

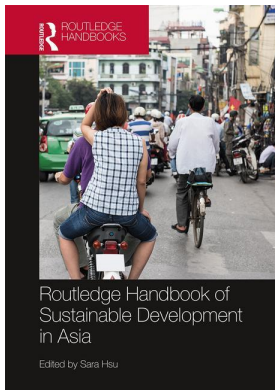
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## **Routledge Handbook of Sustainable Development in Asia**

Sara Hsu

### **Framework for understanding sustainable development**

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# Framework for understanding sustainable development

Sara Hsu

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## Introduction

The *Handbook of Sustainable Development in Asia* highlights the important and relevant topic of sustainable development, which overlaps the fields of economics, environmental science, and social policy. At this stage in global development, countries face the challenge of bringing about development that is inclusive, efficient, and environmentally sound. Simultaneously, the stakes of survival are rising, as climate change exacerbates both environmental and social ills, threatening economic gains.

Asia as a region is particularly vulnerable, since it is the most densely populated region of the world and includes both developed and developing countries, some of which are growing at a rapid pace with limited concern for the environment and limited resources to provide social services. This volume focuses on sustainable development from a perspective of environmental challenges and energy dependence, economic justice and social welfare, and governance and policy making for sustainable development, specifically applied to Asia.

## *Sustainable development*

As is well-discussed within this volume, sustainable development is associated with different definitions. The most common definition is that presented by the Brundtland Commission (1987, 16), which stated that sustainable development is the “ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.” Robinson (2004) views sustainable development as a community-based process that integrates environmental, social, and economic aspects of development in a long-term perspective rather than a one-shot end goal. The World Conservation Union (IUCN) (1991, 10) defined sustainable development as a commitment to “to improve the quality of life while living within the carrying capacity of ecosystems.”

Additional definitions have emphasized other aspects of development. Putnam (1993), for example, stresses the need to consider social capital, behavioral norms, trust, and social interactions. Conway and Barbier (1990) focused on the sustainability of economy, which they viewed as the ability to maintain productivity, or rate of consuming inputs to produce outputs.

Petkevičiūtė and Svirskaitė (2001) described sustainable development as the use of economic development and structural change to broaden human possibilities. We mention just a few here to provide an illustration of the breadth of sustainable development definitions, but we leave the full analysis of these myriad definitions to other works; indeed, there are entire volumes focused on defining sustainable development.

It is worth briefly mentioning that some researchers also make the distinction between strong versus weak sustainability. Strong sustainability emphasizes that the ability to substitute between natural and man-made capital is limited, whereas weak sustainability views these as substitutable, and unproblematic when the total capital stock remains constant over time (Daly 1994). As one can imagine, this broad difference has resulted in diverging policy implications.

In application, Atkinson et al. (1997) show that many countries fail the weak sustainability test, and would certainly fail the strong sustainability test. Many questions arise from the weak versus strong sustainability distinction. We can ask, for example, if natural capital stocks such as coal and oil can be directly substituted for by, say, renewable energy or other resources, why do they continue to play such an important role in the global economy? Why are water shortages so devastating? The answer seems to be that the natural resources we rely upon most are irreplaceable, or far less replaceable, than the weak sustainability requirements imply.

One may argue that definitions of sustainable development are of secondary importance to taking action toward sustainable development. In fact, at this critical juncture, in the face of impending irreversible climate change and lingering economic and social injustices, it is difficult not to view sustainable development as inseparable from development itself. Although the phrase has normative connotations, sustainable development is becoming an increasingly crucial policy mechanism to perpetuating life and human progress around the world, as well as a scientific field of study. If we continue to produce and consume in the same way in the future, humans will bring about rapid climate change, causing widespread suffering and even death for many. Rising sea levels will wipe out cities, violent storms will destroy homes, severe drought will result in rising hunger and water scarcity, hotter temperatures will result in increased vulnerability to disease and death, and destruction of ecosystems will result in dwindling sources of food and medicine. The good news is that we know enough about climate change and positive and negative impacts of various development trajectories to find a way forward, using a framework for sustainable development as a guide.

Sustainable development policies have risen to a level of global importance. In particular, it is significant that the United Nations has adopted Sustainable Development Goals as of September 2015. These goals augment the Millennium Development Goals by incorporating environmental and sustainability concerns, and can be applied not only to developing but also developed countries. These aim to:

- End poverty in all its forms everywhere;
- End hunger, achieve food security and improved nutrition and promote sustainable agriculture;
- Ensure healthy lives and promote well-being for all at all ages;
- Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all;
- Achieve gender equality and empower all women and girls;
- Ensure availability and sustainable management of water and sanitation for all;
- Ensure access to affordable, reliable, sustainable and modern energy for all;
- Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;
- Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;

- Reduce inequality within and among countries;
- Make cities and human settlements inclusive, safe, resilient and sustainable;
- Ensure sustainable consumption and production patterns;
- Take urgent action to combat climate change and its impacts;
- Conserve and sustainably use the oceans, seas and marine resources for sustainable development;
- Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;
- Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels; and
- Strengthen the means of implementation and revitalize the global partnership for sustainable development (United Nations (UN) 2015).

This is quite an agenda; it is one that seeks to address many aspects of sustainable development. Still, as Jabareen (2008) points out, there are inherent conflicts between growth and sustainability, and the way forward is not easy. Whereas economic growth stresses the environment in its deep use of natural resources, sustainability demands continued preservation of ecosystems over time, with little change. To this end, sustainable development has been dubbed by some as an oxymoron, but this appears to be an oversimplification. If anything, sustainable development should imply a wider discourse among environmental, economic, and social interest groups and policy makers, as well as more meaningful compromise. It should mean properly pricing natural resources and resource-intensive production processes. It should also include the use of innovations that reduce the need for resource-intensive production, changes in firm structures, movement away from industry-dependent growth to service-based or balanced growth, emphasis on better incorporating the rural sector into the development process, and creation of proper institutions to protect social and environmental interests.

Sustainable development has become increasingly important today, in contrast to past growth models and trajectories. Early growth models accounted only for the economic dimension of development, which was particularly emphasized after World War II through the late 1990s. In the wake of World War II, policy makers believed that international well-being could be achieved through trade and industry above all else. Focus on the environment mounted in the 1960s and 1970s, as the toxic effects of industrialization were sharply felt, but this movement remained segmented from the larger dialogue on development policy. At last, it was recognized with the Brundtland Report, produced for the UN in 1987, that economic development alone was insufficient in addressing the most pressing development-related issues. Gro Harlem Brundtland states in the report's introduction:

The present decade has been marked by a retreat from social concerns. Scientists bring to our attention urgent but complex problems bearing on our very survival: a warming globe, threats to the Earth's ozone layer, deserts consuming agricultural land. We respond by demanding more details, and by assigning the problems to institutions ill-equipped to cope with them. Environmental degradation, first seen as mainly a problem of the rich nations and a side effect of industrial wealth, has become a survival issue for developing nations. It is part of the downward spiral of linked ecological and economic decline in which many of the poorest nations are trapped. Despite official hope expressed on all sides, no trends identifiable today, no programmes or policies, offer any real hope of narrowing the growing gap between rich and poor nations. And as part of our "development", we have amassed

weapons arsenals capable of diverting the paths that evolution has followed for millions of years and of creating a planet our ancestors would not recognize.

*(World Commission on Environment and Development (WCED) 1987)*

This is a significant statement, but the timing of its release was not ideal; it was around the time that the Brundtland Report was produced that unsustainable neoliberal development policies rose to the global forefront. These policies emphasized reduction in government participation in the economy and society and a robust strengthening of market forces, neither of which placed much focus on environmental sustainability or human well-being. The focus on private ownership of resources drew attention away from sustainable preservation of natural resources. It was not until the late 1990s or early 2000s, in the wake of a series of destructive financial crises and accelerating climate change (understood then as “global warming”), that neoliberalism lost traction and sustainable development gained credibility.

The acceleration of globalization, which has emphasized economic growth, particularly through trade, over all other objectives, has also increased public awareness of serious development issues around the world. The spread of internet usage and enhanced media coverage have highlighted pollution, poverty, health, inequality, and social issues. While globalization itself has resulted in greater inequality within and among nations, as well as severe environmental degradation, the exchange of people and ideas has provided a much richer picture of development challenges and potential solutions faced across societies.

### *Sustainable development in Asia*

Sustainable development is especially important for Asia, which faces some of the worst social, economic and environmental problems on the planet. Poverty levels are high, especially in South Asia, second only to that in sub-Saharan Africa. Environmental issues such as air pollution, water pollution and scarcity, sharp reduction in biodiversity, and land degradation are particularly pressing in Asia, which is home to the majority of highest polluting cities and some of the most rapidly degrading ecosystems in the world. While Asia, particularly China and India, have focused on increasing growth over the past two decades, sustainability aspects of development have been largely overlooked.

The number of sustainable development issues in Asia is prodigious, as the region is home to some 48 countries. It would require hundreds of volumes to cover all of these issues for all Asian nations. Due to space constraints, we therefore rather focus on some key issues, particularly in East, South, and Southeast Asia. These countries can be found in different stages of development. While a few, such as Japan and Singapore, are developed, others, like China and Thailand, are at middle-income status, and others, like Indonesia, remain at low levels of development. All Asian countries experience challenges to sustainable development, but due to insufficient resources, low income countries face some of the most pressing needs.

The issues are diverse. For example, overcrowded urban areas have led to high levels of pollution, from vehicles, industrial and domestic activities, garbage, and waste. Urban slums in some countries, including India, Bangladesh, and Sri Lanka, are particularly polluted. Rising incomes in places like China have led to greater vehicle ownership, which has contributed to traffic congestion and air pollution. Polluted air has resulted in premature deaths in many locations. Coal burning in particular has brought about cases of chronic bronchitis and lung cancer, especially in China and India. Despite the adverse impact that air pollution in particular has had on Asian cities, many Asian nations are continuing to search for secure and diversified energy sources.

Overexploitation of land and natural resources in rural areas, home to about 50 percent of Asia's population, has led to pollution and reduction in the stock of natural resources. Improper irrigation and fertilization practices have brought about land degradation. About 70 percent of water throughout the region is used for agriculture, but water insecurity is high and water infrastructure low. Intensive farming has led to a decline in soil quality, especially in Thailand and Vietnam (Howes and Wyrwoll 2012). Flooding in Bangladesh may destroy hectares of crops, drought in Sri Lanka is likely to lead to declines in tea yields, and higher sea levels on farmlands of the Mekong Delta are likely to lead to food insecurity throughout Cambodia, the Lao PDR, and Vietnam (Sovacool 2014).

Other aspects of pollution, climate change, and land degradation can present problems in both urban and rural areas. Polluted water has led to a sharp decline in fish stocks, important food sources in Asia, and increased cost of access to clean water, essential to sustaining life. Much of the population resides in low-lying and coastal regions, which will become increasingly subject to rising waters as ocean levels rise. Deforestation for collection of fuel wood, biofuels, and palm oil eliminates carbon sinks and accelerates land erosion, worsening climate change and agricultural conditions. Deforestation in Southeast Asia has amounted to five times the global average.

This environmental degradation adversely impacts economic productivity. Due to the large population that continues to live in rural areas and depends on an agricultural livelihood, reduction in access to natural resources and arable land diminishes many livelihoods. Subsistence farmers, who are often mired in poverty to begin with, are particularly vulnerable to the negative effects of climate change. The disappearance of lowland and mangrove forests, which provide protection against soil and coastal erosion and preserve biodiversity, has led to decreased resilience against costly flooding and decline in fish stocks, resulting in a loss of GDP. Increases in temperature and loss of forest cover have led to higher incidences of disease outbreaks, raising health costs and reducing productivity.

Despite success in reducing the incidence of extreme poverty, poverty under slightly less extreme qualifications continues to pose challenges to the region. Poverty and lower levels of development in some Asian countries have resulted in low standards of living, insufficient access to health care or education, hunger and malnutrition, and job insecurity. State intervention in the form of social welfare in many parts of Asia is lower than that in Latin America and Central and Eastern Europe. Low levels of assistance to the elderly in the form of social pensions, low health assistance coverage, and low disability benefit coverage plague the region. Infant, maternal, and under-five mortality remain issues, especially in South Asia. Sustainable development implies that individuals are not only raised out of income poverty, but that their well-being is also improved, yet many aspects of well-being lag behind, even as industrialization advances in many Asian nations.

Furthermore, inequality has risen in Asia. As some individuals remain left behind in subsistence agriculture, others benefit from the processes of globalization and technological change. Economic inequality often translates also into inequality in access to education and health care. In some countries, for example, children in the poorest income quintile were three to five times as likely as those in the richest quintiles to be out of primary or secondary school (Asian Development Bank 2012). Infant mortality rates among poorest households are double or triple that of rich households.

Underdevelopment in some regions has led to insufficient or insecure employment. Youth unemployment is a problem, with 30 percent of individuals ages 15 to 24 remaining jobless across Asia (Packard and Van Nguyen 2014). Informal employment is common, and only increases insecurity of income and social protection. Gender bias also plays into less secure employment, as productive employment for women in child-bearing years is also often limited.

Asian governments have attempted to combat these challenges to sustainable development in different ways, and to various degrees. For example, Taiwan, Hong Kong, Singapore, Malaysia, Indonesia, Thailand and the Philippines all have work injury, health and old age social programs, but some are at low levels compared to GDP (Park 2007). Countries like South Korea and Japan have relatively sophisticated social welfare regimes as well as increasingly innovative climate change adaptation programs. Other countries, such as Indonesia and the Philippines, struggle with poverty and remain vulnerable to climate change.

Many of these issues are addressed in this handbook. Although full exploration of sustainable development issues would comprise many volumes, we attempt to examine some of the most salient and representative topics. In the next section, we discuss the structure of the handbook by section and chapter.

### *Structure of the handbook*

In this handbook, we conceive of sustainable development as encompassing environmental issues, energy dependence, economic justice, social welfare, sustainable governance, and sustainable development policy. Darrin Magee of Hobart and William Smith Colleges provided an introduction to the volume, and Section 1 included a framework for understanding sustainable development by Sara Hsu of the State University of New York at New Paltz.

Section 2 examines the environmental challenges in Asian countries. In this section, Lee Liu, of the School of Environmental, Physical and Applied Sciences at the University of Central Missouri writes on air pollution and its threat to health in Asia; Debashis Chakraborty of the Indian Institute of Foreign Trade and Sacchidananda Mukherjee at the National Institute of Public Finance and Policy cover the topic of environmental challenges in Asia; Seck Tan, Singapore Institute of Technology, discusses environmental policies in Asia; and Farzad Taheripour and Thomas W. Hertel of Purdue University, Badri Narayanan Gopalakrishnan of the University of Washington, Sebnem Sahin of the World Bank, Anil Markandya of Bath University, and Bijon Kumer Mitra of Institute for Global Environmental Strategies discuss climate change and water scarcity in South Asia.

Section 3 addresses energy dependence and transition in Asia, with Reiji Takeishi, of Tokyo International University describing the energy situation in Asia; Helen Cabalu and Yixiao Zhou of Curtin University writing on indicators of energy security in Asia; Soochool Lee in the Faculty of Economics at Meijo University, Japan examining energy systems and low-carbon policies in East Asia; and Peter Marcotullio in the Department of Geography at Hunter College covering the topic of urban energy systems in Asia.

Section 4 is about the topic of economic justice in Asia. In this section, Wenjie Zhang, Economist at Grey Health Group, discusses inequality in China; Eunju Chi at the Peace and Democracy Institute of Korea University lays out the issue of income inequality in East Asia; Dan Biller, Luis Andrés, and Matías Herrera Dappe of the World Bank analyze inequality in infrastructure access in South Asia; Riyana Miranti at the University of Canberra covers the topic of poverty, inequality and public health in Indonesia; and Simi Mehta, at the at the School of Environment and Natural Resources at Ohio State University, Vikash Kumar, at the Centre for Research in Rural and Industrial Development and Rattan Lal at the School of Environment and Natural Resources at Ohio State University write on climate change and food security in South Asia.

Section 5 contains perspectives on social welfare in Asian nations. Contributing to this section are Edi Suharto at the Bandung College of Social Welfare in Indonesia, writing on the topic of social welfare in Indonesia and conditional cash transfers; Selim Elekdag, Dulani Seneviratne,

Edda Zoli of the IMF, discussing social spending in Korea; Levan Lim and Thana Thaver of the National Institute of Education at Nanyang Technological University in Singapore analyzing inclusive education in Singapore; Donghyun Park and Gemma Estrada of the Asian Development Bank examining public pension programs in East Asia; and John Fien at RMIT University in Australia and Rupert Maclean at the College of The North Atlantic in Qatar writing on technical and vocational education for sustainable development in Asia.

Section 6 covers the issue of sustainable governance in Asia. In this section, Neda Trifkovic and Thomas Markussen of the University of Copenhagen, Denmark, Carol Newman of Trinity College Dublin, and John Rand of the University of Copenhagen, Denmark, write about corporate social responsibility in Vietnam; Ashiru Bello of Ahmadu Bello University Zaria and Ainul Jaria Maidin of the International Islamic University Malaysia discuss sustainable development and the role of local governance in Malaysia; Mark Elder at the Institute for Global Environmental Strategies describes regional governance for environmental sustainability in Asia; and Christopher Dent at the University of Leeds analyzes the topic of renewable energy and developmentalism in East Asia.

Finally, Section 7 takes a look at Asia's sustainable development policy. Here, Dennis Victor, an alumnus Research Scientist from the University of Malaya, discusses policy trends on strategic environmental assessment in Asia; Choy Yee Keong of Keio University writes about sustainable development and environmental stewardship in Borneo; Yu-Wai Vic Li at the Hong Kong Institute of Education looks at green GDP in China; Maizatun Mustafa of the International Islamic University Malaysia describes legal solutions to air pollution control in Malaysia; Lahiru S. Wijedasa, Zeehan Jaafar, and Mary Rose C. Posa of the National University of Singapore and Janice S.H. Lee of Nanyang Technological University write on regulating transboundary haze in Southeast Asia; Ken'ici Matsumoto in the Graduate School of Fisheries and Environmental Sciences at Nagasaki University takes a look at energy security in Asia; and Hitomi Rankine, UNESCAP, Kareff Limocon Rafisura, UNESCAP, and José A. Puppim de Oliveira of the Fundação Getulio Vargas examine transformations in sustainable development in the Asia Pacific.

Following, we provide descriptions for each chapter contribution.

Darrin Magee provides an introduction to sustainability in Asia, providing a framework with which to understand the three pillars of sustainable development: the economic pillar, the ecological pillar, and the social pillar. Dr. Magee then discusses environmental challenges, energy dependence, economic justice, social welfare, sustainable development policies, and sustainable governance as these categories apply to Asia.

In Section 1, Sara Hsu writes in "Framework for understanding sustainable development," on sustainable development in general and sustainable development as it applies to Asia. Dr. Hsu then provides chapter summaries.

Section 2 begins with Lee Liu in "Air pollution and its threat to public health in Asia." Dr. Liu writes that air pollution presents a severe threat to environmental, social, and economic sustainability in Asia, and contributes to climate change, resulting in both desertification and rising sea levels in Asia. Access to clean air is essential to human life, but threatens sustainability in many parts of the world, especially Asia. In this chapter, Dr. Liu examines air pollution in Asian countries and then takes China as a case study on variations within a country. Liu explores how air pollution threatens sustainability in Asia in terms of its impact on human health and then uses Asia as an example to challenge the notion that developing countries cannot combat pollution at earlier stages.

Debashis Chakraborty and Sacchidananda Mukherjee discuss, in the following chapter, "Environmental challenges in Asia." They write that Asia contains great biological and environmental diversity, resulting in a diversity of challenges facing Asian countries. However,



Asian nations have in common dense population pressures and lower levels of development, which means that environmental objectives are often not a top priority. Asian nations have exploited natural resources, used greater amounts of power, and converted forests and wetlands to achieve growth targets. This chapter seeks to analyze environmental challenges in Asia and their economic drivers that often result in unsustainable development.

Seck Tan takes a close look at “Singapore’s environmental policy.” Due to the isolation and vulnerability of islands, climate change and its associated phenomena will generate greater environmental stress on island states. Seck Tan analyzes the potential impacts of climate change on island nations and especially on Singapore, and looks at how environmental policies can be crafted in response to observations associated with climate change. This chapter also outlines the progression of Singapore’s environmental policy. One significant achievement which the island-state has demonstrated is to introduce a regulatory mechanism – namely, the Environmental Impact Assessment for developments and projects in Singapore. This serves to protect and create awareness for the environment as the island-state grows and develops. However, in light of less benign challenges ahead for Singapore, future policy directions and recommendations toward sustainable development will be critical as Singapore continues to balance economic performance and environmental protection.

Farzad Taheripour, Thomas W. Hertel, Badri Narayanan Gopalakrishnan, Sebnem Sahin, Anil Markandya, and Bijon Kumar Mitra contribute a chapter on “Climate change and water scarcity: growing risks for agricultural based economies in South Asia.” Here, Taheripour, Hertel, Gopalakrishnan, Sahin, Markandya, and Mitra evaluate economic and environmental consequences of climate change and water scarcity on South Asian economies. The authors implement a computable general equilibrium (CGE) model using biophysical data on climate-induced crop yield changes, water scarcity measures, and land and water resources by Agro-Ecological Zone (AEZ) at the river basin level. They find that even when water supply for irrigation is not limited, climate-induced crop yield changes could generate negative economy-wide impacts and reduce food security across South Asia. Taheripour et al. then examine the combined impacts of the effects of climate-induced crop yield changes and water scarcity on the economies of South Asia, finding that water scarcity, induced by expansion in water demand in non-agricultural uses and lack of water infrastructure, will block the demand for irrigation, generating severe negative economic impacts, badly affecting food production and security, extending food imports and causing major land use changes in South Asia.

In Section Three, Reiji Takeishi takes a look at the “Energy situation in Asia.” He shows that Asia’s growth has resulted in a surge in energy demand, especially for power generation, particularly in the 2000s. Much of the rapid increase was caused by a rise in Chinese demand, but India and other developing Asian countries also contributed to this rise in energy consumption. Dr. Takeishi states that in the near future, approximately 80 to 90 percent of the projected increase of world energy demand will be due to Asian countries, based on forecasts such as that of the IEA International Energy Agency (IEA), such that most new facility construction for power generation, power transmission, refining, and gas transmission will occur in Asia. In this chapter, Dr. Takeishi describes energy demand in Asia and its challenges for the future.

Helen Cabalu and Yixiao Zhou, in “Evaluating indicators of energy security for sustainable development in Asia,” examine the fossil fuel energy profile of selected Asian countries in terms of specific energy supply indicators, which include intensity, net import dependency, ratio of domestic energy production to total domestic energy consumption and geopolitical risk. Drs. Cabalu and Zhou discuss the indicators for selected countries in Asia in the period between 2002 and 2015. A composite supply security index for oil (OSSI), gas (GSSI) and coal (CSSI) are calculated to provide a quantitative measure of energy security for each of the fossil fuels, taking into account the

dynamics among the identified set of energy supply indicators. The authors examine the energy profile of selected Asian countries, including China, India, Japan, Korea, Singapore and Thailand, then compile a supply security index for oil, gas and coal, analyzing and evaluating the index in order to draw policy conclusions.

Soocheol Lee takes a close look at the cases of East Asia especially in Japan and South Korea in “Energy systems and low-carbon policies in East Asia.” Given that East Asian nations face different energy and carbon policies, institutional infrastructure-building, which is instrumental in developing a low-carbon society in the East Asia region, has been moving forward in recent years. In this chapter, Dr. Lee describes the progress and challenges mainly in Japan and South Korea, which have recently achieved some positive results toward reforming energy systems and enforcing low-carbon policies, then mentions briefly the recent development of energy and low carbon policies in China and Taiwan.

Peter Marcotullio examines, in his chapter contribution, “The Asian urban energy system.” Asia’s economic growth has been associated with the massive movement of people to the region’s cities. From 1970 to 2010, approximately 1.36 billion people were added to urban areas across the region, bringing the urbanization level from 23.7 percent to 44.8 percent. Both economic growth and urbanization have driven and been driven by energy use and supply. With the expansion of economic activities and the building of cities in which much of this activity occurs, the region has increased its total energy supply from 4.4 to 12.7 gigatons oil equivalents (Gtoe), almost a threefold increase. All three of these factors are tightly interlinked, although the details of how each has changed together are as varied as the geographies and cultures of the region. This chapter explores the overall trends, patterns and dynamics among Asia’s urbanization and energy supply and demand, using a systems approach in suggesting linkages between these patterns and those of economic progress. Peter Marcotullio first highlights both the overall dynamic change and the diversity among the region’s nations and cities, then points out the sustainable development challenges ahead, including meeting the goals of lowering energy-related pollution, providing universal access to modern energy and reducing greenhouse gas (GHG) emissions.

Section 4 starts with Wenjie Zhang’s chapter, “The evolution of China’s pay inequality during the transitional period.” This chapter provides new estimates of the evolution of pay inequality in China, overall and by region and sector, from 1987 to 2012, using the between-group component of Theil’s T-statistic measured across regions and sectors. Dr. Zhang finds that China’s overall pay inequality started to rise rapidly in the early 1990s, peaking in 2008, with the between-province component peaking as early as 2002. Zhang shows that since 2008, overall pay inequality has decreased, with between-province and between-sector inequality both showing steady declines. She argues that China’s pay inequality during the reform period is not simply a matter of economic inequality; it is a joint product of both market forces and institutional forces. Zhang therefore argues that the recent decline of overall pay inequality after the crisis is not a temporary phenomenon triggered by the global economic downturn, but a long-term outcome driven by both economic and policy factors.

Eunju Chi focuses on economic and social well-being in “Income inequality and welfare in Korea and Taiwan.” Dr. Chi states that deepening inequality is a trend that makes sustainable development difficult to attain. She writes that when a government actively responds to the deepening inequality by providing welfare, inequality is alleviated, and sustainable development is possible. In this chapter, Dr. Chi examines the causes and processes of deepening inequality in Korea and Taiwan, then turns to policies associated with improving economic distribution. Chi finds that democratization required measures to protect the victims of wealth polarization and, as a result, measures to tackle income inequality in Korea and Taiwan were

introduced. However, these were implemented in an ad hoc fashion, rather than resulting from clear goals and plans.

Dan Biller, Luis Andrés, and Matías Herrera Dappe describe, in “Infrastructure gap in South Asia,” the importance of access to basic infrastructure services with regard to welfare and the quality of life contrasted with the South Asia region’s low rates of access to infrastructure. The challenge of increasing access to these services across the South Asian region is compounded by the unequal distribution of existing access for households. This study improves understanding of this inequality by evaluating access across the region’s physical (location), poverty, and income considerations. The chapter also analyzes inequality of access across time—that is, across generations. It finds that while the regressivity of infrastructure services is clearly present in South Asia, the story that emerges is heterogeneous and complex. There is no simple explanation for these inequalities; although certainly geography matters, some household characteristics (such as living in a rural area with a head of household who lacks education) matter, and policy intent matters. If a poorer country or a poorer state can have better access to a given infrastructure service than a richer country or a richer state, then there is hope that policy makers can adopt measures that will improve access in a manner in which prosperity is more widely shared.

Riyana Miranti writes, in “Poverty, inequality and public health in Indonesia,” that the rate of poverty reduction is slowing, while inequality has been increasing since 2000. Miranti focuses on the human development perspective of Indonesia’s development story, taking into account the potential implications in the area of health. Dr. Miranti investigates the relationship between three economic variables: inequality, poverty and income level, and public health indicators during the development period in Indonesia. The focus on health has become very important in this nation, given the implementation of the Universal Health Insurance Scheme, starting in early 2014 and Indonesia’s support toward the new Sustainable Development Goals (SDGs) to foster welfare and well-being for the next 15 years. In this chapter, Miranti analyzes the association between income, poverty, inequality and health in recent years prior to the implementation of the Universal Health Insurance Scheme, asking whether being wealthier is always associated with being healthier and whether the associations with poverty and inequality are different among various health indicators.

Simi Mehta, Vikash Kumar, and Rattan Lal write on “Climate change and food security in South Asia.” South Asia (SA), home to around one-fourth of the world’s population, has a unique geographical location on the world map, located entirely in the Northern and Eastern hemispheres. The constituent eight countries have a mix of climates, from equatorial to tropical savannah, and the coexistence of hot humid summers and mild to cold winters, with temperatures below the freezing points in some places. These climatic conditions lend to varieties of agricultural activities and vegetation practices. However, this region is amongst the most impoverished and food insecure part of the world. To add to the gravity of the situation, climate change increases the vulnerability of these low- or lower-middle income countries to weather-related shocks. This chapter establishes that the risk of food insecurity is directly linked to changes in climate, frequent occurrences of drought, flooding, and variability and extremes in rainfall. It elucidates the status of food security in the region as well as the levels of malnutrition and their socio-economic implications on the large section of people across the eight South Asian countries. The authors establish an interconnection between climate change and vulnerability of food production in SA and conclude with policy recommendations toward adapting and mitigating the negative implications of climate change, and contributing to the fulfillment of the Sustainable Development Goals (SDGs) of the United Nations (UN) by 2030 by ensuring a content and food-secure population in South Asia.

In Section 5, Edi Suharto discusses the “Development of social welfare in Indonesia: the rise of conditional cash transfer.” The conditional cash transfer (CCT) is one of the most prominent social protection programs under the umbrella of social welfare policies. Focusing on the largest social assistance programs of CCT, namely Program Keluarga Harapan (PKH or The Family of Hope Program), Dr. Suharto discusses the management and impacts of CCT in improving the standard of living of the poor. While coverage of PKH continues to increase, it has impacts in the area of health and education as well as the level of household expenditure per capita. Suharto shows that as a national program, PKH has the opportunity to be integrated into a more comprehensive social protection system and hence can contribute to the development of social welfare in Indonesia.

Selim Elekdag, Dulani Seneviratne, and Edda Zoli write in “Social spending in Korea,” that Korea faces two closely related challenges: sustaining economic growth against the backdrop of a rapidly aging population and ameliorating income inequality. Elekdag, Seneviratne and Zoli argue that a gradual increase in social spending could promote more sustainable and inclusive growth in Korea. In particular, simulation results suggest that social spending which supports labor market reforms can boost longer-term growth. However, despite rapid increases recently – albeit from a low base – there is still a social spending gap relative to Korea’s OECD peers. They find that because of several fiscal challenges in the coming decades, increases in social spending should be incremental, and would be usefully guided by a longer-term fiscal framework.

Levan Lim and Thana Thaver next write on the “Inclusion of persons with disabilities in Singapore.” Drs. Lim and Thaver show that although Singapore aspires to be an inclusive society, it struggles to explicitly address inclusive education as a significant agenda within its mainstream education initiatives and reforms. Singaporean schools often fail to sufficiently support students with special needs, with mainstream schools remaining separate from special education. This has had the effect of reinforcing societal prejudice against people with disabilities. In this chapter, Lim and Thaver provide a situated and contextual understanding of the evolution of Singapore’s current attitudes and systemic structures regarding the construction and treatment of disability within society.

Donghyun Park and Gemma Estrada discuss social safety nets for the elderly in “Why does Asia need well-functioning pension systems?” Due to rapid population aging, Park and Estrada state, the number of retirees per worker is increasing. As such, economic security for the elderly looms on the horizon as one of the region’s most significant strategic challenges, but the region is ill equipped to meet this challenge. In this chapter, Drs. Park and Estrada examine the pension systems of eight East Asian countries, namely China, Indonesia, Korea, Malaysia, the Philippines, Singapore, Thailand and Vietnam, all of which are witnessing a sustained rise in the share of the elderly relative to the labor force and total population. They show that extensive social and economic transformation is endangering the economic security of the elderly, and formal pension systems must fill the gap.

John Fien and Rupert Maclean discuss “Technical and vocational education (TVE) for sustainable and inclusive development in Asia” in the following chapter. Fien and Maclean write that the chapter has three goals. First, it describes the long-term interest in the “greening” of technical and vocational education and training (TVET) and the significance, scope and purpose of this according to international agencies concerned with balancing economic growth with sustainability, inclusiveness, and decent work. Drs. Fien and Maclean argue that the focus of TVET for sustainable development in Asia has had a decidedly social justice focus, for example in rural transformation, compared with the predominant concern with energy efficiency, resource conservation and pollution prevention in the Global North. Second, the chapter outlines the world-leading initiatives to reorient skills development toward green growth in the Republic of

Korea, despite the fact that a major research study found that such initiatives are not widespread in the region. This study, by the Asian Development Bank and the Education University of Hong Kong, on “kills development for inclusive growth, sustainable development and the greening of economies” in the Asia region found that the transition toward this goal is only occurring where the influence of government regulation and incentives is strong, in large firms, especially those with a foreign or export orientation, and where the perceived costs of change are low and perceived consumer demand is high. As a result, it is argued that there is currently a dispersed and disconnected narrative of skills training for sustainable and inclusive development in Asia.

Section 6 begins with a chapter by Neda Trifkovic, Thomas Markussen, Carol Newman and John Rand on “Corporate social responsibility in Vietnam.” This chapter investigates the scope for corporate social responsibility (CSR) to play a role in advancing sustainable development. Trifkovic, Markussen, Newman and Rand focus on an empirical analysis of manufacturing firms in Vietnam. CSR is potentially a means for addressing market failures, such as environmental problems and under-provision of health services and infrastructure, although demand for some of the goods typically provided through CSR activities, such as environmental quality, may be increasing more than proportionally with per capita income. This chapter presents data on CSR activities from Vietnam’s private manufacturing sector, which only started to emerge after the initiation of the Doi Moi reform program in 1986. The authors investigate to what extent firms undertake such activities, what characterizes the firms that are most engaged in CSR efforts, and how CSR is related to the financial performance (revenue and profits) of firms. The aim is to increase our understanding of the scope for CSR to play a role in generating sustainable development in low and middle income countries in Asia.

Ashiru Bello and Ainul Jaria Maidin take a close look at Malaysia in “Sustainable development initiatives at the local government level in Malaysia.” The authors write that land use planning and development control have been identified as essential tools in the prevention of many environmental problems, sustainable management of natural resources and management of the urban environment, and Malaysia supports initiatives that seek to achieve sustainable development. As part of this strategy, the Malaysian government promotes the incorporation of environmental protection measures into all the various national development plans. Sustainable development has contributed immensely to the array of issues considered in the efforts to balance between individual interest and common good. This being one of the focal points of Malaysia’s planning system and also concords with international concerns. The argument that there is a firm adoption of sustainable development tenets in planning system as compared to other areas, does not guarantee the occurrence of a systematic transformation of the planning agenda itself. A number of cases particularly regarding spatial development and environmental conservation suggests that the planning system is still dominated by the crave for development which in a way contradicts the modest focus of sustainability. In order to develop a viable approach to environmental conservation and shape the spatial pattern of development at the local level, several strategies have been adopted in Malaysia. This chapter sets out the initiatives taken at the State and local government level in Malaysia guided by the Federal government policies adopted at the State and local authorities where they are entrusted with the task to plan and manage land use planning and development control processes for promoting sustainable development.

Mark Elder discusses in his chapter contribution “Regional governance for environmental sustainability in Asia in the context of sustainable development.” Dr. Elder’s chapter surveys the landscape of regional governance for sustainability in Asia, focusing on regional and sub-regional cooperation frameworks related to the environment. The survey covers not only frameworks specializing in environmental issues, but also broadly focused frameworks which include the environment and could help to mainstream the environment into other policy areas. Agenda

2030 calls on regional and sub-regional cooperation frameworks to facilitate the implementation of the Sustainable Development Goals. There are many cooperation frameworks in the region, and this chapter identifies and classifies the major ones. Elder finds that, although formal and large-scale international organizations and treaties exist in the region, the main trend has been toward smaller scale and looser, informal forms of international cooperation mechanisms. Another trend is increasing involvement of non-governmental stakeholders, which still work closely with governments, either as part of intergovernmental frameworks or in partnership with governments, often with financial support from governments. These frameworks have a wide variation in terms of their nature and structure, involving different levels of governance, and also a range of types of members. However, there are no supranational institutions like the EU, and most are voluntary. Overall, most are not very strong politically, with little authority and limited financial and human resources. Other challenges to regional sustainability governance include: overlaps and fragmentation, need for better coordination, insufficient coverage of issues by existing mechanisms, need for more emphasis on capacity building, and weak financial and human resource capacity. Some major institutions, particularly the ADB and APEC, are not formally focused on sustainability, so SDGs present a good opportunity for them to shift their focus more in that direction. Finally, regional governance for sustainability in Asia is characterized by key Earth System Governance concepts such as complex architecture, complex actors, multiple levels of governance.

Christopher Dent analyzes “Renewable energy and new developmentalism in East Asia.” Prof. Dent’s chapter examines renewable energy development in East Asia and the deeper sustainable and other development contexts in which this has been situated. East Asia comprises two sub-regions, Northeast Asia (China, Japan, South Korea, North Korea, Taiwan and Mongolia) and Southeast Asia (Brunei, Cambodia, East Timor, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam). Over the last five or six decades, East Asia has been the world’s most dynamic and fastest growing economic region. Annual double-digit percent increases in economic growth have not been uncommon for many East Asia countries during this period. The region consists of a diverse set of economies that together accounted for around 30 percent of the global economy in 2014, a higher share than both the European Union and the United States. East Asia has also emerged as the world’s most significant driver of renewable energy development over the last decade or so. It is argued that this can be broadly understood from the conflation of two influencing meta-factors, namely state capacity and ecological modernization that, combined, form the basis of the region’s “new developmentalism.” This concerns the pursuit of new “low-carbon economy” transformative objectives where renewables play a central role in various state strategies to realize these ends. However, this has not been without its conflicts, contradictions and controversies, as Prof. Dent lays out.

In Section 7, Dennis Victor evaluates the “Strategic environmental assessment as a policy framework for sustainable development in Asia.” Dr. Victor provides an overview of the trends of Strategic Environmental Assessment (SEA) in Asia and explores it as a potential tool for sustainable development. Victor finds that SEA integration for sustainable development in Asia may require a paradigm shift from the current reliance on structured instruments such as legislation to unstructured instruments such as behavior based stakeholder and public engagements. SEA trends in Asia indicate that effective implementation of SEA as a tool for sustainable development requires an adaptable application of both structured and unstructured SEA instruments.

Choy Yee Keong writes about “Sustainable development and environmental stewardship,” in the Heart of Borneo a 23-million-hectare tri-national and transboundary protected area in central Borneo, for conservation and sustainable management purposes. This area protects one of the most biological diverse habitats on Earth. However, this area is increasingly subjected to the threat

of ecological destruction due to various unsustainable resource use practices that have prevailed in the region. Choy empirically assesses the drivers behind this environmental paradox and suggests ways to solve the present development-environmental dilemma, drawing from findings on the indigenous worldviews research conducted in Borneo Malaysia between 2007 and 2011.

Yu-Wai Vic Li writes on “China’s green GDP and environmental accounting.” Dr. Li notes that China’s environmental conditions have deteriorated significantly as a result of rapid industrialization, massive urbanizations and shifting demographics that have resulted in resource depletion of unprecedented scale. The annual growth rates that surpass most of the developed and developing worlds invariably contain enormous costs to the natural environment and ecosystem. In the 2000s, Green GDP gained momentum when the country faced skyrocketing pollution in the 2000s and the top party and state leaders adopted a “scientific outlook” of development, endorsing the notion of green GDP and practices of environmental accounting. This galvanized the launch of China’s green GDP accounting in March 2004 led by the State Environmental Protection Agency (SEPA; and upgraded to Ministry of Environmental Protection in 2008) and the National Bureau of Statistics (NBS). The joint-agency campaign centered on accounting of the abatement/treatment costs of, and the economic losses arising from air, water and solid waste pollution in ten provinces and municipalities and 42 industrial sectors. This herculean effort was accomplished in about two years, with the world’s first official green GDP accounting report released in September 2006. However, behind the facade of the campaign’s apparent success laid intractable methodological challenges and political resistance from the statistical bureau and local authorities involved. This not only undermined SEPA’s lead in the accounting exercise, it also foreshadowed the unfortunate end in July 2007, when the NBS unilaterally announced the project’s termination and local authorities quit the project. The research endeavor, however, was carried on by SEPA’s affiliated research body, the Chinese Academy for Environmental Planning (CAEP), which published its own annual results. The central authorities did not extend their support again until 2013, when the new Chinese administration under Xi Jinping rallied for support of the “ecological civilization” campaign and the international framework of environmental economic accounting was finally well-developed. Blessed by the central authorities, the MEP resumed the green GDP study in early 2015, but this was rivaled by a different environmental accounting initiative championed by the NBS, which concerned stock-taking of natural capital that would expand the economy’s asset/wealth level for long-term sustainable development. This added considerable uncertainties to the fate of China’s green GDP survey.

Maizatun Mustafa discusses “Legal solutions to air pollution control in Malaysia.” Despite the fact that air pollution presents the world’s largest environmental health risk, for a developing country like Malaysia, the task of controlling air pollution can be a challenge, not only in understanding and dealing with complex interactions between emissions and resulting air quality, but in identifying and applying the most suitable pollution control strategies in order to achieve the overall targets of air quality enhancement and sustainable development. In Malaysia, most of the air pollution problems are associated with increased concentration of people and economic activities in urban and sub-urban areas, as well as growing numbers of agricultural areas and transportation. Maizatun Mustafa discusses the main sources of air pollution in Malaysia, and highlights existing environmental policy and law related to air pollution control as well as present regional air pollution problems facing Malaysia and its neighboring countries, mainly trans-boundary haze pollution.

Lahiru S. Wijedasa, Zeehan Jaafar, Mary Rose C. Posa and Janice S.H. Lee contribute a chapter on “Regulating trans-boundary haze in Southeast Asia.” In this chapter, the authors describe the causes of and proposed regulations for trans-boundary haze. In particular, the tropical peat swamp forest ecosystem (TPSF) in Southeast Asia, covering over 200,000 km<sup>2</sup>, represents a

significant carbon pool. Over the past three decades, TPSF have been deforested at an alarming rate and converted to large and small-scale plantations. The loss of TPSF is strongly associated with fire, especially because anthropogenic disturbances adversely impact hydrological processes and make peat soils vulnerable to ignition. In addition to the globally significant amounts of carbon dioxide released, particulate matter from peat fires cause a persistent transboundary air pollution, also commonly referred to as “haze.” The authors find that small wins against Southeast Asia’s transboundary haze can be found in the penalization of companies for fire activity, consumer action to limit purchases from companies associated with burning and the successful engagement of local communities for fire prevention, but in the long run, clarifying land tenure procedures, ensuring peatland protection, and aligning agricultural development policies with ecosystem protection, hold the keys to a sustainable solution for the fire and haze problems in Southeast Asia.

Ken’ichi Matsumoto discusses “Energy security performance in Japan.” Matsumoto shows that since Japan is poor in energy sources and because the energy situation in Japan will be tougher in the future, securing its energy supply will be a more important issue for Japan. Ken’ichi Matsumoto evaluates changes in the historical energy security performance and then analyzes energy security in the future under several scenarios for Japan. From the historical evaluation, it is shown that energy security performance evaluated by three energy security indicators improved over time, but energy security declined from 2011 due to the Fukushima nuclear disaster. This means that diversity of primary energy sources, including nuclear power, is important for high energy security performance, as measured by the three indicators introduced in this study. From the scenario analysis, energy security will improve under the future scenarios discussed in this chapter. It is suggested that energy balances mentioned above and also energy saving can improve the energy security performance of Japan compared to the historical situation.

Hitomi Rankine, Kareff Limocon Rafisura, and Jose Puppim de Oliveira write in “Transformations for sustainable development in the Asia and the Pacific” on how the 17 goals of the 2030 Agenda for Sustainable Development move beyond a vision to achievement in 15 years’ time depends on whether we make use of the opportunities provided by regional megatrends, such as urbanization, rising incomes, changing consumption patterns and economic and trade integration. The authors note that aligning the megatrends with sustainable development requires changes in the structures and rules that mediate the relationship between the economy, society and nature. Transformations in social justice, investment flows, economic structures and resource efficiency are imperative. Drs. Rankine, Rafisura, and de Oliveira find that needed transformations are mutually supportive and essential for responding to the Sustainable Development Goals in a way that allows policy coherence and prevents trade-offs between goals.

## An invitation

We invite you to read, in this volume, on a variety of topics related to the multifaceted aspects of sustainable development in Asia. The subject is timely, as we face many challenges to sustainable development in our world today.

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