy in provincial or local planning (interviews CG1-CG6, CG8, CG9, CG11). Environmental governance is further undermined by the weakness of SEPA and its provincial and municipal offices. SEPA lacks the authority to impose its policies and opinions on the Ministries and bureaucracies defining development (English 2006; Gu and Sheate 2005). The Chinese leadership at the 17th CPC congress discussed the possibility of strengthening SEPA but no decision had been announced at the time of writing.

A third, related aspect, is the slow change in the perception of the environment. Michalak (2005) suggests that, "[o]ver the years, the traditional view of environmental issues as externalities has gradually been replaced by a *more proactive* view of environmental management that stresses its potential economic and financial benefits and its *contribution* to establishing better *governance* and *sustainable* development practices" (emphasis added). Furthermore, Child and others (in press) argue that the definition of "environmental protection" evolved "from being a scientific and technical issue, to one incorporating social and political considerations." These are welcome changes; however, Pan Yue (Pan 2007) remains concerned: "[i]n China, we have always looked at the environment as an isolated subject… the state still has no systematic policy framework on the issue of the economy's confrontation

with the environment, and has not developed ways of thinking… on the issue" (see also: Day 2005; Economy 2004; OECD 2007).

These three areas reveal the complex picture of encouraging progress, such as the shifting priority from speed to efficient growth, mixed with major governance challenges that make analysis and decisions within the PEIA process extremely difficult. Noticeably, at the recent SEA conference in Beijing (see above, author's own notes), Pan Yue criticized unequivocally the drive for growth and the "conflicts of interest" that persistently influence "decision-making in development in China," suggesting that "SEA contradicts the short terms interests of local authorities… they believe planning takes too long… prefer[ring] to approve projects quickly" (see also: Gu and Sheate 2005). The implications of the tension between the growth priority and the environment, combined with weak environmental policies and delivery mechanisms—pose serious challenges to PEIA. Informants from the transport sector, and environmental experts (interviews CG1-CG6, CG8, CG9, CG11) illustrate this. They confirm that environmental protection is essentially perceived as a "sector" in itself, and not a dimension of development or economic growth. Although many viewed the new emphasis on energy saving and environmental protection in the 11th five-year plan as a clear priority for their sector's development, nevertheless the *balance* between these and "development" remains squarely in favor of the latter, and current PEIA is unlikely to change this. In the words of a senior transport expert (interview CG19): the new priorities are important but they will not be "equally important as [the priority of] increasing capacity." Interviewees (CG13–15) explained that "sometimes environmental protection has to be compromised for economic growth."

Institutions, Organizations, and Actors

Figure 2 lists three more aspects of the context that challenge PEIA's effectiveness. The first aspect embraces the rules and culture that govern cooperation and coordination between organizations: both between sectors (such as land-use and transport) and between the environment and all major development authorities. The quality of their cooperation is at the heart of sustainability and environmental governance (Jordan and Lenschow 2008) and affects SEA/PEIA practice (Caratti and others 2004; Owens and others 2004; Vicente and Partidario 2006). Informants show it directly affects the effectiveness of PEIA in China, especially in terms of process and timing (see above).

In his general critique of governance practices of the Chinese administration Michalak (2005) argues that vertical and horizontal relations across levels of government for environmental protection policy both needed strengthening. This is further complicated by a more general "inability [of Government departments] to speak to each other… the bureaucratic culture is against collaboration across departments" (interview I11). Most interviewees highlight insufficient coordination between departments as a major problem (interview CG8, CG9, I11, I6): "getting people to talk to each other… is a difficult quest." The cultural and socio-political context in which planning takes place leave limited space for transparency and debate, especially between mainstream development authorities and 'environmental authorities' (as defined in: Zhu and Ru 2007). All this limits the flow of information and the opportunity to develop common understandings of the problems and solutions, critical to SEA's effectiveness (Runhaar and Driessen 2007). Encouragingly a senior bureaucrat (interview CG3) from the environment directorate of the transport ministry explains: "we think [PEIA] is very difficult, but also very helpful… in terms of coordination and integration with other departments at the early stage of planning… [PEIA] can lead to easier implementation."

The general lack of transparency combines with the Government's top-down approach to decision-making, to limit the scope for openness and participatory approaches to planning and assessment. Although some degree of iteration from the bottom is envisaged, the result of classic five-year plans, for example, is essentially a top-down definition of macro objectives and targets which can limit significantly the power of planning and decision at lower levels of government (interviews CG2, CG12). This does not bode well for objectives-led approaches to SEA, and indeed they are rare in China (see below). In the transport sector, for example, provincial administrations are told the length of new infrastructure that needs to be built (interview CG5), reducing the range of alternatives that can be reasonably (and meaningfully) discussed. Poor coordination and transparency help explain why even in the event of an early start, the capacity of using PEIA to help define sustainable development objectives and solutions is often curtailed.

A second aspect refers to the environmental authorities involved in regulation, guidance, and training of PEIA: SEPA, the EPBs, and ACEE (Bao and others 2004; Wang and others 2003), as well as those leading the assessment process. Zhu and Ru (2007) show that the law is ambiguous in terms of their role and responsibilities, particularly in reviewing PEIA reports or approving PEIA reports. As a result, current practice in China is undermined by a certain degree of confusion: environmental authorities are concerned about their limited capacity to enforce the uptake of PEIA and the respect of the assessment's report (interview CG9, CG23, CG34), and practitioners suggest confusion in terms of who, which organization, takes leadership of a

PEIA process. The example of an attempt to complete a PEIA of a sectoral plan, part of the then forthcoming 11th five-year plan, illustrates the problem (interviews CG3, CG18, CG23). Initially, and fully in line with good SEA practice, the environment experts working for the "developer" consulted various agencies, including NDRC, SEPA, and various research institutes, in order to define the purpose and scope of the assessment. However, soon it became clear that there was a lack of coordination and leadership, which meant that at least three organizations claimed that they were leading the process (and two others that they were leading on the economic planning). Eventually, the range of "priorities" originating from different Government agencies made it very difficult to proceed given the time and resource constraints (as well as the late start of the PEIA itself).

A third aspect of the institutional and organizational context relates to public participation. Pan Yue (Xie 2007) has been a staunch supporter of the people's right to know, participate, and supervise (monitor) environmental matters. He has promised new legislation to strengthen the role of public participation, arguing that "[t]he ultimate impetus to the solution to China's grave environment issue will come from the public," and that the public should "fully implement their right[s]… so that they can engage in deeper participation in the environmental protection campaign" (cited in: Xie 2007). SEPA is therefore hoping that the public can support the Government in shifting the balance away from blind pursuit of growth to a more balanced form of development—the two policy shifts summarized earlier. To this end, SEPA has proposed new *Regulations on Open Government Information* (expected to take effect from May 2008), demanding that officials disclose information about air and water quality, pollution spills, and the names and misdeeds of violators (Reuters 2007). Furthermore, in 2006 SEPA issued a set of guidelines on public participation in project-EIA (GOV.cn 2006), pledging that it will use this to set up a comprehensive system which releases environmental information and make procedures more specific to ensure effective public involvement.

However, it is Hu Jintao's (2007) *Report to the Seventeenth National Congress of the CPC* (15 October 2007) that offers the greatest hope for change in this important area of governance. In the *Report* he sets out priorities for further strengthening of "social equity and justice" as the essence of "developing socialism with Chinese characteristics." He illustrates progress in "expand[ing] people's democracy" and advocates the need to "expand the citizens' orderly participation in political affairs at each level and in every field" arguing that:

> "[w]e need to improve institutions for democracy, diversify its forms and expand its channels, and we need to carry out democratic election, decision-making, administration and oversight in accordance with the law to guarantee the people's rights to be informed, to participate, to be heard, and to oversee."

He also stressed improvements in the legal system and warned that: "[w]e must uphold the rule of law as a fundamental principle and adopt the socialist concept of law-based governance."

The Context Thus Far

The six aspects of the context explored here, pose both challenges and opportunities for PEIA's effectiveness. The first set relates to politics, society, and the environment. The limited resources and increasing pressure on the environment resulting from sustained rapid growth, combined with the resulting social tensions, represent the central challenge for environmental management in China and thus, for the revision of PEIA's purpose. The changing development discourse in favor of efficiency and moderate prosperity (partly triggered by resources, constraints, and concerns regarding social unrest) suggests there is political will that can be harnessed for better management. This opportunity is further enhanced by the changing views on environment, away from the periphery of sectoral concern, to a more proactive view of environmental management, although much still needs to be done to define macro-level policies for the environmental agenda of Government. These aspects are crucial in defining a transformative strategy for PEIA and for supporting changes to the existing Law. The second set of contextual aspects refers to institutions, organizations, and actors. The combination of poor coordination, together with top-down structure of power and controlled flow of information, represents a formidable challenge for PEIA's direct effectiveness. This is compounded by the rigid system of certification of institutes entitled to carry out PEIAs. However, the strengthening political support for public participation, access to environmental information, and general improvement of the rule of law are all encouraging signs and opportunities for designing more effective PEIA systems.

Pan Yue (during the SEA conference in Beijing, author's own notes), provided an encouraging view of the direction discussed and agreed at the 17th Congress of the CPC which "involves a need to change the political culture" of the administration, the pursuit of an "ecological culture," and the need for "environmental accountability." SEA (and PEIA) represents a potentially powerful instrument to help promote this change, and I now turn to explore in more practical terms the implications of the conceptual framework for a context-specific SEA system, introduced above and summarized in Fig. 1.

Taking the Opportunity: Toward a Context-Specific System

SEA is, first and foremost, an opportunity. It can assist governments in meeting challenges reiterated at the international level since the 1970s (notably in: UNCED 1992; WCED 1987), and identified here in the context of China: a complex and nuanced range of obstacles, linked to culture, politics, society, and the institutions and organizations operating therein. These obstacles are, essentially, those well rehearsed in the domain of sustainable development and environmental policy integration, and their persistence reflects the varying degrees of failure and reticence with which different governments have embraced the challenge of institutional change, first set in the Brundtland Report over two decades ago (WCED 1987). EIA and SEA have been identified as powerful instruments for addressing these obstacles and improving environmental management (Petts 1999): they can operate *directly* on projects and PPPs, and through systematic and repeated applications, they can also contribute to *incremental* changes in the capacity for environmental governance of the context (politics, culture, institutions, organizations). However, lawyers and bureaucrats defining new SEA procedures tend to focus on direct—rather than incremental—effectiveness (Nykvist and Nilsson submitted press). This amounts to a missed opportunity, because direct effectiveness of SEA depends to a large extent on the capacity for environmental governance of the context of operation. Designing SEA systems aimed at promoting changes in PPPs *and* in the context from which they originate is essential in all cases where Brundtland's challenges are still to be met: because although individual SEAs might fail to improve certain PPPs, their systematic application can nevertheless be designed to maximize opportunities for learning, changing worldviews, and strengthening cooperation.

The following suggestions seek to promote a system that can achieve both direct and indirect effectiveness by addressing the challenges and opportunities of the context. As argued above, this would also shift China's practice towards more strategic interpretations of assessment. I will therefore use the term SEA (rather than PEIA) as I explore the following three elements of a possible system for China: (1) articulating the purpose of an assessment system, thus dealing with the "*why*" question discussed in the introduction; (2) defining a strategy for "*how*" to operationalize SEA with a focus on the contextual dimensions; and (3) defining mechanisms, including legislation, guidance, training, as well as details of the process and tools provides further insight on "*how*" to carry out SEA in practice, and seeks to address the difficulties of current PEIA practice (see also earlier section). I should note that China represents a diverse reality in terms of context and organizations operating within it. Central government operates differently from provincial and municipal levels, and south-eastern provinces are substantially different economic and social realities compared to western and northern regions. The following suggestions are based on observations of central government and selected provincial authorities, and are necessarily at a large scale resolution. More research will be needed to look at sectors as well as governance levels in order to fine tune these initial ideas.

Purpose: More Focused

More specific wording of the purpose of SEA in China would help interpret and substantiate Article 1's precept of "realizing sustainable development" (see above). I draw on two aspects from practice and the context to suggest a revision: (1) the current focus on cumulative impacts and carrying capacity, and (2) the theme that underlies most of the issues explored within the context of "politics and environment:" conflict over resource use, and resulting problems of social justice.

Scholars (Bao and others 2004; Zhu and Ru 2007) and interviewees (CG8) reveal a special concern for cumulative impacts. The first PEIA guidance document, *Technical Guideline for Environmental Impact Assessment of Plans and Programs*, published in August 2003 (SEPA 2003), refers to the need to define the "territorial scope" of the assessment by combining geographical and administrative dimensions, and emphasizing the need to consider "ecologically sensitive regions… habitats." The guidance is replete with direct and indirect references to the concept of ecological sustainability and carrying capacity, and most of the Chinese examples presented at the recent SEA Conference in Beijing (mentioned above) included methods based on ideas of carrying capacity, ecological footprint, and cumulative impacts. However, few scholars and practitioners focus on social effects, and social justice, despite their prominence (see above). Pan Yue (China Daily 2007; Pan and Zhou 2006) refers persistently to the need to consider the capacity, function, and services of natural resources, drawing the link with rising social tensions.

The purpose could be framed in terms of maintenance of ecosystem services and promotion of social justice. The SEA system would operationalize notions of interdependence and social justice central to the political priorities of the context, while building on current practice embracing cumulative impacts and carrying capacity—a practice consistent with the cultural dimension of context that favors techno-rational methods. Given the current political context, and the Party's top leadership's emphasis on the need to shift the development agenda towards more environmentally and socially friendly paths, it would seem opportune to harness such drive through a clearer statement

of SEA's purpose. The Government certainly needs this instrument to improve its poor environmental management record (China Daily 2007).

Strategy: Thinking More Broadly About Effectiveness and "How" to Achieve It

For it to be more than a mere aspiration, it is essential that the purpose is accompanied by a broadening of the existing concept of assessment and its effectiveness, and by the development of a strategy that can provide a link between the purpose and the mechanisms intended to operationalize it. The need for wider effectiveness is already acknowledged. Interviewees from SEPA reveal that there is an expectation that SEA ought to: (1) promote incremental technical (and short term) change, notably through the assessment of the cumulative impacts of multiple projects located within geographic areas with ecological coherence, and (2) facilitate fundamental institutional (and long term) change, whereby authorities will increasingly need to consider the environmental dimension during the planning process. SEPA's Vice-Minister Pan Yue has proposed clear criteria for SEA effectiveness, which fit with the notions of incremental effectiveness and transformative strategies:

> "Conduct SEA so as to take more seriously the natural resource base and the implications of demands on this base; as part of the assessment SEA should contribute to the achievement of circular economy;SEA should ensure environmental policy integration and inter-sectoral coordination; SEA should consider cumulative impacts; SEA should consider social impacts; SEA should consider indirect impacts; SEA promotes the importance and practice of public involvement" (interviewee CG23 translated the text of Pan's presentation art the *Green China Forum*).

He repeated many of these in a recent interview (China Daily 2007), where he stressed the urgent need to influence the strategic choices of industrial development and its location.

Given the challenges and opportunities highlighted in the analysis of the context (previous section), it seems reasonable to propose the development of an SEA strategy that combines transformative elements with existing procedural ones, so as to maximize SEA's potential to contribute to change.

Strategy: Transformative Elements and Related Mechanisms

In China, a transformative strategy could harness the systematic effort of carrying out SEAs on plans in order to address all the six aspects of context discussed above, by designing SEA as: (1) a contributor to social and policy learning, to assist in delivering the policy shift to more 'efficient development' endorsed by the leadership; (2) a policy transfer mechanism—to raise awareness about environmental policy priorities and promote a proactive approach to environmental management; and as (3) a means to promote coordination within and between sectors, and between development and environment agencies. The strategy should also include a fourth, critical element: leadership.

The first three elements aim to improve environmental governance within the organizations that are responsible for development. Torres and Preskill (2001) define organizational learning as a continuous process "that (a) uses information or feedback about both processes and outcomes… to make changes; (b) is integrated with work activities, and within the organization's infrastructure…; and (c) invokes the alignment of values, attitudes, and perceptions among organizational members." The following proposals, partly adapted from Torres and Preskill (2001), can help to integrate various forms of learning with assessment, planning, and decision-making tasks, and should be developed by all major development organizations that are institutionalizing SEA. The first proposal is to identify the major obstacles to the early consideration of environmental and social issues during planning, and to distinguish these in terms of timescale needed to address them: short and long-term. Short-term indicators of progress toward longer-term outcomes should then be defined, linking activities of planning and assessment on specific initiatives to the accumulation of experience and understanding of environmental and social issues. A related proposal is to use past examples of SEA to provide routine learning opportunities through the use of seminars, meetings, and informal gatherings to promote deliberation, team building efforts, and conflict management, and ensure collaborative reflection on the strengths and weaknesses of planning and assessment. These efforts could also turn SEA into a forum for questioning the current predominant view of growth's priority forcing reflection about the long-term implications for society and its natural resource base. Creating opportunities for learning through the process of SEA could lead, in the medium and longer term, to incremental improvement in collaboration and transparency (Hertin and others 2007; Owens and others 2004; Runhaar and Driessen 2007; World Bank 2005), which are highlighted above as a serious contextual challenge. Furthermore, SEA could be promoted as a policy transfer mechanism that ensures wider dissemination of macro-environmental policy concepts among actors from sectoral ministries, shifting their understanding of environment beyond limited to technical aspects, to include also a

socio-political dimension. Possible techniques include seminars and training, as well as wide dissemination of nontechnical intermediate reports arising from the SEA process (especially relating to scoping). These objectives would help promote central Government's concept of scientific development (discussed above).

As for better cooperation across sectors (and Ministries) and with environmental authorities, this has to consider complex issues of rank and authority (English 2006) making it difficult to generalize. The appointment of leaders from high-ranking departments to coordinate SEAs *could* contribute to better coordination. Environmental implications of land-use choices, for example, can more easily be discussed with other relevant ministries (for example urban or transport related authorities) if the request for dialogue comes from the "top" rather than from internal environmental divisions. And repeated applications of SEA can help to open communication channels. Cooperation between development and environment agencies is still a grey area since the responsibility for the SEA process in China awaits clarification (Zhu and Ru 2007). However, at the recent SEA conference, Pan Yue suggested that SEPA's priority is to ensure more effective processes, rather than secure control, as in the case of EIAs (author's own notes): "it is not a matter of strengthening SEPA's power… we are willing to act as a supporting institution." This could lead to the creation of a formal supporting institution within SEPA (for example inspired by the Dutch EIA Commission).

The forth element of the strategy ought to be leadership of *the system* as an agenda for change (and transformation). Given the many challenges identified in the analysis of context, especially in terms of the relative weakness of environmental authorities in managing the assessment process, it may be useful to give leadership of the SEA system to the National Development and Reform Commission (NDRC) and related provincial offices (so-called DRCs). They have the unique capacity (and legitimacy) among China's institutions to develop comprehensive, cross-sectoral overviews essential to a sustainable development perspective. They provide an existing network of institutions that have the benefit of overview, as well as strong political leverage, thanks to their close links with the State Council. Their championship of SEA would help overcome the significant resistance by sectoral ministries. If central Government is serious about pursuing the policy shifts mentioned above, NDRC's adoption of SEA as part of its regular practices would be essential, and a leadership role would be a major step forward. The fact that NDRC was co-organizer of the recent SEA conference in Beijing (November 2007, see above) suggests that the organization is searching for instruments to address the environmental costs of inefficient use of limited resources and of pollution, and that its leadership of SEA might be indeed an option. SEPA could adopt the role of quality control of all SEAs, for example establishing review commissions mentioned above—although this will remain difficult in a culture of rigid hierarchies, unless SEPA is promoted to full ministerial level (currently being discussed).

Strategy: Procedural Elements and Related Mechanisms

The transformative elements of an SEA strategy need to combine with revised procedural elements. In my detailed overview of the experience of PEIA I have highlighted the—weaknesses mainly—of its *implicit* procedural strategy: currently, practice subscribes to a narrow interpretation of impact assessment as a techno-rational mechanism, identifying likely adverse effects and operating in an essentially confrontational environment, where the interests of growth are the primary input for planning, and those of the environment are more or less effectively retrofitted. I now wish to focus on ways in which such considerations can be used to re-design mechanisms, including: legislation, skills and training, the issue of roles and responsibilities, as well as process and tools. Some of the suggestions will be familiar, since critical failures in the capacity for environmental governance are common to many countries, as witnessed by the slow progress towards sustainability.

Legislation in China is being discussed and revised. A new regulation is expected at the time of writing, and based on the above reflections, the following changes are recommended: (1) a revision Article 1, distinguishing between the substantive purpose (the goal) and the means to achieve it, making the purpose as specific as possible (see above); (2) a requirement to make an early start of SEA mandatory for all plans, linking the timing of SEA to the initial stages of planning; (3) a requirement for a scoping report that must be approved and adopted by both the development and environmental authorities, as a way of strengthening cooperation and consultation between development and environment agencies; (4) clear standards aimed to improve the quality and timing of the public's involvement. These suggestions have implications for skills and training. Sectoral ministries could increase professional development opportunities, including training in basic SEA methods and processes, as well as in team development and group process, and where necessary—complement the strong natural science and technical background with social sciences and capacity to address social justice issues. Training on macro-environmental policy (especially for sectoral ministry staff) and on more proactive approaches to environmental management are clear priorities based on the above analysis. In terms of

roles and responsibilities, in addition to the recommendations on leadership, possibly by NDRC, it seems important to revise the existing policy focusing on certified EIA research institutes to carry out SEAs to allow for a stronger in-house role. This is a condition without which learning opportunities could not be maximized. If the existing policy focusing on certified EIA research institutes cannot be revised, nominating an SEA leader or champion from within the sectoral ministry responsible for the plan under scrutiny would help to ensure closer integration between planning and SEA, and thus strengthen the profile of the assessment process amongst planning departments and avoid confusion over roles and responsibilities.

The last set of recommendations relates to process and tools, and is closely linked to all previous ideas. A revised process should insist in closing the gap between assessment and planning practices and timings, especially in terms of the definition of the problem, the objectives, the alternatives to be considered, and the actual evaluations. If the Government's stated intention to pursue a development agenda for a better life and sound ecological and environmental conditions is not rhetorical, then SEA should be used to encourage the consideration and discussion of alternatives from these perspectives. It would therefore help to streamline, prioritize, and simplify the strategic levels of assessment so as to leave the detailed analyses to project-EIA, and two aspects of SEA experience seem relevant here: the objectives-led approach (Sheate and others 2007) and a balance between techno-rational and more participatory processes and tools (Owens and others 2004).

Promoting the practice of objectives-led SEAs, where the assessment is driven by a set of environmentally sustainable objectives, could help to focus the analysis, reduce the need for detailed quantification (as relative trends often are sufficient) and gain legitimacy for the outcomes (if discussed and agreed through wide consultation), (Taiwan has interesting lessons: Liou and others 2006). Experts (interview CG22) acknowledged this: "it is the objectives and [environmental] standards that are crucial," but illustrated the difficulties and the default need for quantification: "who sets them?… yes, we can take some from legislation and from statements, but some of these are very vague—so how do we quantify them?" The objectives-led method is also dependent on knowledge of the "macro environmental policy framework:" another major gap (interview CG9) that SEPA is trying to address through training. An objectives-led approach would include the evaluation of policy coherence (between environmental and sectoral priorities), and would systematize the evaluation of a proposed plan's contribution to environmental objectives, thus increasing the policy relevance of PEIA's findings. Focus on objectives may also assist in cumulative impact assessment, carrying capacity studies, and footprint analyses (mentioned in relation to the purpose of PEIA) as it can facilitate the selection of impact factors. The evidence presented here also supports the greater use of participatory mechanisms. Planning, and thus its assessment, involves dialogue and communication of environmental, social, and economic values (Caratti and others 2004). Not least because uncertainty is intrinsic to strategic-level choices and it can rarely be solved through increasingly complex quantification efforts. SEA requires balancing data with discussion about the objectives and values at stake, even in the case of cumulative impact assessment or carrying capacity analyses (which inevitably include judgments of value as to what is at stake, what is to be counted). Guidance on how to develop carrying capacity analyses tailored to the limited data availability and resources on the ground also seems important, given that several Chinese practitioners have raised the problem of access and cost of data. A policy of reasonable (if not free) access to baseline datasets would be essential to enable SEA to serve the priorities outlined at the recent 17th CPC Congress.

Conclusion

The purpose of this research has been to contribute to the analysis of China's experience through a different set of interpretative lens. Drawing on recent developments in the theory and practice of SEA, I have proposed a conceptualization of SEA effectiveness that combines direct and incremental impacts, and a need for context-specific systems as a way to focus on the relationship between assessment, planning, and their context, and thus maximize effectiveness. This framework has allowed me to examine current practice in China, illuminating the challenges it faces and proposing elements of a new approach.

PEIA in China operates at the point of greatest tension between rapid environmental degradation and persistently high growth targets. China's spectacular growth is undermining the environmental basis on which the health, well-being, and the future of its 1.3 billion people depend. The country's leadership is well aware of the challenges it faces and is searching for a broader perspective of the interaction between man and its environment. It has proposed courageous policy changes, but the pace and scale of growth and deterioration requires even more decisive action to protect peoples' health and the environment they live in. PEIA and SEA can help in different ways, depending on what purpose and effectiveness are sought. This contribution has set out the main challenges and opportunities that need to be considered as the Government revises its approach. If the Government intends to invest further in strategic-level assessment, it should take the opportunity to redesign the system so as to introduce SEA as a transformative force which can improve individual plans in the short term, as well as

promote longer-term change in the socio-political, cultural, institutional, and organizational context, through the strengthening environmental governance practices. The three-part system of course has an order of priority: effectiveness cannot be improved unless the first two (purpose and strategy) are in place; mechanisms will continue to be constrained by the context. Beyond the details, stronger political support for the purpose and functions of PEIA (or future SEA) seems essential. The leadership's concern with scarce per capita resources and with the discontent of rural poor might help raise the issue on the agenda.

Acknowledgments I gratefully acknowledge the support of the Portuguese Fundação para a Ciência e a Tecnologia and the Chinese University of Hong Kong for Visiting Scholar status in 2007. I would like to thank Andrea Ricci for his insightful comments, as well as the three anonymous reviewers for their many useful suggestions. Any shortcomings remain my own responsibility.

References

Audouin M, Lochner P (2000) SEA in South Africa—Guideline Document. A report prepared for the Department of Environmental Affairs and Tourism (DEAT), Pretoria

Bao C-K, Lu Y-S, Shang J-C (2004) Framework and operational procedure for implementing strategic environmental assessment in China. Environmental Impact Assessment Review 24:27–46

Bina O (2007) A critical review of the dominant lines of argumentation on the need for Strategic Environmental Assessment. Environmental Impact Assessment Review 27:585–606

Brown A, Thérivel R (2000) Principles to guide the development of strategic environmental assessment methodology. Impact Assessment and Project Appraisal 18:183–189

Cannibal GL, Winnard GM (2001) Managing the tragedy: an interdisciplinary model for managing the environment as inter-acting chaotic hierarchy. Futures 33:147–160

Caratti P, Dalkmann H, Jiliberto R (2004) Analytical strategic environmental assessment: towards better decision-making. Edward Elgar Publishing Ltd, Cheltenham

CCICED (2005) General Report—Task Force on Economic Growth and Environment. 25 October 2005, Secretariat CCICED

Cheng JYS (2007) Challenges and policy programmes of China's New Leadership. City University of Hong Kong Press, Hong Kong

Child J, Lu Y, Tsai S-HT (2007) Institutional entrepreneurship in building an environmental protection system for the People's Republic of China. Organisation Studies (in press)

China Daily (2007) Ecology vital for scientific outlook of development. China Daily http://www.china.org.cn/english/environment/231667.htm (accessed: 14/11/07)

Clark R (2000) 15–28 in Partidario MP, Clark R, Perspectives on strategic environmental assessment. Lewis Publishers, London

Crawford A, Brown O, Yang V (2006) Growing into risk emerging environment and security issues in China. International Institute for Sustainable Development, Winnipeg, Manitoba (also available at: http://www.iisd.org/publications/pub.aspx?pno = 774 (accessed 15/3/07))

Dalal-Clayton B, Sadler B (2005) Strategic environmental assessment: a sourcebook and reference guide to international experience. Earthscan, London

Day KA (2005) China's environment and the challenge of sustainable development. Armonk, New York

Dryzek JS (1987) Rational ecology: environment and political economy. Basil Blackwell, New York, NY

EC (2005) A sourcebook on strategic environmental assessment of transport infrastructure plans and programmes. A report prepared by BEACON for DG TREN, European Commission, Brussels

Economy EC (2004) The river runs black—the environmental challenge to china's future. a council on foreign relations book. Cornell University Press, Ithaca and London

ERM (1998) Handbook on environmental assessment of regional plans and eu structural funds programmes. a report by environmental resources management, prepared for DG environment. European Commission, Brussels (also available at http://europa.eu.int/comm/environment/eia/sea-support.htm)

GOV.cn (2006) China to seek public opinion on environmental affairs. Chinese Government's Official Web Portal http://english.gov.cn/2006-02/22/content_208022.htm (accessed: 22/2/06)

Gu L, Sheate W (2005) Institutional challenges for EIA implementation in China: a case study of development versus environmental protection. Environmental Management 36:125–142

Hertin J, Turnpenny J, Jordan A, Nilsson M, Russel D, Nykvist B (2007) Rationalising the Policy Mess? Ex ante policy assessment and the utilisation of knowledge in the policy process. FFU report 03/2007, Berlin, available at: http://web.fu-berlin.de/ffu/download/rep_2007_03.pdf.pdf (accessed 5/12/07)

Hildén M, Furman E, Kaljonen M (2004) Views on planning and expectations of SEA: the case of transport planning. Environmental Impact Assessment Review 24:519–536

Hilding-Rydevik T, Bjarnadóttir H (2007) Implementation context and implications for formulating the aim and effectiveness of SEA. Environmental Impact Assessment Review 27:666–684

Hu Jintao (2007) Hold high the great banner of socialism with Chinese characteristics and strive for new victories in building a moderately prosperous society in all respects. China Daily http://www.chinadaily.com.cn/china/2007-10/25/content_6204663.htm (accessed: 25/1/0/07)

Hua J (2007) Development Along A Scientific, Harmonious and peaceful path-at the world economic forum annual meeting 2007. http://www.fmprc.gov.cn/eng/zxxx/t292625.htm (accessed: 30/1/07)

IAIA (2002) Strategic environmental assessment—Performance Criteria

James E, McColl V, Tomlinson P, Fry C (2003) Literature review/scoping study on cumulative effects assessment and the strategic environmental assessment directive. version: final. Centre for Sustainability at TRL Limited, Report prepared for the Environment Agency, Centre for Risk and Forecasting, www.environment-agency.gov.uk/ commondata/103599/cea_final_report_937259.doc (accessed 20/12/06)

Jasanoff S, Wynne B (1998) 1–87 in Rayner S, Malone EL, Human choice and climate change: volume one the societal framework. Batelle Press, Columbus, Ohio

Jordan A, Greenaway J (1998) Shifting agendas, changing regulatory structures and the "new" politics of environmental pollution: British coastal water policy, 1955–1995. Public Administration 76:669–694

Jordan A, Lenschow A (2008) Innovation in environmental policy? Integrating environment for sustainability. Edward Elgar Publishing Ltd, Cheltenham

Lindhjem H, Hu T, Ma Z, Skjelvik JM, Song G, Vennemo H, Wu J, Zhang S (2007) Environmental economic impact assessment in China: Problems and prospects. Environmental Impact Assessment Review 27:1–25

Liou M-L, Yeh S-C, Yu Y-H (2006) Reconstruction and systematization of the methodologies for strategic environmental assessment in Taiwan. Environmental Impact Assessment Review 26:170–184

Liu G (2007) 245–272 in Cheng JYS, Challenges and Policy Programmes of China's New Leadership. City University of Hong Kong Press, Hong Kong

Liu J, Diamond J (2005) China's environment in a globalizing world. Nature 435:1179–1186

Michalak K (2005) 487–533 in OECD, Governance in China. OECD, Paris

NPC (2002) Environmental impact assessment Law of the People's Republic of China. Adopted at the 30th Meeting of the standing committee of the ninth national people's congress on October 28, 2002; promulgated by Order No. 77 of the President of the People's Republic of China. English version provided by ACEE/SEPA (18/10/05),

Nykvist B, Nilsson M (submitted) Are Impact Assessment procedures actually promoting sustainable development? Institutional perspectives on barriers and opportunities found in the Swedish committee system. Environmental Impact Assessment Review

OECD (2007) Environmental performance review of China. Organisation for Economic Co-operation and Development, Paris

OECD, UNDP (2002) Sustainable development strategies—a resource book. Earthscan Publications Ltd, London

Owens S, Rayner T, Bina O (2004) New Agendas for Appraisal: reflections on theory, practice and research. Environment and Planning A 36:1943–1959

Paavola J (2007) Institutions and environmental governance: a reconceptualization. Ecological Economics 63:93–103

Pan Y (2007) Green China and young China (part one) Chinadialogue http://www.chinadialogue.net/article/show/single/en/1167-Green-China-and-young-China-part-one- (accessed: 20/7/07)

Pan Y, Zhou J (2006) The rich consume and the poor suffer the pollution. Chinadialogue http://www.chinadialogue.net/article/show/single/en/493–The-rich-consume-and-the-poor-suffer-the-pollution- (accessed 3/11/06)

Partidario M (2000) Elements of an SEA framework—improving the added-value of SEA. Environmental Impact Assessment Review 20:647–663

Pei M (2006) China's Trapped Transition—The limits of developmental autocracy. Harvard University Press, Cambridge, Massachusetts

People's Daily (2004) Premier Wen highlights scientific development concept. People's Daily http://english.people.com.cn/200402/22/eng20040222_135467.shtml (accessed: 22/2/04)

Petts J (1999) Handbook of environmental impact assessment. Blackwell Science, Oxford

Reuters (2007) China environment official wants action by citizens. Reuters http://www.alertnet.org/thenews/newsdesk/PEK256406.htm (accessed: 30/4/07)

Runhaar H, Driessen P (2007) What makes strategic environmental assessment successful environmental assessment? The role of context in the contribution of SEA to decision-making. Impact Assessment and Project Appraisal 25:2–14

Sadler B (1996) International study of the effectiveness of environmental assessment. Canadian Environmental Agency/IAIA, Minister of Supply and Services Canada, cat. No.: EN106-37/1996E

Sadler B, Verheem R (1996) strategic environmental assessment—status, challenges and future directions. The Hague, ministry of Housing, Spatial Planning and the Environment of The Netherlands

Sadler B, Aschermann R, Dusík J, Fischer TB, Partidario M, Verheem R (2008) Handbook of strategic environmental assessment. Earthscan, London

SEPA (2003) Technical guidance for environmental impact assessment for plans & programs (Interim). SEPA (English verision, 11August 2003), Beijing. Available in Chinese at: http://www.sepa.gov.cn/info/gw/huangfa/200308/t20030801_86602.htm

Sheate W, Dagg S, Richardson J, Aschermann R, Palerm J, Steen U (2001) SEA and integration of the environment into strategic decision-making. Volume 1 (Main Report). Final Report to the European Commission, 1 May 2001. Published on the web [http://europa.eu.int/comm/environment/eia/sea-support.htm (07/09/01)]

Sheate W, Partidario M, Byron H, Bina O, Dagg S (2007) Sustainability assessment of future scenarios: methodology and application to mountain areas of Europe. Environmental Management, available online

Tao T, Tan Z, He X (2007) Integrating environment into land-use planning through strategic environmental assessment in China: Towards legal frameworks and operational procedures. Environmental Impact Assessment Review 27:243–265

Torres RT, Preskill H (2001) Evaluation and organisational learning: past, present, and future. American Journal of Evaluation 22: 387–395

Thérivel R, Wilson E, Thompson S, Heany D, Pritchard D (1992) Strategic environmental assessment. Earthscan Publications Ltd, London

UNCED (1992) Agenda 21. United Nations General Assembly [http://wwwunorg/esa/sustdev/agenda21texthtm 13/12/02], New York

Vicente G, Partidario M (2006) SEA—enhancing communication for better environmental decisions. Environmental Impact Assessment Review 26:696–706

Wallington T, Bina O, Thissen W (2007) theorising strategic environmental assessment: fresh perspectives and future challenges. Environmental Impact Assessment Review 27:569–584

Wang Y, Morgan RK, Cashmore M (2003) Environmental impact assessment of projects in the People's Republic of China: new law, old problems. Environmental Impact Assessment Review 23: 543–579

WCED (1987) Our common future. Oxford University Press

World Bank (1997) Clear water, Blue skies: China's environment in the new century. Background paper for china 2020 Study. World Bank, Washington, DC

World Bank (2005) Integratingenvironmental considerations in policy formulation—lessons from policy-based SEA experience. Environment Department, World Bank, Washington, DC

Worldwatch Institute (2006) State of the World 2006: special focus: China and India. The Worldwatch Institute, Washington DC

Xie C (2007) Calls for public to help stop pollution. China Daily http://www.chinadaily.com.cn/china/2007-04/02/content_841159.htm (accessed: 18/4/07)

Xinhua (2006) Efficiency overtakes speed as primary goal. Xinhua Online http://news.xinhuanet.com/english/2006-12/03/content_5428169.htm (accessed: 14/01/07)

Xinhua (2006) China drafts law on circular economy. People's Daily http://english.people.com.cn/200611/16/eng20061116_321892.html (accessed: 6/11/06)

Xiuzhen C, Jincheng S, Jinhu W (2002) Strategic environmental assessment and its development in China. Environmental Impact Assessment Review 22:101–109

Zhu D, Ru J (2007) Strategic environmental assessment in China: Motivations, politics, and effectiveness. Journal of Environmental Management, online version