

Ecology matters: sustainable development in Southeast Asia

Victor R. Savage

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Abstract Based on empirical evidence in Southeast Asia, this paper critically evaluates the concept of sustainable development based on four themes: population growth and distribution, the capitalistic system, ecological systems and the nature of development. It argues that the development of capitalism took place in both Europe and Asia and is thus culturally neutral. Capitalism, however, is associated with materialistic values and the growth of consumption, and hence is a major social process and structure in undermining ecosystems and biodiversity. While the concept of sustainable development has varied interpretations, this paper asserts the need to contextualize sustainable development with an ecosystem paradigm, whether qualified as cultural, human, political or cultural. Given that cities are likely to be the norm of living in the future, it is imperative that governments focus on sustainable urban development. Cities have two very different environmental contexts. The intra-urban area is a human engineered landscape that is confronted by ‘brown issues.’ These brown issues are exacerbated by the lower circuit of urban dwellers, the poor slum and squatter dwellers. The upper circuit of wealthy, urban residents contribute to the wider extra-urban ecological implications due to their high consumption patterns. They are the major contributors to the size of the ecological footprint. The paper concludes that though there are many prescriptions to curb environmental deterioration and ecological degradation, the

long-term solutions will lie in changing consumption habits, lifestyle goals and value systems. These require an ecological prescription in political thinking, economic activities and educational systems.

Keywords Sustainable development · Urban ecosystems · Ecological footprint · Capitalistic economic system · Sustainable urban development

Introduction

Our biggest challenge in this new century is to take an idea that sounds abstract—sustainable development—and turn it into reality for all the world’s people (Kofi Annan, United Nations Secretary General, 2001).

It is often surprising to see why certain terms, phrases and concepts in academic literature catch on while others fall into oblivion. One such term that has caught the world’s imagination is ‘sustainable development.’ After its introduction by Gro Brundtland in *Our Common Future* prepared by the World Commission on Environment and Development (WCED 1987), the term ‘sustainable development’ seems to have developed a whole literary life of its own. Since 1987, at last count, there are conservatively 50 definitions of sustainable development coined by academics and intellectuals, non-government organizations (World Bank, IUCN, OECD), government and state commissions and government leaders (see Monto et al. 2005, pp 157–166).

Given the other pertinent concepts along a similar theme (eco-development, environmental development,

V. R. Savage (✉)
Department of Geography, Faculty of Arts and Social Sciences, National University of Singapore, 1 Arts Link, Singapore 117570, Singapore
e-mail: geosava@nus.edu.sg

green development), one might wonder why the “oxymoronic,” “vague” and ambiguous concept of sustainable development (see Satterthwaite 1997; Toman 2006; Solow 2006) has become such a popular concept among such a widespread group of people, governments, intellectuals and institutions. I would give three reasons for the popularity of the term. First, sustainable development provides a more ‘neutral term’ in dealing with environmental and green issues that unfortunately at the time of its introduction was viewed negatively by corporations and even governments. Without any reference to ‘green,’ environment or ecology, the concept ironically was more palatable to a wide spectrum of people. Second, ‘sustainable’ is a more acceptable term because it allows for a multitude of interpretations and applications from multi-disciplinary and inter-disciplinary perspectives. Now one talks of sustainable agriculture, sustainable tourism, sustainable industrialization, biogeophysical sustainability, sustainable consumption, sustainable rural development, sustainable urban development, sustainable communities, besides other applications. And third, the initial catchphrase that encapsulated Brundtland’s concept, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs,” has mass appeal because it is future orientated and a “politically correct” stance of our times. This is an issue that can be used effectively for political, economic and social mileage by a wide spectrum of interested parties such as commercial firms, governments, entrepreneurs, politicians and non-government organizations. Furthermore, the catchphrase has resonance across cities, provinces, countries and regions in the underdeveloped, developing and developed worlds.

Given its multitudinous references, ideas, concepts and applications, the aim of this paper is to evaluate critically the conceptual grounds of the usage of sustainable development and relate it specifically to urban environments and the ecological footprint; defined as an “accounting tool that enables us to estimate the resource consumption and waste assimilation requirements of a defined human population or economy in terms of a corresponding productive land area” (Wackernagel and Rees 1995, p 9). In doing so, I draw particular exemplifications from the Southeast Asian region. I have chosen a wider conceptual canvas to deal with the sustainable urban development in the region because any realistic prognosis of the issue cannot be done through myopic lenses. My concern here is two-fold. Firstly, this paper focuses on the eco-logic of sustainable development and wonders whether in fact sustaining development can be met in a world drunk on

capital accumulation, materialistic demands, industrial production, consumer driven economic production, unequal trading relationships and growing expectations for conspicuous consumption. Secondly, this paper draws attention to the importance of sustaining urban development in Southeast Asia from both an intra-urban and extra-urban perspective. Specifically it argues that cities have to be treated both as ‘natural’ ecosystems and artificial, domesticated cultural environments that in some ways are linked to the formal and informal sectors of the dual economies of Southeast Asian cities.

Fundamental issues on sustainable development

The concept of sustainability is not solved by optimizing environmental quality at any price, but by the search for virtuous relations among environmental, social, territorial, economic and political sustainability, harmonizing basic needs, self-reliance and eco-development. From this point of view, the problem of environmental sustainability cannot be isolated from the relations between the action patterns of the settled society and the environment itself (Magnaghi 2005, p 42).

There are four foundational features that we must address with regard to any serious discussion of sustainable development programs and sustainable urban development. Specifically, these are the human, population and urban factors, the capitalistic modes of production and their ramifications, comprehending the ecological issues that govern our global system and evaluating the nature, goals and intent of the developmental trajectory.

Population growth and its implications

In the post-World War II period, the global population has grown rapidly and unequally. It was Paul Ehrlich’s (1968) book, *The Population Bomb*, which sold 3 million copies that dramatically drew global attention to runaway population growth. For some countries, population growth was seen in strategic terms as a testament to national power. In Southeast Asia, Prime Minister Dr. Mahathir had expounded raising Malaysia’s population from its 18 million in the late 1980s to over 70 million in 30 years. But for many other countries, population growth and its concomitant requirements for food, shelter, education, medical needs and jobs were viewed as a serious challenges for sustaining developmental programs.

In Asia, China and India account for over 40% of the global population, and while this huge population has currently enhanced its economic progress and prowess, both governments are also wary about the limitations that such huge populations can have on their future development. Everything being equal, the neo-Malthusianist arguments on population size and growth undermining environments do hold. China's population between 1950 and 2050 will have increased by 160% while India's population for the same period will have grown by 400% (Lomborg 2001, p 47). Both countries recognise they face immense environmental problems that are snow-balling with economic growth tied to their large populations and growing expectations.

Even at the 1.5% natural increase, Southeast Asia's current population of 557 million (2005) will grow to 695 million by 2025 and 795 million by 2050 (Table 1). In Southeast Asia, the biggest population increases came in the 19th and early 20th centuries under colonialism. Java had probably the highest population increases during the Dutch colonial period than any other place in the region. Population grew at 2.48% from 1815 to 1845 and 2.64% from 1860 to 1870 with mixed negative (famines and destruction of handicraft industries) and positive (reduced infant mortality, increase in cultivated area and improved agriculture) results and impacts for the island (White 1973). In his classic essay on Indonesia's eco-economy (swidden vs. sawah ecosystems) under Dutch rule, Clifford Geertz (1963) argued how population surpluses led Java to a situation of "agricultural involution." This large surplus population still plagues the Indonesian economy

and government today in terms of bureaucratic and urban involution (Armstrong and McGee 1980).

Paul and Anne Ehrlich (1991) wrote dramatically about the "population bomb" in the 1960s, and despite toning it down, their message nevertheless still demonstrates serious challenges in three areas: food, agriculture and public health. Certainly all things being equal, highly populated countries face greater challenges in these areas. But studies demonstrate that even with food resources, it is not the lack of food globally or nationally that leads to famines, but the unequal distribution, the inequality of economic resources and poor access to affected areas that are more critical factors (Lappe and Collins 1977). One must address the political economy of food systems as well as the science of the agricultural production of food crops.

Since the 1960s, the global awareness of rapid population growth has led to massive family planning programs in many developing countries. The most draconian family planning schemes and their implementation were not surprisingly found in China and India. In China, it was the promotion of a one-child family, while in India it was sterilization programs for both males and females. In Singapore, the government's successful campaign was "stop at two" (only two children), a policy so successful that population growth has fallen below replacement levels. However, in most Asian societies where children are seen as blessings from God and large families as symbols of fertility and prosperity, such draconian family planning schemes often were not well accepted. Two qualifications need to be made with regard to comprehending

Table 1 2005 Southeast Asian population data

	Population mid-2005 (millions)	Rate of natural increase (%)	Projected population (millions)		Percent of population of age		Life expectancy at birth (years) total	Percent urban
			2025	2050	< 15	65+		
Southeast Asia	557	1.5	695	795	30	5	69	38
Brunei	0.4	1.9	0.5	0.6	32	3	74	74
Cambodia	13.3	2.2	18.9	24.6	37	3	56	15
East Timor	0.9	2.7	1.9	3.3	41	3	55	8
Indonesia	221.9	1.6	275.4	308.4	30	5	68	42
Laos	5.9	2.3	8.7	11.6	40	4	54	19
Malaysia	26.1	2.1	36.1	47.0	33	5	73	62
Myanmar	50.5	1.2	59.0	63.7	29	5	60	29
Philippines	84.8	2.3	115.7	142.2	35	4	70	48
Singapore	4.3	0.6	5.1	5.2	20	8	79	100
Thailand	65.0	0.7	70.2	73.2	23	7	71	31
Vietnam	83.3	1.3	103.2	115.4	29	7	72	26

Source: Population Reference Bureau, Washington (2005)

the population factor in the sustainable development equation.

The first challenge in population ironically has to do with the progress in medicine and public hygiene. The improvements in sanitation, food security, clean water and medicines have enhanced life spans (Lomborg 2001, pp 45–59). Globally, the average age will have increased from 27 years in 1950 to 33 years by 2020 (Lomborg 2001, pp 48). In the developed world, life spans average over 70 years of age. In Southeast Asia, the life spans vary among the 11 countries. In the poorer countries like Laos, Cambodia, East Timor and Myanmar, the life span is shorter than in the more developed countries (Brunei, Malaysia, Thailand and Singapore). For example, life expectancy in Laos is 54 years and 55 years in East Timor compared to 79 years in Singapore, 74 years in Brunei and 73 years in Malaysia (see Table 1). For the more developed countries in the region as elsewhere in the world, 2006 marks the beginning of the ‘senior citizen’ population of post-war baby boomers (1946–1964) reaching 60 years old. This aging and retired population will have ramifications for health care needs and costs. In the US, 77 million baby boomers will be retiring in 2006, while in Japan, 8,500 people, on average, will be celebrating their 60th birthday every day in 2006. In Southeast Asian countries, governments have to contend with one of two sets of dependent populations, young and old. Young children below 15 years of age make up 41% of the total national population for East Timor, 40% for Laos and 37% for Cambodia, whereas people older than 65 years are a growing sector accounting for 8% of the population in Singapore, 7% in Thailand and 7% in Vietnam (see Table 1).

Secondly, there is ample evidence to show that it is not population size per se that is undermining environments, but rather lifestyles that cause environmental degradation and the loss of biodiversity. Affluence supports a greater demand for material goods and services, fuels fetishes, desires and wants, creating a sense of wastefulness in human behavior. The industrialized countries, with 26% of the world population, account for 78% of the production of goods and services, 81% of energy consumption, 70% of chemical fertilizers and 87% of armaments (Escobar 1995, p 212). Or, at the individual level, one American spends as much energy as 7 Mexicans, 55 Indians, 168 Tanzanians and 900 Nepalis (Escobar 1995, p 212). Not only are people in the developed countries using more resources than their counterparts in the developing world, they also create more environmental damage to their environments because of their very exploitative and inefficient systems. In his book, *Man’s*

Responsibility of Nature, the philosopher, John Passmore (1974), noted that 18 million Australians caused more land degradation in Australia compared to 850 million Indians in India. Economic wealth, conspicuous consumption and growing demand for material goods are contributors to dwindling natural resources and degradation of environments. The tragedy is that as China and India unfold their catch-up development strategies, they have set off another train of ecological impacts in other natural resource exporting countries. What is also interesting is that high population is not correlated with poverty per se. In the Philippines the most populous areas (National Capital region; Central Luzon and Southern Tagalog) had a consistently lower poverty incidence than the national average between 1991 and 2000 (Asian Development Bank 2005, p 21). This brings me to one of the major causes of environmental problems, the capitalistic system.

The capitalistic economic system

In the excitement over the unfolding of his scientific and technical powers, modern man has built a system of production that ravishes nature and a type of society that mutilates humanity. If only there were more and more wealth, everything else, it is thought, would fall into place. Money is considered to be all-powerful; if it could not actually buy non-material values, such as justice, harmony, beauty or even health, it could circumvent the need for them or compensate for their loss (Schumacher 1973, p 293).

From its nascent development around the 15th century or even earlier (Frank 1998), the growth and development of capitalism has become almost the universal economic engine for development around the world. Since the capitalistic system has become the avowed villain of many environmental problems around the world, we need to shed more light on its historical developments and global process. Two broad statements can be made about capitalism.

First, the globality and universalism of the economic system have been apparent since its rise in the 15th century or earlier. Immanuel Wallerstein (1974, 1980, 1989) in his monumental three-volume work, *The Modern World System*, discussed capitalism as the “modern world system” to underscore the pervasiveness of the economic system. The rise of capitalism has spawned a number of major works by Fernand Braudel (1975, 1982a, b), Eric Wolf (1982), Blaut (1993) and Andre Gunner Frank (1998), all of which deal with the global economy, the global system and the world economy. Indeed, the historical development of capitalism might be viewed as the first phase of

globalization in which communities were gradually included in an “interrelated political, economic and cultural system and into the evolutionary historical process that we call modernization” (Starrs 2002, p 3). Braudel (1982b, vol. 3, pp 21–22) saw the global process as the product of two systems that he distinguishes as the “world economy” as opposed to the “world-economy”. In the first case, the world economy refers to the whole world, the market of the world, whereas in the second, the world-economy concerns a “fragment of the world, an economically autonomous section of the planet.” Both systems operated at times side by side. The historical perspective is that the vibrant regional economies (world-economy) were the building blocks of the world economy (the global marketplace). Yet, whether as a universal (world economy) or regional (world-economy) system, the capitalist inroads are deep and extensive. Wolf (1982) demonstrates the power of the “self-regulating” capitalistic mode in embedding labor and commodities in generally ‘primitive’ societies, which he refers to as “people without history.”

The second issue about capitalism is whether the system is culture bound. Here, there is a raging debate about the ‘origins’ of capitalism. For Wallestein (1974, 1980, 1989), Braudel (1982a) and Wolf (1982), capitalism is developed in the west with strong Eurocentric perspectives. As Wolf (1982, p 79) notes, the growth of “capitalism-in-production is a historical, developmental process, originating in certain areas of the European peninsula.” For Blaut (1993) and Frank (1998), capitalism was an existing system in the Orient prior to the entry of European 16th century trading expeditions and colonialism. According to Frank (1998, p 324), Afro-Asian economic and financial development and institutions exceeded European standards in 1400 and even up to 1750. Contrary to Karl Marx’s Eurocentric view of the “theory of capitalism,” Frank (1998, pp 322–323) argues that China and India were well ahead of Europe economically, socially and politically, and even in technology. Through colonialism, however, Europe finally hijacked Asia’s thriving economic system and controlled it and in turn the global economy: “Europe climbed up on the back of Asia, then stood on Asian shoulders—temporarily” (Frank 1998, p 5). If capitalism is culturally neutral, it does demonstrate that it will thrive under different cultural systems in China, India or Indonesia.

The culturally biased and Eurocentric views of capitalism propounded by Marx and Weber were encased in such ideas as the Protestant ethic and rational spirit, which led to the thesis of the European development of capitalism and the ‘rise’ of the West,

but not the rest of the world (Frank 1998, p 17). Drawing from Marxian notions of ideology and the sociology of knowledge, Eric Wolf (1982) provides a more structural underpinning of capitalism in concluding that the relation between nature (commodities, natural resources) and culture is “mediated by the prevailing mode of production.” He identified capitalism as one of three modes of production to which societies in the past were exposed. The capitalist mode of production, he argues, is based on division of classes (those who control the means of production and those who produce surpluses), which “continuously re-creates that differentiation” (Wolf 1982, p 79). The growth and development of capitalism has thus become a self-perpetuating economic system because it first develops in human beings a desire for materialism and class differentiation and then seeks to fulfil those materialistic wants and status needs in productive terms. Such human desires, needs and wants are structurally defined and thus can transcend cultures and societies.

In his masterly thesis, Braudel (1975, pp xii–xiii) notes how capitalism, “the vanguard of the economic life of the past,” underscored the growing spread of “material life,” defined as “old routines, inheritances and successes” and denoting “repeated actions, empirical processes, old methods and solutions handed down from time immemorial, like money or the separation of town from country.” Instead of looking at the victors and elites, he chose to show the spread of materialism among the masses, the people who lie “outside the lively garrulous chronicles of history” (Braudel 1975, p xv). Yet one needs to be reminded that pre-capitalistic societies were not materialistic and consumer-orientated societies. Marshall Sahlins (1972, p 2) notes that the hunting and gathering societies are the “original affluent society” because their “material wants are finite and few,” whereas their “technical means” are “unchanging but on the whole adequate.”

The above debates on the western origins and growth of capitalism, the structural edifice of capitalistic systems and the overpowering economic and political impact of colonialism have not escaped the intelligentsia of both the developing and developed countries (especially the French Marxists). Mired by economic problems and exploited by multi-national corporations, Latin American social scientists have been the most vocal advocates against an unequal world and the exploitation of their people by the metropolitan powers of the developed world. Using generally leftist and Marxist theories and ideas, the *dependentistas* school of Latin American social scientists led by Andre Gunnar Frank (1972) have attributed the underdevelopment of

their countries to historical reasons (colonialism) and the current unequal contemporary capitalistic system (the hegemony of metropolitan First World powers). In Southeast Asia, the colonial hegemony was also evident. For example, in Indonesia, Polak calculates that the estimated income distribution for Indonesia in 1939 according to per capita income received by European, Chinese and Indonesian communities was distributed at the ratio of 61:18:1 (Golay et al. 1969, p 117). Up to 1957, a decade after Indonesian independence, 50% of all estate acreage was Dutch-owned and 60% of Indonesian foreign trade was “Dutch controlled” (Golay et al. 1969, p 180).

With a different objective, Edward Said (1994, p 70) translated colonialism as imperialistic in undermining ‘other’ cultures or at least “confining the non-European to a secondary racial, cultural, ontological status”. For Latin American social scientists, their radical prescriptions were to revolt and to de-link their economic systems from the global capitalistic system. Only Cuba has followed that sustained path, though other Latin American countries (Chile and Nicaragua) have flirted with it from time to time with socialist policies and governments.

But the radical Latin American prescription of weaning countries away from the web of capitalistic relationships is becoming more difficult to defend, much less attain. With growing globalization and information technology, it is more difficult for countries to isolate themselves from the global system. The fall of communist regimes and systems and the capitalistic liberalizations in Eastern Europe, Russia, China, Mongolia, Cambodia, Laos and Vietnam have also undermined advocates of the *dependentistas* thesis. The capitalistic modes of production are too embedded in societies, especially in consumption habits, styles of living, conspicuous consumption, materialistic goods and the growing expectations for a better quality of life that unfortunately is defined by capitalistic demands.

Following from the *dependentistas* school of thought, there is now growing recognition of eco-dependency between the metropolitan powers and the satellite clients in the developing world. There is no doubt that the ecological problem in the developing countries is a product of several outcomes of the capitalistic system: Firstly, ecosystems in the developing countries are exploited to fulfill the need for the raw materials and natural resources of urban consumption patterns in the developed countries. By and large, it is the developing countries that bear the weight of the ecological footprint of urban dwellers in developed countries. Secondly, the developing countries usually are the suppliers of raw materials and natural resources

for the industrial and service-orientated economies of the developed states. Thirdly, trading patterns between North and South are unequal, exploitative and favor the developed countries. This is the reason why Adams (2001, p 17) argues that green development is about political economy, about “the distribution of power, and not about environmental quality.” The political ecological perspective reflects to some degree a rejection of both the neo-Malthusianists’ and environmental determinists’ viewpoints on environmental problems. Fourthly, the problem with capitalism and the supposed pro-development organizations like the World Bank and International Monetary Fund (IMF) is the “commodification” of environmental goods such as water, energy, land and other social services that make it easy for institutions and power brokers to accumulate wealth by “appropriation and dispossession” (Bond 2004, p 105). Finally, one has to ask whether the current capitalistic system, predicated on materialism and consumerism, is a sustainable economic system for developing countries (see Schumacher 1973). Can the never-ending multiplication of economic demands continue without having serious effects on the environment?

The ecological paradigm

Ecological consciousness and deep ecology are in sharp contrast with the dominant worldview of technocratic-industrial societies, which regards humans as isolated and fundamentally separate from the rest of nature, as superior to, and in charge of, the rest of creation. But the view of humans as separate and superior to the rest of nature is only part of larger cultural patterns (Devall and Sessions 1985, p 65).

One of the problems with the term “sustainable development” is its lack of a specific in-built paradigm or conceptual framework. How does one derive sustainable development? What principles and methods should one use to achieve sustainable development? Yet, if one scans the plethora of studies on sustainable development, there is now a wide range of conceptual architecture on the theme, an extensive arsenal of models, paradigms, principles, methods, goals, targets and frameworks that all underscore sustainable development (see Monto et al. 2005). Unfortunately, there seems to be a free-for-all interpretation of the subject. Besides inter-generational equity, the term is widened by Australian green groups to include conservation of biodiversity and ecological integrity, maintaining constant natural capital and ‘sustainable income,’ social

equity, limits on natural resource use, qualitative development, pricing environmental values and natural resources, keeping a global perspective, efficiency of resource use, resilience and community participation (Hare 1990, pp viii–ix). Without dealing with the other issues, even the issue of inter-generational asymmetry of costs and benefits for the interests of those unborn, there are problems in getting the economics right. Besides the complexity of the cultural relativity of values, the economist, Clive Spash (2002, p 260), notes how economics has not dealt satisfactorily with the “time” (defined as inter-temporal and inter-generational) component and the issues of fairness and equity. In a rather candid appraisal of economic applications on environmental issues, especially greenhouse gases and global warming, Spash (2002, p 252) highlights the subject’s limitations due to its “rigid model of rationality” that reduces “value conflict” to risk-taking and trade-offs, but cannot handle key concepts of ethics, uncertainty and choice.

While sustainable development can be viewed through economic, social/cultural, political, or territorial perspectives (Magnaghi 2005, pp 48–54), from an environmental point of view, the concept needs to be firmly embedded in an ecological perspective (Odum 1963, p 3), be it a political ecology (Adams 2001, pp 250–284), human ecology (Boughey 1974; Hawley 1986), cultural ecosystem (Bennett 1976) or biocultural human ecology (Schutkowski 2006, pp 251–265) paradigm or perspective. All these qualifications of ecology attempt to embed the concept within a social science and human paradigm. However, hard sciences tend to view ecology from a biogeophysical point of view in terms of looking at the maintenance and improvement of “the integrity of the life-support system on earth” through concepts like “ecological capital,” biomass or energy stocks, diversity and flexibility of ecosystems, biological diversity and renewable and non-renewal stocks (Munasinghe and Shearer 1995). A somewhat integrated human–nature allied paradigm is to accept, modify and expand on James Lovelock’s (1979, 1988) Gaia thesis, which propounds that the world is one living organism. The ecological and Gaia perspectives underscore a fundamental point that humans share the world with other organisms, and we need to be cognizant of this fact.

As Odum (1963, p 3) notes, the root word of *oikos* in ecology means ‘house’ or more broadly ‘environments,’ and we should understand “that mankind is a part of nature, since we are using the word nature to include the living world.” The equating of ecology with a house is indeed important, because we need to embrace our world as our home and ensure we keep

our home as a liveable environment. We do not have accurate data on the number of species in the world, but we know that 1.6 million species have been counted to date (Lomborg 2001, p 250). Despite the plethora of species, the world is a finite place. Despite the idea of renewable natural resources, pollution and environmental degradation delimit usage. The world is even more circumscribed in terms of living space, which means that management and careful usage become even more imperative.

To translate the ideas of human, political or cultural ecology in terms of sustainable development would mean adopting an ideology of ecologism (Dobson 2000, pp 1–12). The ecologism ideology dictates that we cannot achieve sustainable development without “radical changes in our relationships with the non-human natural world, and in our mode of social and political life” (Dobson 2000, p 2). For Aldo Leopold (1970, pp 237–239), that radical change in human nature relationships has to be defined by instituting a land ethics to guide “social” (as opposed to anti-social) behavior vis-à-vis nature to ensure human “obligations” in land relationships and to embed human beings as a “member and citizen” of the land-community. In short, the world is our home and human beings are members of an extended community. While Leopold (1970) talks in terms of a “land ethics,” Carolyn Merchant (2003, pp 229, 246) calls for a “partnership ethics,” which underscores her claim of finding new ways to achieve sustainable relationships with nature by recognizing that the fates of nature and humanity “are deeply intertwined” and that both voices need to be heard in a “nondominating, non-hierarchical” mode of interaction.

In trying to embrace ecological ideas into human perceptions of the world and our behavioral human nature relationships, we do not need to romanticize nature. All aspects of nature go through cycles of life and death, growth and decay. I think there are valuable lessons that we can learn from the respect of nature in age-old traditions and religions. The revival of indigenous knowledge is a step in the right direction to trying to reconnect with nature through the mindsets, lenses, wisdom and visions of our forefathers. The Japanese scholar, Kinji Imanishi (2002), in his seminal work, *Seibutsu no Sekai* (The World of Living Things) bridged the gap between the theological belief of life (God created the world) with the science of evolution and ecology quite creatively. He accepts that while God created life, God did not create the diversity of life forms. The life forms on earth are a product of the science of evolution and ecology, of organisms as species societies (*synusia*) evolving in relationship to

different other species and ecological (environmental) systems. Organisms including human beings have demonstrated over time “creativity” and “spectacular evolution”: “All organisms are creative, but whether evolution is encouraged or not ultimately depends upon their social place in the whole community of living things” (Imanishi 2002, p 73). The “environment” that organisms operate in is particularly important because it is the “place where organisms express their content of living.” The environment is not passive, but an interactive place that represents “an extension of the living thing and at the same time the living thing is autonomous and governs the environment” (Imanishi, 2002, p 38). Human beings must recognize their place in the community of living things or else we undermine our own life span as a species.

While there has been much public discussion on “green” and “environmental” economics, the most pertinent development recently is the return of the ecological perspective into an area where it matters most for sustainable development, the economy. Lester Brown’s (2001) book, *Eco-Economy*, and Mick Common and Sigrid Stagl’s (2005) masterly work, *Ecological Economics*, are a timely step in the right direction. Brown’s (2001, p 77) poignant reminder that an “economy is sustainable only if it respects the principles of ecology” should be heeded by corporations, entrepreneurs, politicians, citizens, governments and officials. Common and Stagl (2005, pp 58–63, 389–401) provide a comprehensive integration of both ecological ideas (evolution, coevolution; equilibrium) and economic principles (precautionary principle; risk; cost-effectiveness) in arriving at policy decisions about resource depletion and environmental damage. There is sound economic logic if we follow good ecological principles just as there are long-term economic benefits when we ensure a sustained ecosystem. Yet the very underbelly of environmental problems and poverty that Brown (2001) and Sachs (2005) focus on, respectively, in developing countries is unfortunately skirted and ignored—the very unequal international trading system. Without a major re-hauling of the global trading system and putting environmental equations on the World Trade Organization’s agenda, the current piecemeal prescriptions for solving eco-dependency and poverty and maintaining sustainable economies in the developing countries are likely to remain mere incomplete, ad hoc and ineffective solutions.

The nature of development

Development is a concept that defies clear definitions. The intellectual evolution of the concept is tied to the

idea of progress (Bury 1955) and material progress (Arndt 1987, pp 166). To a large extent, under the umbrella of economic development, the whole crusade for development has been defined by the post-World War II rise of ‘Third World’ states seeking to move up the ladder of progress to ‘First World’ status (Arndt 1987). Development is often intertwined with the notion of modernization. The conceptual literature might be rich on the subject, but development is very much a product of political vision, policy and ideology and national management capabilities. Unfortunately, in many developing countries, development is often caught up in nationalistic rhetoric and political ideology with little realistic application. Within the orbit of nationalism, development gets translated into status-making symbolic forms of building activity. At the end of the day, development is not about building new airports, golf courses, monuments, government buildings, sports complexes, cultural centers and museums per se. A Malaysian social activist had this to say about his country’s building boom: “Monumental physical development driven by strong capitalist profit tends to ignore and neglect the interests and welfare of that section of people who are often adversely affected by it” (Syed 2000, p 218). Development is about enhancing the software of society, of releasing creativity and talent in people, about ensuring individuals and families a better quality of life, safeguarding individual freedoms and equality and maintaining cultural integrity and pride. Development policies must not only be concerned with enhancing economic growth, but also ensuring an equitable spread of wealth and economic benefits within society.

For developing countries, development policies must remain realistic in vision, holistic in planning, and pragmatic in execution. Most of all, development policies, planning and programs must be sensitively integrated within the national cultural fabric of a society. Unfortunately for the developing countries (the then Third World), the 1949 Harry Truman doctrine of the “fair deal” was accepted by the United Nations as the panacea for the Third World through a total restructuring of underdeveloped societies, a policy and program that after 50 years of implementation is now said to be “amazingly ethnocentric and arrogant, at best naïve” (Escobar 1995, p 4). Instead of the prosperity, progress and abundance promised by theorists and politicians from the developed world, the dream turned into a nightmare for the developing countries. After 50 years, the Third World is still haunted by the spectre of debt crisis, famines, malnutrition, disease, violence and poverty.

In Southeast Asia, despite the positive national economic growth rates, 44% of the region's population is classified as living in poverty (i.e., living with below US \$2 a day) (Population Reference Bureau 2005). The percentage of people living in poverty in the region is embarrassing, from 78% in Cambodia to 33% in Thailand, a country with a booming economy. The best testimony of poverty in the developing world comes from Jeffrey Sachs's (2005) book, *The End of Poverty*. Among his criticisms is how aid agencies, the World Bank and the United Nations have provided prescriptions for poverty alleviation in places where the bureaucrats and officials have never visited. As Sachs (2005:226) argues, the poverty in developing countries also stems from deep-seated environmental disadvantages that countries face such as geographic isolation, disease vulnerability and climate shocks. Yet in Southeast Asia, the reasons for poverty are still awaiting fuller explanation and analysis. Sachs's (2005) quasi-environmentalistic explanations for poverty in Africa, might be difficult to apply in Southeast Asia, given the latter region's richness in natural resources. The curious situation in Southeast Asia is that its rich natural resources have not led to development, hence, the colorful phrase that the region is victim to a 'natural resource curse' (Coxhead 2005).

Fortunately, the United Nations and its members recognize the widespread problems of poverty in the developing world and still remain committed to its development concerns and goals. The best testimony to this is the adoption of the Millennium Development Goals (MDGs) by all 189 UN member states on 8 September 2000 to improve the lot of humanity in the new century (Khor 2003, pp227–250). The UN's MDGs demonstrate that development in the Third World is more than just overcoming issues of laziness and corruption. The UN agencies must also recognize that the mere application of science, technology and western-based 'rational' methods to problems in the developing world is not going to be the panacea for developing countries' problems.

The UN has set an ambitious agenda for development as outlined in its 8 goals and 18 targets for its MDGs (Khor 2003, pp 244–249). These goals and targets cannot be fulfilled unless there is a sensitive cultural and political ecosystem approach to alleviating poverty and other developmental challenges that are specifically applied to different cultural, political and social conditions. Such a politically and culturally sensitive approach to development is underscored by two trends in development referred to as the "participatory approach" (grassroots and local participation) to and the "gendering" (empowerment of women) of

development (Boserup 1975; Burkey 1993; Muraliedharan 2006). Both these alternative frameworks of development emphasize the environmental dimensions. Hence, the United Nations might take heed of Enrique Leff's (1995, pp 52–53) ecological applications to development planning in tropical countries when he highlighted the importance of "regional and local specificities," of "optimizing the primary productivity of biological cycles," of preserving the "productive potentialities of ecosystems" and applying an "integrated and sustainable management of biological diversity of complex tropical ecosystems" by generating "appropriate technologies for transforming those resources efficiently" that are appropriate for "the cultural and economic conditions of social formations."

Sustainable urban development

What is a sustainable city? Girardet (1999, p 13) offers this definition of a sustainable city, one that is "organized so as to enable all its citizens to meet their own needs and to enhance their well-being without damaging the natural world or endangering the living conditions of other people, now or in the future." Operationally, Michael Cahill (2002, p 110) defines a sustainable or "compact" city as one where "there are high-density housing, priority given to walking and cycling as transport modes with discrimination against cars and active promotion of public transport." The need to focus on the sustainable viability of cities is evident for three reasons. Firstly, cities are becoming the norm of human living globally. Urban living for the first time in human history will become the norm for human living globally in the 21st century. While 150 million people lived in cities in 1900, by 2000 this figured had exploded to 2.9 billion, a 19-fold increase. The urban share of the population globally increased from 10% in 1900 to 46% in 2000. In the developed countries, urban living has become the norm for the last century with about 75% of the population living in urban areas (Lomborg, 2001, p 49).

Secondly, while cities will become the way of life for over 70% of humanity by the end of the 21st century, on the time scale of human history, urban living accounts for less than 1% of human history. The growth of cities and urban life is thus a new experience for human societies. Human communities are hence still in an infant stage when it comes to adjusting to urban life. Many of the social, cultural and even political theories in the 19th and 20th centuries were focused on trying to explain human relationships within urban contexts (Tonnie 1988; Redfield and

Singer 1954). We need to understand whether urban living will change indigenous social and cultural systems and make them more homogenized globally or whether communities and societies will find new cultural and social expressions within their urban landscapes (see Mumford 1961). Urbanization has been depicted as the catalyst for modernization and social change, and cities have been adopted in planning as ‘growth poles’ in development theories (Gottmann 1961, 1983; Friedmann 1964, 1966). The growth and development of the city is also testimony to the ultimate human enterprise of creativity, innovation and human expression that we define as civilization. As Gideon Sjoberg (1960, p 1) notes, “the city and civilization are inseparable: with the city’s rise and spread, man (sic) at last emerged from the primitive state.” Yet, the history of urbanization shows that cities have enduring sustenance that has outlived civilizations, kingdoms and nation-states. Eduardo Mendieta (2004, p 23) argues that cities will be “the lingua franca of time keeping” of human societies from the post agricultural age to the age of megalopolises, infopolises and network cities.”

Thirdly, the importance of cities lies not only in their human–human relationships in cultural, social, economic and political arenas, but also the need to understand the human to nature and human to cultural landscape relationships within its human-engineered environments. What I am suggesting is that cities embody both an artificial, human-created environment at an intra-urban level and a more natural ecosystem relationship beyond its territorial borders, the extra-urban relationships. The importance of underscoring the environmental and ecosystem logic of cities is because mainstream modernization theories of development, which are applied blindly in Southeast Asia, are inherently ecologically incompatible. Hence, cities are typified as: “a capitalist mode of appropriating nature” (Leff 1995, p 115), “an infernal machine that consumes and squanders enormous quantities of energy and materials” (Spirn 1984, p 229), an “expression of the divorce between humans and nature” (Savage and Kong 1993, p 37) and “cancerous organisms” (Girardet 1999, p 61). Cities unfortunately are expanding, and urbanization is growing without careful thought to the relationship to earth, the environment and natural resources.

For the developing world, urbanization is a process in motion. While Southeast Asia as a region has one of the lowest percentages of people living in urban areas (38% in 2005) in the world, the rapid urban growth rate is likely to see urban populations reaching 65% by 2050 (Population Reference Bureau 2005). In

the region, urban growth has taken place in the last 40 years. Jakarta, for example, increased in population size from 2.9 million in 1961 to 9.2 million in 1986, its annual growth averaging at 4.6% (Sujarto 2002, p 79). In Southeast Asia, Singapore is the only fully urbanized country by virtue of its city-state status. The urban population in East Timor is only 8% of the total population, and it is 15% in Cambodia, 19% in Laos, 26% in Vietnam and 29% in Myanmar (see Table 1). Despite the current low rates of urbanization in the region, Southeast Asia has had a relatively long history of urban development, a product of indigenous, Chinese, Indian, Islamic and European influences (Evers and Korff 2000; McGee 1967; O’Connor 1983; Wheatley 1983). Given the religious, cultural and symbolic underpinnings of the urbanization process in the region, the scholarly treatment to date of Southeast Asia’s urbanism has focused on socio-political and cultural issues within a spatial context (Askew 1994; Evers and Korff 2000; Kusno 2000; McGee 1967; Nas 2002). More recent studies on urbanization in the region deal with demographic issues and trends (see Ness and Talwar 2005). There are hardly any comprehensive studies that deal with the region’s urban environmental issues. Even the Association of Southeast Asian Nations’ (ASEAN) environmental division is focused more on biodiversity and trans-boundary pollution issues than on the urban environment.

For many Southeast Asian countries (East Timor, Myanmar, Laos, Vietnam and Cambodia), rural living still remains the norm, and agriculture is the mainstay of employment and economic subsistence. However, Rigg (1997, p 153) notes that the rural urban divide in Southeast Asian cities is becoming increasingly blurred “as more and more people, and with increasing frequency, cross the ‘divide’ between the two;” rural areas are being ‘urbanized’ and urban areas have ‘rural’ characteristics. In a way, the rural–urban continuum underscores the urgent need to apply ecosystem perspectives to both rural and urban planning. Specifically, governments cannot address urban problems without paying attention to rural development issues. Indeed, without rural development, it is difficult to stem the tide of rural migrants into urban areas. One aspect of stemming the rural migration tide into cities in Thailand and the Philippines, has been what Jonathan Rigg (2001, pp 122–144) calls the “industrialization of the countryside” and “factories in the fields.” Yet such economic changes in the rural landscape have not kept rural dwellers from migrating into cities because the migration process is a complex product of urban ‘pull’ factors (informal sector and industrial employment)

and rural ‘push’ (de-agrarianization; de-kampong-ization) (kampong is the Malay term for village) factors (see Rigg 2001, pp 101–144).

The migration into cities and rapid urban growth in the region are likely to cause disruption for many societies if governments do not manage these issues in a holistic manner. Added to the growing urban problem in the region is the explosion of megacities (a population of over 10 million). Bangkok, Jakarta and Manila are now classified as megacities, and their urban problems are becoming legendary. Other megacities are likely to develop in Vietnam (Ho Chi Minh City) and Myanmar (Yangon). For both the mega- and smaller cities, rural to urban migration remains a continuing process that undermines infrastructure, enhances unemployment figures and threatens social security. The fact that megacities in the region still continue to be a magnet for rural populations both at the intra-national and extra-national levels demonstrates that they are still economically vibrant. Such megacities in Southeast Asia are likely to stop attracting rural populations if they sustain economic downturn for long periods, a situation that Sao Paulo (Brazil) is currently facing. Long economic recession and high unemployment (17% in November 2004) has dampened the attractiveness of the city and slowed the flow of rural migrants into the city (The Economist 2005, p 37).

Given the growth of cities and the rise of urban populations in developing countries and in Southeast Asia, the planning, implementation and maintenance of sustainable urban development programs is probably the most pertinent challenge for urban and state governments. Time is running short. While rapid population growth rates have been checked, the tide of rural migrants moving into urban areas is growing between 2 and 5% in various cities. Even without such rural-urban migration movements, cities in the region already face major infrastructural deficiencies and are unable to support adequately their resident populations. In order to address sustainable urban development realistically and effectively, there are two themes that need to be better comprehended and focused on by national and urban governments and authorities. One is the better understanding of urban environments and the other is the issue of the growing ecological footprint that urban societies leave behind.

Cities as ecosystems

We have subdued just about everything that moves, and the garden of the Earth’s wilderness is indeed

fast becoming one huge city. But rather than being paved with gold, its streets are paved with homeless people, fast-food restaurants, and, overwhelmingly, with concrete (Heinberg 1996, p 204).

In implementing sustainable urban development programs, one needs to get the eco-logic correct about urban areas. Despite the early recognition of ecology in urban areas by the Chicago School of Human Ecology and the Chicago School of Urban Geography (Yeates 2005), these ecosystem paradigms as applied to urban areas were short-lived because they had less to do with integrating an environmental perspective than with looking at spatial processes of urban activities through ecological processes.

Cities represent an environmental dialectic, which has been referred to elsewhere as the “micro” (creation of new urban landscapes) and “macro” (global hinterland linkages) perspective (Savage and Kong 1993, p 38). On the one hand, cities are viewed in a larger context (macro perspective) at different scales (McGranahan 2005) and “urban ecosystems” (Spirn 1984, pp 242–262). In this context, cities are viewed as more than the sum of their parts—cities are systems of energy and material flows, ecosystems linking air, water, land and living organisms in a vast network (Spirn 1984, p 243). The city is thus not only an “open ecosystem” where its survival depends on imports of energy and materials, but it is also a dynamic system that is able to absorb change with the ebb and flow of energy and materials. Indeed, the resilience of the urban ecosystem, which can be translated as the sustainability of the system, is very much based on whether it can absorb change and perturbations without the ecosystem breaking down. Spirn (1984, pp 246–250) views the urban ecosystem as a sum of other mini-ecosystems within its orbit: buildings, parks and open space. At the heart of this urban ecosystem are human beings sharing space, food and energy with the rest of the organisms. The scholars of the Millennium Ecosystem Assessment (2005, p 798) note that while cities might be equated with the human equivalent of a “livestock feedlot,” the development of urban centers is “tightly bound up with changes in the surrounding ecosystems” and that “urban systems are also linked to more distant ecosystems scattered across the globe.”

At another level, the city might be viewed as an aberration in the natural landscape. The city is a human-engineered, artificial and domesticated environment (Savage and Kong 1993). Most cities have built-up areas that cover 40–50% of the total land area of the city. Cities are thus spatial, organic and environmental breaks within a regional and global ecosys-

tem. Despite emphasizing the ecological perspective to sustainable development, my thesis, however, is that urban areas are not fully operational pristine ecosystems because their sheer concentrations of urban populations and the built-up areas make them unnatural landscapes. Cities are the personification of human planned, engineered, constructed and developed environments. The authors of the Millennium Ecosystem Assessment (2005, p 798) state that human systems within urban boundaries “are not functionally complete ecosystems.” Cities are essentially natural ‘deserts’ where nature almost enters by stealth or is transplanted by human agency. Critics call the numerous golf courses in cities ‘green deserts’ (Fahn 2004, p 51). In tiny Singapore, there are 22 golf courses serving about 56,000 golfers, but only 19 nature conservation areas. As Lester Brown (2001, p 188) contends, “cities are unnatural.” They require a “concentration of food, water, energy, and materials that nature cannot provide” (Brown, 2001, p 188).

The urban ecosystem differs from “wild” ecosystems in two ways. First, the urban ecosystem is “domesticated,” and ecosystem succession differs from wild ecosystems (Decker et al. 2000, p 687). In cities, the anthropogenic mobilization of carbon and nitrogen is so vast that it must be tied to the production and consumption of food and fuel, which in turn will explain the urban carbon and nitrogen cycles (Decker et al. 2000, 689). Second, urban ecosystems are “human-dominated” ecosystems that “serve human needs” and are managed by humans (Decker et al. 2000, p 687). Essentially, cities transform raw materials, fuel and water into “the built environment, human biomass, and waste” through “urban metabolism” (Decker et al. 2000, p 715). In the urban ecosystem, the ecological components of energy flows, transportation of matter, water systems, biological processes and spatial units are determined and shaped by human culture and activities. As Schutkowski (2006, p 22) argues, “human interference with the environment makes use of flows of non-genetic information. It allows available options of environmental transformation to be translated into strategies, rules and arrangements, which become part of their culture, part of their institutions.” Transportation and power systems dominate cities and in turn are major consumers of energy. Jakarta and Manila are oil-intensive urban areas, while Bangkok is said to be a natural-gas dominated city. In Bangkok, for example, the transport fuel sector has risen from 43% in 1973 to 56% in 1986 (Decker et al. 2000, p 696). Cities are also said to transform the ecology of their region not only in the micro-climatic changes, but also through the reshaping

of land surfaces, changing rivers and streams into canals, reworking the urban hydrological cycle, and reclaiming swamps and valleys (Satterthwaite 1997, p 1675). Singapore is a classic case of a city that has expanded its size by 15% over the last 3 decades due to land reclamation.

Despite accepting that the urban ecosystem is part of a larger climatic system, there are many conclusive studies that demonstrate that cities are sites of anthropogenic heat sources causing ‘heat islands’ not only in temperate cities like Tokyo (Ichinose et al. 1999), but also in tropical cities like Singapore and Kuala Lumpur (Nieuwolt 1966; Sani 1991; Tso 1996). The major urban centers of Southeast Asia are also highly polluted, experiencing especially air pollution. There are three sources of air pollution that affect urban residents indoors and outdoors: vehicles, industrialization and wood/charcoal energy uses for domestic purposes. The ambient air quality (measured by total suspended particles in micrograms per cubic meter) for Singapore is 31, Kuala Lumpur 85, Bangkok 223 and Jakarta 271 (Rock 2002, p 4). I will discuss the issue of vehicles in the next section and focus on industrialization and indoor energy usage here. These studies demonstrate that while cities might follow the ‘natural’ ecosystem processes, they cannot be considered ‘wild’ ecosystems because the urban landscape is not a pristine natural landscape, and human activities are not geared in concert with the natural ecosystem.

Given the dialectical and complex relationships that cities have with varied environments and landscapes, the challenges for governments, corporations and citizens are twofold. As cities are human-created environmentally degraded and increasingly unhealthy environments where the human species is a threatened organism, a more anthropocentric environmental response makes for social, economic and political logic. Despite its sacrilegious conceptions in green circles, I use the term anthropocentric in what Frederik Kaufman (2003, pp 320–322) calls “enlightened anthropocentrism”—that human beings are a “marker species” and hence “what is good for us is good for nature.” Human needs after all are not only physical, but also emotional and spiritual, and hence we do look “for morally significant interests beyond the realm of humanity” (Kaufman 2003, p 321).

In the extra-urban relationship between cities and their global hinterlands, we need a more ecological response. The Asian philosophic and religious traditions concerning human relationships with the environment provide the sound basis of what remains the scientific principle of ecology today: maintaining human harmony with nature. Whether it is the idea of

the reincarnation of life and hence the linkages of life between humans and other forms of nature in Hindu or Buddhist thought, the Taoist and Yin-Yang Chinese philosophies, or the Japanese idea of “*awase*” (harmonious, fitting-in) in human–nature relationships, we see the underlying ecological principles underlined.

Socio-economic outcomes

Given that cities are both human-engineered, domesticated landscapes and more natural ecosystems linked with a global ecosystem, I argue that this environmental dialectic is also embedded in the socio-economic dualisms of cities in Southeast Asia. Despite the fact that dualistic models are out of vogue and tend to “oversimplify a complex world” (Rigg 2001, p 142), my emphasis on the urban dualism is on its dialectical process, whether in the intra- and extra-urban environment or the socio-economic dualisms as propounded by various scholars in the region. Arising from the Dutch economist J.H. Boeke’s (1953) conception of dual city-country economies in Dutch Indonesia, over the post-War decades there have been greater academic elaborations of this idea and concept. While Furnivall (1956) applied the dualism concept to colonial administration and governance, in general, the dual or bi-polar idea was applied to economic activities especially in urban areas. Clifford Geertz (1963, p 34) referred to this urban dualism in terms of the ‘firm-centered economy’ and a ‘bazaar economy.’ Terry McGee (1970, p 1971) translated the dual economy in terms of a hawker-dominated informal sector in contrast to the capitalistic-driven formal sector of Western-dominated corporations.

Milton Santos’ (1979) gave the dual economy its most comprehensive analysis based on his conceptual framework of two circuits (upper and lower circuits). The lower circuit is equivalent to the “bazaar” or informal sector, while the upper circuit approximates the formal sector or “firm-centered” economy. More recently, John Mollenkopf and Manuel Castells (1992) have revived the “dual city” concept for the first world city of New York to demonstrate that post-industrial cities reproduce and maintain spatial differentiation, sociospatial distinctions, metropolitan segregation and cultural duality besides being mediators of tradition and modernity, local and global cultures. Even Saskia Sassen (1992) has tried to show the relevance of the “informal economy” in advanced economies and post-industrial societies. All these theories underscore two socioeconomic groups within Southeast Asian cities: the upper circuit is represented by very affluent, visible, well-educated, mobile, high-income people. They

represent, in many cities in the region, the *nouveau riche*. The lower circuit reflects the lower economic strata of cities, people who work as hawkers, maids, artisans, prostitutes, drivers and shop assistants and are resident generally in slum and squatter settlements. The urban poor represent what McGee (1971) calls the “proto-proletariat,” people who are economically exploited and politically not fully represented. What is evident is that both the upper and lower strata of urban society seem to grow at disproportionate rates.

The mix of this economic duality, the urban and rural spatial integration, is best encapsulated by Terry McGee’s (1991) concept of the “*desakota*” (i.e., village–town) in Indonesia. For Southeast Asian cities, it is the slum and squatter settlements that provide the underbelly of the informal economic sector, the bazaar economy, the lower circuit. In the Kelang Valley (the conurbation of towns around Kuala Lumpur), 20% of the population is classified as squatters (Syed 2000, p 217). In Southeast Asian cities, slums and squatter settlements house at least one-third of the urban population (Asian Development Bank 2005; Askew 1994; Balisacan 1995; Pornchokchai 1992). Among the urban poor, the bazaar, informal economy governs subsistence needs and requirements.

Both ends of the socio-economic continuum have environmental impacts in Southeast Asia. The lower circuit, as defined by its large slum and squatter settlements, its informal trade and hawking, underscores the problems of maintaining and sustaining livable, healthy human environments. What we see in intra-urban environments is the degradation of environments due to urban poverty and the lack of political power of the poor to change their deteriorating environments. In most Southeast Asian cities, air, land and water pollution have become commonplace. It is the megacities like Jakarta, Bangkok and Manila that are experiencing a worsening of service conditions and environmental burdens and are severely environmentally distressed (Millennium Ecosystem Assessment 2005, p 819). In the Philippines, poverty is related to environmental problems such as water supply and wastewater disposal, solid waste removal and indoor and outdoor air pollution besides natural resource issues (Asian Development Bank 2005, p 62). As adaptable animals, human beings are adapting to the filth and squalor of unliveable urban environments. Instead of progressing forwards, the human species is moving downwards in terms of its adaptation and use of degraded environments. For the urban poor, the degraded urban environments are cesspools of disease.

Herein lies the vicious cycle of urban poverty in the lower circuits and bazaar economy of cities. In some

ways, the poor underclass is not only a contributor to urban environmental problems, but also a victim. The relationship between poverty and environmental problems becomes an unending vicious cycle. In Thailand, Ross and Pongsumlee (1995, p 148) provide a succinct summary of the nexus between environmental degradation and poverty: “The environmental conditions are suffered by all residents and visitors, but unequally. Poorer people, especially those without land tenure and those dependent on the *khlongs* for their water supply, suffer most and have the least means available to adapt or protect themselves. These are also the people who gain the least from economic growth”. (*Khlongs* are Thai for canals or urban waterways.) Given their limited buying power, lower circuit, bazaar urban citizens are more reliant on their immediate hinterland for their survival. They might be best described as ‘ecosystem people,’ who are dependent on two or three ecosystems around their living environment.

Satterthwaite’s (1997, p 1681) contention is that it is not the size of an urban population that leads to the depletion of natural capital. There is enough evidence to show the disparity of natural resource usage and consumerism between the northern and southern populations that has little to do with Malthusian correlations. The rich and middle class citizens of cities in the region are the greatest consumers of the earth’s resources and hence have extra-urban environmental impacts. After all, urban residents command much higher economic power than the national average. Given the strong economic growth over the last few decades in the region, Richard Robison and David Goodman (1996, p 7) in their thought-provoking book, *The New Rich in Asia*, note the “explosion of an elite culture of materialism, individualism and conspicuous consumption based on the growth of private disposable wealth.” In Thailand, for example, Bangkok’s GDP is three times the national average, and the middle class is said to account for 70–80% of the city’s population (Millennium Ecosystem Assessment 2005, p 819).

The upper circuit urban residents live in beautiful residential areas, green spaces, environmentally friendly environments and aesthetically pleasing landscapes. In many ways, the rich urban dwellers live in a circumscribed oasis within a deteriorating urban system and environment. Rich urban consumers in turn represent the biggest culprits for the ecological footprint of any urban center in the region. Given their economic prowess, the upper circuit urban dwellers can afford to pay for their palatial homes, the upkeep of their home gardens and their conspicuous living. In general, the urban affluent have high consumption

patterns, use energy liberally, and are least interested in recycling and reusing materials. Their affluence, buying power, materialism, consumption habits and wasteful behavior have bearings on non-urban ecosystems and negative impacts of biodiversity in Southeast Asia. It is the affluent urban resident that has the most vehicles, the source of greenhouse gases in cities. Urban societies also consume the most energy: some 75% of fossil fuel production is consumed by urban activities, including intra-urban and inter-urban transport (Millennium Ecosystem Assessment 2005, p 818). It is cities, the sites of the greatest and most intense human activities, where greenhouse gases and anthropogenic aerosols emanate, a major cause in global warming and global climate change.

The urban rich residents are largely responsible for depleting the ‘environmental capital’ of the earth. These are not only cosmopolites, but also ‘biosphere people,’ who live on the provisions of a global hinterland and ecosystem. It is tragic that through an unequal capitalistic system, the rich are able to exploit the earth’s resources and capital through economic means and vested power. Hence, as Satterthwaite (1997, p 1685) notes, “richer groups will oppose what they see as controls on their right to consume or higher costs that arise from changed pricing structures to encourage conservation and waste reduction.” Globalization may not have been beneficial to all countries or societies (Millennium Ecosystem Assessment 2005, p 818), but it has enhanced the spatial reach of a global hinterland for the urban rich through the capitalistic economic system and information technology.

Hence, the urban nouveau riche are also the greatest consumers of products, material goods, food, drinks; they are conspicuous consumers. Ironically, while in the west environmentalism is viewed by Inglehart as an endorsement of “post-materialist values” (Kempton et al. 1995, p 9), in the nouveau riche societies of Southeast Asia, materialistic symbolism is the ultimate statement of success, progress and modernization. A post-materialistic environmental ethos, if it can ever be achieved in capitalist systems, even in the developed world, will only be possible in the region if there is a radical change in values and mindsets. At the end of the day, it is the capitalistic fuelled, status seeking, materialistic driven consumption frenzy (Bocock 1993) that underwrites the growing negative impacts on environments, the dwindling of natural resources, the undermining of biodiversity and the deterioration of landscapes. Unfortunately, few environmental conferences and books take the consumption issue head-on. It is thus notable that the United Nations Centre for Human Settlements (HABITAT 1998) conference in

Fukuoka was dedicated to “Promoting Sustainable Consumption in Asian Cities.” Without explicitly saying so, the conference recognized the issue of the ecological footprint and demonstrated ways to combat inefficient, wasteful and unsustainable consumption habits, especially in Asian cities and societies.

The intra-urban human domesticated environment

Alberto Magnaghi’s (2005) book, *The Urban Village*, postulates a “territorialist approach” to sustainability that in some ways comes closest to a realistic understanding of the urban ecosystem. His notion of the sustainability of the urban environment is encased in the idea of territory, a neo-ecosystem produced by humans that comprises three components: the natural environment, the built environment and the “anthropic environment” (Magnaghi 2005, p 42). The intra-urban landscape is thus a network of transportation routes, buildings, houses, factories and schools, sewerage and water pipes, electrical wires, parks and gardens, power and gas stations, canals and drains, and car parks.

My contention is that in the intra-urban area, the biggest problem lies in the deterioration and degradation of the environment. This deals essentially with urban governance that is unable to address the brown issues within cities. Garbage disposal, sewerage issues, clean water, efficient and clean energy, and air, land and water pollution are the most severe environmental problems confronting cities in Southeast Asia. The creation of polluted environments that are detrimental to human health creates in densely populated cities an environment of disease and ill-health. As David Satterthwaite (1997, p 1671) argues, “cities can become among the most health-threatening of all human environments as disease-causing agents and disease vectors multiply.” The annual costs of health problems and loss of productivity in three ASEAN cities testifies to this: US \$1.3 to US \$3.1 billion for Bangkok; US \$1 to US \$1.6 billion for Kuala Lumpur and US \$400 to US \$800 million for Jakarta (Marcotullio 2001). For tropical cities, the creation of ‘sick cities’ is even more amplified by a climate compounding the multiplication of disease vectors and the spread of malaria, dengue fever, filariasis, yellow fever, small pox, tuberculosis, dysentery, measles and diphtheria.

These urban disease-threatening environments are not only products of the current state governments in the region, they existed in colonial times as well. Batavia (now Jakarta) under the Dutch administration was, in the 18th and early 19th centuries, a city notorious for foul, pestilential and polluted air, a hotbed for miasmatic diseases, and wasknown as the “White Man’s

Graveyard” (Savage 1984, pp 160–169). Singapore under the British administration was in the late 19th and early 20th centuries a disease-prone place of zymotic diseases such as cholera, enteric fever, tubercular diseases, beriberi, malarial or remittent fevers, dysentery and diarrhea and “filth” diseases carried by “dirty people to dirty places” (Yeoh 1996, pp 90–91).

Given these life-threatening environments, should there be more concern for green or brown environmentalism? Would the mere creation of parks, botanical gardens and pocket gardens as well as the lining of roads with trees and flowering plants address the urban environmental problems in the region? The greening of cities is only icing on the cake. If the urban cake is not well developed, what is the use of the green icing? The main urban environmental problems have got less to do with greening campaigns and programs or maintaining biodiversity within the urban landscapes. The challenge of urban environments lies in tackling the ‘brown issues,’ the problems of garbage, sewerage, littering, waste disposal, air and water pollution, ensuring efficient, clean energy and providing clean water to citizens. The classic case of Pattaya, the tourist resort in Thailand, tells a sad story of how a total lack of a proper, comprehensive and holistic sewerage system led to practically the whole town emptying their semi-treated waste into the sea, the very natural resource that tourists come to enjoy. After several decades, the beach front cannot be used for swimming because its water pollution levels are environmentally unhealthy for humans. Pattaya is just one example of the environmental problems of beach resorts throughout Southeast Asia (Wong 2003, pp 427–428). The moral of the story is evident: brown issues have got to be tackled in a planned, comprehensive and systematic manner. It requires major investments in infrastructure that is hidden underground or behind walls, but is more important to the effective, efficient and sustained functioning of the city than investments in the visibility of symbolic buildings, national landmarks and urban monuments. If science and technology are the infrastructure of the urban landscape, the symbols of civilization, then science and technology must be also sensitively applied in the management of urban environments.

Many city governments in the region unfortunately have not addressed their brown issues directly. Urban and national authorities have swept such issues under the carpet and implement short cut and ad-hoc prescriptions in handling their brown issues. Garbage disposal is littered all around urban areas in available vacant lots, and the poor, squatter dwellers live off the urban garbage as a way of life in Manila, Jakarta and

Bangkok. These haphazard and ad-hoc solutions are the Achilles' heel of many cities in the region. They remain an environmental time bomb waiting to explode. The lack of proper garbage and sewerage disposal systems means the contamination of land and water systems that urban dwellers depend on. In Malaysia, for example, of the 110 rivers monitored for pollution, 16 were found to be seriously polluted and 71 slightly polluted (Rock 2002, p 122). The major sources of pollution in 1998 were agricultural run-off, domestic sewerage, earthworks and land-clearing activities (Rock 2002, p 122).

The sheer concentration of population in cities produces major headaches for garbage disposal. Most cities in the region are producing considerable garbage, and many have attained per capita garbage outputs similar to the developed countries. Based on the excess of 1 kg per capita per day, the Southeast Asian cities with high waste outputs include: Surabaya (1.08, 1993), Kuala Lumpur (1.29, 1989), Johor Bahru (1.0, 1990), Singapore (1.1, 1996), Bangkok (1.0, 1998), Chiangmai (1.87, 1998), Nakhonsawan (1.11, 1998), Rachaburi (2.78, 1998), Nakhonratchasima (1.41, 1998), Pattaya (1.63, 1998), Phuket (2.15, 1998) and Songkhla (1.11, 1998) (see Table 2). Of all the countries in the region, Thailand seems to have the highest number of cities and towns with very high per capita waste generation. This could be because of its large tourism sector in its cities and beach resorts, but the question remains whether the Thais are by habit high waste disposers. In either case, the Thais clearly require greater curbs on wastage and better schemes for recycling and reusing materials. Their poor intra-urban environmental track record is a tinderbox for the spread of disease and ill-health.

Given the high concentrations of population in cities, industrialization schemes have become the norm. Industrial estates in Thailand have poor environmental records. A Pollution Control Department

(PCD) study in 1998, which looked at 11 Industrial Estate Authority of Thailand (IEAT)-managed estates and 13 private estates, found that 65% had significant odor and dust fallout problems, most did not adequately treat and dispose of hazardous waste, and 43% were out of compliance with wastewater effluent regulations (Rock 2002, p 118). For many developing countries in Southeast Asia, the question is the trade-off between maintaining clean environments versus attracting industrial development. But is this a zero sum game? Is a country's industrial development going to be thwarted because it wants also to maintain healthy environmental policies? Michael Rock (2002, pp 23–42) uses Singapore as a case study to show how the city-state has attracted industries while maintaining strict environmental standards based on four lessons. Firstly, Singapore made its city an "industrial-world oasis in Asia" by engaging in "environmentally responsible" policies that together with its location and good labor force was a plus point in attracting industrial MNCs to its shore. Secondly, Singapore set up high environmental standards and a "fair command and control environmental agency" that attracted new environmental agencies. Thirdly, the government's wide control over land areas helped to build environmental considerations into industrial estate management. Fourthly, the government gave its command and control environmental agency political and economic clout in screening potential new industrial ventures for its environmental implications (Rock 2002, pp 37–38). Yet Rock's glowing appraisal of Singapore's environmental management has to be qualified because few other countries in the world have had a government in power for 46 years (1959-present), a government that owned over 80% of all land in the city-state by 1992 (Perry et al. 1997, p 166). Also, it does not have to contend with unchecked rural-urban migrants. Yet, the Singapore case study does show that, contrary to what

Table 2 Waste generation rates for selected Southeast Asian cities

Country	Year	Urban population	Generation rate (kg/capital/day)	Total waste (kg/day)
Surabaya	1993	2,700,000	1.08	2,916,000
Kuala Lumpur	1989	920,000	1.29	1,186,800
Johor Bahru	1990	300,000	1.00	300,000
Singapore	1996	3,000,000	1.1	3,300,000
Bangkok	1998	5,876,000	1.00	5,876,000
Chiangmai	1998	167,000	1.87	312,290
Nakhonsawan	1998	152,000	1.11	168,720
Udonthani	1998	137,000	0.62	84,940
Nakhonratchasima	1998	278,000	1.41	39,198
Rachaburi	1998	NA	2.78	NA
Pattaya	1998	NA	1.63	NA
Phuket	1998	NA	2.15	NA
Songkhla	1998	243,000	1.11	269,730

Source: Hoornweg and Thomas (1999)

state and urban authorities think, maintaining high environmental standards can be a major attraction for certain industries to a city. Hong Kong's high air pollution levels on the other hand are said to deter foreign skilled and talented labor from taking on jobs in the vibrant city.

In his controversial book, *The Skeptical Environmentalist*, the Danish political scientist, Bjørn Lomborg (2001), drew attention to the fact that while first world scientists were concerned with outdoor air pollution, for the developing countries, indoor air pollution was a graver threat to human health and life. The World Health Organization (WHO) showed that indoor air pollution caused 14 times more deaths than outdoor air pollution, and an estimated 2.8 million lives are lost annually to indoor air pollution, accounting for 5.5% of all deaths globally (Lomborg 2001, pp 182–183). The reasons for indoor air pollution in the developing world and especially among poor slum and squatter dwellers are not difficult to comprehend. In Bangkok, a 1990 survey showed that over 16% of the city's population lived in 981 slums (Pornchokchai, 1992, p 63). Poor families in Southeast Asia like other developing regions rely on traditional fuels like firewood, charcoal, dried dung, driftwood and various types of agricultural waste (rice husks, bagasse). In Thailand, the use of such traditional forms of biomass fuels accounted for 34.3 million tons in 1990 that emitted some 54.2 million tons of carbon dioxide (Wibulswas 1993, p 176). In addition, agricultural residues (rice straw, maize stalks, cassava, sorghum, soyabean, cotton) are burned in agricultural fields close to homes, adding to the indoor pollution. Unfortunately, there are few specific studies in the region that have assessed the extent, nature and impacts of indoor air pollution.

If cities represent the ultimate in human ingenuity in creating humanized landscapes, then it has failed miserably in many urban centers worldwide. The model of urban living in the developing world provides a dismal record of the way human beings are forced to live without choice and alternatives. Imprisoned by poverty, the exploitative nature of the capitalistic super-structure and the powerful enforced legality of an unequal political ecosystem, slum and squatter urban dwellers will continue to live on fringe urban ecosystems and as marginalized citizens in the socio-economic and political national systems. If poverty alleviation and the eradication of slums and squatters are not addressed in cities, then urban blight will remain, and no amount of greening and sprucing is going to wish the problems away.

It would seem that the management of intra-urban urban environments has to be tackled at three levels.

Firstly, governments need to provide a more equitable system of housing for especially the disadvantaged populations to eradicate slums and squatters and focus on the brown issues. Without attempts at addressing the social injustice within cities (Harvey 1973), the widening economic and social disparities of urban dwellers is likely to create conditions of civil unrest, political instability and insecurity as demonstrated by the Malaysian squatter riots in the early 2000s, the anti-Chinese riots in Jakarta and the never ending political demonstrations that confront Manila nearly every year. It is not hard to see why Manila faces so much civil unrest when one sees that urban poverty in the Philippines has increased from 28% in 1961 to 41% in 1991 (Balisacan 1995, p 1).

Low cost housing schemes are important in not only helping to close the gap between economically disparate groups of urban dwellers, it also provides for a holistic solution to brown urban issues. Good housing schemes solve numerous brown issues at one go: they provide modern garbage and sewerage systems, enhance public sanitation and hygiene, and provide electricity and clean water. In the region, Malaysia, Indonesia and Singapore have provided different housing schemes to tackle the housing problem for poorer urban dwellers. In Indonesia, for example, major private developers in Jakarta have built satellite towns for populations of 150,000 persons and more. In building these towns, the developers have ensured that besides the luxury houses, there are many flats within the estate for poorer people, who invariably are going to be employed by the wealthy residents as cooks, maids, gardeners, security guards and drivers. In the Malaysian example, the government has provided private developers a set amount of money for them to build houses for the poorer urban dwellers. Some developers have complained that the amounts per unit are too little and hence the flats that are built are sub-standard and of poor workmanship (Syed 2000, p 223). Contractors, however, bank on their profits building more upmarket housing and hence accept the government-directed low-cost housing directives with little protest. Yet the sub-standard Malaysian low-cost housing is said to quickly turn into "new slums" (Syed 2000, p 223). Finally, the Singapore model of public housing remains the standard for the region. With 86% of Singapore living in government-built flats that range from the low to the high end, the Singapore success story in public housing is a model for international scrutiny. The government has built more than 20 satellite towns in Singapore over the last 30 years, and each new town seems to be improving in terms of facilities, landscaping, transportation networks and the layout of flats.

Secondly, governments need to overhaul and redress their sewerage and garbage disposal systems in a fundamental manner. If a comprehensive and holistic urban sewerage and garbage system is not in place, then all urban development becomes ad hoc and patchy and will never be able to address sustainable environmental standards. Waste disposal systems, sewerage systems and clean water piping and distribution are the ‘common-pool’ environmental goods that governments must manage for the welfare of all urban residents. While these might be farmed out to private companies, the provisions of such environmental goods cannot be apportioned to only rich residents that can afford such facilities. An urban community, comprising upper and lower circuits of people, has to co-exist within a holistic environment. Given the growing threat of pandemics of Avian flu, SARS and other communicable diseases, urban environments must be maintained as healthy and hygienic public environments.

Thirdly, a sustainable ecosystem can only be achieved if the software of environmental awareness and appropriate eco-friendly behavior is in place amongst urban dwellers. Environmental civic consciousness needs to be embedded in citizens through public and school educational programs. Having visited Japan several times, I am most impressed by the high degree of Japanese personal civic consciousness in maintaining public hygiene and keeping up environmental quality. Here are lessons for many Southeast Asian cities, though one wonders how long it would take to arrive at the Japanese standards. Without sustained environmental education and public environmental campaigns, the software for sustainable urban development will be undeveloped. In many public environmental surveys in Singapore, it seems evident that while environmental awareness is strong among both young and older Singaporeans, this has not translated to good environmental behavior. It is also imperative that academics are engaged in the dialogues and contribute to “mainstream analysis” and urban debates without using “theoretical language that is inaccessible to nonspecialists even within the discipline” and thereby reproducing the “Ivory Tower mentality” that they profess to reject (Leitner and Sheppard 2005, p 363).

The extra-urban ecosystem: ecological footprint

While Singapore might maintain an enviable good environmental track record within its national boundaries, it is quite another story about whether the city-state is an environmentally friendly city in a holistic manner. As discussed earlier on, urban residents are by

far the most wealthy people in any country. More important is that nearly all countries in Southeast Asia are nouveau riche societies where the propensity for material goods and services, and flaunting symbols of affluence and status are almost the norm. Yet, this materialistic worldview, ethos and behavior have environmental ramifications. The environmental impact of urban dwellers is now encapsulated in the idea of the environmental footprint. Mathis Wackernagel and William Rees (1995, pp 51–52) define the ecological footprint as “the area of ecologically productive land (and water) in various classes—cropland, pasture, forests, etc.—that would be required on a continuous basis (1) to provide all the energy/material resources consumed and (2) to absorb all the wastes discharged by the population with prevailing technology, wherever on earth that land is located.” The ecological footprint is thus the measure of the land area needed to sustain the levels of resource consumption and waste discharge by a city, or at the individual level, it is the amount of ecological resources needed to support a human being in a particular society. At a national level, if all the countries wanted to enjoy the American and Canadian standard of living, we would need four to five earths. Specifically, the ecological footprint for an American person is 9.72 h, while the global average is 2.03 h (Williams 2005, p 130). London is said to have an ecological footprint of 125 times its size (Satterthwaite 1997, p 1677). Globally, even at current levels of consumption, the Worldwide Fund notes that we already need 1.2 earths. I would like to explore four areas of the ecological footprint that urban dwellers leave behind.

My first point is the amount of natural resources that are used up in other ecosystems due to the material consumption patterns of urban residents. For example, Singapore has the highest percentage of paper waste in the region even when compared to other countries rather than cities in the region. Based on the composition of waste, paper waste makes up 28.3% of total waste composition in Singapore (Table 3). Specifically, government departments in Singapore use 80,000 tons of natural pulp paper, and the Civil Service spent S\$53.7 million on paper in 1991 for duplicating, photocopying and typewriting (Savage et al. 2001, p 9). If this paper waste is translated in terms of trees turned into pulp, one can see the extensive deforestation that is needed to supply Singapore’s paper needs. To translate the 80,000 tons of government paper usage in natural resource terms would mean 1.2 million trees were required (Savage et al. 2001, p 9).

The second broad aspect of the ecological footprint generated by urban consumption patterns is based on

Table 3 Waste compositions in Southeast Asian countries

Country	Waste compositions (%)					
	Compostable	Paper	Plastic	Glass	Metal	Others
Myanmar	80.0	4.0	2.0	0.0	0.0	14.0
Laos PDR	54.3	3.3	7.8	8.5	3.8	22.5
Indonesia	70.2	10.9	8.7	1.7	1.8	6.2
The Philippines	41.6	19.5	13.8	2.5	4.8	17.9
Thailand	48.6	14.6	13.9	5.1	3.6	14.2
Malaysia	43.2	23.7	11.2	3.2	4.2	14.5
Singapore	44.4	28.3	11.8	4.1	4.8	6.6

Source: Hoornweg and Thomas (1999)

sustenance: food and water. In the past, there was a clear correlation between the size of the hinterland and the size of the city. A city's growth was reflective of the productivity of its hinterland. But in the days of pre-mechanical transport, societies were space bound and hinterlands were limited and hence the growth of urban centers was circumscribed. Today with faster land, sea and air transportation modes, hinterlands are global and cover vast ecosystems. Global cities depend on global hinterlands for their sustenance. Ironically, a measure of the global stature of a city is its global reach. Singapore is a classic example of a global city-state that depends on many countries and ecosystems for its water, staples, vegetables, meats, fish, beverages, health foods, spirits and other gastronomical delicacies. Given that the city-state has no natural resources and produces barely 10% of its food, it is understandable that the sustainability of Singapore's 4.3 million population requires an ecological footprint possibly 50–70 times larger than its current 697 sq km of land area to maintain its current standards of living and quality of life. Other cities in the region depend on their sustenance from a combination of domestic and international ecosystems. Yet, the ecological footprint of Singapore is likely to remain much larger than cities of similar population size in the region because Singapore's higher standards of living and quality of life are the major barometer of its extensive ecological footprint.

Unfortunately, urban dwellers also consume food, drinks, traditional medicines, aphrodisiacs, health foods and delicacies that have become a form of branding for many affluent urban dwellers in the region. For example, in Chinese restaurants in the region and in Hong Kong and Taiwan, live Napoleon wrasse (*Cheilinus undulatus* or *so mei*) and Hi-fin groupers (*Ephinephelus lanceolatus* or *lou so pun*) are available for their rich customers because these fish are status symbols and signs of wealth for the Chinese. These are some of the most expensive fish one can eat as a live

Napoleon wrasse weighing 25 kg can command a price of US \$150 per kilo (Aw 2002, p 19). A Napoleon wrasse can easily cost US \$800 in a Chinese restaurant in Singapore, Hong Kong or Taipei. The tragedy of eating such fish is the manner in which these fish are caught. Given that these fish are reef fish in the Philippines, Malaysia and Indonesia, sodium cyanide is used to stun these fish. The use of such highly toxic poisons in the process kills the reef life and destroys the marine coral ecosystem. In 1995, nearly two-thirds (25,000 tons) of all fish sold in restaurants in Taiwan, Hong Kong and Singapore were captured by using sodium cyanide (Aw 2002, p 18). Such highly damaging forms of fishing are now threatening coral reefs the world over and in the region so much so the WWF predicts that by 2020 almost 80% of the world's coral reefs will be damaged beyond repair (Aw 2002, p 34). Besides these fish, the Chinese love for shark-fin soup, sea horses, black bear bile, snake wine, tiger's penises and rhinoceros horns for medicinal, good health and longevity uses are all having an effect on the decimation of these animals. Does one need to take rhinoceros powder to reduce fevers when a simple tablet of paracetamol can provide equally effective medical relief at a cheaper price?

One other big challenge for urban communities in the region is the supply of adequate water for its residents. Without long-term planning and assessments of water management, water will become the Achilles' heel for the development of many cities. In the region, apart from Singapore, many cities do not have coverage of water supplies for all the urban residents. Jakarta, for example, has only 27% of the city covered by water supplies (see Table 4). In Singapore, for example, daily consumption of water has increased seven times from 1950 (142,000 m³ a day) to the 1990s (1.05 million m³) and growth between 1987 and 1997 averaged 3 tons annually (Arlosoroff 1998, p 35). However, in the last 6 years water consumption has stabilized. In 2005 Singapore's per capita water

consumption was 162 l per day, which was a reduction from the 165 l per day in 1999 (Ministry of the Environment and Water Resources 2005, p 26). Yet, despite its increase in water demands for domestic and industrial use, the government has established many effective policies in water management ranging from conservation policies, price controls, expanding water reservoirs, recycling water (newater), and developing alternative water sources (desalinization). What is significant is that these water management systems will make Singapore self sufficient in water in the future and wean the city-state off its current dependence on Malaysian water supplies (from Johor), thus reducing its ecological footprint at least in water.

Without going into a litany of consumption products, I would like to draw attention to the car to illustrate my point about the complexity of addressing eco-development from a consumer's perspective. Globally, the car industry is adding 60 million vehicles a year to a global population in excess of 600 million cars. The car is a complex economic, cultural and environmental issue. Cars can be viewed as pragmatic transportation vehicles that help in the mobility of people, goods and services. But the car in Southeast Asia is also a symbol of status, success and wealth. It is for most nouveau riche urban societies in the region the paragon of conspicuous consumption. It is also viewed as one of the important industrial sectors by several countries. Thailand, Malaysia, the Philippines and Indonesia all have car manufacturing plants. In Malaysia, under Prime Minister Dr. Mahathir, owning a car was seen as an indicator of development and quality of life. The Malaysian Prime Minister wanted every family to own a car, hence the establishment of the Malaysian car plant Proton and the protection of the national car industry that gave Proton cars unequal advantage over imported cars.

Unfortunately the car is an inefficient energy user and also a major contributor to urban air pollution. The average car releases 2.2 kg of carbon dioxide for

every 32 km of travel. If an average person travels 19,200 km in 1 year in his or her car, it would mean releasing 1,320 kg of carbon dioxide. Such high emissions of pollution from vehicles are the major reason why cities throughout the region have high pollution rates. In Bangkok, 80–90% of patients who visit physicians are victims of air pollution, coming mainly from vehicles (Japan Environmental Council 2000, p 10). It is estimated that 1.9 million people visit hospitals ten times a year, which comes to 9.5 billion bahts in medical costs, while the total vehicle social costs of petroleum consumption, time benefit and health damage amounts to 59.13 billion baht (approx: US \$1.00–39 baht) annually or 28.44 baht per person per day (Japan Environmental Council 2000, p 10). And in an energy crunch like in 1973–1974 and 2005–2006, the use of energy to transport a few individuals by cars is a waste of petroleum and an inefficient use of expensive energy. Furthermore, traffic jams in Bangkok mean that commuters (in 1.5 million vehicles) take 86 min of time to move within a 30 km radius of central Bangkok, which amounts to 37.26 billion baht of productive valued time lost (Japan Environmental Council 2000, p 10). For petrol importing countries in the region (Thailand, Laos, Vietnam, the Philippines), the waste of vehicle-driven energy consumption is something that these countries can ill afford. The subsidization of the car manufacturing industry and the importation of large amounts of natural resources and raw materials in the car industry calls into question the economic logic of maintaining such industries.

The third serious impact on the environment is the export of pollution to other countries: in the form of air, sea and water pollution. This might be more difficult at times to measure, but given that ecosystems observe no boundaries, city dwellers have to be mindful that their polluting habits can have both domestic and international implications. Fortunately, none of the countries or cities in the region has air pollution (industrial or urban) that has become a major bilateral or multilateral issue. It will be some time before the region embarks on intra-regional emission trading similar to other polluting countries in the developed world (Farrell and Morgan 2003). But there are precedents to both water and air pollution that show signs of regional cooperation as well as political strains. The ASEAN countries of Malaysia, Indonesia and Singapore have cooperated well to ensure the prevention of major oil spills and the concomitant environmental damage in the Straits of Malacca. Given that all three countries have oil refineries and ports in the Straits ensures cooperation among the countries. In the case of air pollution, the repeated bouts of haze

Table 4 Water supply coverage, availability, and consumption in Southeast Asian cities, 1997

City	Coverage (%)	Water availability (h/day)	Consumption (l/capital/day)
Bandung	42	6	120
Bangkok	82	24	265
Hanoi	76	18	45
Jakarta	27	18	135
Manila	67	17	202
Singapore	100	24	183

Source: McIntosh and Uniguez (1997)

arising from forest fires in Indonesia (Kalimantan and Sumatra) and affecting neighboring countries (Brunei, Malaysia, Singapore and southern Thailand) have clearly been an issue that has strained ASEAN relationships (Qadri 2001). In particular the 1997–1998 haze led certain ASEAN members to question whether the cardinal rule of non-interference in domestic issues for the regional organization should be reviewed given that Indonesian authorities seemed unable or even disinterested in curbing domestic forest fires.

Fourthly, urban demands can have extensive ecological footprints and impacts, especially when an ecosystem is based on a common-pool resource (common property; the commons) (see Dolšak and Ostrom 2003, pp 3–34) shared by several countries. The best illustration of this point is to use the Mekong River and the Mekong River Commission (MRC) countries. The Lower Mekong Basin (LMB) covering 600,000 km² and supporting 60 million people is an important river for many reasons (transport, food, water, tourism, recreation, water management, irrigation, energy, biodiversity). The fact that the Mekong River flows by several countries (Cambodia, China, Lao PDR, Myanmar, Thailand and Vietnam) justifies the need for riparian countries to treat the river as a common-pool resource. Unfortunately, this is not the case. The towns, ports and cities (Jinghong, Vientiane, Luang Prabang, Mei Sai, Chiang Kong, Stung Treng, Phnom Penh, Ho Chi Minh City) along the river can only share in the river's sustainable ecosystem if countries move away from territorial concerns and cooperate as a river community.

Unfortunately, each country sees the river as a resource in different ways, which is likely to undermine the river's ecosystem and short-circuit the sustainable development of all the cities and countries sharing the river's resources. While to date studies show that water pollution is not a problem amongst LMB states, the pollution is unevenly distributed and positively correlated with income levels (Guo 2005, p 172). There are also worries that if water pollution goes unheeded, it might be too late to deal with it especially when the population rises to 100 million by 2025 (Guo 2005, p 173). Despite the Mekong River Commission's establishment in 1995, each state seems content on milking the river for its own needs. The Chinese have gone ahead and dammed (hydro-electric power) the Mekong River within its borders for power to serve its cities and industries (Liebman 2005). Laos wants to follow in the Chinese footsteps, but more as a way of selling power to Thailand and neighboring countries. The Thais are looking to the River as a means of transportation, to ferry goods and people between

China and Thailand (Korat area, northeast Thailand) and Laos. It has already developed the river port at Chiang Kong. Cambodia looks to the river to provide fishery resources, while Vietnam wants the river for agricultural purposes, especially rice production. This is the classic case of a shared common resource in which each stakeholder wants to maximize benefits for their own selfish national interests. In the end, the Mekong might end up like Garrett Hardin's (1969, p 371) classic thesis of the tragedy of the commons: "freedom in a commons brings ruin to all."

Alternative prescriptions, environmental choices

In trying to alleviate the environmental problems and challenges nationally, regionally and globally, we are confronted by an overwhelming amount of conflicting information and data about the environmental health of our planet. One could divide the arguments into two schools of thought. The pessimists include Thomas Malthus (1979), the guru of gloom, and are followed by Paul and Anne Ehrlich (1968, 1991), the Club of Rome reporters (Meadows et al. 1974) and the Second Club of Rome reporters (Mesarovic and Pestel 1974). On the other side of the environmental spectrum, we have the optimists, as exemplified in the works of Julian Simon (1995) and Bjørn Lomborg (2001). Added to these two different schools are three underlying causative perspectives. I would label these as firstly, the Malthusianists and neo-Malthusianists who view population as a major issue in the human-nature equation; secondly, the Marxists and their related consumer class-orientated viewpoints, who argue along political ecological lines about how power influences resource distribution; thirdly, the neo-environmental determinists that see nature's wealth as finite and hence influencing human and societal outcomes.

The complexity of the global or local environmental challenges cannot be pigeon-holed in such neat boxes. Environmental issues are long term and deal with spatially expansive systems that go beyond human life spans and quotidian experiences. We need to be alert to the issues of the negative and positive human impacts on our environment and at the same time to be open to a critical evaluation of applying Garrett Hardin's (1980, p 7) Promethean (i.e., technological and forward thinking) type of solutions. Whatever the optimism and faith in human science and technology (Mitsubishi 2000), green technology is a double-edged sword that needs constant monitoring. The Green Revolution has provided food security in the region, but also has severely reduced the gene-pool of rice

agriculture and created major environmental problems due to its heavy usage of chemical fertilizers and pesticides (Trebuil 1995).

Over the last few decades, we have a wide range of alternatives to choose from to change our lifestyles, our consumption habits and our value systems. The British civil servant E. F. Schumacher (1973) in his provocative book, *Small is Beautiful*, talked in terms of adopting Buddhist economics that lay emphasis on the “purification of human character,” moderating the “multiplication of wants.” The Deep Ecologists talk in terms of “cultivating ecological consciousness” not by listening to others, but by involving ourselves in changing our lifestyles (Devall and Sessions 1985, pp 7–15). Based on Martin Buber’s I-It and I-Thou relationships, Barnette (1972, pp 40–44) argues that human beings need to move our I-It relationships with nature (manipulating, exploitative) to an I-Thou relationship (respect, mutuality). Stephen Schneider (1977, pp 295–299) prescribes the Genesis Strategy by advocating that we save in the good years for the lean years to come. Marius de Geus (2003, pp 91–97) argues that we should be looking at ‘ecological utopias’ to counterbalance the insufficient attention given to environmental degradation and the deterioration of nature. An ecological utopia has less to do with material satisfaction than with viewing the world through “green-tinted glasses” (de Geus 2003, p 92).

We place a lot of trust in the accumulated wisdom of science, but unfortunately most scientists are academically myopic and intellectual snobs because they only restrict their views to official scientific literature. There is a lot of wisdom in indigenous knowledge and folk science that is being lost as tribal groups (and their potable libraries of knowledge) are decimated in their forest habitats. Furthermore, as Hardin (1980, p 19) notes, “much scientific wisdom can be found outside the mainstream of science, in poetry, novels, and histories.” We need to tap the traditional attitudes and perceptions of nature as found in myths, legends, animistic beliefs and folk culture (Bruun and Kalland 1995). Savage (1998) argues that eco-education, in its formal and informal, private and public, indigenous and modern forms, is critical for the long-term sustainability of societies. It is indeed comforting to see that the United Nations has finally given education for sustainable development its most comprehensive endorsement, by proclaiming in 2002 the United Nations Decade of Education for Sustainable Development (DESD) over a 10-year period (2005–2014). The ambitious education program hopes to impart in communities decision-making information about the “long term

future of the economy, ecology and equity of all communities” (Shaw 2004, p 3).

Others call for “participatory environmentalism” to counter the limitations of the “top-down environmentalism” (Haglund and Still 2005, p 23). But James Fahn (2004, p 15) argues specifically that “without a sense of community, people won’t cooperate to improve their environment.” Tired of the theoretical, academic and impersonal treatment of environmentalism, Brent Haglund and Thomas Still (2005, p 37) strongly advocate “hands-on environmentalism,” which does not assume all environmental problems are equal in scope and gravity, but places trust in people “to develop their own conservation ethic—based on incentives, values and an inborn sense of self-preservation—and following that ethic to compatible solutions.”

With the growing tide of democratic-led systems defining the global political landscape, the politically correct environmental buzz word now seems to be “civic environmentalism,” with its emphasis on grassroots political participation in sustainable development (John 1994). The American political landscape is now defined as “Green Democracy” (Baber and Bartlett 2005, pp 1–13). The plethora of recent books from America on environmental justice, rights, equity and law (Rhodes 2003; Agyeman 2005; Pellow and Brulle 2005) demonstrate how the American political concern with human rights, individual rights and ‘environmental racism’ is in turn shaping environmental issues in the USA.

Yet the democratization of environmental issues does not necessarily mean better environmental solutions. On the one hand, I am reminded by Michael Redclift’s (1984, p 122) observation some 2 decades ago that “environmentalism lacks a coherent political direction.” And on the other hand, the American responses to environmental issues will not fit with Asian values, where community concerns override individual rights. For Asian countries, we need to keep the community and societal concerns at the forefront of environmental problems. These cultural differences as Richard Nisbett (2003, pp 2–8) points out are deeply rooted in the cultural histories of East And West: the Greeks had a remarkable concern with “personal agency”, of being in charge of their lives, whereas the Chinese saw themselves as a “collective agency”, a product of “several collectives” (the family, clan, village). Perhaps, there is an important lesson that we can learn from the Canon company’s philosophy of *kyosei*, which means “symbiosis” or operationalized as “working together to do something good for society” (Yamaji 2000, p 27). We need to adopt *kyosei* not only between people, but between people and nature. The

survival and viability of cities and countries, and in turn its residents, can be sustainable without factoring its impacts on the landscapes, natural resources, climate change and biodiversity.

Reflections

Ironically, economic globalization, which provides for a seamless system of linkages between peoples and goods around the world, underscores the holism and integration of the global ecosystem. Yet economic globalization works on different principles from ecology. Economic globalization accentuates and exploits economic differences and does little to recognize the need for a harmonious relationship with nature. Sustainable development in a globalizing world cannot be achieved by poor, deprived developing countries because the more such developing countries are integrated in a global capitalistic system, the more they are sucked into an unequal economic system of exploitation. The developing world cannot absorb the “ecological debt” of the developed world, nor should they sell off their ecological capital to the metropolitan powers.

Ironically, the development of global cities, which is facilitated by modern, efficient transport systems, expands the hinterland of cities, and in turn buttresses the sustainability and viability of these cities. The current neo-modern trajectory of cities in Southeast Asia is thus to enhance their global status and expand their global reach. The current modern status label is to become branded as a global city. Unfortunately, that global urban status has not been met by up-market urban citizens becoming more socially and environmentally responsible. Hence, the downside of this expanding global city quest is the legacy it is leaving in terms of its ecological footprint. One might view globalization, the interlocking of capital and state, as what Daniel Goh (2001, p 30) refers to as “global systemic colonization.” Are the nouveau rich colonizing ecosystems around the world through capitalism? Can a finite world underwrite the expanding urban oasis of opulent, wasteful and materialistic living?

We thus need to revise our views of the urban ecosystem. Urban ecosystems are dialectical environments, reflecting both natural and domesticated landscapes, open and closed ecosystems. On the one hand, cities reflect ‘natural’ environmental processes that respond to a wider ‘open’ ecosystem. On the other hand, urban environments are the personification of human made, engineered and domesticated landscapes. Cities are islands of built environments within a

global ecosystem of pristine landscapes, secondary vegetation and agricultural lands. Such human-engineered landscapes create ‘heat’ and thermal islands as well as floristic and faunistic ‘deserts.’ In cities, it is human beings that are the dominant species, and hence we need a pro-active human response to ensure the viability of the city and its inhabitants. Yet, one has to be careful not to go overboard on command-and-control environmentalism or we might end up with a Singapore model of nanny-type environmentalism, where the government plays an overbearing role in environmental management.

The human species in Southeast Asian cities has also developed two circuits of livelihood: the upper circuit comprising the firm-centred economic system of the generally rich and upper middle class and the lower circuit of the bazaar economic system of the poorer sectors of society. Both circuits might compete and complement each other in economic terms, but in human–nature relationships they create their own sets of environmental problems and challenges that need different sets of solutions. The richer, upper circuit urban dwellers leave a large ecological footprint, undermining other ecosystems and biodiversity nationally, regionally and globally, while the lower circuit of poorer urban residents are the cause and the victims of intra-urban brown issues. Without substantial investments and holistic programs in improving their conditions of livelihood, there is no way urban authorities will be able to eradicate systemic urban brown issues. The quality of living in urban areas has a direct relationship with the quality of urban environments and sustainable urban development. A city that thrives on an environmentally sustainable system is one whose citizens enjoy social justice and a good quality of life with eco-friendly high standards of living. Sustainability requires the embedding of the ecological framework in politics (ecologism), economy (eco-economy) and education (eco-education).

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