Available online at www.sciencedirect.com
ScienceDirect
journal homepage: www.elsevier.com/locate/envsci

Review

Policy trends of strategic environmental assessment in Asia

Dennis Victor *, *P. Agamuthu*

Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia

ARTICLE INFO

Article history:
Received 18 July 2013
Received in revised form
22 March 2014
Accepted 23 March 2014
Available online xxx

Keywords:
Policy, Trends
Overview
Strategic environmental assessment
Asia

ABSTRACT

This paper provides an overview on the policy trends of strategic environmental assessment (SEA) in Asia. SEA is promoted as a system of incorporating environmental considerations into policies, plans and programmes (PPP). SEA has evolved from an alternative of environmental impact assessments (EIA) to a potential environmental policy integration (EPI) tool in national policy planning. Nevertheless, SEA trends in Asia require a re-examination on its role and effectiveness to avoid SEA implementation in Asia mimicking SEA developments in Europe without customizing its application to local conditions in Asia. Policy trends of SEA in Asia indicate that it is currently an important environmental policy consideration for countries in the region with the formulation of SEA legislations in Hong Kong, China, South Korea, Taiwan, Vietnam and Indonesia. Nevertheless, SEA implementation also has been impeded by challenges in realizing practical SEA public participation especially in countries with traditionally high cultural power distance dynamics such as China, Indonesia and Vietnam. Meanwhile, countries such as Japan and Pakistan have voluntarily implemented SEA elements such as public participation without legislative provisions while countries such as Thailand, Philippines, Bangladesh and Sri Lanka are resisting the adoption of SEA. The primary problem of SEA implementation in Asia has been its limited integration in strategic decision making due to the highly political nature of policy planning framed within the cultural context of Asian countries. Notable progress of SEA implementation in Asia has been the emerging awareness on the need for SEA. Interestingly, SEA prospects in Asia seem to be in the development of international regional cooperation on SEA capacity building. Meanwhile, SEA implementation range from the use of structured policy instruments such as legislative frameworks to non-structured policy instruments such as stakeholder engagement. Consequently, the SEA paradigm analysis suggests that SEA integration in Asia requires a paradigm shift to address the primary strategic gap of over-reliance on structured policy instruments such as legislation. This fundamentally means an adaptation towards a hybrid of structured and non-structured policy instruments to super-stream the benefits of SEA. In conclusion, SEA trends in Asia indicate a sagacious realization that SEA in theory may be a strategic and rationale approach to integrating environmental considerations. However, SEA in practice is a complex, dynamic and challenging process that requires political will, legislative framework and a transparent stakeholder engagement process framed within the cultural context of Asian countries.

© 2014 Elsevier Ltd. All rights reserved.

* *Corresponding author*. Tel.: +60 3 79676756; fax: +60 3 79674178.
E-mail address: dennisvic@gmail.com (D. Victor).

http://dx.doi.org/10.1016/j.envsci.2014.03.005
1462-9011/© 2014 Elsevier Ltd. All rights reserved.

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

1. Introduction

Strategic environmental assessment (SEA) is a system of incorporating environmental considerations into policies, plans and programmes (PPP) (Fig. 1). SEA is described as the evaluation of the likely environmental effects of PPP and includes the preparation of an environmental report and the carrying out of public participation and consultations (United Nations, 2012). SEA was initially promoted to address the gaps in project based environmental impact assessment (EIA). This was due to the inability of EIA to address environmental policy integration (EPI) at strategic levels especially during the policy and plan-making process. EIA is limited in its ability to account for the strategic impacts of cumulative effects of multiple and successive projects in a particular area (Dennis and Agamuthu, 2012a) (United Nations, 2003). Consequently, SEA added value by analyzing PPP at an early stage and setting the framework for EIAs at the Project level (OECD, 2006).

SEA has evolved from an alternative to shortcomings perceived in the project based EIAs in the 1970s to an environmental policy planning tool in the 1990s. Currently, it is hailed as a potential strategic environmental governance instrument in national policy planning. The current proliferation of SEA legislation around the world emphasizes the role of SEA as an essential environmental policy planning tool to integrate environmental considerations as well as to complement EIA in environmental protection. SEA potentially can satisfy the emerging need for environmental policy integration (EPI) at a more strategic level than the project level (Dusik and Xie, 2009; Rachid and El Fadel, 2013; Thérivel, 1997). This enables governments to integrate environmental and sectoral policy objectives in national policy planning (Lafferty and Hovden, 2003).

Nevertheless, international trends in SEA is increasingly re-examining and questioning the role and effectiveness of SEA in environmental policy planning. This is due to potential gaps in SEA integration and towards fulfilling its full potential as a strategic environmental governance instrument (Sadler et al., 2011; Tetlow and Hanusch, 2012). This is to avoid SEA implementation in Asia mimicking SEA development in Europe without customizing its application to local conditions (Agamuthu and Dennis, 2013). This also ensures that SEA fulfils its potential as a strategic environmental governance instrument in Asia. Consequently, this paper aims to provide an overview of SEA policy trends in Asia by conducting an extensive literature review of SEA policy trends of 15 countries in Asia. Subsequently, the authors analyzed the SEA application in these countries on its problems, progress and prospects with a summary on the presence or absence of SEA legislation and public participation provisions in contrast with the practical application of SEA in policy planning and public participation. Furthermore, each country overview was also discussed in the framework of Hofstede's cultural dimensions of power distance index (PDI) to provide a comparative cultural context on similarities and divergences on SEA implementation across Asia. This is because national cultures differ at the level of unconscious values held by society and is generally stable over generations. Hofstede defines power distance as the extent to which the less powerful members of society accept and expect that power is distributed unequally (Hofstede, 2010). Typically, PDI ranges from 0 to 100 with higher scores for Asian countries than their European counterparts where the average PDI in Asia is 71. Thus in theory, countries that have a lower PDI expect and accept power relations that are more consultative and open to public participation which is one of the key drivers of SEA. Finally, the findings were synthesized within a SEA paradigm framework consisting of structured vs. non-structured policy instruments and their effectiveness in Asia. The purpose of this paper is to expand the SEA subject knowledge by providing insights on SEA policy drivers in Asia.

2. Overview of sea in Asia

In Asia, SEA has been translated into national legislation in a number of countries including Hong Kong, China, South

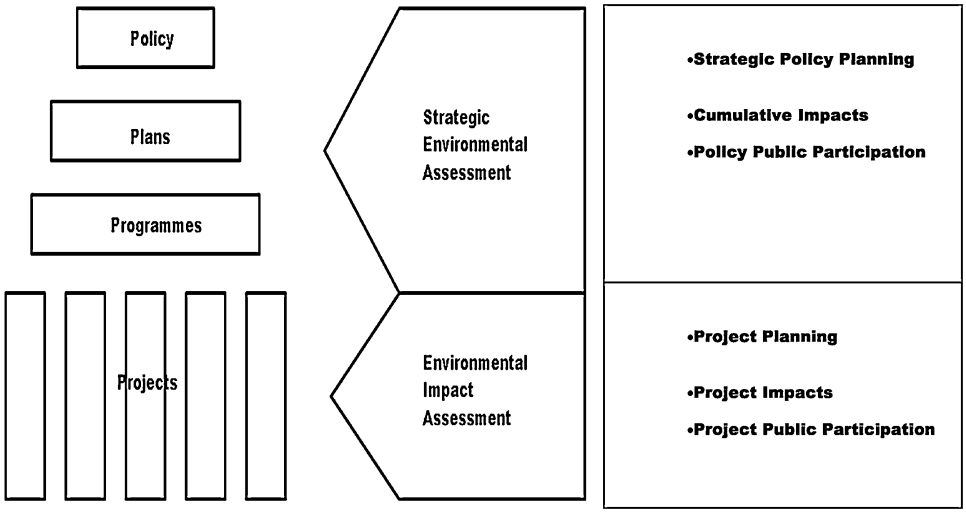

Fig. 1 – SEA and EIA in PPP. (Adapted from OECD, 2006).

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

Korea, Taiwan, Vietnam and Indonesia. Meanwhile, SEA development in other Asian countries is still in the exploratory stage with various degrees of success. An overview of 15 countries indicate that the SEA implementation level in Asia ranges from a mix of legislative, institutional and capacity building frameworks.

2.1. *Hong Kong*

Hong Kong has transposed its SEA requirements into its national planning framework via a government directive that mandated EIAs for major policies, strategies and plans as well as with its EIA ordinance. A primary problem identified in SEA implementation for Hong Kong has been the lack of an overarching macro environmental planning policy while a secondary problem has been the pseudo inter-government cooperation and unity due to diverse agendas and conflicting agency pursuits. The trends in SEA implementation may indicate that Hong Kong is at a crossroads of SEA development from its EIA roots. This may results in either SEA devolving into a strategic tool for economic development facilitation or SEA evolving into a strategic planning framework for sustainable development (Au, 1998; Au et al., 2004; Ng, 1993; Ross et al., 2006). Meanwhile, notable progress of SEA implementation in Hong Kong has been its early adoption of SEA implementation within the Asian region as well as its potent integration of public participation.

This has resulted in a high degree of influence from the public and non-governmental organization (NGO) in their ability to sanction projects with significant environmental impacts. Other progress includes the establishment of a SEA web based knowledge centre and a SEA manual for the dissemination of SEA information and best practices. SEA prospects seem to be in the development of sustainability centric SEA application and the concept of continuous public participation resulting in a heightened transparent multi-stakeholder engagement process. This shift towards increased public participation is viewed as the foundation for a transparent and multi-tiered inclusive environmental governance system in line with a sustainability focused society (Ng and Obbard, 2005). In terms of cultural dimensions, Hong Kong has a moderately high PDI with a score of 68 which indicates that it is a society that believes that inequalities are acceptable and where individuals are influenced by formal authority (Hofstede, 2014). Finally, SEA developments in Hong Kong indicate the presence of SEA legislation and provisions for SEA public participation including the presence of SEA application in policy planning and public participation. Consequently, Hong Kong's moderately high PDI may explain its heightened public participation due to general public exigency.

2.2. *China*

China has transposed its SEA requirements into its national planning framework via its regional environmental impact assessment (R-EIA) practices. This is required for the development of river basins, economic zones and urban areas as well as with its EIA Law which requires SEA for strategic planning at national, provincial and sector levels (Dalal-Clayton and Sadler, 2004). A primary problem identified in SEA implementation for China has been the restrictive public participation and sometimes secretive nature of its policies and strategies. A secondary problem has been the bureaucratic politics between inter-sectoral agencies involved in the policy planning process in China (Bao et al., 2004a; Che et al., 2002; Zhu et al., 2005). The trends in SEA implementation may indicate that China is still battling its socio-political dynamics of engaging in a policy planning tool such as SEA that requires access to information, public participation in decision making and access to autonomous environmental justice and mediation avenues (Zhu and Ru, 2008). Meanwhile, notable progress of SEA implementation in China has been the distribution of SEA principles, procedures, technical guidelines, environmental indicators and reporting formats for various planning sectors. Other progress includes the establishment of an online database of SEA professionals to assist in the implementation of SEA within sectoral agencies. SEA prospects seem to be in the development of proposed amendments to the EIA Law. This applies to decision making with potential impacts on the environment, development of additional sector specific technical guidelines, capacity building for SEA professionals and government agencies, setting up of SEA research and development centres in China as well as integrating climate changes issues in SEA (Bina, 2008; Chang and Wu, 2013; Tao et al., 2007). In terms of cultural dimensions, China has a high PDI with a score of 80 which indicates that it is a society that believes that inequalities are acceptable and where individuals are influenced by formal authority and sanctioned against aspirations beyond their rank (Hofstede, 2014). Finally, SEA developments in China indicate the presence of SEA legislation and provisions for SEA public participation including the presence of SEA application in policy planning though public participation practice is absent. Consequently, China's high PDI may explain its restrictive public participation and the apparent conflict between provisions for SEA public participation and its actual implementation.

2.3. *South Korea*

South Korea has transposed its SEA requirements into national legislation including the prior environmental review system which is designed to identify and minimize environmental impacts of PPPs and realize environmentally sustainable growth. A primary problem identified in SEA implementation for South Korea has been the limited scope of SEA application for the final plan or programme when it is deemed as national security, prohibited by legislation or a hindrance to general administration. A secondary problem is the lack of cohesive horizontal integration of the legislative environmental system in South Korea (Hayashi, 2007; Hayashi et al., 2011; Song and Glasson, 2010). The trends in SEA implementation may indicate that South Korea is resolutely though practically proceeding forward in its SEA implementation (Ahn et al., 2008). Meanwhile, notable progress of SEA implementation in South Korea has been the major improvements to the SEA process by expanding its scope of application, stakeholder engagement and a revamped SEA reporting format (Song and Kim, 2007). Furthermore, the revised SEA process interlinks SEA and EIA through a consistent and systematic environmental criterion by down-streaming the SEA baseline results and SEA findings for

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

the EIA. SEA prospects seem to be in the development of sustainable development indicators and capacity building especially from the local governments (Volkery, 2004). In terms of cultural dimensions, South Korea has a borderline PDI with a score of 60 which indicates that it is a slightly hierarchical society where centralization is popular (Hofstede, 2014). Finally, SEA developments in South Korea indicate the presence of SEA legislation and provisions for SEA public participation including the presence of SEA application in policy planning and public participation. Consequently, South Korea's relatively borderline PDI may explain the paradox between its hierarchical vertical down-streaming of SEA findings to EIA and its problematic horizontal legislative cohesiveness.

2.4. *Japan*

Japan has not transposed its SEA requirements into national legislation though it is currently establishing the groundwork for a SEA system through research projects commissioned by the Ministry of Environment (MOE) including SEA guidelines formulated for waste management plans and SEA for programme of projects subject to EIA. A primary problem identified in SEA implementation for Japan has been a lack of legislative framework for SEA. The trends in SEA implementation may indicate that Japan does not perceive the need for SEA as part of its national policy planning process where existing environmental systems may be deemed adequate for addressing environmental issues at a strategic level (Barrett and Therivel, 1989; Harashina, 1998). Meanwhile, notable progress of SEA implementation in Japan has been the introduction of SEA in local planning in areas such as Saitama prefecture, Tokyo Metropolitan Area, Hiroshima and Kyoto. Other notable progress has been the initiation of the public involvement (PI) system which considers environmental, social and environmental aspects including alternatives for sectoral planning of infrastructure projects such as roads, airports, harbours and river basins. One perception is that the PI system in Japan may mimic the form and function of SEA. SEA prospects seem to be in the development of a SEA legislative framework in the context of updating the existing EIA legislation (Imura and Schreurs, 2005; Sachihiko, 2001; Uesaka et al., 2000).

In terms of cultural dimensions, Japan has a borderline PDI with a score of 54 and the lowest score among the 15 Asian countries reviewed which indicates that it is a borderline hierarchical society where hierarchy may be less important than meritocracy (Hofstede, 2014). Finally, SEA developments in Japan indicate the absence of SEA legislation and application in policy planning but the presence of public participation provisions and its application. Consequently, Japan's borderline PDI may explain the paradox in the lack of a SEA legislation but nonetheless the practical and vigorous implementation of public participation in other forms such as the public involvement system.

2.5. *Taiwan*

Taiwan has transposed its SEA requirements into national legislation including the EIA Act, SEA manual and SEA PPP list. A primary problem identified in SEA implementation for Taiwan has been the lack of a comprehensive SEA scoping process and prioritization of environmental aspects. A secondary problem is the limited competency capacity for SEA implementation due to restricted training and knowledge for environmental and planning agencies. Furthermore, a tertiary problem has been the negligible public participation in SEA implementation which is characteristically limited to government agencies and approving bodies. The trends in SEA implementation may indicate that Taiwan is still limited in its political will for stakeholder engagement with a bureaucratic top-down policy planning system. Meanwhile, notable progress of SEA implementation in Taiwan has been the early adoption of a SEA legislative framework relative to other Asian countries. Other progress includes experimentation of various SEA mechanism such as Delphi-indicators and health impact assessment (HIA) as well as SEA of the National Scheme for the location of industrial parks, construction and management guidelines for golf courses, National Water Resources Development Plan and the protected watersheds reduction plan (Chen et al., 2011; Kuo and Chiu, 2006; Kuo et al., 2005). SEA prospects seem to be in the development of capacity building for policy administrators and SEA review system to identify best practices in the international community. Other prospects include the introduction of sustainability concepts within the SEA framework via the Taiwan sustainable development indicators (Liou et al., 2006, 2003; Wang et al., 2012). In terms of cultural dimensions, Taiwan has a borderline PDI with a score of 58 which indicates that it is a hierarchical society where everybody has their place without the need for justification (Hofstede, 2014). Finally, SEA developments in Taiwan indicate the presence of SEA legislation and provisions for SEA public participation including the presence of SEA application in policy planning though public participation practice is absent. In this respect, Taiwan is similar with China though with significant differences in PDIs. Consequently, Taiwan's borderline PDI does not explain its lack of public participation though this may be impeded by Taiwan's political history and opacity with China.

2.6. *Vietnam*

Vietnam has transposed its SEA requirements into national legislation including the Law on environmental protection which includes mandatory SEA requirements for national, provincial and local PPPs. A primary problem identified in SEA implementation for Vietnam has been the lack of SEA knowledge and experience at the ministerial levels while a secondary problem has been the lack of a systematic coordinated inter-agency planning. The trends in SEA implementation may indicate that Vietnam is implementation SEA at a rapid rate in relation to its SEA capacity building development (Clausen et al., 2011; Doberstein, 2004). This is because the drive for SEA in Vietnam has been emerging for more than a decade with key national policy initiatives urging the strategic integration of environmental consideration in PPP to ensure sustainable development. This evolution has finally led to the culmination of the introduction of SEA in Vietnam especially in the context of the comprehensive poverty reduction and growth strategy (2002), National Strategy for Environmental Protection to 2010 and Vision

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

2020. Meanwhile, notable progress of SEA implementation in Vietnam has been the legislative and administrative development of its SEA framework as well as legal provisions for public participation. Other notable progress includes the requirements to synchronize integration with national development strategies and the development of technical guidelines on methodological aspects. Interestingly, the guidelines adopt a pragmatic and basic approach for SEA which includes simple techniques such as matrices, expert judgements and trend analysis. SEA prospects seem to be in the development of inter-sectoral coordination including the streamlining of SEA requirements for various policy planning processes (Obbard et al., 2002; Partidário et al., 2008; Sekhar, 2005). In terms of cultural dimensions, Vietnam has a moderately high PDI with a score of 70 which indicates that it is a hierarchical society where centralization is popular and challenges to leadership are discouraged (Hofstede, 2014). Finally, SEA developments in Vietnam indicate the presence of SEA legislation and provisions for SEA public participation including the presence of SEA application in policy planning though public participation practice is absent. Consequently, Vietnam's moderately high PDI may explain its limited public participation in contrast to its legal provisions for public participation.

2.7. *Indonesia*

Indonesia has transposed its SEA requirements into national legislation including the environmental protection and management law which requires mandatory SEA for spatial and development plans at the national, provincial and local levels as well as optional SEA for PPP with potentially significant environmental impacts. A primary problem identified in SEA implementation for Indonesia is the efficacy of the newly formulated SEA legislation in the policy planning process. A secondary problem is the perception by the planning agencies and stakeholders that SEA may potentially burden and delay the authorization process of PPP in Indonesia. Furthermore, a tertiary problem is the potential for economic concerns to supersede SEA implementation and adoption of SEA findings (Dusik and Xie, 2009). The trends in SEA implementation may indicate that Indonesia has evolved from its EIA approach to a SEA framework and is now embarking on its SEA application in practice (Purnama, 2003; Spaling and Vroom, 2007). Meanwhile, notable progress of SEA implementation in Indonesia has been the establishment of its SEA legislative framework which includes provisions for public participation and the consideration of carrying capacity of the environment.

This is a relatively novel SEA initiate in the region. Furthermore, SEA requirements are currently being streamlined through regulations and guidance documents. Other notable progress includes the successful application of its SEA consultation for disaster management (Prasetio et al., 2012). SEA prospects seem to be in the development of SEA sector specific guidelines for national development and sectoral plans as well SEA multi-plan assessments within a single assessment process (Dusik and Kappiantari, 2010; Dusik et al., 2010; Ministry of Environment, Indonesia, 2007). In terms of cultural dimensions, Indonesia has a high PDI with a score of 78 which indicates imbalanced power dynamics between leaders and the people where communication may be indirect with hidden negative feedback (Hofstede, 2014). Finally, SEA developments in Indonesia indicate the presence of SEA legislation though its application in policy planning is absent. Nevertheless, provisions for SEA public participation is present though public participation practice is also absent. Consequently, Indonesia's high PDI suggests its SEA initiatives may be driven in a top-down manner where in theory the legal provisions are in place but in practice there may be limited consensus in its application to the extent SEA may be considered a burden by planning agencies.

2.8. *Philippines*

Philippines has not transposed its SEA requirements into national legislation though it has implemented it in an ad-hoc manner for infrastructure programmes such as transportation and energy. It also has included para-SEA elements within its Local Government Code, Clean Water Act, Clean Air Act, Solid Waste Management Act, National Integrated Protected Areas System and Indigenous People's Rights Act. A primary problem identified in SEA implementation for Philippines has been the reactive approach to SEA while a secondary problem is it's unrealized utilization of para-SEA elements within its existing legislative framework. The trends in SEA implementation may indicate that Philippines is still hesitant on evolving from EIA to SEA especially within a legislative framework (Abracosa and Ortolano, 1987; Lim, 1985; Smith and Van der Wansem, 1995). Meanwhile, notable progress of SEA implementation in Philippines has been the inclusion of SEA elements within the formulation of the Palawan Sustainable Development Act, Bohol Environment Code and the National Integrated Protected Area Management Systems Act. Other notable progress includes the application of SEA within various regional environmental assessments for river basins, coastal zones and urban planning including the Manila Third Sewerage Project. SEA prospects seem to be in the development of a SEA framework within the Environmental Assessment Act that would require SEA for PPPs involving multi-component, multi-sector projects and activities (Gilbuena Jr. et al., 2013; Mercado, 2007). In terms of cultural dimensions, Philippines has a high PDI with a score of 94 which indicates a hierarchical society where centralization is prevalent (Hofstede, 2014). Finally, SEA developments in the Philippines indicate the absence of SEA legislation, SEA application, public participation provision as well as public participation application. Consequently, Philippines high PDI suggests its lack of SEA initiatives may be consistent with its reactive and top-down dependent approach towards SEA.

2.9. *Thailand*

Thailand has not transposed its SEA requirements into national legislation though it has developed a SEA guideline that considers social, economic and environmental alternatives. A primary problem identified in SEA implementation for Thailand has been the lack of a SEA legislative framework to support SEA implementation notwithstanding it has been implicitly mentioned in national environmental policies such as the National Environmental Quality Management Plan. This

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

has resulted in a lack of prioritization for SEA since its implementation is on a voluntary basis. A secondary problem is the minimalistic public participation in environmental planning. This is because public engagements are conducted in a cursory manner to conform to minimum legislative requirements typically towards the tail-end of the process when it has the least influence. Thus, while in theory there is a legitimate provision for public participation but in practice it has been difficult to operationalize due to stakeholder non-articulation (Bureekul, 2000). The trends in SEA implementation may indicate that Thailand is resiliently predisposed to a top-down planning framework with inherent restrictions to public participation in policy planning and decision making (Euamonlachat, 2010; Nishiuraa et al., 2008; Wirutskulshai and Coowanitwong, 2008). Meanwhile, notable progress of SEA implementation in Thailand has been the diverse capacity building initiatives including a series of SEA trainings and workshops organized by academic institutions in Thailand as well as the various ongoing SEA pilot studies (Lindberg, 2001). SEA prospects seem to be in the development of a universal SEA procedural approach that is robustly adaptable for different PPP assessments (Wirutskulshai et al., 2011). In terms of cultural dimensions, Thailand has a moderately high PDI with a score of 64 which indicates a society of status and privileges where management is paternalistic and information flow restrained (Hofstede, 2014). Finally, SEA developments in Thailand indicate the absence of SEA legislation, SEA application and public participation application though public participation provisions are present. Consequently, Thailand's moderately high PDI may explain its reluctance in formulating SEA legislation including its cursory implementation of public participation initiatives.

2.10. *Laos*

Laos has not transposed its SEA requirements into national legislation though it has conducted World Bank and Asian Development Bank (ADB) supported SEA pilot projects (Goodland, 2005). A primary problem identified in SEA implementation for Laos has been the lack of obvious direction for SEA implementation in its policy and legislative framework. The trends in SEA implementation may indicate that Laos is still ambivalent on SEA since traditionally it has been driven by donor funded SEA projects required as part of the investment due diligence process. Meanwhile, notable progress of SEA implementation in Laos has been the SEA implementation for the Nam Theun II Hydropower Project. Other progress include the SEA for the Nam Ngum River Basin which adopted a cumulative impact assessment (CIA) to study the environmental and social impacts of multiple hydropower development on agriculture, natural resources and local communities (Jusi, 2011; Keskinen et al., 2012; Vientiane, 2011). Other notable progress includes the realization of public participation initiatives within the context of these donor funded SEA though this view is controversial (Lawrence, 2009; Singh, 2009). SEA prospects seem to be in the development of capacity building and awareness training for key government agencies (Dusik and Xie, 2009).

In terms of cultural dimensions, the PDI for Laos was not available within Hofstede's cultural dimensions research though estimates on Laos PDI has been conducted based on the average PDI of Thailand and Vietnam both key neighbours of Laos and hence share similar cultural backgrounds (Dorner and Gorman, 2011). The estimated PDI for Laos was moderately high at 67 which indicates a hierarchical society with top-down management where society is generally patient and accepting of its members and leadership. Finally, SEA developments in Laos indicate the absence of SEA legislation, SEA application and public participation provisions though public participation application is present. Consequently, Laos' moderately high PDI may explain its ambivalence towards SEA implementation consistent with a laissez-faire attitude towards change.

2.11. *Bangladesh*

Bangladesh has not transposed its SEA requirements into national legislation though it has introduced EIA through its National Environmental Policy and the Environmental Conservation Act as well as the environmental assessment of regional water quality projects (Khan and Belal, 1999; Rahman et al., 2000). A primary problem identified in SEA implementation for Bangladesh has been the lack of a comprehensive environmental assessment system that is non-dependent on international donor agency requirements. A secondary problem is the lack of transparency in the decision making system. Furthermore, a tertiary problem is the lack of public participation in environmental decisions since it is non-mandatory in Bangladesh. The trends in SEA implementation may indicate that Bangladesh is struggling with the challenges of good governance due to antagonistic politics, invasive corruption and bureaucratic procrastination. Meanwhile, notable progress of SEA implementation in Bangladesh has been an emphasis on incorporating environmental consideration within sectoral policies as well as the development of ministerial sustainable development policies. SEA prospects seem to be in the development of a more robust environmental legislative and institutional framework which includes compulsory public participation and the inception of an environmental independent body consisting of NGOs, international aid agencies and research think tanks (Ahammed and Harvey, 2004; Alshuwaikhat et al., 2007; Momtaz, 2002). In terms of cultural dimensions, Bangladesh has a high PDI with a score of 80 which indicates a hierarchical society where autocratic leadership is accepted as a norm (Hofstede, 2014). Finally, SEA developments in Bangladesh indicate the absence of SEA legislation, SEA application, public participation provision as well as public participation application. Consequently, Bangladesh high PDI may explain its limited transparency in decision making consistent with a paternalistic society.

2.12. *Pakistan*

Pakistan has not transposed its SEA requirements into national legislation though it has introduced EIA through its Environmental Protection Act and Environmental Regulations as well the implementation of SEA for thermal power generation and drainage PPPs (Naureen, 2009; Slootweg et al., 2007; Wood, 2003). A primary problem identified in

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

SEA implementation for Pakistan has been the low prioritization of SEA within the environmental management system. A secondary problem is the undue influence of environmental aid organizations and the government in the environmental decision making process.

The trends in SEA implementation may indicate that Pakistan is struggling with the challenges of good governance due to political pressures where the environmental assessment process is used more as a project rationalization tool as opposed to an environmental sustainable decision support system. Meanwhile, notable progress of SEA implementation in Pakistan has been the mandatory inclusion of the public participation requirements for all public sector projects. SEA prospects seem to be in the development of environmental tribunals to ensure the environmental rights of stakeholders (Nadeem and Fischer, 2011; Nadeem and Hameed, 2008; Saeed et al., 2012). In terms of cultural dimensions, Pakistan has a borderline PDI with a score of 55 which indicates a consultative society open to public participation (Hofstede, 2014). Finally, SEA developments in Pakistan indicate the absence of SEA legislation and SEA application but the presence of public participation provision and public participation application. Consequently, Pakistan's borderline PDI is consistent with its mandatory requirement for public participation in all public sector projects and the formulation of environmental tribunals which is atypical of Asian top-down countries.

2.13. *India*

India has not transposed its SEA requirements into national legislation though it has introduced EIA through its Environmental Protection Act. India has also conducted SEA for irrigation projects in Central India, the Indian eco-development project, the Gujarat State Highway Programme and the Gujarat National Dairy Support Project (Garcia et al., 2011; Hirji and Davis, 2009; Singh and Singh, 2011). A primary problem identified in SEA implementation for India has been the low prioritization of SEA compared to EIA. A secondary problem is the weak environmental assessment methodology, unreliable baseline data and incoherent application of assessment tools. Furthermore, a tertiary problem is the non-accountability of environmental agencies and professionals in disclosing environmental findings. The trends in SEA implementation may indicate that India is restricted by excessive bureaucratic and potentially corrupt administrative barriers to sustainable environmental governance (Banham and Brew, 1996; Paliwal, 2006; Valappil et al., 1994; Vyas and Reddy, 1998). Meanwhile, notable progress of SEA implementation in India has been the internalization of environmental considerations in the Palar Basin as well as the use of SEA as a diagnostic framework for biodiversity. SEA prospects seem to be in the development of SEA in updating environmental policy guidelines and increasing the accountability of environmental professionals (Rajvanshi, 2005, 2003, 2001). In terms of cultural dimensions, India has a high PDI with a score of 71 which indicates a hierarchical society with a top-down structure and highly dependent on leadership for direction (Hofstede, 2014). Finally, SEA developments in India indicate the absence of SEA legislation, SEA application and public participation provisions though public participation application is present. Consequently, India's high PDI suggests SEA initiatives may be impeded due to bureaucratic restrictions where communication is top-down with minimal bottoms-up constructive feedback to facilitate improvements.

2.14. *Sri Lanka*

Sri Lanka has not transposed its SEA requirements into national legislation though it has introduced EIA through its National Environmental Act as well as the SEA for its Tourism Master Plan. A primary problem identified in SEA implementation for Sri Lanka has been the lack of technical capacity for environmental assessments. A secondary problem is the perception that SEA is a means to bypass the EIA process as opposed to complementing it. The trends in SEA implementation may indicate that Sri Lanka is at a transition state of unstable political atmosphere where its main priority is focused on economic and social developments superseding environmental concerns (Samarakoon and Rowan, 2008; Sathananthan, 1992; Zubair, 2001). Meanwhile, notable progress of SEA implementation in Sri Lanka has been the growing awareness on the importance of SEA. SEA prospects seem to be in the implementation of SEA within government agencies in the tourism, energy, forestry and urban planning sectors (Mackee et al., 2001; Samarakoon and Rowan, 2008; Vidyaratne, 2006). In terms of cultural dimensions, Sri Lanka has a high PDI with a score of 80 which indicates a hierarchical society which is perceived as reflecting inherent inequalities (Hofstede, 2014). Finally, SEA developments in Sri Lanka indicate the absence of SEA legislation, SEA application, public participation provision as well as public participation application. Consequently, Sri Lanka's high PDI may explain its entitled perception that SEA is a means of bypassing customary environmental requirements.

2.15. *Malaysia*

Malaysia has not transposed its SEA requirements into national legislation though it has introduced EIA through its Environmental Quality Act. SEA has also been conducted for the Paya Indah Wetlands, Selangor Structure Plan, Perak Structure Plan, Beaufort and Kuala Penyu Landuse Plan and the National Water Resources Management Study. The current application of SEA in Malaysia is mainly focused in land use development plans via the Town and Country Planning Department (Briffett et al., 2004; Memon, 2000). A primary problem identified of SEA implementation in Malaysia has been its limited adoption as a policy planning tool even though it has been explicitly stated in the National Policy on the Environment and the Ninth Malaysia Plan. A secondary problem is the lack of methodological guidelines in conducting SEA in a consistent and systematic manner. Many of the SEA implementations are varied in their definition and integration of environmental considerations ranging from simple utilization of rapid EIA screening approaches to descriptive sustainability assessment evaluations. Furthermore, a tertiary problem is the existing low level of awareness on SEA and its potential for super-streaming environmental considerations in policy planning. The trends in SEA implementation may indicate that Malaysia is still experimenting

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

with the use of SEA as a policy planning mechanism and is hesitant in embracing SEA. This may be due to its traditional top-down policy planning with minimal public participation and its conventional reliance on EIA. Meanwhile, notable progress of SEA implementation in Malaysia has been the recent recommendation by the Ministry of Natural Resources and Environment for SEA to be implemented in mainstreaming biodiversity. SEA prospects seem to be in the development of public participation initiatives in national legislation and policies. This includes the recent Malaysian government circular on the online public engagement of new legislation as well as the utilization of sustainability assessments in land use planning (Government of Malaysia, 2012; Halimaton, 2007; Marzuki, 2009; Moi, 2007).

In terms of cultural dimensions, Malaysia has the highest PDI in the world with a score of 100 which indicates an extremely hierarchical society where the public is expected to accept leadership's authority without question (Hofstede, 2014). Finally, SEA developments in Malaysia indicate the absence of SEA legislation and public participation practice though SEA application and public participation provisions are present. Consequently, Malaysia's high PDI may explain its top-down policy planning where SEA initiatives is highly dependent on leadership's political will as opposed to public pressure.

3. Sea problems, progress & prospects

A summary of SEA trends in Asia indicate a proliferation of SEA legislation possibly a mimicking of trends in Europe due to the EU SEA Directive (Briffett et al., 2003; Dusik and Xie, 2009; Hayashi et al., 2011). Meanwhile, SEA implementation also range from the use of structured and non-structured policy instruments such as legislation and stakeholder engagement. The primary problem of SEA implementation in Asia has been its limited integration in strategic decision making due to existing meta-policy structures. These deeply rooted systems are highly political and sensitive to change even in countries with a SEA legislative framework (Hezri, 2004). The secondary problem has been the assimilation of public participation and stakeholder engagement in a truly transparent and inclusive manner with often mixed results. The tertiary problem has been the utilization of a consistent methodological framework for SEA due to its highly abstract nature at the policy level (Table 1). These trends indicate that SEA in Asia is still in an evolutionary pathway and may be dependent on each country's cultural dimensions of PDI. This suggest that borderline PDI country's such as Japan, Pakistan, Taiwan and South Korea are more likely to implement SEA public participation requirements irrespective of legislative provisions as opposed to high PDI countries

Table 1 – Summary of SEA problems, progress and prospects in Asia.

Country	SEA problems	SEA progress	SEA prospects	Power distance index
Hong Kong	Lack of macro environmental policy	Heightened SEA public participation.	Sustainability centric SEA.	68
China	Restrictive public participation.	SEA technical guidelines and indicators.	Expansion of SEA scope.	80
South Korea	Lack of legislative cohesion.	Down-streaming SEA findings to EIA.	SEA sustainable development indicators.	60
Japan	Lack of SEA legislation.	Public involvement system.	SEA legislation.	54
Taiwan	Limited political for stakeholder engagement.	SEA systems such as Delphi indicators and health impact assessment.	SEA capacity building.	58
Vietnam	Limited influence on strategic decision making.	Synchronized SEA implementation with policies.	Inter-sectoral coordination.	70
Indonesia	Perception of SEA as a burden by planning agencies.	SEA legislative provisions for public participation.	SEA multi-plan assessments.	78
Philippines	Reactive approach to SEA implementation.	SEA application in regional planning.	SEA inclusion in environmental legislation.	94
Thailand	Lack of SEA legislation with limited public participation.	SEA training and workshops.	Universal SEA procedure for different hierarchical levels.	64
Laos	Ambivalent SEA implementation.	Public participation initiatives.	SEA capacity building and training.	67*
Bangladesh	Limited transparency in decision making.	Integrating environmental consideration in sectoral policies.	Public participation initiatives.	80
Pakistan	Challenges in SEA governance due to political pressure.	Mandatory public participation.	Environmental tribunals.	55
India	Bureaucratic restrictions.	Systematic participatory process.	Augmenting accountability of environmental professionals.	77
Sri Lanka	Unstable political climate transition.	Growing awareness on SEA.	SEA implementation in agencies.	80
Malaysia	Top-down policy planning with conventional reliance on EIA.	Promotion of SEA in mainstreaming biodiversity.	Public participation initiatives on new legislation.	100

* Estimated Laos PDI.

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

such as Malaysia, Philippines, China, Bangladesh and Sri Lanka which are more likely to struggle with practical SEA public participation initiatives even though it is mandated by legislation. Furthermore, the trends also indicate that SEA application can vary within planning levels and sectors (Tetlow and Hanusch, 2012). Meanwhile notable progress in SEA implementation in Asia has been the global awareness on the need for SEA to integrate environmental considerations in a more strategic setting. Finally, SEA prospects in Asia seem to be in the development of a common international regional cooperation on SEA capacity building as well as the integration of sustainability assessments within the SEA framework (White and Noble, 2013).

4. Sea paradigm analysis

The SEA paradigm analysis is a metaphorical categorization of countries based on their SEA implementation into 'White or Green Elephants' or 'White or Green Tigers'. 'Elephants' refer to highly visible and structured policy instruments such as legislation while 'Tigers' refer to latent non-structured policy instruments such as public participation and stakeholder engagement. 'Green' refers to effective policy instruments while 'White' refers to ineffective policy instruments (Fig. 2). Typically 'White Elephants' refers to something that is highly visible but is functionally ineffective and becomes a burden to sustain where 'Green Elephants' are the anti-thesis of 'White Elephants'. Similarly, 'White Tigers' are something that is latent and looks potent but is inherently weak where 'Green Tigers' are the anti-thesis of 'White Tigers'.

'White Elephants' are countries that lack SEA legislation and/or SEA application in policy planning. 'White Elephants' are also countries that have SEA legislation but are unable to implement it due to ambitious and burdensome legislative requirements and/or weak policy implementation as well as countries that attempt to apply SEA practice without a structured SEA legislative framework. Characteristics of 'White Elephants' are countries that have failed to implement and enforce their mammoth legislative EPI initiatives or attempt to implement SEA application through ad-hoc measures. This often results in SEA legislation that in the short-term appear robust but in the long-term is resource intensive and non-pragmatic.

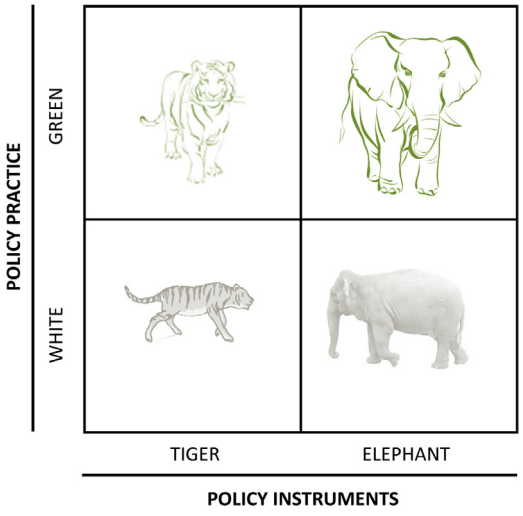

Fig. 2 – SEA paradigm framework.

'Green Elephants' are countries which have formulated SEA legislation and implemented SEA application in policy planning. 'Green Elephants' have SEA legislation and an effective SEA policy implementation due to their highly structured and technical SEA framework. This is achieved by structuring policy instruments in a standardized, definite and publicized approach to provide an established and consistent legislative or administrative technical framework for all stakeholders. Characteristics of 'Green Elephants' are countries that have developed and implemented extensive and effective SEA relevant legislation to enforce EPI initiatives.

'White Tigers' are countries that lack public participation provisions and/or public participation initiatives. 'White Tigers' have stakeholder engagement provisions but are ineffective in its implementation due to non-adaptive targeting of stakeholders and weak policy implementation. 'White Tigers' also refer to countries that conduct public participation practices merely as a quasi-policy endorsement facade. Characteristics of 'White Tigers' are countries that do not consult stakeholders in their policy planning or implement public participation exercises in an inaccessible manner. This often results in SEA implementation that externally appear strong but internally is weak and lack stakeholder and public support.

'Green Tigers' are countries which have included public engagement provisions in their administrative requirements and implemented public participation practice in policy planning. 'Green Tigers' integrate stakeholder engagement in a latent adaptive approach to achieve policy objectives. This is achieved by modulating policy implementation and targeting key stakeholders based on their specific drivers and need. Characteristics of 'Green Tigers' are countries that widely and effectively utilize stakeholder engagement and public participation tools to drive EPI initiatives.

The SEA paradigm analysis was conducted using the DEFINITE model (Decisions on a Finite Set of Alternatives Decision Support System for Environmental Evaluation) (Janssen, 2001). The model utilizes the direct summation weight method where the weightage for all policy instruments and policy effectiveness was set as equal. The DEFINITE model codes each country's policy instruments and policy practice with a 0 or 1 tag. The 0 tag refers to an absence of a policy instruments or policy effectiveness while the 1 tag refers to presence of a policy instruments or policy effectiveness. The DEFINITE model coding tags utilized four main effects for its evaluation which are the presence/absence of SEA Legislation, presence/absence of SEA Application, presence/absence of public participation provisions and presence/absence of public participation application. The coding tags were derived from the extensive literature review and analysis conducted for the 15 countries in Asia in terms of their SEA policy trends (Fig. 3).

Countries in Asia with a Tier 1 ranking for SEA integration are Hong Kong and South Korea which have SEA constructs of 'Green Elephants' and 'Green Tigers'. These countries have the presence of all four SEA constructs of SEA legislation, SEA application, SEA public participation provision and SEA public participation application. These countries dominantly utilize both structured and non-structured policy instruments to

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

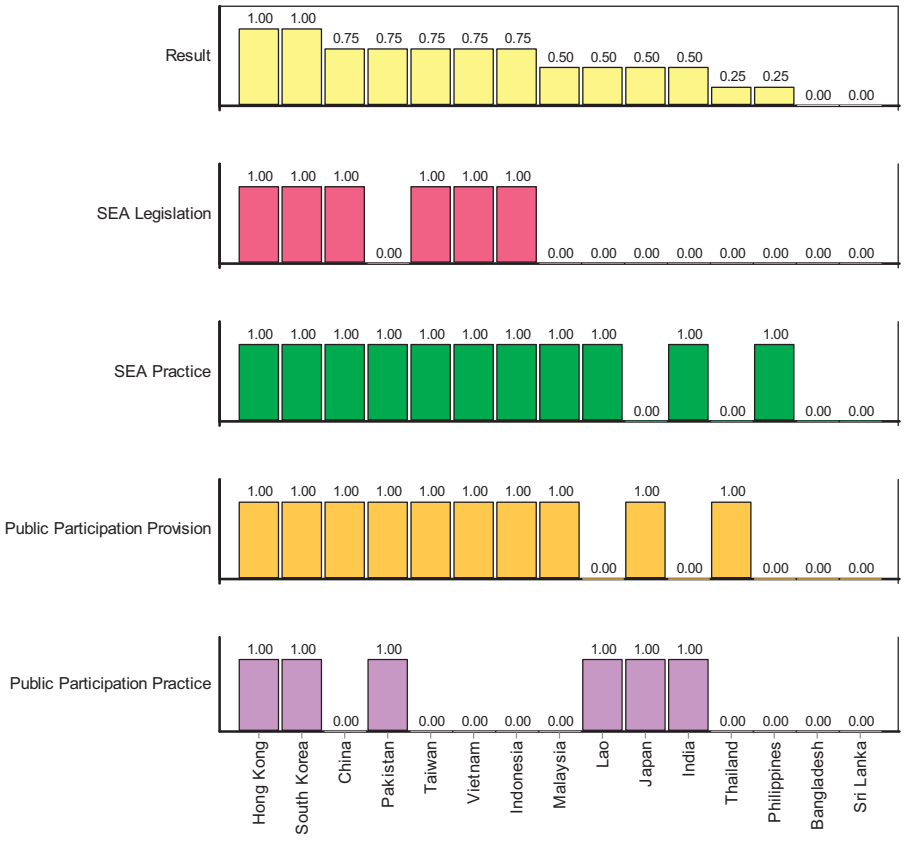

Fig. 3 – SEA paradigm analysis.

drive SEA policy and practice. Countries in Asia with a Tier 2 ranking for SEA integration are China, Pakistan, Taiwan, Vietnam and Indonesia which have SEA constructs of 'Green Elephants', 'White Elephants' and 'Green Tigers'. These countries have the presence of three SEA constructs of SEA legislation, SEA application and SEA public participation provision but lack SEA public participation application. These countries dominantly utilize structured policy instruments to drive SEA policy and practice but are weak in non-structured policy instruments such as stakeholder engagement.

Meanwhile, countries in Asia with a Tier 3 ranking for SEA integration are Malaysia, Laos, Japan and India which have SEA constructs of 'White Elephants', 'Green Tigers' and 'White Tigers'. These countries have the presence of two SEA constructs of either SEA application, SEA public participation provision or SEA public participation application but lack SEA legislation. They dominantly utilize non-structured policy instruments to drive SEA policy and practice but are weak in structured policy instruments such as legislation and application. Countries in Asia with a Tier 4 ranking for SEA integration are Thailand, Philippines, Bangladesh and Sri Lanka which have SEA constructs of 'White Elephants' and 'White Tigers'. These countries have only the presence of one SEA construct of either SEA Application, SEA public participation provision or SEA public participation application. Tier 4 ranking also includes countries with no SEA constructs. These countries typically fail to prioritize SEA or are unable to implement both structured and non-structured policy instruments to drive SEA policy and practice.

5. Sea policy implications

SEA policy trends in Asia indicate that it is at a crossroads between 'Green Elephants-Green Tigers' and 'White Elephants-White Tigers' countries. These SEA Tier 1 countries such as Hong Kong and South Korea have developed and integrated legislative frameworks in contrast to SEA Tier 4 countries such as Bangladesh and Sri Lanka that have ignored SEA integration and implementation. There are also a group of emerging SEA Tier 2 and SEA Tier 3 countries such as China, Taiwan, Indonesia and Malaysia that are experimenting and considering SEA. Nevertheless these countries face challenges in integrating stakeholder engagement and public participation in policy planning. The fundamental challenge of SEA integration in Asia may be due to a larger systemic policy formulation and governance framework (Dennis and Agamuthu, 2012b). This stems from the existing emphasis on the project based EIA process as the main driving force for environmental integration as well as existing top-down policy planning systems (Partidário, 1996; Wallington et al., 2007). This policy formulation process has often been perceived as highly bureaucratic, lacking public participation with minimal cross-sectoral horizontal EPI (Hezri and Nordin Hasan, 2006). Consequently, SEA policy trends in Asia also indicate potential linkages between SEA public participation initiatives and country specific PDI where SEA initiatives in moderately high and high PDI countries may require top-down political will for pragmatic SEA implementation though

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

SEA itself may provide the catalyst to stimulate a bottoms-up consultative society.

Furthermore, it has been advocated that SEA should evolve beyond the EIA paradigm and its associated technical and procedural approach (Bina, 2008; Wallington et al., 2007). However, the authors suggest that SEA integration in Asia requires a paradigm shift to address the prime strategic gap of SEA integration. This refers to the current biased over-reliance on the legislative aspects of SEA and a disconnected emphasis on structured policy instruments. This is compounded with limited development on the non-structured policy instruments of SEA including the development of strategic behavioural models of stakeholder and public integration of SEA in policy planning. Recent, SEA research highlight the importance of novel and innovative approaches in integrating non-structured policy instruments through the use of strategic behaviour models that are able to predict stakeholder policy support of SEA (Dennis and Agamuthu, 2013). This also relates with the fact that environmental policymaking is highly politicized and policy makers are reluctant to initiate environmental integration which may be rejected by stakeholders and the public (Groot and Schuitema, 2012; Juntti et al., 2009). The common prevailing mind-set is that SEA implementation would take care of itself once a SEA legislation or SEA plan is conducted. Nevertheless, SEA experiences indicate otherwise where SEA implementation can be severely hindered due to the socio-economic complexity and political nature of policy planning. This includes each countries' cultural power distance dynamics of consultation and public participation of SEA initiatives. This findings highlighting the emphasis on legislation in Asia is consistent with SEA trends observed in the literature (Dusik and Xie, 2009; Hayashi et al., 2011; Sadler et al., 2011). Policy makers and stakeholders have a complex decision making and integration drivers which may significantly affect their choices and potential to either facilitate or hinder SEA implementation which transcend simplistic SEA awareness programmes (Axelsson et al., 2012; Bina, 2007). This is aptly demonstrated by SEA experiences in China, Taiwan and Indonesia that signal SEA implementation can be highly multi-dimensional. This is due to differing environmental and local cultural context across countries with varying levels of environmental development and power distance index (Bao et al., 2004b; Liou and Yu, 2004; Ministry of Environment, Indonesia, 2007).

This may simply imply that SEA legislation is not a 'silver bullet' that can be mimicked from other countries but has to be customized and complemented with a locally validated SEA analytical and behavioural framework taking into consideration national environmental data availability and cultural systems (Agamuthu and Dennis, 2013). Furthermore, there are differing views on the potential development pathway for SEA in Asia. One point of view is that SEA should be linked with the sustainable development agenda while others contend that SEA should be focused on its core function of environmental protection to ensure its viability (Gao et al., 2013; Lafferty and Hovden, 2003; Sadler et al., 2011). In contrast, the authors assert that the overarching SEA prime directive is on securing the SEA value proposition in policy planning to decision makers before debating its expansion from environmental protection to sustainable development as these aspects are systemically inter-related. Consequently, this can only be achieved when SEA re-instantiates its strategic value by integrating itself in policy planning. The policy implication of these trends is that countries considering SEA integration in policy planning will require a paradigm shift towards a nexus of SEA structured and non-structured policy instruments. This is to ensure they avoid the pitfalls of ineffectual and profligate SEA adoption while super-streaming the benefits of SEA in their policy planning.

6. Conclusions

Policy trends of SEA in Asia indicate that it is currently an important environmental policy consideration for countries in the region with the formulation of SEA legislations in Hong Kong, China, South Korea, Taiwan, Vietnam and Indonesia. Nevertheless, SEA implementation also has been impeded by challenges in realizing practical SEA public participation especially in countries with traditionally high cultural power distance dynamics such as China, Indonesia and Vietnam. Meanwhile, countries such as Japan and Pakistan have voluntarily implemented SEA elements such as public participation without legislative provisions while countries such as Thailand, Philippines, Bangladesh and Sri Lanka are resisting the adoption of SEA. Consequently, a key SEA policy recommendation for Asia include the establishment of a regional Asian virtual SEA Governance Centre (SGC) supported by national SGCs for the purpose of mainstreaming SEA into country specific national policy planning as well as SEA capacity building. The function of the regional and national SGCs would be to provide resources, technical assistance and standards for SEA implementation in Asia including establishing a web based database on SEA practices, problems and progresses. The potential benefits of the regional SGC is in its role as the SEA knowledge hub in Asia to establish linkages with government agencies, private organizations, academic researchers, NGOs and the public. The SGC may also function as a training and licensing centre for SEA professionals in the region. Ultimately, the SGC may be critical in providing a platform for SEA involving regional multi-stakeholder cooperation to coordinate SEA initiatives in Asia.

In conclusion, SEA trends in Asia indicates a sagacious realization that SEA in theory may be a strategic and rationale approach to integrating environmental considerations and preventing environmental problems. However, SEA in practice is a complex, dynamic and challenging process that requires political will, legislative framework and a transparent stakeholder engagement process framed within the cultural context of Asian countries. This essentially is the paradigm shift that links structured and non-structured policy instruments, resulting in the evolution of 'White Elephants-White Tigers' to 'Green Elephants-Green Tigers' of Asia.

Acknowledgements

The authors acknowledge the University of Malaya for the financial support for this study under the Institute of Research Management & Monitoring (PV054/2011A) research fund. We are also grateful for our anonymous reviewer's constructive feedback.

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

REFERENCES

Abracosa, R., Ortolano, L., 1987. Environmental impact assessment in the Philippines: 1977–1985. Environ. Impact Assess. Rev. 7, 293–310.

Agamuthu, P., Dennis, V., 2013. Policy trends of e-waste management in Asia. J. Mater. Cycles Waste Manage. 15, 411–419, http://dx.doi.org/10.1007/s10163-013-0136-7.

Ahammed, A.K.M., Harvey, N., 2004. Evaluation of environmental impact assessment procedures and practice in Bangladesh. Impact Assess. Proj. Apprais. 22, 63–78.

Ahn, K., Han, S.-W., Han, Y.-H., Jung, J., Jung, J.-G., Kim, I.-S., Lee, J., Lee, S., Ryu, G.-C., Ryu, J.-G., 2008. Method development for the integrated impact assessment in Korea-a case study for the construction of Great Korean Waterway. In: IAIA Conference Proceedings', The Art and Science of Impact Assessment 28th Annual Conference of the International Association for Impact Assessment.

Alshuwaikhat, H., Rahman, S.M., Aina, Y.A., 2007. The rationale for SEA to overcome the inadequacy of environmental assessment in Bangladesh. J. Environ. Dev. 16, 227–246, http://dx.doi.org/10.1177/1070496507300917.

Au, E., 1998. Status and progress of environmental assessment in Hong Kong: facing the challenges in the 21st century. Impact Assess. Proj. Apprais. 16, 162–166.

Au, E., Hui, S., Morrison-Saunders, A., Arts, J., 2004. Learning by doing: EIA follow-up in Hong Kong. In: Assessing Impact: Handbook of EIA and SEA Follow-up. .

Axelsson, A., Annandale, D., Cashmore, M., Slunge, D., Ekbom, A., Loayza, F., Verheem, R., 2012. Policy SEA: lessons from development co-operation. Impact Assess. Proj. Apprais. 30, 124–129.

Banham, W., Brew, D., 1996. A review of the development of environmental impact assessment in India. Proj. Apprais. 11, 195–202.

Bao, C., Lu, Y., Shang, J.-C., 2004a. Framework and operational procedure for implementing strategic environmental assessment in China. Environ. Impact Assess. Rev. 24, 27–46.

Bao, C., Lu, Y., Shang, J.-C., 2004b. Framework and operational procedure for implementing strategic environmental assessment in China. Environ. Impact Assess. Rev. 24, 27–46, http://dx.doi.org/10.1016/S0195-9255(03)00137-9.

Barrett, B., Therivel, R., 1989. EIA in Japan: environmental protection v economic growth. Land Use Policy 6, 217–231.

Bina, O., 2007. A critical review of the dominant lines of argumentation on the need for strategic environmental assessment. Environ. Impact Assess. Rev. 27, 585–606, http://dx.doi.org/10.1016/j.eiar.2007.05.003.

Bina, O., 2008. Context and systems: thinking more broadly about effectiveness in strategic environmental assessment in China. Environ. Manage. 42, 717–733.

Briffett, C., Obbard, J., Mackee, J., 2004. Environmental assessment in Malaysia: a means to an end or a new beginning? Impact Assess. Proj. Apprais. 22, 221–233, http://dx.doi.org/10.3152/147154604781765923.

Briffett, C., Obbard, J.P., Mackee, J., 2003. Towards SEA for the developing nations of Asia. Environ. Impact Assess. Rev. 23, 171–196, http://dx.doi.org/10.1016/S0195-9255(02)00100-2.

Bureekul, T., 2000. Public Participation in Environmental Management in Thailand. King Prajadhipok's Institute.

Chang, I.-S., Wu, J., 2013. Integration of climate change considerations into environmental impact assessment—implementation, problems and recommendations for China. Front. Environ. Sci. Eng. 1–10, http://dx.doi.org/10.1007/s11783-013-0496-1.

Che, X., Shang, J., Wang, J., 2002. Strategic environmental assessment and its development in China. Environ. Impact Assess. Rev. 22, 101–109.

Chen, C.-H., Liu, W.-L., Liaw, S.-L., 2011. Integrated dynamic policy management methodology and system for strategic environmental assessment of golf course installation policy in Taiwan. Environ. Impact Assess. Rev. 31, 66–76.

Clausen, A., Vu, H.H., Pedrono, M., 2011. An evaluation of the environmental impact assessment system in Vietnam: the gap between theory and practice. Environ. Impact Assess. Rev. 31, 136–143.

Dalal-Clayton, B., Sadler, B., 2004. Strategic Environmental Assessment: An International Review. International Institute for Environment and Development, London.

Dennis, V., Agamuthu, P., 2012a. Strategic environmental assessment policy optimization prospects for solid waste management in Malaysia. In: Presented at the International Solid Waste Association World Congress Italy 2012, Florence, Italy.

Dennis, V., Agamuthu, P., 2012b. Strategic environmental assessment policy intervention scenario for solid waste management in Malaysia. In: Presented at the The 7th Asian-Pacific Landfill Symposium 2012, Bali, Indonesia.

Dennis, V., Agamuthu, P., 2013. Strategic environmental assessment policy integration model for solid waste management in Malaysia. Environ. Sci. Policy 33, 233–245, http://dx.doi.org/10.1016/j.envsci.2013.06.008.

Doberstein, B., 2004. EIA models and capacity building in Viet Nam: an analysis of development aid programs. Environ. Impact Assess. Rev. 24, 283–318.

Dorner, D.G., Gorman, G.E., 2011. Contextual factors affecting learning in laos and the implications for information literacy education. Inform. Res. Int. Electron. J. 16, n2.

Dusik, J., Kappiantari, M., 2010. Customizing Strategic Environmental Assessment for Indonesian Decisionmaking Context: Initial Lessons Learnt. Internal Report on Lessons Learnt. (Unpublished).

Dusik, J., Setiawan, B., Kappiantari, M., Argo, T., Nawangsidi, H., Wibowo, S.A., Rustiadi, E., Djoekardi, A., 2010. Making SEA Fit for Political Culture of Strategic Decision-Making in Indonesia: Recommendations for MOE General Guidance on SEA.

Dusik, J., Xie, J., 2009. Strategic Environmental Assessment in East and Southeast Asia. A Progress Review and Comparison of Country Systems and Cases. World Bank, Washington, DC.

Euamonlachat, I., 2010. EIA, SEA and TBEIA Application in Thailand, in: Climate Symposium 2010. 95.

Gao, J., Kørnøv, L., Christensen, P., 2013. The politics of strategic environmental assessment indicators: weak recognition found in Chinese guidelines. Impact Assess. Proj. Apprais. 31 (3) 232–237.

Garcia, K., de Brigard, J.C.G., Holm, T., le Maitre, D., Mathur, V., Muhamad, S., Olivier, E., Rajvanshi, A., Schemmel, J.P., Slater, M., 2011. SEA as a Tool for the Conservation and Sustainable Use of Biodiversity in Developing Countries 1. Handbook of Strategic Environmental Assessment. 274.

Gilbuena Jr., R., Kawamura, A., Medina, R., Amaguchi, H., Nakagawa, N., Bui, D.D., 2013. Environmental impact assessment of structural flood mitigation measures by a rapid impact assessment matrix (RIAM) technique: a case study in Metro Manila, Philippines. Sci. Total Environ. 456–457, 137–147, http://dx.doi.org/10.1016/j.scitotenv.2013.03.063.

Goodland, R., 2005. Strategic environmental assessment and the World Bank Group. Int. J. Sustain. Dev. World Ecol. 12, 245–255.

Government of Malaysia, 2012. Malaysian Government Circular on Online Public Participation for New or Revised Legislation. .

Groot, J.I.M., Schuitema, G., 2012. How to make the unpopular popular? Policy characteristics, social norms and the

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

acceptability of environmental policies. Environ. Sci. Policy 19–20, 100–107, http://dx.doi.org/10.1016/j.envsci.2012.03.004.
Halimaton, S.H., 2007. A Malaysian experience in strategic environmental assessment (SEA), presentation at a workshop. In: Understanding Strategic Environmental Assessment, Putrajaya, August 2007.
Harashina, S., 1998. EIA in Japan: creating a more transparent society? Environ. Impact Assess. Rev. 18, 309–311.
Hayashi, K., 2007. Comparative study on strategic environmental assessment system in selected Countries. In: International Symposium on EcoTopia Science (ISETS 2007), Nagoya, Japan, pp. 23–25.
Hayashi, K., Song, Y., Au, E., Dusik, J., 2011. In: Sadler, B., Aschemann, R., Dusik, J. (Eds.), SEA in the Asia region. pp. 89–107.
Hezri, A., 2004. Sustainability indicator system and policy processes in Malaysia: a framework for utilisation and learning. J. Environ. Manage. 73, 357–371, http://dx.doi.org/10.1016/j.jenvman.2004.07.010.
Hezri, A., Nordin Hasan, M., 2006. Towards sustainable development? The evolution of environmental policy in Malaysia. Nat. Resour. Forum 30, 37–50.
Hirji, R., Davis, R., 2009. Strategic Environmental Assessment: Improving Water Resources Governance and Decision Making. .
Hofstede, G., 2010. Cultures and Organizations: Software of the Mind; Intercultural Cooperation and Its Importance for Survival. McGraw-Hill, New York, NY USA.
Hofstede, G., 2014. Hofstede's Power Distance Index [WWW Document]. http://geert-hofstede.com/countries.html (accessed 16.03.14).
Imura, H., Schreurs, M.A., 2005. Environmental Policy in Japan. Edward Elgar Publishing.
Janssen, R., 2001. On the use of multi-criteria analysis in environmental impact assessment in The Netherlands. J. Multi-Crit. Decis. Anal. 10, 101–109.
Juntti, M., Russel, D., Turnpenny, J., 2009. Evidence, politics and power in public policy for the environment. Environ. Sci. Policy 12, 207–215, http://dx.doi.org/10.1016/j.envsci.2008.12.007.
Jusi, S., 2011. Challenges in developing sustainable hydropower in Lao PDR. Int. J. Dev. Issues 10, 251–267.
Keskinen, M., Kummu, M., Käkönen, M., Varis, O., 2012. Mekong at the crossroads: next steps for impact assessment of large dams. AMBIO: J. Hum. Environ. 1–6.
Khan, N.A., Belal, A.R., 1999. The Politics of the Bangladesh Environmental Protection Act. .
Kuo, N.-W., Chiu, Y.-T., 2006. The assessment of agritourism policy based on SEA combination with HIA. Land Use Policy 23, 560–570.
Kuo, N.-W., Hsiao, T.-Y., Yu, Y.-H., 2005. A Delphi–matrix approach to SEA and its application within the tourism sector in Taiwan. Environ. Impact Assess. Rev. 25, 259–280.
Lafferty, W., Hovden, E., 2003. Environmental policy integration: towards an analytical framework. Environ. Polit. 12, 1–22, http://dx.doi.org/10.1080/0964401041233130825 4.
Lawrence, S., 2009. The Nam Theun 2 Controversy and Its Lessons for Laos. Contested Waterscapes in the Mekong region: Hydropower, Livelihoods and Governance. 81–114.
Lim, G.-C., 1985. Theory and practice of EIA implementation: a comparative study of three developing countries. Environ. Impact Assess. Rev. 5, 133–153.
Lindberg, T., 2001. Strategic Environmental Assessment on shrimp farms in the southeast of Thailand. Swedish University of Agricultural Sciences, International Office.
Liou, M., Kuo, N.-W., Yu, Y.-H., 2003. Sustainable indicators for strategic environmental assessment in Taiwan. Ecosyst. Sustain. Dev. I, 623–634.
Liou, M., Yeh, S.-C., Yu, Y.-H., 2006. Reconstruction and systemization of the methodologies for strategic environmental assessment in Taiwan. Environ. Impact Assess. Rev. 26, 170–184, http://dx.doi.org/10.1016/j.eiar.2005.08.003.
Liou, M., Yu, Y.-H., 2004. Development and implementation of strategic environmental assessment in Taiwan. Environ. Impact Assess. Rev. 24, 337–350, http://dx.doi.org/10.1016/j.eiar.2003.10.018.
Mackee, J., Obbard, J.P., Briffett, C., 2001. Environmental assessment in Sri Lanka: its status and the potential for the introduction of strategic environmental assessment. J. Environ. Assess. Policy Manage. 3, 209–240.
Marzuki, A., 2009. A review on public participation in environmental impact assessment in Malaysia. Theor. Emp. Res. Urban Manage. 4, 126–136.
Memon, P.A., 2000. Devolution of environmental regulation: environmental impact assessment in Malaysia. Impact Assess. Proj. Apprais. 18, 283–293, http://dx.doi.org/10.3152/147154600781767295.
Mercado, E., 2007 September. A Discussion Paper for a Strategic Environmental Assessment (SEA) Policy in the Philippines. CIDA, Manila.
Ministry of Environment Indonesia, 2007. A brief overview on environmental impact assessment and strategic environmental assessment in Indonesia. In: Presentation by the State Ministry of Environment of the Republic Of Indonesia, ASEAN-China Workshop on EIA. SEA, Beijing, pp. 15–20.
Moi, T.K., 2007. An Overview of SEA in Malaysia. In: 'ASEAN-China Workshop on EIA, SEA, Beijing, October 2007.
Momtaz, S., 2002. Environmental impact assessment in Bangladesh: a critical review. Environ. Impact Assess. Rev. 22, 163–179.
Nadeem, O., Fischer, T.B., 2011. An evaluation framework for effective public participation in EIA in Pakistan. Environ. Impact Assess. Rev. 31, 36–47.
Nadeem, O., Hameed, R., 2008. Evaluation of environmental impact assessment system in Pakistan. Environ. Impact Assess. Rev. 28, 562–571.
Naureen, M., 2009. Development of environmental institutions and laws in Pakistan. Pak. J. Hist. Cult. 30 (1).
Ng, K.L., Obbard, J.P., 2005. Strategic environmental assessment in Hong Kong. Environ. Int. 31, 483–492, http://dx.doi.org/10.1016/j.envint.2004.09.023.
Ng, M.K., 1993. Strategic planning in Hong Kong: lessons from TDS (Territorial Development Strategy) and PADS (Port and Development Strategy). Town Plann. Rev. 64, 287.
Nishiuraa, S., Matsuyukia, M., Kishitaa, K.M.M., Satoha, E., 2008. Strategic environmental assessment for sustainable urban development in Thailand. Asian Environ. Res. (1) 17 2008.
Obbard, J.P., Lai, Y.C., Briffett, C., 2002. Environmental assessment in Vietnam: theory and practice. J. Environ. Assess. Policy Manage. 4, 267–295.
OECD, 2006. Applying Strategic Environmental Assessment. .
Paliwal, R., 2006. EIA practice in India and its evaluation using SWOT analysis. Environ. Impact Assess. Rev. 26, 492–510, http://dx.doi.org/10.1016/j.eiar.2006.01.004.
Partidário, M., 1996. Strategic environmental assessment: key issues emerging from recent practice. Environ. Impact Assess. Rev. 16, 31–55.
Partidário, M., Paddon, M., Eggenberger, M., Chau, D.M., Van Duyen, N., 2008. Linking strategic environmental assessment (SEA) and city development strategy in Vietnam. Impact Assess. Proj. Apprais. 26, 219–227.
Prasetio, E.A., Arifianti, Y., Hardjakaprabon, B., Agustin, F., 2012. Triple Helix in disaster management: case study of strategic environmental assessment (SEA) for Government Office Relocation Planning of Padang City, Indonesia. Proc. Soc.

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005

Behav. Sci. 52, 150–159, http://dx.doi.org/10.1016/j.sbspro.2012.09.451.
Purnama, D., 2003. Reform of the EIA process in Indonesia: improving the role of public involvement. Environ. Impact Assess. Rev. 23, 415–439.
Rachid, G., El Fadel, M., 2013. Comparative SWOT analysis of strategic environmental assessment systems in the Middle East and North Africa region. J. Environ. Manage. 125, 85–93, http://dx.doi.org/10.1016/j.jenvman.2013.03.053.
Rahman, M.M., Hassan, M.Q., Islam, M.S., Shamsad, S., 2000. Environmental impact assessment on water quality deterioration caused by the decreased Ganges outflow and saline water intrusion in South-Western Bangladesh. Environ. Geol. 40, 31–40.
Rajvanshi, A., 2001. Strategic environmental assessment of the India ecodevelopment project: experiences, prospects and lessons learnt. J. Environ. Assess. Policy Manage. 3, 373–393.
Rajvanshi, A., 2003. Promoting public participation for integrating sustainability issues in environmental decision-making: the Indian experience. J. Environ. Assess. Policy Manage. 5, 295–319.
Rajvanshi, A., 2005. Strengthening biodiversity conservation through community-oriented development projects: environmental review of the India ecodevelopment project. J. Environ. Assess. Policy Manage. 7, 299–325.
Ross, W.A., Morrison-Saunders, A., Marshall, R., Sanchez, L.E., Weston, J., Au, E., Morgan, R.K., Fuggle, R., Sadler, B., 2006. Round table: common sense in environmental impact assessment: it is not as common as it should be (with responses and a riposte). Impact Assess. Proj. Apprais. 24, 3–22.
Sachihiko, H., 2001. A new stage of EIA in Japan: towards strategic environmental assessment. Built Environ. 27, 8–15.
Sadler, B., Aschemann, R., Dusik, J., 2011. Handbook of Strategic Environmental Assessment. Routledge, London, UK.
Saeed, R., Sattar, A., Iqbal, Z., Imran, M., Nadeem, R., 2012. Environmental impact assessment (EIA): an overlooked instrument for sustainable development in Pakistan. Environ. Monit. Assess. 184, 1909–1919.
Samarakoon, M., Rowan, J.S., 2008. A critical review of environmental impact statements in Sri Lanka with particular reference to ecological impact assessment. Environ. Manage. 41, 441–460.
Sathananthan, S., 1992. Development of environmental policy – Sri Lanka. Environ. Policy Law 22, 182–188 (Lausanne).
Sekhar, N.U., 2005. Integrated coastal zone management in Vietnam: present potentials and future challenges. Ocean Coast. Manage. 48, 813–827.
Singh, M., Singh, N., 2011. Strategic Environment and Social Assessment (SESA) for National Dairy Support Project (NDSP). NDSP, Anand, Gujarat, India.
Singh, S., 2009. World Bank-directed development? Negotiating participation in the Nam Theun 2 hydropower project in Laos. Dev. Change 40, 487–507, http://dx.doi.org/10.1111/j.1467-7660.2009.01562.x.
Slootweg, R., Hoevenaars, J., Abdel Dayem, S., 2007. Drainframe as a tool for integrated strategic environmental assessment: lessons from practice. Irrigat. Drain. 56, S191–S203.
Smith, D.B., Van der Wansem, M., 1995. Strengthening EIA Capacity in Asia: Environmental Impact Assessment in The Philippines, Indonesia, and Sri Lanka. World Resources Institute, Washington, DC.
Song, Y.-I., Glasson, J., 2010. A new paradigm for Environmental Assessment (EA) in Korea. Environ. Impact Assess. Rev. 30, 90–99.
Song, Y.-I., Kim, H., 2007. Role and Implementation of SEA for Sustainable Society.
Spaling, H., Vroom, B., 2007. Environmental assessment after the 2004 tsunami: a case study, lessons and prospects. Impact Assess. Proj. Apprais. 25, 43–52.
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. Environ. Impact Assess. Rev. 27, 243–265.
Tetlow, M., Hanusch, M., 2012. Strategic environmental assessment: the state of the art. Impact Assess. Proj. Apprais. 30, 15–24, http://dx.doi.org/10.1080/14615517.2012.666400.
Thérivel, R., 1997. Strategic environmental assessment in Central Europe. Proj. Apprais. 12, 151–160.
Uesaka, K., Ohnishi, H., Tachibana, H., 2000. New environmental impact assessment method for road traffic noise in Japan, in: Internoise 2000. In: Proceedings Of The 29th International Congress On Noise Control Engineering, Held 27-31, Nice, France, August 2000.
United Nations, 2003. Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context. .
United Nations, 2012. Resource Manual to Support Application of the Protocol on Strategic Environmental Assessment.
Valappil, M., Devuyst, D., Hens, L., 1994. Evaluation of the environmental impact assessment procedure in India. Impact Assess. 12, 75–88.
Vidyaratne, H., 2006. EIA theories and practice: balancing conservation and development in Sri Lanka. J. Environ. Assess. Policy Manage. 8, 205–222.
Vientiane, L., 2011. Mayhem on the Mekong. .
Volkery, A., 2004. Republic of Korea Case Study. .
Vyas, V.S., Reddy, V.R., 1998. Assessment of environmental policies and policy implementation in India. Econ. Polit. Wkly. 48–54.
Wallington, T., Bina, O., Thissen, W., 2007. Theorising strategic environmental assessment: fresh perspectives and future challenges. Environ. Impact Assess. Rev. 27, 569–584, http://dx.doi.org/10.1016/j.eiar.2007.05.007.
Wang, H., Bai, H., Liu, J., Xu, H., 2012. Measurement indicators and an evaluation approach for assessing strategic environmental assessment effectiveness. Ecol. Indicat. 23, 413–420, http://dx.doi.org/10.1016/j.ecolind.2012.04.021.
White, L., Noble, B.F., 2013. Strategic environmental assessment for sustainability: a review of a decade of academic research. Environ. Impact Assess. Rev. 42, 60–66, http://dx.doi.org/10.1016/j.eiar.2012.10.003.
Wirutskulshai, U., Coowanitwong, N., 2008. Implementation of strategic environmental assessment in Thailand: to mitigate the problem or to repeat the same pitfalls. In: Proceedings: International Conference on Sustainable Urban Environmental Practices. p. 33.
Wirutskulshai, U., Sajor, E., Coowanitwong, N., 2011. Importance of context in adoption and progress in application of strategic environmental assessment: experience of Thailand. Environ. Impact Assess. Rev. 31, 352–359, http://dx.doi.org/10.1016/j.eiar.2011.01.001.
Wood, C., 2003. Environmental impact assessment in developing countries: an overview. In: Conference on New Directions in Impact Assessment for Development: Methods and Practice. pp. 24–25.
Zhu, D., Ru, J., 2008. Strategic environmental assessment in China: motivations, politics, and effectiveness. J. Environ. Manage. 88, 615–626, http://dx.doi.org/10.1016/j.jenvman.2007.03.040.
Zhu, T., Wu, J., Chang, I.-S., 2005. Requirements for strategic environmental assessment in China. J. Environ. Assess. Policy Manage. 7, 81–97.
Zubair, L., 2001. Challenges for environmental impact assessment in Sri Lanka. Environ. Impact Assess. Rev. 21, 469–478.

Please cite this article in press as: Victor, D., Agamuthu, P., Policy trends of strategic environmental assessment in Asia. Environ. Sci. Policy (2014), http://dx.doi.org/10.1016/j.envsci.2014.03.005