

# Sustainable Resource Management and Ecological Conservation of Mega-Biodiversity: The Southeast Asian Big-3 Reality

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**Abstract**—This article uses a combination of quantitative and qualitative approaches to assess the effectiveness of local and regional environmental protection laws, declarations and action plans in promoting sustainable resource use and environmental protection in the three most biologically diverse regions in Southeast Asia, namely, Indonesia, Malaysia and the Philippines, collectively called here the Southeast Asian Big-3. The argument is that despite the plethora of multi-protection initiatives and safeguards, the regional environment is in the throes of an unending episode of degradation and depletion. In addressing this paradox, this paper considers the role of environmental ethics in ecological conservation and proposes it as one of the main keys in managing environmental sustainability.

**Index Terms**—Environmental degradation, environmental ethics, environmental protection and conservation laws, Southeast Asian Big-3.

## I. INTRODUCTION

Among the world's 17 megadiverse countries, three are found in Southeast Asia, namely, Indonesia, Malaysia and the Philippines (referred to here as the Southeast Asian Big-3). Recognizing the role of biodiversity for socio-economic progress and development, leaders in the region have made concerted efforts at strengthening environmental protection. At the national level, each country has enacted a variety of environmental laws to protect the environment and natural resources. At the regional level, the ASEAN Centre for Biodiversity has been established to enhance cooperation and coordination for the conservation and sustainable use of biodiversity.

Despite these environmental initiatives, however, paradoxically, the overall regional environment has hardly improved, and has in fact worsened, and new environmental threats and challenges continue to emerge. Against this backdrop, this study aims to examine why the national and regional environmental protection initiatives have failed to halt further local and regional environmental degradation, and to suggest ways to mitigate the problems at hand.

The analysis is based on investigations, using qualitative and quantitative approaches, of the changes in the regional ecological state over the past few decades amid increasing legal and regional environmental controlling efforts. It

provides ample evidence of higher-order tragedies of the commons across the Southeast Asian region. It is argued that nurturing a sense of environmental stewardship could serve as an important force to mitigate the perversity of the tragedies of the commons particularly when actors at each level have an ethical sense of ecological connection. In this regard, the paper examines how human environmental attitudes and values help to influence individual behaviour and government policy concerning resource management and conservation practices. The findings are from a case study carried out in the state of Sarawak in Malaysia between 2007 and 2011. It is acknowledged that there is no other way for our planet in general, and the Southeast Asian Big-3's natural environment in particular, to survive the scourge of unrestrained environmental exploitation and degradation except by altering the theater of our actions premised on a holistic cast of environmental beliefs, ecological attitudes and values.

## II. THE STATE OF ENVIRONMENT IN SOUTHEAST ASIA AND THE SOUTHEAST ASIAN BIG-3 REGION: AN OVERVIEW

Although occupying only three percent of the earth's total area, the tropical rainforests in Southeast Asia are home to over 20 percent of all known plant, animal and marine species, many of which are found nowhere else in the world. Three of the world's 17 "mega-diverse" countries, Indonesia, Malaysia and the Philippines, characterized by species richness and species endemism and endangerment, are also located in the region. Species endemism in Southeast Asia is extraordinarily high. As of 2008, for example, a total of 26,268 endemic species was recorded in the whole Southeast Asian region. The region also contains high concentrations of restricted ranges of bird, plant and insect species. It is noteworthy that the Southeast Asian Big-3 have each recorded more than 7,000 endemic species [1].

Among the three Southeast Asian mega-diverse countries, Indonesia leads as the most biologically rich nation in the region and the second most diverse territory on earth after Brazil. It is also the world's third largest forested country after Congo and Brazil. Its rainforests contain 10 percent of the world's flowering plant species; 12 percent of the world's mammal species; 16 percent of all reptile and amphibian species, and 17 percent of the world's bird species. Indonesia ranks first in the world for species richness for mammals (515 species with 36 percent classified as endemic) and first in the world for swallowtail butterflies (121 species with 44 percent classified as endemic) [2].

Malaysia ranks 14th on the list of the 17 global

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mega-diverse countries. Its forests support an array of unique flora and fauna species with exceptionally high degree of densities and very high rates of endemism and uniqueness. Malaysia is also ranked 14<sup>th</sup> in the world for its concentration of vascular plants (15,500 species as recorded in 2004). Home to 336 species of mammals, roughly 750 species of birds with high level of endemism, 212 species of amphibians, Malaysia's ecosystem is considered as one of the globally important and representative unique ecosystems with high conservation priority [3]-[5].

The Philippines ranks 17<sup>th</sup> on the 17-global mega list. 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 [6]. In addition, its forests harbour an exceptionally high number of endemic species [5]. Sixty-one percent of the total number of mammal species (165 species), 35 percent of the total number of birds (530 species) and one-third of more than 9,250 vascular plant species found in the country are classified as endemic [7]-[9].

It is thus increasingly clear that the ecosystems in Southeast Asia in general and in the Southeast Asian Big-3 region in particular are some of the Earth's most distinctive biological treasures. Their exceptionally rich endowment of unique biota is also representative of the world's diverse ecosystems, hence the term "Megadiverse" given by the World Conservation Monitoring Centre of the United Nations Environment Programme. The region's high concentrations of endemic species also make it one of the most important priority conservation eco-regions in the world.

### III. ENVIRONMENTAL PROTECTION INITIATIVES: NATIONAL AND REGIONAL LEVELS

TABLE I: ENVIRONMENTAL LAWS IN THE SOUTHEAST ASIAN BIG-3 REGIONS

Indonesia	Malaysia	The Philippines
Environmental Management Act (1997, revised 1982; 1990)	National Wildlife Act (1972)	The Philippines Environment Code (1977)
Forestry Law (1999)	National Forestry Act (1984)	The Philippines Environmental Policy (1977)
Conservation Law (1990)	National Policy on Biological Diversity (1998)	Executive Order No.263 (Community-based Forest Management) (1995)
Environmental Protection Law (2009)	National Environment Policy (2002)	National Integrated Protected Areas System Act (1992)
Cultivation Law (1992)	Natural Resources and Environment Ordinance, Sarawak (1993)	Mt. Kanla-on Natural Park (MKNP) Act (2001)
Plantation Law (2004)	Wild Life Protection Ordinance, Sarawak (1998)	Sustainable Forest Management Act (2005, revised 2009)
Ministry of Agriculture Regulation (2007)	Environmental Protection Enactment, Sabah (2002, amended 2004)	Wildlife Resources Conservation and Protection Act (2001)

Note: The environmental legislations listed above are some of the major laws enacted in the respective countries concerned and they are by no means exhaustive

Deeply concerned by the growing trend of environmental degradation due to rapid economic growth and increasing material consumption, regional leaders have enacted a number of environmental legal instruments in order to safeguard the ecological integrity of the environment and to promote sustainable resource use (Table I). Also, on a regional basis, the Southeast Asian leaders have adopted a wide range of declarations and conventions in order to ensure that the regional rich biological diversity is conserved and sustainably managed towards enhancing social, economic and environmental well-being.

The abovementioned legal instruments have a common purpose in securing sustainable use of natural resources and environmental protection while promoting economic growth and social progress. One of the strategic means employed by the regional policy makers to achieve this ideal path of development is through the creation of legally protected areas, nature reserves, national parks or totally protected areas where economic exploitation of natural resources is prohibited. A wide range of rare and endangered flora and fauna species are also protected by specific laws in each of the countries. Fundamentally, unsustainable use of resources such as illegal logging and extensive monoculture development which threatens the continued survival of biological species is regulated by various national legislations.

Recognizing the importance of environmental cooperation for sustainable development, the Southeast Asian leaders have, since 1977, cooperated closely in promoting ecologically sustainable development. Leaders in the region have also adopted various documents as listed below to protect the regional terrestrial ecosystems and biodiversity [1], [10]:

- 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) ASEAN Concord II (Bali Concord II) (2003)
- 14) Yangon Resolution on Sustainable Development (2003)
- 15) Joint Declaration on the Attainment of the Millennium Development Goals in ASEAN 2009
- 16) Statement by the ASEAN Environmental Ministers for the eleventh meeting of the conference of the parties to the Convention on Biological Biodiversity 2012.

One of the most important documents which is worth emphasizing is the ASEAN Agreement on the Conservation

of Nature and Natural Resources which was adopted at the 118<sup>th</sup> ASEAN Ministerial Meeting in Kuala Lumpur, Malaysia on July 9, 1985 and formally came into force in 1995. This document provides some of the most holistic guidelines for the design of environmental planning and management framework to ensure that the regional rich biological diversity is conserved and sustainably managed towards enhancing social, economic and environmental well-being.

In particular, Article 1 of the ASEAN Agreement explicitly states that each member country should undertake to adopt measures in accordance with its national laws to protect the ecological life support system, to preserve genetic diversity and to ensure the sustainable use of natural resources. It further states that member countries should undertake to integrate ecological conservation and sustainable management of natural resources in development planning process. The ASEAN Agreement which covers every area of environmental management represents a comprehensive framework of environmental conservation and provides a basis for guiding environmental planning and management in the region.

Based on this regional 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 (Kalimantan), Malaysia (the states of Sarawak and Sabah) and Brunei Darussalam [1]. It is of passing interest to note that the Heart, which is approximately 23.4 million hectares in area, is the world's final tropical frontiers of rainforest characterised by exceptionally high concentrations of threatened species and high levels of endemism. The HoBI seeks to protect this region for scientific and biological research, and for the benefits of future generations. The environmental protection initiative is one of most important regional cooperative efforts in promoting environmental sustainability.

It is also instructive to note that the ASEAN Strategic Plan of Action (1994-1998) adopted on April 26, 1994 in Bandar Seri Begawan, Brunei Darussalam by the Environmental Ministers, was designed based on the guidelines of ASEAN Agreement. The action plan includes all the critical aspects of environmental conservation which covers, among other, the protection and conservation of endangered species and heritage areas, and the enhancement of biodiversity conservations efforts.

In an attempt to reinforce regional conservation efforts, the ASEAN member countries have also adopted the ASEAN Socio-Cultural Community (ASCC) Blueprint (2009-2015) in 2009 as an annex to the 2009 Cha-am Hua Hin Declaration on the Roadmap for an ASEAN Community (2009-2015). The Cha-am Hua Hun Declaration was signed on March 1<sup>st</sup>, 2009 by the ASEAN leaders at the 14<sup>th</sup> ASEAN Summit in Thailand. The Cha-am Hua Hin Declaration aims at building an ASEAN Community, comprising three pillars, namely, political-security community, economic community and socio-cultural community. The annexed ASCC Blueprint explicitly stipulates that the regional rich biological diversity must be conserved and sustainably managed toward enhancing social, economic and environmental wellbeing.

#### IV. ECOLOGICAL CONSERVATION IN SOUTHEAST ASIA BIG-3: THE REALITY

Despite the above environmental protection initiatives, a casual observation of events indicates that the governments have not been able to halt further environmental degradation in the region. To illustrate, between 1985 and 2008, Indonesia lost 49 percent or 12.5 million hectares of its forest cover due to the unsustainable pulp and paper industrial development, oil palm plantation expansions and illegal logging activities. This accounts for almost 50 percent loss in 23 years with forest cleared at an annual average of 542,000 hectares per year. By 2008, the nation has only 29 percent of forest cover left, covering roughly 12.8 million hectares of its total land area [11]. This has made Indonesia the most significant contributor to the loss of forests in the ASEAN or Southeast Asia region [12], [13].

Oil palm plantation development is the biggest cause of deforestation in Indonesia today. To cite a specific example, between 2009 and 2011, Indonesia cleared 300,000 hectares of forest for oil palm plantation development [14]. Such a massive scale of deforestation and hence, habitat destruction is increasingly threatening the continued existence of some of the world's iconic and endangered species such as the Sumatran tiger, the Sumatran elephant, the Javan rhinoceros and the orangutan. 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 [2], [9], [15]. It is also worth noting that the loss of habitat due to commercial agricultural development and illegal hunting has led to the extinction of the Balinese and Javan tiger in the country.

In Malaysia, environmental degradation and ecological impoverishment are mainly due to the loss of natural habitat as a result of unrestrained logging activities, physical conversion of natural forests into mega-dam infrastructures, oil palm or rubber-wood plantations [16]. Furthermore, between 2000 and 2012, the rate of deforestation in Malaysia has accelerated faster than any other country in the world at 14.4 percent against the forest cover in 2000. The total loss of forest over the three years was roughly 4,727,800 hectares, an area larger than the size of Denmark (4.3 million hectares) [16]. In this connection, it is worth emphasised that between 1990 and 2005, one million hectares of forest were cleared for oil palm plantation development in the country [17]. In addition, the construction of the Bakun and Murum dams in the state of Sarawak has also aggravated the deterioration in quality of the environment in the country. These two dam projects have resulted in an irreversible destruction of roughly 94,000 hectares of some of the world's most biologically rich and unique rainforests [18].

The growing realization of the magnitude of environmental disruption in Malaysia is also well reflected by a strong deforestation signal picked up by NASA Global Forest Disturbance Alert System (GloF-DAS) in 2013. The signal indicated that in the first quarter of the same year, Malaysia saw a 115 percent increase in deforestation [19]. The unrestrained use of natural resources is also well manifested by the degazettement of Permanent Forest Reserves for monoculture development in the state of Perak in Peninsular Malaysia. It may be noted that in July 2003, the Bikam

Permanent Forest Reserve (400 hectares) in the state was clearcut for oil palm plantation development. As a matter of fact, for the past few years since 2009, over 9,000 hectares of Permanent Forest Reserves in the state have been degazetted for timber production and other commercial activities [20].

The rapid disappearance of natural habitat in the country has led to the extinction of the Javan rhinoceros in Peninsular Malaysia, and the extinction of the Sumatran rhinoceros in the state of Sarawak [3]. The increasing trend of environmental degradation in the country also threatens the continued survival of a wide range of key forest-dependent and endangered mega-fauna such as the tiger, pygmy elephant, orangutan, Sumatra rhinoceros and clouded leopard. On the whole, about 14 percent of the mammals in Malaysia are listed under the IUCN Red List as endangered, and 47 out of the 218 species of amphibians in the country are threatened with extinction [5]. Other species whose ecological survival is critically threatened due to development-induced habitat destruction are the black shrew, Malayan tapir, mousedeer and orangutan. They are classified as the top five endangered species in Malaysia.

The irreversible destruction of the Bikam Permanent Forest Reserve as noted above also resulted in the extinction of keruing paya (*Dipterocarpus coriaceus*) on the Peninsular Malaysia. Keruing paya is a large hardwood tree listed as Critically Endangered on the IUCN (International Union for Conservation of Nature) Red List [20]. The degazettement of various 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 threatens the continued survival of a range of protected species including leopard, Malayan tapir, siamangs, and the great Argus pheasant thriving in the region [20].

In digression, 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".

In the Philippines, years of uncontrolled forest destruction caused by commercial logging and agricultural conversion have contributed to tremendous loss of its original forests. Between 1934 and 1990, the country lost 10.9 million hectares at an annual average of 194,000 hectares per year. Out of the total area of the forest lost, roughly 95 percent was converted to other uses such as agricultural expansion while 0.52 percent was damaged by logging activities [21].

Between 1990 and 2000, the Philippines further lost more than 800,000 hectares of forests mainly due to agricultural conversions, illegal logging and widespread logging activities despite the government's timber harvesting bans. The alarming rate of forest destruction has left the country with only seven percent of its original low land forests [22]. Out of this remaining habitat, it seems that only four percent of its area is suitable for a large number of endemic species. According to the Philippines' Department of Environment and Natural Resources, in view of massive change in environmental conditions, the rate of species extinction in the country is 1,000 times the natural rate [23].

Some of the important species which are increasingly exposed to the threat of extinction due to massive environmental change include the Philippines eagle, the Philippines tarsier, tamaraw, kagwang, the Philippines tube-nosed bat, the Philippines spotted deer, the Calamian deer and the Philippines forest turtle, among others [24]. In view of serious habitat destruction, the Philippines supports more severely threatened endemic species than any other country in the world [25], [9]. In addition, it is one of the few nations that is in its entirety, both a hotspot and a mega-diversity country [8]. Also, the country is now classified among ten of the world's most threatened forest hotspots, and one of the top global conservation priority areas [9], [24].

#### V. NATIONAL ENVIRONMENTAL LAWS, REGIONAL ENVIRONMENTAL PROTECTION INITIATIVES AND ENVIRONMENTAL PROTECTION: THE MISMATCH

It is increasingly evident from the above revelation that decades of national and regional environmental conservation efforts have not been able to prevent severe loss and degradation of natural habitats in the region. Uncontrolled commercial agricultural development and other human activities, such as clear-cut logging of old-growth forests and mega-dam construction are the biggest causes of environmental degradation and ecological impoverishment in the region. There seems to have been limited integration of environmental concerns into development policies in the region for the past few decades.

It may further be remarked that the root cause of the region's environmental and ecological plight is not due to the deficiency of national environmental laws or the lack of regional cooperation in addressing environmental issues but due to a fundamental lack of a real commitment on the part of economic agents to liberate the natural environment from unsustainable use. Very often, the natural environment or natural resources are considered as a means to an end, that is, they are valued for their economic and practical benefits for human beings.

To illustrate, in Indonesia, for example, natural resources have long been regarded as cheap and undervalued commodities [26]. Also, time and again, the Indonesian rainforests are left to be invaded by loggers, poachers, and miners because of poor or non-enforcement of laws [27]. Because of the human-centric attitudes towards nature, 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. Ostensibly, the mindless and profound transformation of nature was largely due to the absence of moral constraints when optimizing the economic use of the natural environment.

In Malaysia, the enactment of the National Forestry Policy and the National Wildlife Act which empower the government to demarcate forests of high conservation values as totally protected areas have not been ecologically effective. The irony is that forests are also legally demarcated as productive resources for sustaining long-term timber production. Indeed, the practice of commercial exploitation remains a key component of Malaysia's approach to biodiversity management, leading to shallow forest resource

and biodiversity management practices on the ground [28].

The “Bikam Permanent Forest Reserve dilemma” as discussed above offers a good illustration. Indeed, it is the most valuable pointer that even the natural environment is legally protected; it is by no means safe from man’s mindless exploitation or thoughtless destruction. Such exploitative mode of human behaviour symbolizes the lost of harmony of “mechanised” human race with nature.

It is equally irrefutable that in the Philippines, despite the imposition of a logging ban on old-growth forests and the enactment of numerous legislative controlling measures, its remaining forest is being depleted at an alarming rate. Manifestly, various factors such as the abuse of logging concessions, illegal harvesting, and unsustainable use of forestry resources have worked to frustrate the sustainability purpose of these environmental laws and management policies [29]. Again, these provide incontrovertible evidence that the fervent pursuit of Almighty Dollar or socio-economic progress serves to encourage wanton destruction of nature and overexploitation of natural resources.

It is increasingly becoming apparent from the aforesaid discussion that the force of economic growth and the desire for increasing material consumption are so strong that national legislative instruments designed to protect the environment tend to change in a highly unfavourable direction when it comes to the implementation stages. Indeed, at times, environmental policies are construed by the economic agents in the region as imposing a drag on production activities and economic growth. It seems that the environmental legislative instruments have remarkably little influence on the mechanical view of nature of the “mechanised” economic agents.

For these reasons, we may claim that the environmental problems in the region are to a great extent, an ethical and behavioural problem — a moral failure. That is to say, there is a lack of a sense of environmental awareness and an ethic of moral concern for the welfare of future generations on the part of the economic agents when optimizing the economic use of nature. In addressing the behavioural dimensions of environmental sustainability, it is important to consider the role of environmental ethics in influencing individual behaviour and government policy concerning resource management and conservation practices. This will be discussed in the next section.

## VI. ENVIRONMENTAL ETHICS — THE KEY TO SUSTAINABLE ENVIRONMENTAL DEVELOPMENT

Environmental ethics provides a moral basis for engagement with environmental problems confronting us today. Still more important is the claim that it has an important role to play in influencing human responses to environmental sustainability. Environmental ethics may be defined as a set of moral principles that guides certain forms of right human conduct towards nature. Here, we may safely begin our discussions from the philosophical foundations of Aldo Leopold’s land ethics.

According to Leopold, who is commonly hailed as the “father of modern environmental ethics”, we abuse the use of land (nature) because we regard it as a commodity belonging

to us. However, when we see land as a community to which we belong, we may begin to use it with “love and respect” (p. 223) [30]. For Leopold, such ethics of human-nature interactions tend to encourage us to do the right thing in “preserving the integrity, stability, and the beauty” of the environment (pp. 224-225) [30]. Leopold defines ethic as “a limitation on freedom of action in the struggle for existence” (p. 202). This means that human race should exercise ethical constraints when exploiting the economic use of nature.

Leopold’s philosophical principle of land ethics requires us to extend an ethical sense of responsibility or moral consideration to nature when attempting to exploit its instrumental or economic value. An object is said to be instrumentally valuable if it serves as a useful means for acquiring something else of value. For instance, natural resources are instrumentally valuable because they serve as a means for promoting economic growth or improving material wellbeing. Fundamentally, an instrumental value is always a function of usefulness.

Instrumental value may be contrasted to intrinsic value which is not a function of object’s usefulness. Furthermore, intrinsic value is independent of any human evaluation. When we say things are intrinsically valuable, it means that they have value for themselves, for what they mean, for what they stand for in themselves. In other words, things that have value in themselves means that it is worthy of being appreciated and valued for its own beauty, aesthetic experience or other non-economic values which give us satisfaction. In view of these, it is entitled to ethical concerns of love and respect.

These are some of the most important philosophical principles underlying Leopold’s land ethic and they are the basis for our new common sense in dealing with nature. The upshot is that environmental ethics calls us to consider the ethical dimensions of our relations to nature, and at the same time, to renounce our human-centered attitude and to treat the environment in ways that would protect its integrity, stability, and beauty (the intrinsic value of nature).

Such ethics of human-nature interactions have tremendous influence on decision-making as they tend to encourage policy makers to assume greater responsibility for prudent use of natural resources while optimizing its economic or instrumental use. Furthermore, if society at large abides by the ethical code of conduct in the economic or instrumental use of nature, it will help to avoid large-scale or irreversible environmental degradation. Indeed, the positive impacts of land ethics in promoting sustainable resource use have been demonstrated based on the author’s extensive field research with the indigenous people in the tropical rainforest in Sarawak in Malaysia between 2007 and 2011 [31].

## VII. ENVIRONMENTAL ETHICS: EMPIRICAL EVIDENCE AND IMPLICATIONS

The field research was conducted in the indigenous settlements located mostly in the forest interiors in Bintulu, Sibui, Miri, Mulu and Kuching in Sarawak. The main purpose of the research was to gather qualitative data through in-depth interviews with the local people concerning their land perceptions, environmental morality systems, and traditional land use practices, among other areas of interest. The 5-year

field research covered 50 villages, and on average, 10–15 households in each village were interviewed. On the whole, the field research reveals clearly the moral and environmental positions of the local communities in fostering carefully managed and sustainable uses of their ancestrally inherited land and forest resources. The findings of the research may be summarized as follows:

- 1) All the respondents interviewed unanimously concurred that they are bonded by their customs (adat) to use their land resources sustainably for the benefit of their descendants - a reflection of moral concern for future generation and the observance of the principle of intergenerational equity.
- 2) All the local communities show due respect and passion towards their land and forests inherited from their ancestors – a reflection of spiritual importance of nature which represents one form of intrinsic value.
- 3) All those who have travelled to town areas feel that they are happier living in the forests than in the town because the forested areas are the original home to which they belong – a reflection of the psychological importance of nature and the appreciation of the intrinsic beauty of nature.

Implicitly, based on the strength of belief of a mixture of ethical, environmental, and philosophical wisdoms, the local communities assume a holistic posture in holding a deep respect for their natural surroundings and exhibit an earnest desire to live in harmony with nature. It is these ethics of human-nature interactions that dictate the distinctive ways in which the local peoples must behave concerning their land use patterns, that is, to preserve “the integrity, stability, and the beauty” of the environment when optimizing its instrumental use for socio-economic sustenance. Indeed, it is this cultural and ethical orientation towards nature that has enabled the indigenous communities to protect the ecological integrity of their forest landscapes for the past few centuries as confirmed by the author’s numerous field trips to the forest interiors.

Now, the question is: can the indigenous land wisdoms and traditional patterns of human-nature interaction provide a role model of sustainable resource use in today’s environmentally overstressed and ecologically degraded world? I think it certainly can. Indeed, the state of environment in the world in general, and in the Southeast Asian Big-3 in particular would not be at the critical stage of environmental deterioration they are in today had they embraced the indigenous worldview of ethical belief and environmental attitudes when optimizing the instrumental or economic use of nature.

What may be stressed at this point of analysis is that sustainable resource use and environmental conservation cannot be decoupled from the ethical principles of environmental sustainability. It is also explicitly clear that if policy-making concerning resource use were predominantly dictated by economic motives or instrumental values, there is little hope that the growing ecological impairment in the region could be contained effectively based on legislation alone.

The conclusion is that all strategies for environmental protection or biodiversity conservation are not just solely concerned with legislative requirements. On this account, it is fair to say that the unsustainable course of development in the

Southeast Asian Big-3 region is unlikely to be mitigated, let alone halted, so long as the ethical precepts for sustainable resource use do not find an unequivocal expression in economic reasoning or legislative order.

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