

# Economic Growth, Sustainable Development and Ecological Conservation in the Asian Developing Countries: The Way Forward

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**Abstract** The Asian developing region, defined here for the purpose of analysis to include China, Malaysia, Thailand, Indonesia, the Philippines and Vietnam, is one of the most economically vibrant regions in the world. Acknowledging that rapid economic growth has had damaging environmental consequences, leaders in the region have made concerted efforts to strengthen the protection of the regional environment which is home to some of the richest and most biologically diverse habitats in the world. Each country has set up its environmental ministry or equivalent agency and enacted numerous laws to ensure stronger effort in biodiversity conservation and environmental protection. Despite these environmental protection initiatives, however, environmental degradation in the region remains a serious problem. Existing legislative efforts to halt extensive deforestation in the region have been hampered by various unsustainable resource use practices. In an attempt to make headway in an urgent task to contain this critical problem, this paper seeks to develop more adequate perspectives and concepts for an analysis of the complex process, which has led to the present conundrum, and to offer a way out of it. More specifically, in addressing the issues at hand, the paper examines the role of environmental ethics in fostering stronger environmental controlling actions based on the philosophical insights of Aldo Leopold's land ethics and empirical evidence drawn from field research on the indigenous environmental worldviews conducted between 2007 and 2011 in Malaysia. It is concluded that in halting further environmental decline in the region, it is necessary for the regional leaders to mark a higher level of ethical engagement with the natural environment.

## 1 Introduction

Sustainable development is defined in the Brundtland Report or “Our Common Future” as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs” (WECD 1987). The

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Report which introduced a new growth model “that is forceful and at the same time socially and environmentally sustainable”, places great emphasis on the needs to manage and use natural resources wisely so as to uphold the principle of intergenerational equity. More particularly, it calls for the need to achieve economic progress and social justice in ways that will not deplete the earth’s finite resources.

Recognizing the growing importance of sustainable development, leaders in the Asian region, defined to include the world fastest developing country, China and the fast developing ASEAN economies, namely, Malaysia, Indonesia, Thailand, the Philippines and Vietnam (or the ASEAN-5), for the purpose of analysis, have expended much effort to sell to the public development policies that they believe would conform to the Brundtland’s concepts of sustainable development.<sup>1</sup> In addition, with the growing awareness of the potential threats of environmental impairment caused by economic growth, all the countries in the region have ratified the United Nations Convention on Biological Diversity (CBD), a globally binding legal document on biodiversity conservation, as a sign of commitment to ensure that the regional rich biological diversity is conserved and sustainably managed towards enhancing social, economic and environmental well-being. Each country has also set up its environmental ministry or equivalent agency and enacted numerous laws to strengthen biodiversity conservation efforts.

Despite these environmental initiatives, however, the overall environmental conditions in the region have in fact worsened. Casual observation of what happens on the ground seems to indicate that national and regional environmental efforts have been unable to reverse the rapid loss of environmental resources and biodiversity in the region. Indeed, signs are evident that the regional environment is increasingly exposed to extensive and irreversible physical transformations as a result unrestrained pursuit of economic growth or material progress. One of the most disturbing environmental features in the region is the rapid and abrupt disappearance of species. This gravest environmental worry is reflected by the increasing number of the regional biological species being put under the purview of the IUCN Red List of Threatened Species (Hilton-Taylor et al. 2009; Wilson 2000; Carpenter and Peter 2009).<sup>2</sup>

In an attempt to make headway in an urgent task of containing these higher-order of environmental tragedies across the Asian region, this study seeks to develop more adequate perspectives and concepts for an analysis of the complex process, which has led to the present conundrum, and to offer a way out of it. Methodologically, it examines the dynamic implications of the link between economic growth and ecological sustainability under the spectrum of “Our Common Future”. It further

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<sup>1</sup>ASEAN comprises of ten countries of Southeast Asia, which include Singapore (developed nation state), Indonesia, Vietnam, Malaysia, Thailand, Cambodia, Laos, Brunei, Burma (Myanmar) and the Philippines (developing nations).

<sup>2</sup>IUCN (International Union for Conservation of Nature and Natural Resources) Red List is the world’s most comprehensive information source on the global conservation status of biological species around the world. The IUCN

Categories of threat for the existing species include “near threatened”, “vulnerable”, and “critically endangered”. The other two categories are “extinct” and “extinct in the wild”

assesses the main driver behind the increasing incidence of the regional environmental paradox.

The assessment cogently demonstrates that the prevalence of the regional environmental issues partly lie in the lack of a philosophical basis for engagement with the natural environment when optimizing the economic use of nature. It is argued that the anthropocentric view of nature – the view which sees nature as serving human interests – still dominates the environmental regimes or society in the region to the extent that when environmental sustainability comes into conflict with economic growth or material progress, the former will be sidelined. To a large extent, environmental degradation in the region is human-induced; it is spurred by man’s deeply entrenched exploitative behavior.

In addressing the above unsustainable anthropocentric value system, the study examines how human environmental attitudes and values help to influence individual behaviour and government policy concerning resource management and conservation practices based on the philosophical insights of Aldo Leopold’s land ethics. The practical implications of Aldo Leopold’s ethical argument in ecological conservation will be further examined based on field investigation of the indigenous environmental worldviews conducted in the state of Sarawak in Malaysia between 2007 and 2011. It is concluded that the environmental decline in the Asian region can possibly be addressed by altering man’s actions founded on holistic environmental beliefs, ecological attitudes and values.

## 2 The State of Biodiversity in the Asian Region

It goes without saying that the Asian region as defined above is one of the most biologically rich and diverse environments in the world. Take the case of China, for instance, it is ranked third place behind Brazil and Colombia in terms of plant diversity (Lopez-Pujol et al. 2006, 2011). It has roughly 32,000 vascular plants, many of which are evolutionarily associated with ancient geological history. Also, more than half of these higher plants (17,300 species) are endemic (Huang et al. 2015; Ministry of Environmental Protection, China 2008). There are roughly 6347 species of vertebrates including 1244 species of birds and 3862 species of fish recorded in China. These account for about 14 % of the world’s total vertebrate species (Ministry of Environmental Protection, China 2008). China is also listed as one of the world’s 17 “megadiverse” countries.<sup>3</sup>

In the above connection, it may be revealed that the Three Gorges reservoir region located along the Yangtze River and with a total area of roughly 58,000 square kilometres (km<sup>2</sup>), is one of most biologically diverse regions in China. It is

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<sup>3</sup>Of the 170 countries in the world, a mere 17 countries which has less than 10 % of the global surface but lay claim to 70 % of the biological diversity on earth. The megadiversity concept was created to encourage and prioritize conservation efforts of biological resources around the world especially in these megadiverse countries (Conservational International 1998)

also one of the most fascinating ecological treasures in the world. It is home to over 6400 plant species (roughly 19 % of total number of species found in China) with 57 % of them categorized as endangered, 3400 insect species (8.5 % of China's total), more than 360 fish species, and more than 500 terrestrial vertebrate species (22 % of China's total) (Ministry of Agriculture, Beijing 1995; He and Xie 1995; Xie 2003; Wu et al. 2003; Tian et al. 2007; Zhang and Lou 2011). Twenty-seven percent of all the Chinese endangered freshwater fish are found in the Yangtze River which cut across by the Three Gorges dam, and of these roughly 177 species are classified as endemic (Yue and Chen 1998; Xie 2003; Fu et al. 2003; Zhang and Lou 2011).

Some of the most important and rare species found in the Three Gorges Dam area which are listed under the IUCN Red List as endangered are:

- (i) The Chinese sturgeon, the hugest form of legendary fish species which has been swimming in the Yangtze waters for the past 140 million years. It would swim 3000 kilometres (km) upstream during spawning season (Evans 2007). The Chinese sturgeon is considered as a national treasure in China, and is now listed as Class I State protected species under the Chinese law (Hu et al. 2009).
- (ii) The Chinese paddlefish or the "King of Yangtze", the world's longest freshwater fish. The species, which is placed under the China Species Red List, is protected under the Chinese state law.
- (iii) The Yangtze River dolphin or Baiji, the world's rarest freshwater dolphin which has been thriving in the Yangtze River for the past 20 to 30 million years (Wu et al. 2003). The Baiji is classified as the First Category of National Key Protected Wildlife Species in China.
- (iv) Other state protected or IUCN Red List species found in the Three Gorges dam area include the Yangtze finless porpoise, the Chinese tiger; the Chinese alligator; the Chinese giant salamander; the Siberian crane, and the giant panda.

The ASEAN-5 region is also one of the world's most biologically rich regions. Among the world's 17 megadiverse countries, three are located in the region, namely, Indonesia, Malaysia and the Philippines (Williams et al. 2001). Among these countries, Indonesia is the most diverse and biologically rich in the ASEAN region. It is also the third most biologically diverse country in the world. Occupying only 1.3 % of the earth's surface, it has 12 % of the world's mammal species (515 species with 36 % classified as endemic and first in the world in term of species richness). It ranks third for reptiles (with more than 600 species), fourth for birds (roughly 1519 species with 28 % classified as endemic) and fifth for amphibians (roughly 270 species) (UNEP 2010). There are 31,746 vascular plants recorded in Indonesia based on a taxonomic assessment conducted in 2007 (Hickey et al. 2004; Ministry of Environment, Indonesia 2005, 2009; Choy 2015). Also, new species continue to be discovered in the country on an annual basis (Yeager 2008). Indonesia is also a highly endemic region. The number of endemic fauna comprises 270 mammal species, 386 bird species, 328 reptile species, 204 amphibian species and 280 fish species (Ministry of Environment and Forestry of Indonesia 2014).

Malaysia ranks 14th out of the global-17 megabiodiverse list. Its rainforests contain roughly 306 species of mammals, 742 species of birds with high level of ende-

mism, 242 species of amphibians, 567 species of reptiles, and 15,000 vascular plants, more than 449 species of freshwater fish, and more than 150,000 species of invertebrates (Ministry of Natural Resources and Environment, Malaysia 2014) The country is also ranked fourth in the Asian list in term of biological richness for amphibian (218 species) (IUCN 2009).

It may be of interest to note that out of the 13 states in Malaysia, the states of Sarawak and Sabah located in Borneo Island have important concentrations of threatened and highly endemic species (Hilton-Taylor et al. 2009; WWF 2010a, b).<sup>4</sup> Respectively, these two states contribute roughly two and four million hectares (ha) of their rainforests to the formation of the “Heart of Borneo” (HoB). The HoB is a tri-national and transboundary protected area made up of more than 23 million ha of biological rich dense tropical rainforests. It is located at the borders of West Kalimantan in Indonesia (share of HoB’s contribution: roughly 16.8 million ha), the Malaysian states of Sarawak and Sabah, and Brunei (share of HoB’s contribution: roughly 340,000 ha) (WWF 2010a).<sup>5</sup> It is the world’s final tropical frontiers for scientific and biological research. Scientists have discovered more than 123 new species in this conservation zone for the past three years between 2007 and 2009 – an average of more than three new species per month (Thompson 2010). The rainforests in Sarawak alone are home to 185 animal species, 530 bird species, over 10,000 insect species, over 8000 plant species, more than 1000 species of orchid and with more new species continued to be discovered (Sarawak Forestry Corporation 2006). While in Sabah, its forests are home to roughly 6000 species of flowering plants, 2000 species of orchids, and 189 species of land mammals, out of which 42 are considered endemic to Borneo, 120 species of mammal, 300 species of bird, 72 species of reptile, 56 species of amphibian, and 37 species of fish (UNDP 2012; Sabah Forestry Department 2012).

The Philippines ranks 17th on the 17-global mega list. There are roughly 530 species of birds (some 185 species are endemic), at least 165 species of mammals (over 100 are endemic), about 235 species of reptiles (roughly 160 are endemic), nearly 90 species of amphibians (about 76 are endemic), and more than 9250 vascular plant species (about one-third is endemic), found in the country (Conservational International 2013). It also has among the highest rates of biological discovery in the world. For example, in the last 10 years, 36 new species of plants and animals have been discovered (Hance 2012a; see also, ACB 2010; Conservational International 2013). These include, for example, the Camiguin hawk owl, Cordillera shrew mouse, Zambales forest mouse, Sierra Madre mouse, and Southern Leyte frog (DENR-BMB 2014).

Although Thailand is not listed as one of the global-17 megadiverse countries, it is considered as one of the most biologically rich regions in the world. According to

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<sup>4</sup>Malaysia consists of 13 states with 11 states located in Peninsular or West Malaysia and 2 states, namely, Sarawak and Sabah located in East Malaysia, on the island of Borneo

<sup>5</sup>Currently, the Indonesian share of HoB’s contribution is 12.6 million hectares while the proposed share is about 16.8 million. For Brunei, its share is roughly 576,000 ha (WWF 2010a). The 23.4 million hectares as stated above covered the proposed figure of Indonesia

the order of the World Conservation Monitoring Centre, Thailand is ranked 16th in term of biodiversity richness (Ministry of Natural Resources and Environment, Thailand 2014). Being connected to the Himalayan mountain range, Southern China, Peninsular Malaysia, Myanmar, Laos and Cambodia, the Thai forests provide excellent natural habitats for rich and diverse sources of biodiversity from three floristic elements, namely, Indo-Burmese, Indo-Chinese and Malaysia's elements. There are 4722 species of vertebrates comprising 336 species of mammals, 1010 species of birds, 394 species of reptiles, 157 species of amphibians, and 2825 species of fish found in Thailand. Of these, 555 species of vertebrates are classified as threatened. These include 118 species of mammals, 118 species of birds, 49 species of reptiles, 18 species of amphibians, and 202 species of fish (Ministry of Natural Resources and Environment, Thailand 2014; see also, Ministry of Natural Resources and Environment, Thailand 2009; ONEP 2009; Baimai 2010). Thailand also has about five percent (10,250 species) of all the vascular plants and gymnosperms in the world (Ministry of Natural Resources and Environment, Thailand 2014).

Vietnam is also considered as one of the world's most biologically diverse regions with very high rates of terrestrial endemism (Carew-Reid et al. 2010). There are roughly 310 species of mammals, 260 species of reptiles, 262 species of amphibian, 840 species of birds and 13,766 floral species found in the country (Ministry of Resource and Environment, Vietnam 2008; see also, Carew-Reid et al. 2010). Vietnam's global biodiversity significance was highlighted by the recent discovery of four large mammal species, namely, Saola (*Pseudoryx nghetinhensis*), Large-antlered Muntjac (*Megamuntiacus vuquangensis*), Annamite Muntjac (*Muntiacus truongsongensis*), and Khting Vor (*Pseudonovibos spiralis*), two new species of snake in the Annamite range of Truong Son and the central highlands (Warne and Phong 2002; Carew-Reid et al. 2010).

It is thus increasingly clear that the ecosystems in the Asian developing region are some of the earth's most distinctive biological treasures. Their exceptionally rich endowment of unique and highly endemic biota also makes it one of the most important priority conservation ecoregions in the world. Acknowledging that the rapid economic growth in the region has had damaging environmental consequences on these ecological treasures, regional leaders have established various institutional and legal frameworks to promote sustainable natural resource use and environmental protection. Despite these environmental protection initiatives, however, paradoxically, the overall regional environmental situations are becoming worse. In what follows is an attempt to examine this environmental paradox, and to suggest ways to mitigate the problems at hand.

### 3 The State of Economic Growth

Before entering into the core of the analysis, it is appropriate to provide a brief discussion on the economic growth trends in the Asian developing region as defined above. This enables us to see clearly the connection between economic growth and

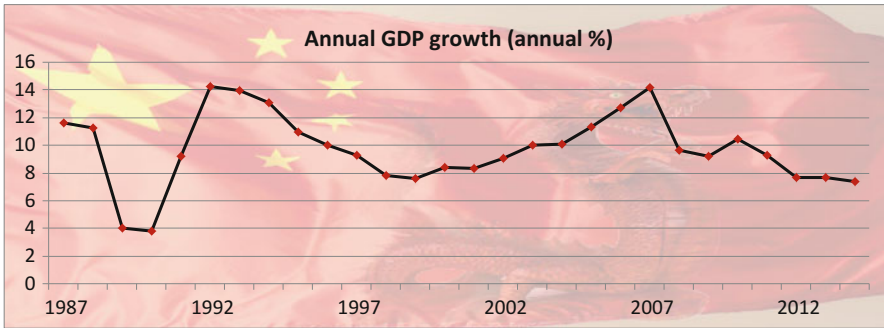
environmental sustainability in the region. Environmental sustainability may be loosely defined as the balance in sustaining the ecological health of the ecosystem while optimizing the instrumental use of nature to promote economic growth or satisfying human wants. It involves making responsible decisions and taking action to preserve the quality and capability of environment to support human life on a long-term basis. Environmental sustainability may be distinguished from ecological sustainability which is defined as the capacity of ecosystems to maintain and sustain their essential functions and processes, and biodiversity over time (see Holling's concept of resilience as discussed below). Also, it may be of passing interest to note the distinction between an environment and an ecosystem. While an environment refers to the sum total of surrounding things such as physical features or biological components, conditions and influences such as rainfall, temperature and thunderstorm, an ecosystem refers to an ecological unit in a specific area. The Heart of Borneo ecosystem as noted above is an example. As these terms are closely related, depending on circumstances of the case, they may be used interchangeably for analytical convenience.

To begin with, for decades, the Asian developing economies have joined the race to compete with one another to gain a competitive edge in the global economy. This dominant force of capitalist competition has changed the Asian economic order dramatically. Under the new economic order, the Asian economic dynamism continued to shape the global economic landscapes based on a new strategic economic impulse—the promotion of sustainable economic growth within the Brundtland's spectrum of sustainability.<sup>6</sup> The consensus among the Asian leaders is that the Brundtland model of sustainable development contributes to achieving not only economic growth and prosperity but also, environmental or ecological sustainability and intergenerational distributive justice. We shall have occasion here to examine whether the Asian model of sustainable growth conforms to the Brundtland's traits of sustainability.

To put issues into perspective, within one generation, the Asian region has been transformed into one of the most economically vibrant entities in the world today, having persistently achieved and sustained high economic growth for the past few decades based on the prescription of neoliberal economic policies (Choy 2014a). The priorities of neoliberal policies are to expand market forces, facilitate deregula-

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<sup>6</sup>The term economic growth refers to the amount of goods and services produced in an economy. It may be expressed in term of an increase in GDP (gross domestic product), that is, quantitative growth. As distinct from economic growth, economic development is a wider concept. It is not only concerned with quantitative growth but also, qualitative expansion of an economy as a whole, that is, qualitative growth. Some of the important features associated with qualitative growth are: (i) modern economic transition from an agriculture or primary-product based economy to a manufacturing or industrial-based economy especially technologically advanced economy and, (ii) social improvement in the quality of life or standard of living of citizens. Sustainable development, as defined above may slightly be distinguished from economic development in term of the environmental emphasis it places on development process. That is, it is fundamentally concerned with prudent use of natural resources when promoting development so that future generations will not be worse off than the present generation



**Fig. 1** Average GDP growth of China from 1987 to 2014 (Source: Countries and Economies, 2015, The World Bank, <http://data.worldbank.org/country?display=default>; World Economic Outlook, 2015, IMF 2015)

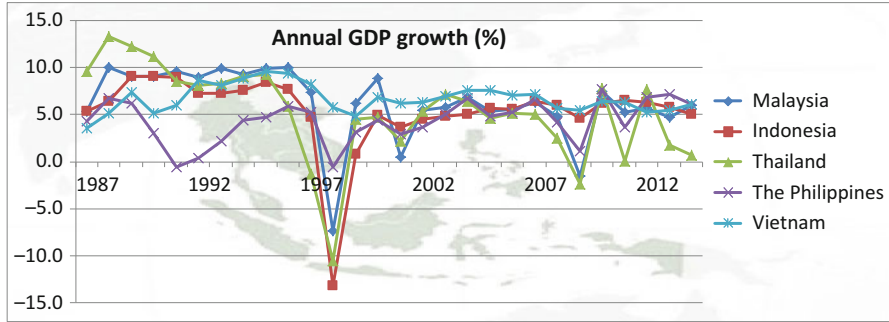
tions, promote free trade; privatization and global competitiveness, enhance mass production and consumption, attract foreign direct investment and maximize consumption (see, for example, FAO 2006; Chow 2012). The policies also place great emphasis on industrial expansion and the promotion of export-oriented growth (Haque 1999).

The rigor of the Asian economic dynamism is well illustrated by the rapid capitalist transformation in China since the adoption of its market reforms in 1978 under the leadership of Deng Xiaoping. Before the reform period, China's per capita GDP (gross domestic product) was lower than that of Malaysia, Indonesia and Thailand. In fact, China was one of the poorest countries in the world, with a GDP per capita of only US\$165 (constant US\$ 2000) (UNICEF 2014). However, since the commencement of market reforms, China has been achieving a remarkable GDP growth—far higher than the ASEAN-5 region. Over the past 28 years between 1987 and 2014, it has achieved an annual GDP growth of 9.7 % – three times the global average (Fig. 1).

Within a decade, China has been able to transform itself into a modern industrial state that many developing countries needed 100 years to achieve. It is also noteworthy that China has successfully achieved a 9.2 % GDP growth during the full-blown global recession in the year 2009. It is also the first of the major economies in the world, which was able to withstand the effects global recession (Zissis and Bajoria 2008; Xia and Wang 2012; Kong et al. 2012). China has also surpassed Japan as the world's second largest economy after the United States in 2010 — a clear indication of its influence in changing the balance of power in the global economic order (Xia and Wang 2012; Yuan and Yu 2012).<sup>7</sup> Although China's GDP growth has slowed down to an average of 7.5 % between 2012 and 2014, it still remains a crucially influential world economic player.

<sup>7</sup> China's GDP in 2010 in figure was USD 5,878,629 while Japan's GDP was at USD 5,497,813 (World Bank 2011). The figures were increased to USD 8,227,103 for the former and USD 5,959,719 for the latter in 2011 (World Bank 2013a).





**Fig. 2** Average GDP growth of ASEAN-5 from 1987 to 2014 (Source: Countries and Economies, 2015, The World Bank, <http://data.worldbank.org/country?display=default>; World Economic Outlook, 2015, IMF 2015)

If the ecological aspects of China’s growth performances are to be appreciated fully, some discussions on the economic contribution of the Three Gorges dam project are warranted. In brief, the Three Gorges dam, which cuts across the Yangtze River (6300 km), is the largest in the world with a massive reservoir area measuring up to 58,000 km (Zhang and Lou 2011). It is also one of the most important economic pillars underpinning China’s robust industrial development and socioeconomic progress. Indeed, the Three Gorges project has been crucial in sustaining the momentum of growth in China for the past few decades. Apart from generating electricity to power China’s economic growth, the project has also led to the development of advanced inland shipping industry and heavy industrial development in the Yangtze economic zone.

To illustrate, shipping load along the Three Gorges waterway accounts for 80 % of the total shipping capacity of China’s inland rivers. It was estimated that from 2003 to 2010, the amount of cargo load passed through the Three Gorges-Yangtze waterways exceeded 44 million tons, contributing to sustain robust growth of the Chinese economy (Yang 2011). For instance, the rapid industrialized provinces, namely, Jiangsu, Hube, Shanghai, Anhui, Hunan, Sichuan, Chongqing, Zhejiang, and Chongqing located around the Three Gorges region, contributed 41 % (US\$ 3 trillion) to the overall Chinese GDP growth in 2011. The figure increased slightly to 42 % (US\$ 3.55 trillion) in 2012 (Asia Times 2006; Zhang and Lou 2011; Gu 2012; Yao 2013).<sup>8</sup>

The ASEAN-5 economies have also attained an impressive record at an annual average of 5.5 % GDP growth in the same period (Fig. 2). Economic growth in the latter 1980s and early 1990s was so spectacular that it prompted the World Bank to label the region as an economic miracle (Intal et al. 2012). The promotion of export-led industries especially high value-added industries, which are associated with output

<sup>8</sup>Geographically, the Three Gorges region is located at the lower section on the upper reaches of the Yangtze River (6300 km) with a total area of 56,700 km<sup>2</sup>

expansion and increased export and trading activities, has been the main driver for the impressive economic performances in the region (ASEAN 2007, 2008, 2012, 2014).

Malaysia, Thailand and Indonesia, termed as high performing developing economies (HPAEs), were together considered an important epicenter of growth in the Asian Pacific region. Take the case of Malaysia, for instance, it has attained a remarkable growth performance in the late 1980s and through the 1990s with an average annual growth rate of over eight percent based on a neoliberal shift from its primary product or agricultural-based economy to a manufacturing-based and export-oriented economy (Tik 2009). The manufacturing sector is an important economic pillar of the Malaysian economy, accounting for 25 % of GDP and more than 60 % of the country's total exports (Taborda 2013a; McGregor 2008; Lim 2009). The oil palm industry is also an important economic activity in Malaysia. Currently, Malaysia is the second largest producer of palm oil in the world (MPOB 2011). In view of its remarkable economic success, the World Bank has classified Malaysia as an upper-middle-income economy.

In the 1980s, Thailand embarked on a neoliberal shift of development paradigm from an agrarian and resource-based economy to a manufacturing and export-oriented economy. During the early 1990s, the export-based manufacturing industries in the country had been playing an important role in sustaining its double-digit annual growth (Islam and Chowdhury 1997). In the late 1980s, it was able to edge over the rest of the Southeast Asian developing countries to become one of the fastest growing economies in the world (Muscat 1994; Taborda 2013b). Rubber cultivation remains an important commercial agricultural activity in the Thai economy while coffee plantation, tea and cacao commercial cropping are increasingly becoming important (Ministry of Resources and Environment, Thailand 2006). Thailand is ranked as an upper-middle-income economy by the World Bank. Although the political instability between November 2013 and May 2014, which culminating in a military takeover of the government in May, has drastically slowed its economic growth to 0.7 % in 2014, GDP growth is projected to improve to 3.6 % in 2015 and 4.1 % in 2016 due to a relatively calm political environment and increased public fixed investment (ADP 2015).

Compared to Malaysia and Thailand, Indonesia's economy is less export-oriented. Since the Suharto's dictatorial regime, its economic policy has always been a mix of state intervention and free-market forces (Wijaya 2009). However, despite its half-hearted shift towards more market-intensive policies, the neoliberal force of structural transformation seems to have delivered strong exports and FDI performance in the Indonesian economy between 2007 and 2008 (Prasetyo 2009). Currently, Indonesia is the largest economy in ASEAN and the 17th largest in the world. Industry is the most important growth engine in the Indonesian economy, making up roughly 46.5 % of total GDP (Taborda 2013c). Indonesia continued to post significant economic growth with its GDP expanding to six percent in the first quarter of 2013 although growth in the year was expected to slow down due to decreasing private consumption and physical investment, and a contraction in mining services (Taborda 2013c). Similar to Malaysia, the palm oil industry is one of the most important economic pillars of the Indonesian economy (Budidarsono et al.

2013). In fact, the country is the largest exporter of palm oil in the world (MPOB 2011). Although GDP growth slowed to five percent in 2014, political transition to the new government led by President Joko Widodo in Indonesia in October 2014 is expected to improve investment climate and spur greater economic growth. It is projected that GDP growth will increase to 5.5 % in 2015 and six percent in 2016, respectively (ADP 2015).

Although the Philippines is classified as a lower-middle income economy by the World Bank, it has been achieving an annual GDP growth at five percent since 2002, significantly higher than the previous two decades. Also, amid global uncertainties, it was able to achieve 6.8 % GDP growth in 2012 (Fig. 2). In the first quarter of 2013, driven mainly by robust domestic consumption and government spending, its economy further expanded to 7.8 %, up from 7.1 % in the previous quarter, making it the fastest growing economy in Asia (Taborda 2013d). Robust private consumption, investment, and exports continued to drive Philippines' strong GDP growth to 6.1 % in 2014. GDP growth is projected to increase to 6.4 % in 2015 and 6.3 % in 2016, respectively (ADP 2015). It may be of passing interest to note that the Philippines' economy is one of the most consumer-driven economies in the Asian region, with its domestic consumption contributing to the largest expenditure component of GDP (Colombo 2013). Private consumption grew by 5.6 % in 2013 and contributed more than half of the increase in GDP (ADP 2014). The Philippines' economy continues to depend on remittances from its overseas workers, which account for about 10 % of GDP growth (Lester and Yap 2013). Indeed, remittances are the force behind powerful consumption growth as well as real estate expansions in the country (Banyan 2010).

Interestingly, among the ASEAN-5 economies, the economic performance of Vietnam is the most impressive. It has been achieving an annual average GDP growth of 6.6 % for more than a decade since it implemented the new open door policy called *Doi Moi* (Renovation) in 1986 (Fig. 2). Its persistent high rate of economic growth has made it one of the fastest growing economies in the world (Intal et al. 2012). Roughly 73 % of the wealth creation in Vietnam derives from the economic use of natural capital including cropland, pasture, timber and minerals. Approximately 55 % of the wealth comes from the agricultural sector. Some of the major agricultural activities include the production of rice, black pepper, coffee, tea and rubber (World Bank 2008; Trading Economics 2014). Rising foreign direct investment helped to sustain a strong economic growth of six percent in 2014. GDP growth is projected to increase to 6.1 % and 6.2 % in 2015 and 2016, respectively. Compared to 2013, industry in Vietnam had increased by 7.1 % in 2014 (ADP 2015). Recently, manufacturing, information technology and high-tech industries are becoming increasingly important in the Vietnamese economy (Trading Economics 2014).

In summary, as shown in Table 1, the economic growth of China and ASEAN-5 over the past few decades at an annual average of 9.7 % and 5.5 %, respectively, have been extraordinary compared to the advanced OECD countries or the upper-middle income Latin American, Caribbean or African economies. The high economic performances have also led to a dramatic change in socio-economic structure by creating new middle class or affluent industrialized societies in the region (Kahn 1996; Robison 1996; Hewison 1996; Hill 1999).

**Table 1** Economic growth of the Asian developing economies: a comparative view

	Country	Annual average GDP growth between 1987 and 2014
East Asian fast developing economy (world's fastest growing economy)	<b>China</b>	<b>9.7%</b>
ASEAN-5 (Southeast Asian fast developing economies)	<b>Vietnam</b>	<b>6.6%</b>
	Malaysia	6.2%
	Thailand	5.2%
	Indonesia	5.4%
	The Philippines	4.3%
	<b>ASEAN-5 average</b>	<b>5.5%</b>
OECD (selected countries)	Japan	1.6%
	Korea	5.8%
	U.S.A	2.6%
	UK	2.2%
	France	1.8%
	Australia	3.2%
	<b>OECD average</b>	<b>2.9%</b>
Upper middle-income Latin American and Caribbean region (selected countries)	Argentina	3.2%
	Brazil	2.5%
	Mexico	2.8%
	Peru	2.5%
	Venezuela	2.5%
	Ecuador	3.3%
	<b>Latin American/Caribbean average</b>	<b>2.8%</b>
Upper middle-income South Africa (largest economy in Africa)	<b>South African average</b>	<b>2.5%</b>

In the next section, the discussion will consider the interface between economic growth and environmental sustainability.

## 4 Economic Growth and Environmental Sustainability: The Asian Way

Acknowledging the threat of environmental degradation caused by rapid economic growth and increasing material consumption, the Asian leaders have reaffirmed their commitment to achieving the sustainability goals of “Our Common Future” by putting greater weight to integrate environmental concerns into development discourse

**Table 2** Environmental protection laws in the Asian countries

World's fastest growing developing economies		ASEAN-5 (fast developing economies in Southeast Asia)			
China	Malaysia	Thailand	Indonesia	The Philippines	Vietnam
Environmental Protection Law (1979, amended in 1989)	National Policy on Biological Diversity (1998)	The Forest Act (1941, amended in 1948, 1982 and 1989)	Environmental Management Act (1997, revised 1982, 1990)	Executive Order 578 (2006): a decree which seeks to "protect, conserve, and sustainably use biological diversity to ensure and secure the wellbeing of the present and future generations of Filipinos"	Forest Protection and Development Law (1991, amended 2004)
Wildlife Protection Law (1988)	National Forestry Policy (1978, revised 1993)	Wildlife Reservations and Protection Act (1960, amended in 1992)	Forestry Law (1999)	Presidential Decree 1151 or The Philippine Environmental Policy (1977): a decree which seeks to promote a harmonious relationship with nature, sustainable resource use and the principle of intergenerational equity	Land Use Law (1993, amended 1998, 2003)

(continued)

**Table 2** (continued)

	ASEAN-5 (fast developing economies in Southeast Asia)				
	Malaysia	Thailand	Indonesia	The Philippines	Vietnam
World's fastest growing developing economies					
China					
Fisheries Law 1986 (amended in 2000 and 2004)	Environmental Protection Enactment, Sabah (2002, amended 2004)	National Park Act (1961)	Conservation Law (1990)	Presidential Decree 1152 of the Philippine Environment Code (1977) (mandates the Department of Environment and Natural Resources to establish a system of national resource exploitation and wildlife conservation)	Environmental Protection law (1993, amended 2005)
Water Pollution Prevention Law (1984, revised 1996)	Sabah Forestry Policy (2005)	National Forest Reserve Act (1964)	Environmental Protection Law (2009)	Presidential Decree 705 or the Revised Forestry Code of the Philippines (1975) (primary legal instrument guiding the use and management of forest resources and biodiversity conservation)	Law on Fisheries (2003)

Solid Waste Pollution Prevention Law (1995)	Natural Resources and Environment Ordinance, Sarawak (1993, amended 1997, 2001)	Reforestation Act (1992)	Cultivation Law (1992)	Republic Act 7586 or the National Integrated Protected Area System Act, 1992	Ordinance on Plant Varieties (2004)
Protection of Terrestrial Wildlife Law (1992)	Wild Life Protection Ordinance, Sarawak (1998)	Tambol Council and Tambol Administration Organization Act (1994) (aims to strengthen the role of local government in sustainable natural resource use and management)	Plantation Law (2004)	Sustainable Forest Management Act (2005, 2009)	Biodiversity Law (2008)
Regulation on the Protection of Aquatic Wild Animals (1993)	National Parks and Nature Reserves Ordinance, Sarawak (1998)	Thailand Constitution (2007) (seeks to promote systematic management and use of natural resources for the benefit of the public)	Ministry of Agriculture Regulation (2007)	Republic Act 9147 or the Wildlife Resources Conservation and Protection Act (2001)	Decree 32 on the Management of Endangered, Precious, and Rare Species of Wild Plants and Animals (2006)

in order to protect the regional environment and natural resources. At the same time, regional leaders have also put in place comprehensive environmental institutions and legal systems to strengthen efforts for natural resource management, genetic resource conservation, and environmental protection (Table 2).

To elaborate, in the case of China, for example, apart from the enactment of various environmental laws as shown in Table 2, it had also set up the State Environmental Protection Commission in 1984. In 1998, it was elevated to the status of State Environmental Protection Administration and finally became the Ministry of Environmental Protection (MEP) in 2008. Its main function is to formulate environmental protection guidelines, policies and laws in order to ensure sustainable development. It goes without saying that environmental protection was among the most heavily legislated sectors of public policy in China during the post-Mao period (Ross and Silk 1987).

In the post-Mao era, the Brundtland Report also provided a remarkable conceptual framework and impetus for shaping policies based on the integration of environmental concerns into development policy. In the wake of the Earth Summit held in 1992, China ratified the United Nations CBD. This was followed by the formulation and adoption of the National Biodiversity Action Plan in 1994 which was aimed at halting the loss of biodiversity by 2020. In the same year, it also adopted its local Agenda 21, also known as the White Paper on China's population, environment, and development in the twenty-first century. China's Agenda 21 sought to reinforce its commitment to environmental preservation and sustainable resource use while pursuing economic growth and social development. Indeed, China was one of the first few countries in Asia to propose and implement sustainable development strategies, and to publish its first, second and third national sustainable development reports in 1997, 2002 and 2012, respectively (NDRC 2012). Under the umbrella of the Scientific Outlook on Development (SOD), China formulated and implemented the 11th Five-Year Plan (2006–2010) and the 12th Five-Year Plan (2011–2015) to promote sustainable development (Hu 2014).

In the ASEAN-5 region, in the wake of *Our Common Future*, the regional leaders also ratified various international agreements as a sign of commitment to sustainable development. At the national level, in an attempt to ensure stronger effort in biodiversity conservation and environmental protection in line with the United Nations CBD, each country has strengthened its environmental controlling framework based on the establishment of formal institutions such as the Ministry of Natural Resources and the Environment in Malaysia, in Thailand and in Vietnam; the Department of Environment and Natural Resources in the Philippines; and the Directorate General of Forest Protection and Nature Conservation in Indonesia. To demonstrate further commitment to promoting sustainable development, each country has also created its local Agenda 21 in order to execute full integration of sustainable development principles and environmental concerns of Agenda 21. Environmental protection is also being reinforced based on the enactment of a wide range of environmental laws as shown in Table 2.



**Table 3** ASEAN environmental protection declarations and accords

1	Manila Declaration on the ASEAN Environment (1981)
2	ASEAN Declaration on Heritage Parks and Reserves (1984)
3	Bangkok Declaration on the ASEAN Environment (1984)
4	ASEAN Agreement on the Conservation of Nature and Natural Resources (1985)
5	Jakarta Resolution on Sustainable Development (1987)
6	Manila Declaration of 1987
7	Kuala Lumpur Accord on the Environment and Development (1990)
8	Singapore Resolution on Environment and Development (1992)
9	Bandar Seri Begawan Resolution on Environment and Development (1994)
10	ASEAN Vision 2020 (1997)
11	Jakarta Declaration on Environment and Development (1997)
12	Kota Kinabalu Resolution on the Environment (2000)
13	Yangon Resolution on Sustainable Development (2003)
14	Cebu Resolution on Sustainable Development (2006)
15	ASEAN Declaration on Environmental Sustainability (2007)
16	ASEAN Charter (2008)
17	Cha-am Hua Hin Declaration on the Roadmap for an ASEAN Community 2009–2015 (2009)
18	ASEAN Socio-Cultural Community (ASCC) Blueprint 2009–2015 (2009)
19	Joint Declaration on the Attainment of the Millennium Development Goals in ASEAN 2009
20	Statement by the ASEAN Environmental Ministers for the eleventh meeting of the conference of the parties to the Convention on Biological Biodiversity 2012
21	New Delhi ASEAN -India Ministerial Statement on Biodiversity (2012)

At the regional level, each ASEAN-5 member country has endorsed a series of environmental agreements and declarations in order to strengthen regional cooperation for the conservation and sustainable use of biodiversity (ASEAN 1997, Table 3). The most important document adopted by the regional leaders is the ASEAN Agreement on the Conservation of Nature and Natural Resources (1985), a legally binding agreement which serves to guide effective implementation of regional action plans or programmes for the promotion of green economy by balancing the three pillars of sustainable development, namely, the economic, social and environmental dimensions. The ASEAN Agreement provides some of the most holistic guidelines for the design of environmental protection and sustainable resource management framework to ensure that the regional rich biological diversity is conserved and sustainably managed in line with the Brundtland concept of sustainability and the United Nations CBD (Choy 2015). It is worth noting that Article 1 of the ASEAN Agreement explicitly requires each member country to undertake and adopt measures in accordance with its national laws to ensure sustainable use of natural resources.

Based on the ASEAN regional environmental protection framework, various environmental protection programmes have been initiated and implemented. These

include the ASEAN Heritage Parks Programme, ASEAN-Wildlife Enforcement Network and the tri-country Heart of Borneo Initiative (HoBI), which involves Indonesia, Malaysia and Brunei. The HoBI concerns the protection of about 23 million hectares of ecologically connected and biologically diverse forest straddling Indonesia (Kalimantan), Malaysia (Sarawak and Sabah) and Brunei (Choy 2015).

## **5 Environmental Protection Initiatives and Ecological Sustainability: The Reality**

### **5.1 *The Chinese State of Environment***

Despite the above far-reaching environmental protection initiatives, however, mere casual observation of what has been happening on the ground reveals that rapid economic growth accompanied by increased resource consumption in the region has caused a steady and alarming deterioration of its environment. In China, for instance, up to 70 % of its rivers and lakes are seriously polluted, and ecological degradation is widespread (Morton 2006; WWF 2012). It may well be noted that of the world's 20 most polluted rivers, 16 are in China (McBeath and Leng 2006). The dumping of untreated waste water and animal wastes into the rivers by industries is widespread (Turner and Ellis 2007). For example, petrol chemical plants and factories located by the bank of the Yangtze River release large amounts of industrial wastes including toxic materials, heavy metals (cadmium, mercury, lead, and arsenic), chemical effluents and organic matters, into the river every year. The amount of discharge increased at an alarming rate from 15 billion tons in the 1980s to 33.9 billion tons in 2010, causing unprecedented destructive impacts on the Yangtze aquatic ecosystem (WWF 2007; Wong et al. 2007; Ting 2011; Mo 2011). Not surprisingly, the Yangtze River is now one of the most polluted and endangered rivers in the world (WWF 2007).

Also, it is estimated that 5850 tons of organic pollutants are released into Chinese waters everyday compared to 2750 tons in the United States, 1700 tons in Japan, 1150 tons in Germany, 1600 tons in India, and 300 tons in South Africa (Refkin and Cray 2013). The construction of the Three Gorges dam in the Yangtze River system also resulted in massive loss of natural habitats, exerting immense pressure on the regional biodiversity and threatening the long-term survival of the Siberian crane, Chinese tiger, giant panda and red panda (WWF 2004). All these species are classified as endangered either by the IUCN, U.S. Fish and Wildlife Service or the World Wildlife Fund. They are also totally protected by the Chinese national laws such as the Environmental Protection Law or the Wildlife Protection Act as noted above. It may also be noted that the "living fossil", the ancient *Cathaya argyrophylla* trees and dawn redwood trees which date back to millions of year have been irreversibly extirpated due to uncontrolled human economic activities. The continued existence

of 47 plant species which are unique to the Three Gorges region are also being threatened due to extensive habitat fragmentation (Lopez-Pujol et al. 2006).

Other adverse ecological impact of the Three Gorges architectural monument is the blockage of the migratory paths of certain fish species to their spawning grounds in the upriver (Gao et al. 2009a; Gleick 2009). For example, taking 2002 as a pre-dam baseline, from 2003 to 2005, the commercial harvests of four important commercial species of carp, namely, grass carp (*Ctenopharyngodon idella*), silver carp (*Hypophthalmichthys molitrix*), black carp (*Mylopharyngodon piceus*) and bighead carp (*Aristichthys nobilis*), were found to be 50–70 % below the pre-dam levels due to the disturbances of their migratory routes during spawning seasons (Xie et al. 2007; Zhang et al. 2012). In addition, since 1998, only three to ten adults have been found below the dam annually (Berra 2007).

A myriad of factors caused by unsustainable human activities such as increased shipping traffic, blockage of fish's migratory routes, uncontrolled river pollution and extensive habitat degradation coupled with illegal and unsustainable bycatch by fishermen by rolling hook long-line fishing, gill nets, electrocution and dynamite or other banned destructive fishing methods have resulted in the extinction of the world's most critically endangered and rare cetacean, the Yangtze River dolphin (Baiji or goddess of the Yangtze) (Ding et al. 2006; Turvey et al. 2007). The evolutionarily distinct Baiji had been thriving in the Yangtze River for the past 20–30 million years. In the past, the relic species was commonly hunted in the local fisheries for meat, oil and leather. Its population dropped drastically from a healthy number of 6000 in the 1950s to only 1 individual in 2004. It was declared extinct in 2006; making it the first dolphin that mankind directly drove to extinction. This happened despite having in place various ecological protection programs and legal instruments to protect its continued survival.

The continued deterioration of the Yangtze ecosystem is also evidenced in the decline or extinction of many notable aquatic species that used to thrive in the river. The endemic Chinese paddlefish which dates back to 70 million years ago, for instance, may have become extinct in 2003 as none have been sighted in the wild since then (Bourton 2009; Gao et al. 2009b). In addition, with the population declined drastically from 2000 in 2006 to about 1000 in 2012, the state protected Yangtze finless porpoises are also increasingly facing the threat of ecological extinction as a result of various unsustainable human economic activities (Lovgren 2007; Wang et al. 2010; Qiu 2012; Hance 2012b, 2013a).

Illegal wildlife trade in China also contributes to endangering the continued survival of many of its rare and endangered species. China is a top consumer country for illegal wildlife products and one of the world's hotspots for illegal trade in wildlife and wildlife parts (Felbab-Brown 2011). Furthermore, compared to the average global rate of biological loss of 10 %, the rate of biodiversity loss in China is about 15–20 % (McBeath and Leng 2006). The China Red List indicates that 40 % of mammals, seven percent of birds, 28 % of reptiles, 40 % of amphibians and three percent of fish are vulnerable to ecological extirpation (McBeath et al. 2014).

In summary, the disappearance of Baiji in the wild is a stark indication of how unrestrained pursuit of economic growth and socioeconomic progress is changing

irreparably the country's natural environment. It also symbolizes the loss of harmony of human beings with nature. This is excruciatingly clear particularly since the Baiji had long been recognized as the rarest and most critically threatened mammal species on earth, and despite China having expressed serious commitment to its ecological conservation by legally categorizing it as the First Category of National Key Protected Wildlife Species.

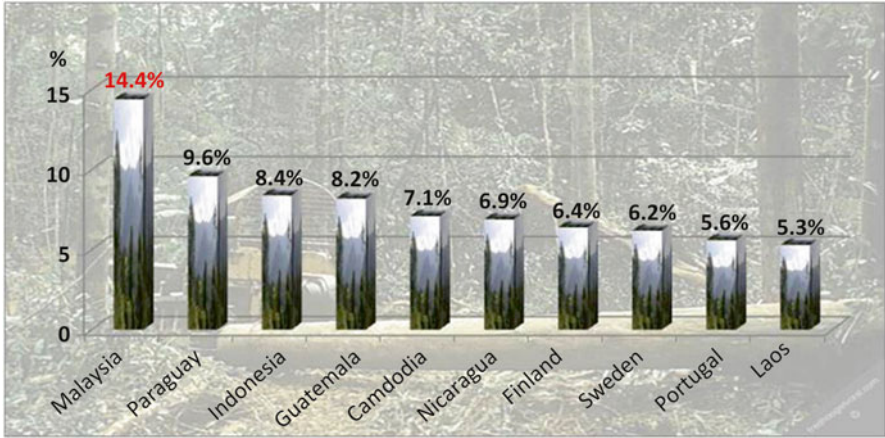
## **5.2 *The ASEAN-5's State of Environment***

Similarly, in ASEAN-5, despite having in place comprehensive environmental protection institutions and legal frameworks, and the adoption of various regional declarations and conventions to safeguard the ecological integrity of the environment and to promote sustainable resource use, environmental degradation remains a serious problem confronting the region today. Existing legislative efforts and regional cooperation to halt extensive deforestation in the region have been hampered by uncontrolled and illegal logging activities, large-scale monoculture expansion and dam construction, among others.

### **5.2.1 Indonesia**

As a case in point, in Indonesia, between 1985 and 2008/9, it lost 49 % (12.5 million ha) of its 1985's original natural forest cover (25.3 million ha) due to unsustainable pulp and paper industrial development, uncontrolled oil palm plantation expansions and illegal logging activities. This accounts for almost 50 % loss in 23 years with forest cleared at an annual average of 542,000 ha per year. By 2008/9, the nation has only 12.8 million ha of its natural forest cover left (WWF 2010a). This has made Indonesia the most significant contributor to the loss of forests in Southeast Asia (Stibig et al. 2007; ESCAP 2011). In 2012, Indonesia further lost another 800,000 ha of forest due to various economic activities. This is extensive compared to Brazil which lost about 460,000 ha in the same year (Margon et al. 2014).

Oil palm plantation development is the biggest cause of deforestation in Indonesia today. To cite a specific example, between 2009 and 2011, Indonesia had converted 300,000 ha of forest into oil palm plantations (Butler 2013a). Even the highland forests found in steep hills and mountains, such as those in Sumatra, Sulawesi, and Halmahera, were cleared for short-term economic gains. Indeed, time and again, the Indonesian rainforests are left to be invaded by loggers, poachers, and miners because of poor or non-enforcement of laws (Felbab-Brown 2013). Behind the scene of this unsustainable resource use, it is noteworthy that natural resources in the country have long been regarded as cheap and undervalued commodities (National Development Planning Agency 2003). This tends to give rise to disincentive for environmental conservation when optimizing the economic use of nature.



**Fig. 3** Rate of deforestation in Malaysia between 2000 and 2012: a global comparison

Unmistakably, such a massive scale of deforestation, and hence habitat fragmentation and destruction is detrimental to the continued survival of some of the world's iconic and endangered species such as the Bali, Javan and Sumatran tigers, the Sumatran elephant, the Javan rhinoceros and the orangutan (Brown and Jacobson 2005; WWF 2010b). The loss of habitat due to commercial agricultural development and illegal hunting has led to the extinction of the Bali and Javan tiger in the country (Brown and Jacobson 2005). Illegal hunting and pollution such as soil erosion caused by deforestation also contribute to aggravate the ecological status quo. Indonesia is now rated as one of the top ten countries in the world with the most threatened species, and a global hotspot of great conservation concern (Hickey et al. 2004; Yeager 2008; ACB 2010).<sup>9</sup> Indonesia is also the world's third largest source of greenhouse emissions due to deforestation and land degradation and conversion, contributing significantly to climate change (PEACE 2007).

### 5.2.2 Malaysia

Between 2000 and 2012, Malaysia lost 4.7 million ha of forest, an area larger than the size of Denmark or the state of Virginia. This made Malaysia's rate of deforestation the highest in the world at 14.4 %, compared to Indonesia at 8.4 % during the same period (Butler 2013b, Fig. 3). Unrestrained logging activities, physical conversion of natural forests into mega-dam infrastructures, oil palm and rubber-wood plantations are some of the most important drivers of deforestation in Malaysia (Litta 2012; Butler 2013b; Choy 2015). To cite an example, between 1990 and

<sup>9</sup>For a region to qualify as a hotspot, two strict criteria must be met, that is (i) it must contain at least 1500 species of vascular (higher order) plants (>0.5 % of the world's total) as endemics, and (ii) it has to have lost at least 70 % of its original habitat

2005, one million ha of forest were cleared for oil palm plantation development in the country (Subramanian et al. 2011).

The construction of the Bakun and Murum dams in the state of Sarawak has also aggravated the environmental situations. These two dam projects have necessitated an irreversible destruction of roughly 94,000 ha of some of the world's most biologically diverse rainforests (Choy 2005). The unsustainable resource use practice in Malaysia is also well reflected by the degazettement of the Bikam Permanent Forest Reserve for monoculture development in the state of Perak located in West Malaysia. In 2003, roughly 400 ha of the forest reserves were clearcut for oil palm plantation development. For the past few years since 2009, over 9000 ha of the permanent forest reserves in the state have been degazetted for timber production and other commercial activities (Hance 2013b).

The extensive development-induced habitat fragmentation or destruction has led to the extinction of the Javan Rhinoceros in Peninsular Malaysia, and the extinction of Sumatran Rhinoceros in the state of Sarawak (Greenpeace 2004). In 2015, the Sumatran rhinoceros has been declared extinct in the wild in Malaysia (Zorthian 2015). Habitat destructions caused by human's economic activities also threatens the continued survival of a wide range of key forest-dependent and endangered mega-fauna such as tiger, Pygmy elephant, Orangutan, and Clouded leopard. On the whole, about 14 % of the mammals in Malaysia are listed under the IUCN Red List as endangered, and 47 out of the 218 species of amphibian in the country are threatened with extinction (Hilton-Taylor et al. 2009).<sup>10</sup> Other species whose ecological survival is critically threatened due to human activities are the Black shrew, Malayan Tapir, and Mouse deer. Malaysia is also classified as one of the global hotspots of conservation priority.

The irreversible destruction of the Bikam Permanent Forest Reserve as noted above also resulted in the extinction of keruing paya (*Dipterocarpus coriaceus*). Keruing paya is a large hardwood tree listed as Critically Endangered on the IUCN Red List (Hance 2013). The degazettement of the permanent forest reserves in the state of Perak as discussed above could possibly lead to the extinction of the last stand of keruing padi (*Dipterocarpus semivestitus*) found in the region. It also increasingly threatening the continued survival of a range of protected species including leopard, Malayan tapir, siamangs, and the great Argus pheasant thriving in the region (Hance 2013b).

It may be remarked in light of the above that despite enacting the National Forestry Policy and the National Wildlife Act which empower the government to demarcate forests of high conservation values as totally protected areas, they have not been ecologically effective or environmentally meaningful. This is because to a greater extent, forests are legally classified in the "production" category meant for sustaining long-term timber production rather than environmental protection (Nagle 2009). To give a specific example, for instance, under the Statement of Forest Policy

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<sup>10</sup>The IUCN Red List is the world's most comprehensive information source on the global conservation status of biological species. The Red List's categories of threat for the existing species include "near threatened", "vulnerable", and "critically endangered". The other two categories are "extinct" and "extinct in the wild"

(1954) or the Forest Ordinance (1958, revised in 1977) as enacted in the state of Sarawak, sustainable forestry management is mostly being interpreted as continuous flow of forest products and benefits rather than the promotion of environmental protection or sustainable resource use. Indeed, the practice of commercial exploitation remains a key component of Malaysia’s approach to biodiversity management (Nagle 2009).

### 5.2.3 The Philippines

In the Philippines, years of unmitigated and uncontrolled forest destruction caused by commercial logging and agricultural conversion have contributed to tremendous loss of its original natural forests. In 1934, it was estimated that about 17 million ha of the country’s land area were covered with forest (Carandang 2005). However, between 1934 and 1988, forest had been cleared at an average of roughly 198,000 ha per year. The total forest loss within this period was 10.72 million ha (Fig. 4). Out of the total area of the forest lost, roughly 95 % were converted to various economic uses such as agricultural expansions, while 0.52 % was damaged by logging activities (Rebugio et al. 2007).

Between 1990 and 2000, Philippine further lost more than 800,000 ha of forests mainly due to agricultural expansion, illegal logging and widespread timber harvesting despite government’s timber harvesting bans. In fact, timber harvesting increased by nearly 30 % from 2008 to 2013 (Panela 2014). The alarming rate of forest destruction has left the country with only seven percent of its original lowland forests (PRB 2006; Mongabay 2011). Besides, the country also has lowest forest cover in the ASEAN region (World Bank 2013b, Table 4).

Out of the remaining forest habitat in the Philippines, it seems that only four percent of the area is suitable for a large number of endemic species. These include 6000 plant species and 1196 known species of amphibians, birds, mammals and reptiles (Isaacson 2011). Furthermore, according to the Philippines’ Department of

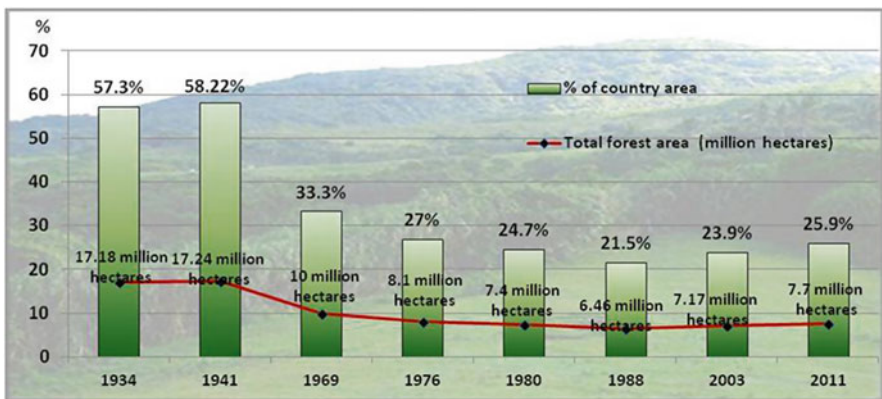


Fig. 4 Deforestation in the Philippines

**Table 4** The Philippines' forest cover in 2011: a comparative view (Source: World Development Indicators: Rural environment and land use, 2013, The World Bank, <http://wdi.worldbank.org/table/3.1#>)

Country	Forest cover (million hectares)	Forest area (% of land area)
Indonesia	93.7	51.7
Myanmar	31.4	48.2
Malaysia	20.4	62
Thailand	19	37.2
Lao	15.7	67.9
Vietnam	14	45
Brunei Darussalam	12.7	71.8
Cambodia	10	56.5
Philippines	7.7	25.9

Environment and Natural Resources, in view of massive change in the environmental conditions, the rate of species extinction in the country is 1000 times the natural rate (Isaacson 2011). Indisputably, despite the imposition of logging ban on old-growth forests and the enactment of various legal environmental conservation instruments, the country is still losing its remaining forest at an alarming rate. Manifestly, various factors such as the abuses of logging concessions, illegal harvesting, and unsustainable use of forestry resources have worked to frustrate the objectives and effectiveness of the national environmental laws and natural resource management policies (GEF 2009; Guiang 2001).

Some of the important species which are increasingly exposed to the threat of extinction due to massive environmental change include the Philippines eagle, Philippine tarsier, tamaraw, kagwang, the Philippine tube-nosed bat, the Philippine spotted deer, Calamian deer and the Philippines forest turtle, among others (Maala 2001; Duckworth et al. 2012; Conservational International 2011). Species which were unable to withstand the human force of economic destruction such as the Cebu warty pig, Panay flying fox, and Chapman's fruit bat have become extinct (Alave 2011). In view of serious habitat destruction, the Philippines supports more severely threatened endemic species than any other countries in the world (Oliver 2006; ACB 2010; Duckworth et al. 2012). It is one of the few countries that is in its entirety, both a hotspot and a mega-diverse region (Conservational International 2013). Also, the country is now classified as ten of the world's most threatened forest hotspots, and one of the top global conservation priority areas (ACB 2010; Conservational International 2011).

#### 5.2.4 Thailand

In Thailand, biodiversity loss is mostly due to the following economic activities:

- (i) Excessive logging of forests
- (ii) Commercial exploitation of rare plant species
- (iii) Poaching of tigers, bears, turtles, and seahorse



- (iv) Overhunting of wildlife
- (v) Disturbance of natural habitats caused by the clearance of mangroves for shrimp farming, conversion of peat swamps into cropland
- (vi) Irreversible destruction of virgin forest for dam building and road construction
- (vii) Expansion of rubber, coffee, tea and cacao plantations, among others (Delang 2005; Ministry of Resources and Environment, Thailand 2006; Stibig et al. 2007; Trisurat et al. 2011; Trisurat and Duengkae 2011).

Overall, Thailand has lost roughly 70 % of its original forest cover (Corlett 2009; Trisurat and Duengkae 2011). Since 1980, Thailand lost 43 % of its 1973's forest cover (WWF 2013). Worth noting is the stunning rate of forest loss in the Greater Mekong Sub-region which covers Myanmar, Thailand, Cambodia, Laos, Vietnam, and Yunnan and Guangxi in China. Between 1973 and 2009, the sub-region excluding China lost just under a third of its forest cover. Thailand and Vietnam experienced the highest rates of loss at 43 % each compared to 22 % in Cambodia, 24 % in Laos and Myanmar (WWF 2013). Incontrovertibly, the imposition of logging ban in 1989 and the formulation of various environmental policies such as the Forest Protection Act (1913), First National Economic and Social Development Plan (NESDP); National Forest Policy (1985), and the 7th NESDP (1992–1996) in Thailand, have not been able to contribute effectively in addressing its decades-old problem of illegal logging and upland encroachment (Lakanavichian 2001).

The extensive disruption of natural habitat has substantially increased the number of threatened mammal species in Thailand from 38 species in 2004 to 57 in 2012 (Baillie et al. 2004; World Bank 2013c). This made Thailand as having one of the highest threatened mammal species in the world. Extensive habitat disruption also affects the continued existence of range of species thriving in the region. These include 45 species of birds, 23 species of reptile and 72 species of fish (ESCAP 2011). Some of the critically endangered species which have not been able to withstand the force of human-induced ecological disturbances such as the Schomburgk's deer, Eld's deer, Kouprey, the Javan and Sumatran rhinoceros have become extinct in the country (Nabhitabhata and Chan-ard 2005).

### 5.2.5 Vietnam

Similar to Thailand, Vietnam has also lost 43 % of its 1973's natural forest cover (WWF 2013). Deforestation in the country is mainly caused by the expansion of coffee plantation, timber harvesting for the furniture industry, illegal logging, and infrastructure development especially dam construction (Carew-Reid et al. 2010; Drollette 2013a; OECD 2014). These economic activities impacted heavily on the ecological integrity of the country's natural forests, which are either degraded, poorly stocked or badly fragmented (WWF 1998). In 2010, its biodiversity-rich primary forest coverage dropped below one percent compared to 12 % in 2005 due to unrestrained forest exploitations (Hance 2011;

ESCAP 2011). This poses massive ecological threat of extinction of roughly 700 species of plants and 300 species of animals found in the region (Carew-Reid et al. 2010; PARC Project 2006).

The rapid disappearance of closed-canopy forest has resulted in the wild extinction of nine rare animal and plant species. These include four forest animal species, namely, the two-horn rhino, kouprey, tapir and otter civet (Ministry of Resource and Environment, Vietnam 2008; Vietnam Net 2013). According to Vietnam Red Book 2007, the total number of endangered wildlife species has increased by 161 species to 882 species. These include 418 animal species and 464 plant species (Ministry of Resource and Environment, Vietnam 2008). Particularly, the banting, the Javan rhinoceros, tiger, the Asian elephant, and the saola are increasingly exposed to the threat of extinction (CNRES 2000; Tordoff et al. 2012; Drollette 2013b). The 2007 Red Book revelation indicates a worrying situation about the reduction of Vietnamese flora and fauna resources. Indeed, Vietnam is now regarded as one of the world's most endangered terrestrial ecoregions as well as a top global conservation hotspot (World Bank 2005; Sterling et al. 2006; Hilton-Taylor et al. 2009). It is increasingly clear that the enactment of one of its most comprehensive environmental protection laws, the Biodiversity Law (2008) has not been effective to address its exploitative mode of resource utilization and biodiversity destruction (Nagle 2009).

It is also relevant to note that in all the ASEAN-5 countries, poaching and illegal wildlife trading also exacerbate the ecological quagmire in the region (Sodhi et al. 2004, ASEAN undated). The alarming scale of illegal wildlife trade in the region has resulted in the drastic decline of the number of high commercial value species such as the tiger, elephant, rhino, pangolin, and wild orchids and rare plants in Indonesia and Vietnam (ACB undated). If left unchecked, illegal wildlife trade will lead to massive and irrevocable loss of many of the world's unique and rare species endemic to the region (Nayar 2009; Inciong 2013). It is noteworthy that Malaysia, Indonesia, the Philippines and Vietnam share the dubious reputation of being among the world's top ten wildlife smuggling hubs (Felbab-Brown 2011; Gooch 2011).

## **6 Environmental Laws and Ecological Conservation-the Paradox**

It is manifestly clear from the above discussions that the well-entrenched institutional and legal frameworks have not been effective in addressing the environmental problems in the region. In fact, the overall regional environment has worsened and new environmental threats and challenges continue to emerge. Indeed, the above quantitative environmental and ecological investigation provides ample evidence of growing level of environmental degradation across the region. This strongly suggests that decisions on "sustainable resource use" in the region were mostly guided by self-interest and economic maximization motive so much so that the well-established legal and institutional instruments were ineffective in containing

environmentally destructive resource use practices under the guise of “sustainable development”.

Viewed from the Asian perspective, sustainable development is often taken to mean growth that lasts for an indefinite period of time, and the meaning of sustainability is to a large extent, referred to sustaining economic growth and consumption rather than sustaining the ecological health of the natural environment. Thus the Asian concept of “sustainable development” has in practice contributed to exposing the regional environment to heightened risks of over-exploitation and ecological destruction.

The Asian environmental paradox bespeaks the fact that institutional capacity building and legislative enactment alone cannot offer an adequate tool for containing the massive biodiversity disruptions across the region. As it turned out, the regional environmental issues or ecological problems are not due to the deficiency of environmental laws but basically owing to the lack of an ethical commitment to environmental protection and sustainable resource use. Put it bluntly, the Asian environmental problem is a behavioral problem -a moral failure that led to collective stewardship collapse. To bring the regional environment in closer accord with the Brundtland’s trait of sustainability, substantial changes in human responses to the environment based on the ethical principles of natural resource use is a *condicio sine qua non*. This will be examined in the ensuing section.

## **7 Environmental Ethics: The Key to Ecological Sustainability**

The Asian environmental protection initiatives have failed to bring an environmentally sustainable mode of development in the region because the regional policy makers were too preoccupied with the self-interested aims of catching up with the industrial West in term of higher economic growth and material progress. Natural resource use ethics in the region were and are still fundamentally governed by economic motives, entailing little environmental protection obligations. Thus, despite having comprehensive environmental protection frameworks in place, conservation still proceeds at a snail’s pace. The remedy here is to find ways to change the self-interested and exploitative mode of environmental behaviour when optimizing the economic use of nature.

To wit, no important change in environmental behaviour or natural resource use ethics was ever accomplished without improving our relationship with the natural environment. However, we can be ethical only if we see ourselves as a part of the natural world. In this regard, a proper understanding of the ethical connection between humanity and the natural environment is appropriate. To wit, nature provides various ecosystem services through biological, chemical, and physical interactions between biotic (living) components such as plants, animals and other living organisms, and abiotic (non-living) components such as air, water, soil and sunlight.

Some of the critical services provided by the ecosystems to sustain human wellbeing and continued existence include climate change regulation, drought and flood mitigation, detoxification and decomposition of toxic or industrial wastes, and air and water purification, among others. It is no exaggeration to say that man's continued existence and long-term socio-economic prosperity hinges on maintaining the ecological health of the ecosystems, that is, the capacity of ecosystems to deliver a continued flow of regulating functions, services and control mechanisms over time. Undoubtedly, as it is made clear above, sustainable use and management of ecosystems constitutes one of the major challenges facing the Asian region today.

It may thus be remarked that humans, being an interdependent part of nature, owe a moral responsibility to preserve the health of the ecosystem out of ecological necessity and ethical imperative for protecting the welfare of not only the present but also, the future generations. These ecological and ethical responsibilities are some of the most defining mental representations of our relationship with nature. Indeed, these beliefs have a central place in the foundation of environmental ethics. Environmental ethics may be defined as a set of moral principles that guides certain forms of right conduct toward non-human natural entities. According to Aldo Leopold, who is universally hailed as the father of contemporary environmental ethics, a conduct is right "when it tends to preserve the integrity, stability, and beauty of the biotic community and "is wrong if it tends otherwise" (Leopold 1949:224–225). Biotic community includes "soils, waters, plants and animals" or collectively, land (ecosystem) (1949:204).

Leopold explicitly asserts that an ethical relationship with nature is based on "love, respect, admiration and a high regard for its value" (1949:223). By value, Leopold means intrinsic value, that is, value in the "philosophical sense" (1949:223). More specifically, intrinsic value refers to value that something has for its own sake regardless of its value to humanity, for itself or as an end in itself, not just a means to another end. The source of value for intrinsically valued objects is not their use, but rather the value they have beyond their use, or in spite of their usefulness. Intrinsic value may be conferred by a valuer on an object. In this case, we may say that the object has value for its own sake. Intrinsic value of an object may also arise independently of the valuation of valuers. In such a case, we may say that the object is valuable both in and for itself.

Intrinsic value may be contrasted to instrumental value. Something is said to be instrumentally valuable if it is valuable as a means to an end (Ouderkirk and Hill 2002). Instrumental value is always a function of an object's usefulness. In other words, the value of an object lies not in the object itself but in its usefulness in serving as a means or instrument to attain something else of value. Under an instrumental worldview, human beings are intrinsically valuable and all non-human entities including natural beings and objects, are valuable only as means or instruments which serve human interests (Callicot 1989). Instrumental value is often associated with money, commodities or materialism. Considering the natural environment such as forest or wilderness as a resource base is to treat it as having instrumental value. Implicitly, many environmental problems arise out of the instrumental value human beings overly placed on nature (Des Jardins 2013). More specifically, one of

the main causes of environmental problems in the Asian economies is their strong tendency to prioritize economic growth or human consumption over sustainability concerns, which is, in turn, attributed to the lack of ethical considerations for the environment on the part of the stakeholders when optimizing the instrumental or economic use of nature.

When human beings continue to exhibit a strong inclination to treat the natural world as having mere instrumental value, it will tend to lead to serious threats of unrestrained exploitation of natural resources, biotic despoliation or environmental destruction. This is because mere human interests on the instrumental worth of nature do not point to the general ethical desirability for preserving the integrity, stability, and beauty of the biotic community. Under the instrumentally dictated resource use system, nature is a means, not an end in itself and thus, the name of the game is to optimize the economic use of nature for achieving the highest material gains possible. Thus, it is a lack of love, respect and moral concern for non-human entities that induces humans' abusive use of nature.

Precisely, as what Leopold has conceded, we abuse the use of nature because we regard it as a commodity belonging to us. Nonetheless, if we were to see nature as a community to which we belong, that is, seeing ourselves as a part of it, we will feel obliged to undertake the "obligations over and above self-interest" to preserve its integrity and continuous existence (1949:209). The metaphor, "community" denotes the interconnectedness or interdependence between human beings and the natural world (Rolston 2000). Here, apart from human beings, the non-human entities are also considered as intrinsically valuable. Wild-flowers and songbirds are such examples. As Leopold declared, wildflowers and songbirds, many of which cannot put into "economic use" are entitled to continuance as members of the biotic community because they are intrinsically valuable (1949:210). Humans, being a part of nature are obliged to show appropriate concern for and duties to protect the intrinsic value of these natural beings or other non-human entities, which made up the biotic community.

These duties may be discharged through the "extension of the social conscience from people to land" and "a limitation on freedom of action in the struggle for existence", collectively called here the ecological conscience (Leopold 1949:223; 202). In other words, human beings should exercise restraint when optimizing the economic or instrumental use of nature so as to avoid exerting undue influence on the intrinsically valuable biotic community. The development of the ecological conscience based on the integration of environmental values and the change of environmental attitudes, rather than simply from the imposition of environmental laws, represent one of the most effective means in protecting the integrity, stability, and beauty of the biotic community. From a practical point of view, such ethical and environmental attitudes would not only encourage us to maintain a state of harmony with nature but also, to induce us to undertake the obligations to protect its ecological integrity and continued existence for the benefits of future generations (Callicott 1989).

However, it may be noted that the extension of Leopold's ecological conscience to nature does not necessarily call upon us to completely withhold any form of eco-

logical disturbances to the natural environment. Rather, it requires us to undertake certain forms of moral obligation to protect the integrity and stability of the environment when harnessing its instrumental use. This is well reflected in Leopold's assertion that, "conservation means harmony between men and land" (1999:207). That is to say, it is a "positive exercise of skill and insight" to keep "the resource in working order, as well as preventing overuse" (1999:164). In other words, when optimizing the economic use of nature, there is a need to observe its ecological health so as to preserve the intrinsic value of the non-human entities. Leopold defines ecological health as the "capacity for self-renewal in biota" (1999:164).

In above connection, it may be of interest to note that Leopold's ecological health concept found a correspondence with the ecological sustainability concepts eloquently examined by Crawford Stanley Holling, an ecologist who is often acclaimed as the founding father of resilience theory for his pioneering work on ecosystem dynamics and ecological resilience. From an ecological perspective, Leopold's "capacity for self-renewal in biota" may be interpreted as ecological resilience of the ecosystem. Resilience or more specifically Holling's resilience, is defined as "the ability of a system to maintain its structure and patterns of behavior in the face of disturbance" (Holling 1986:296). Put differently, Holling's resilience is a measure of the ability of a system to absorb changes in the face of disturbances (Holling 1973). An ecosystem or an integrated system of human beings and natural resources ("biotic community" in Leopold) is said to be resilient if it is able to withstand external pressure when disturbed and retain its domain of attraction (Holling and Walker 2003).

In summary, environmental ethics plays an important role in influencing human beings to make ecologically sustainable decisions when optimizing the economic use of nature (Choy 2014b). It also helps us to be more aware of and concern for the risk of causing irreversible damage to natural landscapes to the detriment of future generations. More particularly, environmental ethics is a moving force of behaviour which encourages us to be more ecologically minded in affirming the virtue that human beings are a part of nature, that is, members of the biotic community, and that the ecological health of the natural environment should be protected as a matter of biotic right irrespective of the presence or absence of economic values. This will draw us nearer to admitting our obligation over and above economic self-interest in our dealing with nature, and refrain from acting in a manner that causes extensive and irreversible destruction to the natural environment. In what follows is an empirical study to show how the admission of our ecological conscience to nature could be brought to bear upon questions of sustainable resource use and management in a real world system.



Fig. 5 Geographical indication of the targeted areas of study

Table 5 Targeted areas of study in Sarawak, East Malaysia

Year	Month	Name of longhouse/tribe	Location
2007	May	Mudung Ambun (Kenyah)	Bintulu
	May	Terbila Tubau (Kenyah)	Bintulu
2008	February	Ado Bilong (Penan)	Bintulu
	May	Long Bala (Kenyah)	Bintulu
	May	Long Apok (Penan)	Bintulu
	May	Rumah Anthony Lerang (Kenyah)	Bintulu
	August	Rumah Bagong (Iban)	Bintulu
	August	Rumah Jalong (Kenyah)	Bintulu
	August	Long Biak (Kenyah)	Bintulu
	August	Kampong Gumbang (Bidayuh)	Kuching
	August	Tanah Mawang (Iban)	Kuching
	August	Nanga Entawai (Iban)	Sibu (Song)
	August	Kulleh Village (Iban)	Sibu (Song)
	October	Rumah Amit (Iban)	Bintulu
	October	Rumah Mulie (Iban)	Bintulu
	October	Rumah Kiri (Iban)	Bintulu
October	Uma Sambop (Kenyah)	Bintulu	
November	Rumah Akeh	Miri	
2009	January	Long Lawen (Kenyah)	Bintulu
	January	Long Wat (Penan)	Bintulu
	January	Long Pelutan (Penan)	Bintulu
	January	Long Peran (Penan)	Bintulu
	January	Long Jek (Penan)	Bintulu
	July	Long Koyan (Kenyah)	Bintulu

(continued)

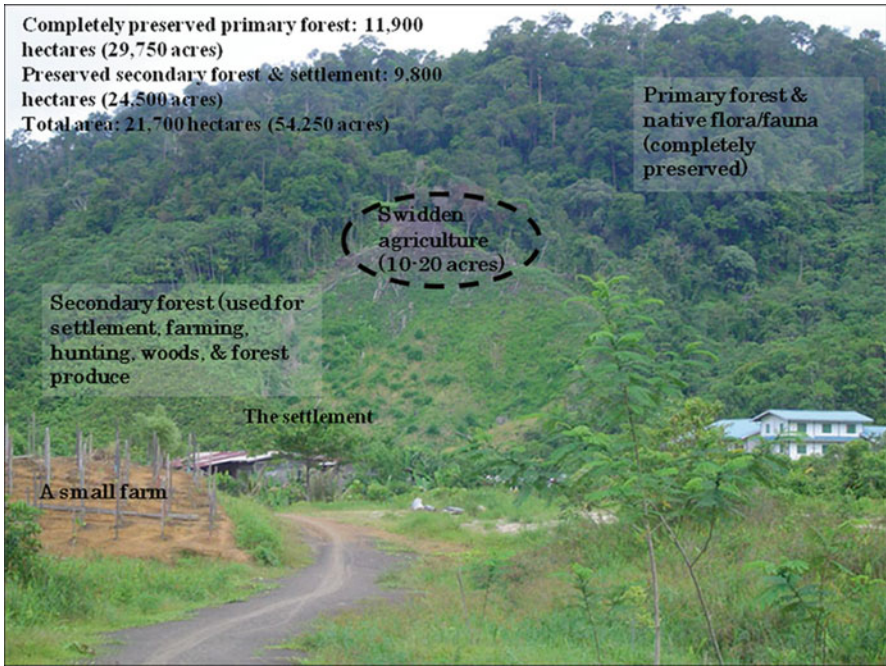
**Table 5** (continued)

Year	Month	Name of longhouse/tribe	Location
	October	Rumah Sekapan Pitt (Kenyah)	Bintulu
	October	Long Dungun (Kenyah)	Bintulu
	October	Sekapang Panjang (Kenyah)	Bintulu
	October	Rumah Aging Long (Penan)	Bintulu
	November	Kampung Sg. Entulang (Iban)	Miri
	November	Kampung Sg. Buri (Iban)	Miri
	November	Long Laput (Kayan)	Miri
	November	Long Tutoh (Kenyah)	Miri
	November	Long Ikang (Kenyah)	Miri
	November	Long Banyok (Kenyah)	Miri
	December	Long Miri (Kenyah)	Miri
	December	Long Na'ah (Kayan)	Miri
	December	Long Pillah (Kayan)	Miri
	December	Long Kesih (Kayan)	Miri
2010	February	Arur Dalan (Kelapit)	Miri (Bario Highland)
	February	Bario Asal (Kelapit)	Miri (Bario Highland)
	February	Ulung Palang (Kelapit)	Miri (Bario Highland)
	August	Rumah Busang (Iban)	Miri
	November	Rumah Ranggong, Sungai Sah (Iban)	Miri (Niah district)
	November	Rumah Umpur (Iban)	Miri (Niah district)
	November	Rumah Ampan (Iban)	Miri (Niah district)
	November	Rumah Usek (Iban)	Miri (Niah district)
	November	Rumah Tinggang (Iban)	Miri (Niah district)
2011	February	Batu Bungan (Penan)	Mulu (near Miri)
	February	Long Iman (Penan)	Mulu (near Miri)
	February	Long Terawan (Berawan)	Mulu (near Miri)

## 8 Environmental Ethics: An Empirical Assessment

This section is an attempt to reinforce the argument that the existence of ecological conscience tends to encourage a conviction of individual responsibility for preserving “the integrity, stability and beauty” of the biotic community based on a field study conducted in the state of Sarawak in Malaysia. The fieldwork, which was conducted between 2007 and 2011, covered 50 indigenous settlements located mostly in the forest interiors in the state (see Fig. 5; Table 5). One of the main aims of the fieldwork was to assess the relationship between environmental ethics and environmental conservation. More specifically, it evaluates the contributions of the local people’s environmental worldviews and moral environmental sentiments to preserving “the integrity, stability and beauty” of the biotic community in the local region.





**Fig. 6** Indigenous land use patterns (a diagrammatic representation)

Fieldwork and interviews were conducted with the indigenous people, including village headmen and old and young men and women through random house visits and field encounters. Interviews were primarily conducted in the Malay language and all the translations are mine. On average, 10–15 households from each long-house were interviewed. Unless otherwise indicated, the names of the interviewees are withheld in order to protect their privacy, as agreed with them.

To start, when asked about his views on his community’s environmental perceptions during an interview conducted in 2009 in Long Lawen, the community’s chief, Gara Jalong, replied:

*Lands and forests are our Datuk Nenek Moyang Temuda (ancestral domain). They are a ‘green bank’ for our cultural identity and socioeconomic survival. Our community possess 21,700 hectares of forests and out of these, 11,900 hectares are marked as completely preserved areas. These are our communal forests and we are bounded by our adat (custom) to protect them from degradation so that they could be passed down to our future generations in good state.... (Fig. 6).*

He further added that:

*In order to use our land resources sustainably, each household, depending on the size of its family, uses about 10 to 20 acres of the secondary forests for shifting cultivation. The same piece of land is used over and over again after it is allowed to replenish. In this way, we are able to manage our lands and forest in a sustainable way... (Fig. 6).*

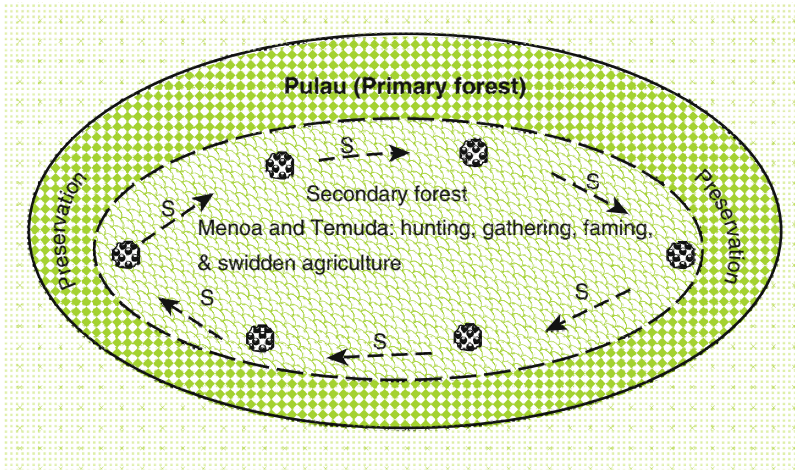


Fig. 7 Indigenous land use patterns in Long Lawen, Sarawak, Malaysia (Source: Choy 2004)

Basically, the local communities' land use system may be categorized into three distinctive patterns as follows:

- (i) Hunting and gathering in the forested region, known as *pemakai menoa*,
- (ii) Farming on agricultural land located in the vicinity of the tribal longhouses, called *temuda*, and
- (iii) Preservation of old-growth forest, termed *pulau*. The *pulau* preservation initiative aims to protect catchment areas and the medical plants and fruit trees found in these areas. Taken together, *pemakai menoa*, *temuda*, and *pulau* constitute the ancestral domains of the indigenous communities (see Figs. 6 and 7).

Datuk Nenek Moyang Temuda or ancestral domain refers to lands on which the indigenous people have lived since time immemorial. Historically, it contributes to defining the cultural identity and spiritual attachment of the communities to their traditional lands. Furthermore, the term “*adat*” (custom or moral codes) refers to the oral traditions, cultural beliefs, rights and responsibilities, and customary practices that were created, nurtured, and preserved by previous generations based on their daily interactions with nature. These normative unwritten rules have been inherited wholly or partially and further developed by successive generations over the past few centuries (Colchester 1993). *Adat*, which is obligatory rather than cohesive, not only governs the social behaviors of the local communities but also, prescribes certain ethical norms in the use of the natural environments in such a way as to avoid massive and irreversible destruction to the natural surroundings.

It is particularly noteworthy that during a farm encounter, Unit Liah, in her mid-30s, was asked whether she would give up her land resources for, say, one million Malaysian ringgit (roughly US\$267,000 as of June 12, 2015), which would allow

her to buy anything she wanted (such as a big, modern house, a car, and other luxurious items). Her reply was:

*Of course not! Land resources are the most important things to us. They are not meant for sale. What is money without land? The dense-forested place here also gives our people pleasant and comfortable living conditions compared to town area...although we are not rich, we are happy and satisfied living here...Our adat also requires us to protect the land for the benefits of our children... (2009).*

We conducted further interviews with other local inhabitants in the same year, including Juk Nyok Along, Loong Lian, Siting Selong, Suti Lawa, Nyanting Anyie, Julit, Sam, and Chu from *Long Lawen* and Engkong Muang, Mamay, Uluk Impung, and Yaos, among others, from *Long Anau*, a subsidiary settlement of the Long Lawen communities located near the logging camp.<sup>11</sup> All similarly reported that they feel psychologically comfortable, spiritually satisfied, and economically stable living in the forests. They also conceded that they were bound by their *adat* to use the land in a sustainable way by practicing shifting cultivation in order protect the interests of their future generations.

In order to furnish a large sampling and a qualitative index of the overall studies, field research was also carried out in other areas of the forest interiors in the following settlements. Similarly, the communities were surveyed about their environmental morality, cultural beliefs, and ways of life as noted above. A few selected revelations from the interview processes are worth noting:

1. Long Peran (Penan community) – The chief of the longhouse affirmed that the local people are bonded by their *adat* “*to use the natural resources sustainably and to protect them from degrading for the benefits of our future generations... and we feel happy roaming around in the forested areas and listening to the birds’ sound...*” (2009)
2. Rumah Aging (Penan community) – The chief of the longhouse contended that, “*We show a lot of respect and love to our surrounding areas including the trees planted by our Datuk Nenek Moyang (ancestors)...when we see the fruit trees they planted bearing fruits, we feel joyful and grateful to them...*” He further disclosed that, “*Sometimes we feel a sense of emptiness in our heart when we see some of the forests surrounding our areas have been felled for plantation development...we also feel sad when some of the wild birds which used to rest or fly around in our areas disappeared because of this...*” (2009)
  - (i) Interviews were conducted with the local communities from other longhouses including Mudung Abun (Kenyah community), Terbila Tubau (Kenyah community), Uma Sambop (Kenyah community), Long Bala (Kenyah community), Long Apok (Penan community), Rumah Anthony (Kenyah community), Long Pelutan (Penan community), Long Wat (Penan community), Long Jek (Penan community), Long Koyan (Kenyah community), Rumah Sekapan Pitt (Kenyah community), Rumah Sekapan Panjang

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<sup>11</sup>The establishment of the subsidiary settlement near the logging camp is to enable the local communities to market their agricultural products.

(Kenyah community), and Long Dungun (Kenyah community), among others. Villagers in all of these communities also share common ethical and moral orientations toward their land resources. For instance, in a revealing statement, the longhouse's chief from Uma Sambop had the following to say: "*An indigenous individual who has lost his ancestral lands is just like a ship without a captain...*" (2008).

The moral and environmental trends of the local communities as revealed from the above interviews may be simply summarized as follows:

- (i) All unanimously concurred that traditionally they owe a moral responsibility to use their land resources sustainably and to protect them from alienation for the benefit of their future generations.
- (ii) All show due respect and passion toward their surrounding areas, including the trees planted by their ancestors. This harmonious human-nature relationship is harnessed through the local people's daily interaction with nature.
- (iii) All those who have travelled to town areas feel that they are happier living in the forests than in the town because forests give them a sense of belonging.

## 9 Indigenous Land Use Philosophy: Some Remarks

The above revelations uncovered some of the salient features of the ethical and moral orientations of the local communities toward the natural environment. To start, despite the diversity among indigenous groups, tribal languages, and geographic locations, all respondents in the forest interiors consistently recognize the cultural and spiritual importance of the forest landscapes that were once the dwellings of their remote ancestors. To the local communities, the forest landscapes are apparently reverential in the sense that they are imbued with an array of sentimental qualities such as cultural values, social morality, passion, and spiritual and psychological significance, among others.

Essentially, the indigenous centuries-old adat (culture) command the local communities to use their forest resources sustainably so as to protect "the integrity, stability and beauty" of the natural environment for the benefit of their future generation. To the local communities, the natural environment is not only instrumentally valuable but also intrinsically regarded for its non-economic or non-use values such as cultural, aesthetic, spiritual, and psychological values. The indigenous belief in environmental value pluralism induced certain psychological attributes of land resources, such as the belief in moral duty or fiduciary responsibility to protect the natural environment from degradation for the benefit of future generations.

More specifically, indigenous perception on nature is based on a matrix of the spiritual, ecological, ethical, social, aesthetic, and psychological affection or satis-

faction they derive from their interactions with the biotic community. This simply means that to the local communities, land resources are to a great extent intrinsically valuable (Choy 2014b). These environmental dispositions serve to guide the local communities in determining how much of their ancestrally defined forest landscape they should preserve, how much culturally modified landscape they should demarcate, and in what ways the land should be modified in order to foster mutually enhancing human-nature relations that are in accord with their *adat* (Choy 2014b). An important lesson that may be drawn from these observations is that if a person acts in accordance to the above environmental perceptions, moral obligations, or ethical duties when optimizing the economic use of nature, this tends to result in more prudent resource use patterns.

What may further be remarked is that sustainable resource use and environmental conservation cannot be decoupled from the ethical principle of environmental sustainability. It is also explicitly comprehensible that if decision-making on natural resource use were predominantly dictated by economic motive, there will be little hope that the growing ecological impairment in the region can be contained effectively based on legislations or environmental policies alone. Indeed, all strategies for environmental control or ecological conservation are not just solely concerned with legislative requirements. This is made clear from the failure of the Asian ways in containing widespread environmental disruptions in the region based on authoritative rules and regulations. Besides, ethical or ecological values cannot be legislated or decreed based on environmental laws. It can only be inculcated based on education. Upon this account, it is fair to say that the unsustainable nature of the Asian course of development is unlikely to be mitigated let alone halted, so long as the ethical percepts for sustainable resource use does not find an unequivocal expression in economic reasoning or the legislative order.

## 10 Concluding Remarks

The policy objective of rigorous economic growth has been paramount in the political agendas of the Asian region. Typically, rapid economic growth in the region is achieved with more attention paid to economic benefits than to costs, in particular ecological costs. This is reflected by the mushrooming of a wide range of dominant economic activities in the region such as timber extraction, commercial-scale monoculture conversion, and mega dam or large-scale infrastructure development, all seek to optimize the highest level of economic advantage possible out of nature. That is to say, the environment is viewed instrumentally as a resource base to satisfy the needs of economic growth and human material consumptions. This is in stark contrast to the indigenous people in the tropical rainforests in Sarawak who take the

view that the environment is not only instrumentally valuable but also, intrinsically worth.

There is thus something profoundly incoherent in the regional dominant growth models despite having being shown to be receptive to the natural environment by putting in place a wide range of environmental legislations to regulate the destructive force of the economic growth processes. It may well be that by and large; the current ecological predicaments in the region are an attitudinal issue and implementation problem rather than a product of legislative deficiencies. Put otherwise, the root of the problem mainly lie in the lack of intrinsic moral standing on the part of policy makers or economic agents when optimize the economic use of nature.

It should be clear by now that whether policy makers or economic agents would choose to get unhooked from ecologically damaging economic activities ultimately depend on how they embrace nature. That said, the ecologically destructive transformation of natural environment in the Asian region will neither be reduced nor halted if the ethical concerns of environmental sustainability failed to find an unequivocal expression in their economic systems or legislative orders. We have to conclude that the Asian natural environment would not be what it is today had the regional policy makers or economic agents embraced the ethical philosophy of sustainable resource use in the real sense of the meaning.

## References

- ACB (2010) ASEAN biodiversity outlook. ASEAN Centre for Biodiversity, Laguna
- ACB (undated) Illegal wildlife trade: key driver of biodiversity loss. ASEAN Centre for Biodiversity, Laguna
- ADP (2014) Asian development outlook 2014. Asian Development Bank, Metro Manila
- ADP (2015) Asian development outlook 2015. Financing Asia's future growth. Asian Development Bank, Metro Manila
- Alave KL (2011) Hottest of biodiversity hot spots found in PH. Philippine Daily Inquirer
- ASEAN (1997) ASEAN vision 2020. ASEAN (Association of Southeast Asian Nations), Kuala Lumpur
- ASEAN (2008) ASEAN economic community blueprint. ASEAN (Association of Southeast Asian Nations), Jakarta
- ASEAN (2012) ASEAN framework action on rural development and poverty reduction (2011–2015). ASEAN (Association of Southeast Asian Nations), Jakarta
- ASEAN (2014) Hanoi action plan. ASEAN (Association of Southeast Asian Nations), Jakarta
- ASEAN Secretariat (2007) ASEAN plan of action on science and technology: 2007–2011. ASEAN (Association of Southeast Asian Nations), Jakarta
- Asia Times (2006) Three Gorges Dam starts to earn its keep. Asia Times, Hong Kong (10 June)
- Baillie JEM, Hilton-Taylor C, Stuart SN (eds) (2004) 2004 IUCN red list of threatened species. A global species assessment. International Union for Conservation of Nature and Natural Resources, Gland/Cambridge
- Baimai V (2010) Biodiversity in Thailand. J R Inst Thail 2:107–114
- Banyan (2010) The Philippines and its remittance economy. People, the Philippines' best export'. The Economist
- Berra TMB (2007) Freshwater fish distribution. The University of Chicago Press, Chicago

- Bourton J (2009) Giant fish 'verges on extinction. British Broadcasting Corporation, London
- Brown E, Jacobson MF (2005) Cruel oil. How palm oil harms health, rainforest & wildlife. Center for Science in the Public Interest, Washington, DC
- Budidarsono S, Susanti A, Zoomers A (2013) Oil palm plantations in Indonesia: the implications for migration, settlement/resettlement and local economic development. In: Fang Z (ed) Biofuels – economy, environment and sustainability. InTech Publisher, Rijeka, pp 173–193
- Butler RA (2013a) Palm oil now biggest cause of deforestation in Indonesia. mongabay.com (September 3)
- Butler RA (2013b) Malaysia has the world's highest deforestation rate, reveals Google forest map, mongabay.com (November 15)
- Callicott JB (1989) In defense of the land ethic: essays in environmental philosophy. State University of New York Press, Albany
- Carandang AP (2005) Forest resources assessment national forest assessment: forestry policy analysis. Working paper 101/E. Forestry Department. Food and Agriculture Organization of the United Nations, Rome
- Carew-Reid J, Kempinski J, Clausen A (2010) Biodiversity and development of the hydropower sector: lessons from the Vietnamese experience. Volume I: review of the effects of hydropower development on biodiversity in Vietnam. ICEM International Centre for Environmental Management, Prepared for the Critical Ecosystem Partnership Fund, Hanoi
- Carpenter PA, Peter CB (2009) The seventh mass extinction: human-caused events contribute to a fatal consequence. *Future* 41:715–722
- Chow GC (2012) Rising China. Its strength and problems. In: Wang LM (ed) *Rising China in the changing world economy*. Routledge, London, pp 42–51
- Choy YK (2004) Sustainable development and the social and cultural impacts of dam-induced development strategy- the Bakun experience. *Pac Aff* 77(1):50–68
- Choy YK (2005) Dam-induced development, environmental and social sustainability- the Bakun industrialization strategy revisited. *J Econ Issues* 39(1):123–150
- Choy YK (2014a) ASEAN Vision 2020 and the United Nations millennium development goals (MDGs): poverty reduction in ASEAN-5 with specific reference to Malaysia. LESTARI Public Lecture No. 12. Institute for Environment and Development, Universiti Kebangsaan Malaysia, Bangi
- Choy YK (2014b) Land ethic from the Borneo tropical rainforests in Sarawak, Malaysia: an empirical and conceptual analysis. *Environ Ethics* 26(4):421–441
- Choy YK (2015) Sustainable resource management and ecological conservation of megabiodiversity: the Southeast Asian Big-3 reality. *Int J Environ Sci Dev* 6(11):876–882
- CNRES (Center for Natural Resources and Environmental Studies of the Vietnam National University, Hanoi) (2000) Vietnam: North and Central Highlands. In: Wood A, Stedman-Edwards P, Mang J (eds) *The root causes of biodiversity loss*. Earthscan Publication, London, pp 337–370
- Colombo J (2013) Here's why the Philippines' economic miracle is really a bubble in disguise. *Forbes* 21 Nov 2013
- Conservation International (1998) Megadiversity: the 17 biodiversity superstars. Conservation International, Arlington
- Conservation International (2011) The world's 10 most threatened forest hotspots. Conservation International, Arlington
- Conservation International (2013) Biological diversity in the Philippines. Conservation International, Arlington
- Corlett RT (2009) *The ecology of tropical East Asia*. Oxford University Press, New York
- Delang CO (2005) The political ecology of deforestation in Thailand. *Geography* 90(3):225–237
- DENR-BMB (2014) The fifth national report to the convention on biological diversity. Department of Environment and Natural Resources-Biodiversity Management Bureau, Metro Manila
- Des Jardins JR (2013) *Environmental ethics: an introduction to environmental philosophy*, 5th edn. Clark Baxter/Wadsworth, Boston
- Ding W, Zhang XF, Wang KX, Wei Z, Würsig B, Braulik GT, Ellis S (2006) Conservation of the Baiji: no simple solution. *Conserv Biol* 20:623–625

- Drollette D (2013a) A plague of deforestation sweeps across Southeast Asia. *Yale Environment* 360 (May 20)
- Drollette D (2013b) Gold rush in the jungle: the race to discover and defend the rarest animals of Vietnam's "Lost World". Crown Publisher, New York
- Duckworth JW, Batters G, Belant JL, Bennett EL, Brunner J, Burton J, Challender DWS, Cowling V, Duplaix N, Harris JD, Hedges S, Long B, Mahood SP, McGowan PJK, McShea WJ, Oliver WLR, Perkin S, Rawson BM, Shepherd CR, Stuart SN, Talukdar BK, van Dijk PP, Vié J-C, Walston JL, Whitten T, Wirth R (2012) Why South-east Asia should be the world's priority for averting imminent species extinctions, and a call to join a developing cross-institutional programme to tackle this urgent issue. S.A.P.I.E.N.S (Surveys and Perspectives Integrating Environmental and Society), Institut Veolia Environnement, Paris
- ESCAP (2011) Statistical yearbook for Asia and the Pacific 2011. Economic and Social Commission for Asia and the Pacific (ESCAP), United Nations, Bangkok
- Evans A (2007) River Yangtze: the great river. Rivers of the world, Thames Festival Trust, London
- FAO (2006) Rapid growth of selected Asian economies. Lessons and implications for agriculture and food security. Synthesis Report, Policy Assistance Series 1/1. Food and Agriculture Organization of the United Nations, Bangkok
- Felbab-Brown V (2011) The disappearing act. The illicit trade in wildlife in Asia. Foreign policy at Brookings, Working paper 6
- Felbab-Brown V (2013) Indonesia field report III – the orangutan's road: illegal logging and mining in Indonesia, Foreign Policy Trip Reports 48. The Brookings Institution, Washington, DC
- Fu CZ, Wu JH, Chen JK, Wu QH, Lei GC (2003) Freshwater fish biodiversity in the Yangtze River basin of China: patterns, threats and conservation. *Biodivers Conserv* 12:1649–1685
- Gao X, Brosse S, Chen YB, Lek S, Chang JB (2009a) Effects of damming on population sustainability of Chinese sturgeon, *Acipenser sinensis*: evaluation of optimal conservation measures. *Environ Biol Fishes* 86(2):325–336
- Gao X, Wang JW, Brosse S (2009b) Threatened fishes of the world: *Psephurus gladius* (Martens 1862) (Acipenseriformes: Polyodontidae). *Environ Biol Fishes* 84(4):421–422
- GEF (2009) Expanding and diversifying the national system of terrestrial protected areas in the Philippines. Global Environmental Facility (GEF), Washington, DC
- Gleick PH (2009) Three Gorges dam project. Yangtze River, China. In: Gleick PH, Cooley H, Cohen MJ, Morikawa M, Morrison J, Palaniappan M (eds) *The world's water 2008–2009: the biennial report on freshwater resources*. Island Press, Washington, DC, pp 139–150
- Gooch F (2011) *Shoot on sight*. Xlibris Corporation, Bloomington
- Greenpeace (2004) Malaysia biodiversity under threat. Greenpeace (January 5)
- Gu J (2012) China's provincial GDP figures in 2011. China Briefing, Hong Kong
- Guiang ES (2001) Impacts and effectiveness of logging bans in natural forests: Philippines. In: Durst PB, Waggener TR, Enters T, Tan LY (eds) *Forests out of bounds: impacts and effectiveness of logging bans in natural forests in Asia-Pacific*. Food and Agricultural Organization of the United Nations Regional Office for Asia and the Pacific, Bangkok, pp 103–136
- Hance J (2011) [Logged forests in Vietnam retain significant biodiversity, including dipterocarp trees](#). Mongabay.com (March 28)
- Hance J (2012a) Two new frogs discovered in Philippines spur calls for more conservation efforts. Mongabay.com
- Hance J (2012b) Over 30 Yangtze porpoises found dead in China as population nears extinction. Mongabay.com (May 1)
- Hance J (2013a) Yangtze finless porpoise drops to critically endangered. Mongabay.com (July 7)
- Hance J (2013b) Malaysia clearcutting forest reserves for timber and palm oil. mongabay.com. (September 26). Mongabay.com
- Haque MS (1999) The fate of sustainable development under neo-liberal regimes in developing countries. *Int Polit Sci Rev* 20(2):197–218
- He JS, Xie ZG (1995) The impact of the Three Gorges Hydroelectric Project on and the preservation strategies for the biodiversity in the affected region. *Chin Biodivers* 3:63–72



- Hewison K (1996) Emerging social forces in Thailand. In: Robison R, Goodman DSG (eds) *The new rich in Asia. Mobile phones, McDonalds and middle-class revolution*. Routledge, London, pp 137–160
- Hickey V, Mathur P, Murray A, Whitten T (2004) *Crouching tiger, hidden langur: World Bank support to biodiversity conservation in East Asia and the Pacific*. The World Bank, Washington, DC
- Hill H (1999) An overview of the issues. In: Arndt HW, Hill H (eds) *Southeast Asia's economic crisis: origins, lessons, and the way forward*. Institution of Southeast Asian Studies, Singapore, pp 1–15
- Hilton-Taylor C, Pollock CM, Chanson JS, Butchart SHM, Oldfield TEE, Katariya V (2009) State of the world's species. In: Vié J-C, Hilton-Taylor C, Stuart SN (eds) *Wildlife in a changing world. An analysis of the 2008 IUCN Red List of threatened species*. International Union for Conservation of Nature and Natural Resource, Gland, pp 15–42
- Holling CS (1973) Resilience and stability of ecological systems. *Ann Rev Ecol Syst* 4:1–23
- Holling CS (1986) The resilience of terrestrial ecosystems: local surprise and global change. In: William CC, Munn RE (eds) *Sustainable development of the biosphere*. Cambridge University Press, Cambridge, pp 292–317
- Holling CS, Walker B (2003). Resilience defined. Entry prepared for the internet encyclopedia of ecological economics. Accessible at: <http://isecoeco.org/pdf/resilience.pdf>
- Hu A (2014) *China: innovative green development*. Springer, Heidelberg/New York/Dordrecht/London
- Hu JJ, Zhang ZB, Wei QW, Zhen HJ, Zhao YB, Peng H, Wan Y, Giesy JP, Li LX, Zhang B (2009) Malformations of the endangered Chinese sturgeon, *Acipenser sinensis*, and its causal agent. *Proc Natl Acad Sci U S A* 106(23):9339–9344
- Huang HW, Oldfield S, Hong Q (2015) Global significance of plant diversity in China. In: De-Yuan H, Stephen B (eds) *Plants of China. A companion to the flora of China*. Cambridge University Press, New York, pp 7–34
- IMF (2015) *World economic outlook. Uneven growth. Short- and long-term factors*. International Monetary Fund, Washington, DC
- Inciong RA (2013) Status of ASEAN biodiversity and the illegal wildlife trade. Paper presented at the Third ASEAN Chief Justices Roundtable on Environment, 16 Nov 2013, Bangkok
- Intal PS Jr, Paloyo AR, Garde M (2012) Facilitating domestic investment and growth. In: Henckel T (ed) *Sustaining development and growth in East Asia*. Routledge, London, pp 27–65
- Isaacson A (2011) A new species bonanza in the Philippines. *Science & Nature, Smithsonian Mag*
- Islam I, Chowdhury A (1997) *Asia Pacific economies: a survey*. Routledge, London
- IUCN (2009) *The Asian amphibian crisis: the state of amphibians in Malaysia*. International Union for Conservation of Nature, Gland
- Kahn JS (1996) Growth, economic transformation, culture and the middle classes in Malaysia. In: Robison R, Goodman DSG (eds) *The new rich in Asia. Mobile phones, McDonalds and middle-class revolution*. Routledge, London, pp 49–75
- Kong V, McKissack A, Zhang D (2012) China in a new period of transition. In: *The treasury economic round up. Special edition: China. Issue No. 4, The Treasury, Australian Government, Canberra*, pp 43–62
- Lakanavichian S (2001) Impacts and effectiveness of logging bans in natural forests: Thailand. In: Durst PB, Waggener TR, Enters T, Tan LY (eds) *Forests out of bounds: impacts and effectiveness of logging bans in natural forests in Asia-Pacific*. Food and Agricultural Organization of the United Nations, Regional Office for Asia and the Pacific, Bangkok, pp 138–167
- Leopold A (1949) *A sand county almanac with sketches here and there*. Oxford University Press, New York
- Leopold A (1999) In: Callicott JB, Freyfogle ET (eds) *For the health of the land: previously unpublished essays and other writings by Aldo Leopold*. Island Press, Washington, DC
- Lester K, Yap M (2013) Consumer boom fuels Philippines as Asian exports falter. *Bloomberg* (February 1)

- Lim CY (2009) Southeast Asia. The long road ahead. World Scientific, Singapore
- Litta H (2012) Regimes in Southeast Asia. An analysis of environmental cooperation. Springer Fachmedien, VS Verlag für Sozialwissenschaften, Germany
- López-Pujol J, Zhang FM, Ge S (2006) Plant biodiversity in China: richly varied, endangered and in need of conservation. *Biodivers Conserv* 15:3983–4026
- Lopez-Pujol J, Hua-Feng W, Zhi-Yong Z (2011) Conservation of Chinese plant diversity: an overview. In: Pavlinov I (ed) *Research in biodiversity – models and applications*. InTech, Rijeka, pp 163–202
- Lovgren S (2007) World's largest river fish feared extinct. *National Geographic News*, (July 26)
- Maala CP (2001) Endangered Philippine wildlife species with special reference to the Philippine Eagle (*Pithechophaga jefferyi*) and Tamaraw (*Bubalus mindorensis*). *J Int Dev Coop* 8(1):1–17
- Margon BA, Potapov PV, Turubanova S, Stolle F, Hansen MC (2014) Primary forest cover loss in Indonesia over 2000–2012. *Nat Clim Chan* 4:730–735
- McBeath GA, Leng T-K (2006) Governance of biodiversity conservation in China and Taiwan. Edward Elgar, Cheltenham
- McBeath GA, McBeath JH, Qiang T, Yu H (2014) Environmental education in China. Edward Elgar, Cheltenham
- McGregor A (2008) Southeast Asian development. Routledge, Abington
- Ministry of Agriculture (Beijing) (1995) China: country report to the FAO international technical conference on plant genetic resources. Ministry of Agriculture, Beijing
- Ministry of Environment (Indonesia) (2005) Third national report. The convention on biological diversity. Ministry of Environment, Jakarta
- Ministry of Environment (Indonesia) (2009) Fourth national report. The convention on biological diversity. Ministry of Environment, Jakarta
- Ministry of Environment and Forestry (Indonesia) (2014) Indonesia: fifth national report of Indonesia to the convention of biological diversity. Ministry of Environment and Forestry of Indonesia, Jakarta
- Ministry of Environmental Protection (China) (2008) China's fourth national report on implementation of the convention on biological diversity. Ministry of Environmental Protection, Beijing
- Ministry of Natural Resources and Environment of Malaysia (2014) Fifth national report to the convention on biological diversity. Ministry of Natural Resources and Environment of Malaysia, Kuala Lumpur
- Ministry of Natural Resources and Environment, Thailand (2009) Thailand fourth national report on the implementation of convention on biological diversity. Office of Natural Resources and Environmental Policy and Planning. Ministry of Natural Resources and Environment, Bangkok
- Ministry of Natural Resources and Environment, Thailand (2014) Thailand fifth national report on the implementation of convention on biological diversity. Office of Natural Resources and Environmental Policy and Planning. Ministry of Natural Resources and Environment, Bangkok
- Ministry of Resource and Environment, Vietnam (2008) 4th country report. Vietnam's implementation of the biodiversity convention. Ministry of Resource and Environment, Hanoi
- Ministry of Resources and Environment, Thailand (2006) Thailand. National report on the implementation of the convention on biology diversity. Office of Natural and Environmental Policy and Planning. Ministry of Natural Resources and Environment, Bangkok
- Mo T (2011) Yangtze River pollution concerns. *Global Times*, Beijing
- Mongabay (2011) Philippines forest information and data. [Mongabay.com](http://Mongabay.com)
- Morton K (2006) Surviving an environmental crisis: can China adapt? *Brown J World Aff* 13(1):63–75
- MPOB (2011) Malaysia palm oil industry. Malaysia Palm Oil Board, Kuala Lumpur
- Muscat RJ (1994) The fifth tiger. A study of Thai development policy. United Nations University Press, Tokyo
- Nabhitabhata J, Chan-ard T (2005) Thailand Red data: mammals, reptiles and amphibians. Office of Natural Resources and Environmental Planning, Bangkok
- Nagle JC (2009) The effectiveness of biodiversity law. *J Land Law* 14(2):203–252

- National Development Planning Agency (2003) Indonesian biodiversity strategy and action plan. National document. The National Development Planning Agency, Jakarta
- Nayar A (2009) Wildlife trade threatens Southeast Asia's rare species. *Nature*. 22 (Dec), doi:[10.1038/news.2009.1136](https://doi.org/10.1038/news.2009.1136)
- NDRC (National Development and Reform Commission) (2012) The People Republic of China national report on sustainable development. Permanent Mission of the People's Republic of China to the UN, New York
- OECD (2014) Towards green growth in Southeast Asia. Organisation for economic co-operation and development green growth studies. OECD Publishing, Paris
- Oliver WLR (2006) Philippines biodiversity conservation programme: integrating institutional partnerships and practical conservation measures in some of the world's highest priority areas. In: Hiddinga B (ed) Proceedings of the EAZA conference 2005. EAZA Executive Office, Amsterdam, pp 249–263
- ONEP (2009) National report of convention on biological diversity. Office of Natural Resources and Environmental Policy and Planning, Bangkok
- Ouderkirk W, Hill J (2002) Land value, community. Callicott and environmental philosophy. State University of New York Press, Albany
- Panela S (2014) The Philippines: where 'megadiversity' meets mega deforestation. *mongabay.com* (July 31)
- PARC Project (2006) Building Viet Nam's protected areas system. Policy and institutional innovations required for progress (Creating protected areas for resource conservation using landscape ecology [PARC] project. Government of Vietnam [FPD]/UNOPS/UNDP/ICUN, Hanoi
- PEACE (2007) Indonesia climate change. Current status and policy. PEACE (PT. Pelangi Energi Abadi Citra Enviro), Jakarta
- Prasetyo JA (2009) The crisis of neoliberalism: rhetoric and reality. *Jakarta Post* (June 18)
- PRB (2006) Making the link in the Philippines. Population, health, and the environment. Population Reference Bureau (PRB), Washington, DC
- Qiu J (2012) Yangtze finless porpoises in peril. *Nature*, Nature Publishing Group (December 25), London
- Rebugio LL, Pulhin JM, Carandang A P, Peralta EO, Camacho LD, Bantayan NC (2007) Forest restoration and rehabilitation in the Philippines. In: Lee DK (ed) *Keep Asia green*, Volume 1: Southeast Asia. IUFRO world series volume 20-1. International Union of Forest Research Organizations (IUFRO), Vienna
- International Union of Forest Research Organizations (IUFRO), Vienna
- Refkin A, Cray S (2013) *Conducting business in the land of the dragon: what every businessperson needs to know about China*. iUniverse, Bloomington
- Robison R (1996) The middle class and the bourgeoisie in Indonesia. In: Robison R, Goodman DSG (eds) *The new rich in Asia. Mobile phones, McDonalds and middle-class revolution*. Routledge, London, pp 79–101
- Rolston H III (2000) The land ethic at the turn of the millennium. *Biodivers Conserv* 9:1045–1058
- Ross L, Silk MA (1987) *Environmental law and policy in the People's Republic of China*. Quorum Books, New York
- Sabah Forestry Department (2012) Annual report 2011. Sabah Forestry Department, Sandakan
- Sarawak Forestry Corporation (2006) Biodiversity conservation. Sarawak Forestry Cooperation, Kuching
- Sodhi NS, Koh LP, Brook BW, Ng PKL (2004) Southeast Asian biodiversity: an impending disaster. *Trends Ecol Evol* 19(12):654–660
- Sterling EJ, Hurley MM, Minh LD (2006) *Vietnam: a natural history*. Yale University Press, New Haven
- Stibig H-J, Stolle F, Dennis R, Feldkötte C (2007) Forest cover change in Southeast Asia. The regional pattern. European Commission Joint Research Centre, Ispra

- Subramanian SM, Gasparatos A, Braimoh AK, Elliott W (2011) Unraveling the drivers of Southeast Asia's biodiversity loss. United Nations University, Tokyo
- Taborda J (2013a) Malaysia GDP annual growth rate. Trading Economics, New York
- Taborda J (2013b) Thailand GDP annual growth rate. Trading Economics, New York
- Taborda J (2013c) Indonesia GDP annual growth rate. Trading Economics, New York
- Taborda J (2013d) Philippine GDP annual growth rate. Trading Economics, New York
- Thompson C (2010) Borneo's new world. Newly discovered species in the heart of Borneo. World Wildlife Fund (WWF)-Malaysia, Sabah
- Tian ZQ, Chen WL, Zhao CM, Chen Y, Zheng BH (2007) Plant diversity and its conservation strategy in the inundation and resettlement districts of the Yangtze Three Gorges, China. *Acta Ecol Sin* 27(8):3110–3118
- Tik J (2009) Saving the Golden Goose: why the export-driven growth model still works for Malaysia? *Stanf J Int Relat* 11(1):1–31
- Ting M (2011) Yangtze River pollution concerns. *Global Times*, Beijing
- Tordoff AW, Bezuijen MR, Duckworth JW, Fellowes JR, Koenig K, Pollard EHB, Royo AG (2012) Indo-Burma biodiversity hotspot. Critical Ecosystem Partnership Fund, Conservation International, Arlington
- Trading Economics (2014) Vietnam GDP growth rate. Trading Economics, New York
- Trisurat Y, Duengkae P (2011) Consequences of land use change on bird distribution at Sakaerat Environmental Research Station. *J Ecol Field Biol* 34(2):203–214
- Trisurat Y, Alkemade R, Verburg PH (2011) Modeling land use and biodiversity in northern Thailand. In: Trisurat Y, Shrestha RP, Alkemade R (eds) Land use, climate change and biodiversity modeling: perspectives and applications. Information Science Reference, Hershey, pp 199–218
- Turner JL, Ellis L (2007) China's growing ecological footprint. *The China Monitor*
- Turvey ST, Pitman RL, Taylor BL, Barlow J, Akamatsu T, Barrett LA, Zhao XJ, Reeves RR, Stewart BS, Pusser LT, Wang KX, Wei Z, Zhang XF, Richlen M, Brandon JR, Ding W (2007) First human-caused extinction of a cetacean species? *Biol Lett* 3:537–540
- UNDP (2012) United Nations development programme county: regional (Sabah, Malaysia) project document. United Nations Development Programme, New York
- UNEP (2010) National environmental summary. Indonesia. United Nations Environment Programme, Nairobi
- UNICEF (2014) Children in China: an atlas of social indicators. United Nations Children's Fund, Beijing
- Vietnam Net (2013) Vietnam to have 41 biodiversity reserves by 2020. <http://www.vfej.vn/en/4647n/vietnam-to-have-41-biodiversity-reserves-by-2020.html>
- Wang D, Zhao XJ, Hao YJ, Zhao YM, Lei G (2010) Review of the conservation and protected areas established for the Baiji, *Lipotes vexilifer*, and the finless porpoise, *Neophocaena phocaenoides*, in the Yangtze River, China. In: Kreb D, Reeves RR, Thomas PO, Braulik GT, Smith BD (eds) Final workshop report: establishing protected areas for Asian freshwater cetaceans: "Freshwater cetaceans as flagship species for integrated river conservation management", 19–24 October 2009 in Indonesia. Conservation Foundation for Rare Aquatic Species of Indonesia, Samarinda, pp 62–72
- Warne S, Phong TL (2002) Vietnam. In: Carew-Reid J (ed) Biodiversity planning in Asia. International Union for Conservation of Nature, Gland, pp 288–311
- WECD (1987) Our common future. World Commission on Environment and Development, Oxford University Press, Oxford
- Wijaya M (2009) Neo-liberalism a dirty Indonesian word. *Asia Times* (June 11)
- Williams J, Read C, Norton T, Dovers S, Burgman M, Proctor W, Anderson H (2001) Biodiversity. Australia State of the environment report 2001 (Theme Report). CSIRO, on behalf of the Department of the Environment and Heritage, Canberra
- Wilson EO (2000) Vanishing before our eyes. *Time* 255:28–31, 34

- Wong CM, Williams CE, Pittock J, Collier U, Schelle P (2007) World's top 10 rivers at risk. World Wildlife Fund, Gland
- World Bank (2005) Vietnam environment monitor 2005. Biodiversity. The World Bank, Washington, DC
- World Bank (2008) Vietnam. Environment at a glance. The World Bank, Washington, DC
- World Bank (2011) World development indicators database. The World Bank, Washington, DC
- World Bank (2013a) World development indicators database. The World Bank, Washington, DC
- World Bank (2013b) World development indicators: rural environment and land use. The World Bank, Washington, DC
- World Bank (2013c) Mammal species, threatened (Thailand). The World Bank, Washington, DC
- World Bank (2015) Countries and economies. The World Bank, Washington, DC
- Wu JG, Huang JH, Xie ZQ, Gao XM (2003) Three-Gorges Dam— experiment in habitat fragmentation? *Science* 300(5648):1239–1240
- WWF (1998) Root causes of biodiversity loss in Vietnam: summary. World Wildlife Fund (WWF), Washington, DC
- WWF (2004) Rivers at risk. Dams and the future of freshwater ecosystems. WWF Dams Initiative, World Wildlife Fund (WWF), Washington, DC
- WWF (2007) World's top 10 rivers at risk. Wildlife Fund (WWF), Washington, DC
- WWF (2010a) Feasibility assessment for financing the heart of Borneo landscape. Malaysia (Sabah and Sarawak). Wildlife Fund (WWF), Washington, DC
- WWF (2010b) Save Sumatra: protect some of the world's richest biodiversity, natural heritage and global climate. World WWF fact sheet. Wildlife Fund (WWF), Washington, DC
- WWF (2012) China ecological footprint report 2012. World Wildlife Fund, Beijing
- WWF (2013) WWF-Greater Mekong. Ecosystems in the Greater Mekong. Past trends, current status, possible futures. World Wildlife Fund (WWF), Washington, DC
- Xia W, Wang LM (2012) Rising China and its integration with the changing world economy. In: Wang LM (ed) *Rising China in the changing world economy*. Routledge, London, pp 1–41
- Xie P (2003) Three-Gorges Dam: risk to ancient fish. *Science* 302(5648):1149–1151
- Xie SG, Li ZJ, Liu JS, Xie SQ, Wang HZ, Murphy BR (2007) Fisheries of the Yangtze River show immediate impacts of the Three Gorges Dam. *Fisheries* 32(7):343–344
- Yang H B (2011) Green economic practices of the Three Gorges Project. Paper presented at international UN-water conference, water in the green economy in practice: towards Rio+20 held at Zaragoza, Spain on 3–5 Oct 2011
- Yao L (2013) China's provincial GDP figures in 2012. China briefing, Hong Kong
- Yeager C (2008) Conservation of tropical forests and biological diversity in Indonesia. Prepared for USAID (Energy Agency International Development), Jakarta
- Yuan ZG, Yu YX (2012) The long-run growth and short-run fluctuations of the Chinese economy. In: Woo WT, Lu M, Sachs JD, Chen Z (eds) *A new economic growth engine for China: escaping the middle-income trap by not doing more of the same*. Imperial College Press, London, pp 71–89
- Yue PQ, Chen YY (1998) China red data book of endangered animals: pisces. Science Press, Beijing
- Zhang QF, Lou ZP (2011) The environmental changes and mitigation actions in the Three Gorges Reservoir region, China. *Environ Sci Pol* 14:1132–1138
- Zhang G, Wu L, Liu M, Cheng F, Murphy BR, Xie SG (2012) Preliminary evidence of delayed spawning and suppressed larval growth and condition of the major carps in the Yangtze River below the Three Gorges Dam. *Environ Biol Fish* 93(3):439–447
- Zissis C, Bajoria J (2008) China's environmental crisis. Council on Foreign Relations, New York
- Zorthian J (2015) Sumatran rhino deemed extinct in Malaysia. *Time*