The Challenges of Sustainable Development in Northeast Asia:
Lessons from the Nordic Experience of Environmental Management

Sangsoo Lee

ASIA PAPER
September 2009

Institute for Security & Development Policy

The Challenges of Sustainable Development in Northeast Asia:

Lessons from the Nordic Experience of Environmental Management

Sangsoo Lee

Västra Finnbodavägen 2, 131 30 Stockholm-Nacka, Sweden
www.isdp.eu

"**The Challenges of Sustainable Development in Northeast Asia: Lessons from the Nordic Experience of Environmental Management**" is an *Asia Paper* published by the Institute for Security and Development Policy. The *Asia Papers Series* is the Occasional Paper series of the Institute's Asia Program, and addresses topical and timely subjects. The Institute is based in Stockholm, Sweden, and cooperates closely with research centers worldwide. Through its Silk Road Studies Program, the Institute runs a joint Transatlantic Research and Policy Center with the Central Asia-Caucasus Institute of Johns Hopkins University's School of Advanced International Studies. The Institute is firmly established as a leading research and policy center, serving a large and diverse community of analysts, scholars, policy-watchers, business leaders, and journalists. It is at the forefront of research on issues of conflict, security, and development. Through its applied research, publications, research cooperation, public lectures, and seminars, it functions as a focal point for academic, policy, and public discussion.

This publication is kindly made possible by support from the Swedish Ministry for Foreign Affairs. The opinions and conclusions expressed are those of the author/s and do not necessarily reflect the views of the Institute for Security and Development Policy or its sponsors.

ISBN: 978-91-85937-64-6

Printed in Singapore

Distributed in Europe by:

Institute for Security and Development Policy
Västra Finnbodavägen 2, 131 30 Stockholm-Nacka, Sweden
Tel. +46-841056953; Fax. +46-86403370
Email: info@isdp.eu

Distributed in North America by:

The Central Asia-Caucasus Institute
Paul H. Nitze School of Advanced International Studies
1619 Massachusetts Ave. NW, Washington, D.C. 20036
Tel. +1-202-663-7723; Fax. +1-202-663-7785
E-mail: caci2@jhuadig.admin.jhu.edu

Editorial correspondence should be addressed to Dr. Bert Edström at: bedstrom@isdp.eu

Table of Contents

Executive Summary

In comparing the Nordic and Northeast Asian countries, it is clear that governments have promoted different conceptions of sustainable development in their policy actions to tackle environmental problems. This paper attempts to analyze Northeast Asian countries' experience of environmental policy development in an effort to provide a more systematic analysis of how those countries have responded to environmental degradation, and in what areas they should and could modify their policies. Following this analysis, the paper examines the Nordic countries as a model of an environmentally-friendly society and draws lessons that can be applied to Northeast Asia.

The most important lessons for Northeast Asia are deemed to be as follows: 1) the enhancement of the relationship between humans and their natural environment by increasing environmental awareness in people's daily lives, as well as greater consideration for future generations; 2) improving energy efficiency and the use of alternative energy sources through a renewable energy approach; 3) the promotion of regional environmental cooperation.

This paper is divided into five parts. Part one analyzes the current concept of sustainable development in the international context. Part two outlines both the past and present environmental problems experienced by Japan, South Korea, and China. Part three examines the challenges for sustainable development in Northeast Asia in terms of environmental management. Part four then provides an overview of the Nordic experience in environmental management and cooperation. Finally, part five concludes by looking at what lessons the Nordic countries hold for sustainable development in Northeast Asia.

Introduction

The Beijing Olympic Games in 2008 proved a good opportunity for China to showcase its economic, and also its sporting, achievements to the rest of the world. But while the event was staged successfully, the problem of air pollution in Beijing lingered as a bad memory after the end of the Games, with the result that the awareness of the value of a clean environment has been enhanced among Chinese citizens.

When the Tokyo and Seoul Olympic Games were held in 1964 and 1988, respectively, environmental problems were also of great concern in Japan and South Korea. While there was a twenty-year plus gap between the Olympic Games in Japan, South Korea, and China, the staging of the prestigious Games encapsulated two sides of a common story: on the one hand, the achievement of high-speed economic development and, on the other, serious environmental degradation. Indeed, there are similarities between the three Northeast Asian countries of China, Japan, and South Korea[1] in their phases of industrialization that centered on short-term, rapid economic development to the detriment of the environment. People and governments in these countries, especially present-day China, have deep environmental concerns, and are also realizing that it is difficult to achieve economic development without engendering significant cost to the environment.

The Environmental Sustainability Index (ESI), published in 2005, ranks countries according to their level of sustainable development. Most Northeast Asian countries ranked near the bottom: South Korea came 122nd, China 133rd, Taiwan 145th, and North Korea was 146th; only Japan, which was ranked 30th, showed a relatively high level of sustainable development

[1] Northeast Asia is generally taken to include China, North Korea, Japan, Mongolia, South Korea, and the Russian Federation. This paper deals with China, Japan, and South Korea which were selected as case-studies since there is much in common between the three countries in regard to the root of their environmental problems and how environmental management is conducted.

among the 146 countries evaluated.[2] Thus, North Korea and Taiwan ranked at the very bottom of the list, with China not far behind. Meanwhile, the Nordic countries[3] of Finland, Norway, Sweden, and Iceland were among the world's top-five environmentally sustainable countries.[4] Even though the ESI score cannot be said to paint the whole picture of a country's level of sustainable development, it does at least indicate that there are significant differences between countries in regard to both current environmental results and probable longer-term trends. In fact, some countries manage their pollution control and natural resource management relatively well, while others do not. Based on the ESI scores, it is obvious that efforts have not been enough to achieve sustainable societies in Northeast Asia compared to the Nordic countries, the latter which can arguably be said to have already successfully created sustainable societies. In light of this contrast, it stimulates discussion and investigation into what is the best way to promote sustainable development across different regions and countries, and how images of a more sustainable society can be created considering differing cultural, historical, natural, and social heritages, which can affect environmental ethics and behavior. Another important ingredient is to devise ways for making a sustainable society more fashionable and desirable through adopting innovative lessons and ideas from other regions, the Nordic countries being a case in point.

---

[2] The Environmental Sustainability Index (ESI) benchmarks the ability of nations to protect the environment over the next several decades. The 2005 ESI was published by Yale University Center for International Earth Science Information Network and Columbia University in collaboration with the World Economic Forum and European Commission, http://www.yale.edu/esi/ESI2005_Main_Report.pdf (accessed April 8, 2009).

[3] The Nordic region – or "Norden" to its inhabitants – is generally taken to include those countries represented in the Nordic Council: Denmark, Sweden, Finland, Iceland, Norway, the Åland Islands, the Faroe Islands, and Greenland.

[4] Denmark ranked 6th and Swaziland was 4th.

The Concept of Sustainable Development

The definition often given to the concept of sustainable development is found in the Brundtland report.[5] The report highlighted the idea of sustainable development and defined it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[6] Recently, the concept of sustainable development has centered on the contention that it is possible to achieve economic growth and industrialization without, or minimizing, environmental damage.[7] Nevertheless, the relationship between environmental sustainability and economic development is complex, and many countries have yet to find a suitable approach to the equation.

During the 1950s and early 1960s, many countries placed top priority on efforts designed to improve economic development and rapid economic growth, with little consideration for environmental pollution. Since the end of 1960s, however, the perception of the importance of the environment started to gradually change as a number of environmental problems, in particular the emission of air pollutants and acid rain from industrial and traffic sources, endangered the environment – and by extension people – on a local, regional, and even global scale. The environmental problem was formally put on the international political agenda for the first time with the United Nations Conference on the Human Environment, which was held in Stockholm in 1972. The conference marked a turning point in the development of international environmental politics and public awareness of international environmental problems. Moreover, it was acknowledged that economic growth had caused increasingly severe pollution problems. The

---

[5] In 1983, the United Nations Secretary-General invited Norwegian Prime Minister Gro Harlem Brundtland to chair a World Commission on Environment and Development and published the Brundtland report. See World Commission on Environment and Development, *Our Common Future* (Oxford and New York: Oxford University Press, 1987).

[6] Ibid.

[7] World Conservation Union, "The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century," 2006, p.1, Report of the IUCN Renowned Thinkers Meeting, January 29-31, 2006, http://cmsdata.iucn.org/downloads/iucn_future_of_sustanability.pdf (accessed April 15, 2009).

conference issued the Declaration of the United Nations Conference on the Human Environment, which laid out a guideline for environmental protection action. In spite of this, attitudes toward pollution between regions and between countries differed greatly, with understanding of the importance of the environment being limited to a few developed countries. This means that the tenets of sustainable development were seen to be too early for certain countries to adopt since economic development had priority for these countries. In many cases it was stated that they couldn't afford to pay attention to environmental issues.

More detailed issues concerning global environmental problems and environmental cooperation were discussed at the Earth Summit, the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, where over one hundred heads of state and government gathered and adopted the Rio Declaration. Based on this declaration, several other initiatives were taken at the Summit, including Agenda 21, which called on international, governmental, and non-governmental organizations to develop environmental indicators in order to provide a solid basis for decision-making at all levels.[8] In response to these initiatives, many countries recognized the role of indicators in promoting sustainable development at international, regional, and local levels.

Another important achievement in reaching a global consensus, especially between developed and developing countries, was the agreement on the Kyoto Protocol in 1997. One hundred and thirty-seven countries have ratified the Kyoto Protocol to date, with the protocol demanding the reduction of greenhouse gas emissions to levels specified for each country. It is significant that this protocol began not only to link individual states' efforts as part of a wider global responsibility, but also addressed environmental ethics to deal with a global environmental problem for nations. This code of ethics includes a call for global cooperation to take responsibility for the impact of human activities on nature.

---

[8] United Nations Environment Programme (UNEP), Regional Resource Centre for Asia and the Pacific, *Environmental Indicators Northeast Asia,* (Klong Luang, Thailand, 2004), p. 9, http://www.rrcap.unep.org/indicator/Vertical%20North%20East%20Asia.pdf

Many countries in recent years have attempted to promote the concept of sustainable development, on a global level as well. This issue was specifically discussed at the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002, which brought together tens of thousands of participants, including heads of state and government, national delegates, and leaders from non-governmental organizations (NGOs) and businesses. The summit concluded that environmental protection is greatly contributing to changes in the patterns of economic growth and will continue to play an important role in creating a sustainable society in the future.[9]

As such, these various events over the course of more than three decades have increased the general consciousness of global environmental issues associated with people's interaction with the natural environment. Nevertheless, it is not enough to create a global mechanism for sustainable development since most regions are still not in the process of sustainable development. Furthermore, there is an increasing gap between countries and regions pursuing policies that result in more sustainable development and those that display unsustainable development. This is indicative of the fact that most developing countries are still unwilling and/or unable to change or modify policies in response to the problems. However, the fact is that environmental degradation, such as transboundary pollution, does not just necessitate action on the part of an individual nation-state, but requires regional and global mechanisms of cooperation for policies to be effective.

An obvious question centers on the contention why it is so difficult for developing, and even some developed, countries to change their attitude and establish a new and better direction for sustainable development. It should be recognized that environmental ethics are based on a set of values, practices, and institutions that differ in each country, and which determine how the environment is managed.[10] Therefore, it might be that the existing environmental ethics in some countries are at fault, and this means that

---

[9] United Nations Economic and Social Commission for Asia and Pacific (UNESCAP), *Green Growth at a Glance: The Way Forward for Asia and the Pacific* (Bangkok, 2006), p. 6, http://www.unescap.org/esd/water/publications/sd/ggbrochure.pdf

[10] James Connelly and Graham Smith, *Politics and the Environment from Theory to Practice* (New York: Routledge, 2000), p. 16.

they need a new environmental ethic comprehensive enough to provide a justification for all their environmental duties. There has been a tendency that most governments have conducted environmental policy by political rather than ethical consensus, and more often than not environmental problems are the focus of national and political choice.[11] However, environmental policy should be based more on an environmental ethic that stresses a sustainable interplay between humans and nature so as to seek new trends of sustainable development, such as "green" growth and international co-operation. Thus, without a fundamental reassessment of those ethics, it will not be possible to achieve sustainable development. However, the call for a new ethics-based environmental mechanism should be examined carefully. What was wrong with the old one, where could a new ethic be applied, and how could people possibly be persuaded to adopt it?[12] We need, then, to examine our new moral concerns about environmental problems to see how well they are suited to (or can be adapted to) our traditions and situations.

[11] Steve Rayner and Elizabeth L. Malone, eds., *Human Choice and Climate Change* (Ohio: Battelle Press, 1998), Vol 1, p. 15.
[12] Ibid., p. 7.

The Environmental Problems of Northeast Asia

Japan and the Environment

Japan's environmental problems are a result of its past industrialization, which caused serious pollution in both industrial and residential areas. In the 1950s and 1960s, the country achieved a remarkable economic success with double-digit growth rates. While this rapid economic growth was outstanding, it came at an environmental cost, the negative effects of which still persist today.[13] The greatest environmental pollution problem was caused by burning coal, which was Japan's main energy source during the 1950s. However, for reasons of pollution and energy efficiency, the government changed the basic energy source from coal to heavy oil in the 1960s. Yet, in spite of the decline of smoke from coal burning, the pollution problems were not solved by this measure.[14] With the increasing use of heavy oil propelling an expanding industrial economy and with a growing number of vehicles on the roads, the problem in fact became more serious. Furthermore, many industrial factories were built in surrounding big cities, along the coast of the Pacific Ocean from Tokyo, through Nagoya and Osaka, and onward to the Kyushu region, which significantly contributed to increasing urban and marine pollution.[15] This resulted in that people in urban areas were directly exposed to serious levels of pollution. For example, during the late 1960s, Tokyo policemen were forced to inhale oxygen while directing traffic. In fact, "vendors sold oxygen on Tokyo's streets, and children wore masks on their way to school" because Japan "may [at the time] have been the world's most polluted country."[16] The occurrences of

---

[13] Hidefumi Imura and Miranda A. Schreurs, *Environmental Policy* in *Japan* (Cheltenham: Edward Elgar and the World Bank, 2005), p. 267.

[14] See Yoshiro Hoshino, "Japan's Post-Second World War environmental problems," in Jun Ui, ed., *Industrial pollution in Japan* (Tokyo: United Nations University Press, 1992).

[15] Ibid.

[16] See, e.g., Miranda A. Schreurs, *Environmental Politics in Japan, Germany, and the United States* (Cambridge, UK, and New York: Cambridge University Press, 2002),

the Minamata disease (a neurological syndrome caused by severe mercury poisoning), Itai-itai disease (caused by cadmium poisoning and results in the softening of bones), and Yokkaichi asthma (a chronic obstructive pulmonary disease caused by severe smog) were, furthermore, all testaments to the serious environmental situation that was a threat to people's lives and health in Japan. Nevertheless, the government failed to prevent urban pollution and its associated diseases from increasing. Rather, the Japanese government surprisingly refrained from taking strict measures against the responsible companies for a long time, largely because policymakers were worried about the possible negative impact on Japan's high economic growth.[17]

It was not until the 1970s with the first oil crisis in 1973 and the second in 1979, which had a huge impact on the Japanese economy as it was heavily dependent on oil from the Middle East, that Japan started to shift away from oil-intensive industries and made efforts to improve energy efficiency. Furthermore, many Japanese factories based on heavy industry have moved into other Asian countries. As a result, significant progress has since been made in limiting environmental pollution. Yet in spite of these efforts, overall environmental standards in Japan have still not been as high as those in most developed countries. The problem is rooted in the fact that the government has believed that problems of environmental destruction can primarily be solved on the basis of government controls and the use of energy and environmental technologies, without reference to the sensitivities of nature.[18] Japan has thus traditionally paid less attention to issues of nature conservation. For example, although Japan is heavily forested, much of the forest is monoculture, which lacks great biological diversity. Even today, the government is undertaking large-scale construction projects that cut a maze of highways and tunnels through Japan's mountainous terrain.

---

p. 36; Thomas G. Rawski, "Urban Air Quality in China: Historical and Comparative Perspectives," *International Center for the Study of East Asian Development Kitakyushu*, 2006, p. 2, http://www.econ.pitt.edu/papers/Thomas_air_quality.pdf

[17] Government of Japan, Ministry of the Environment, *Annual Report on the Environment in Japan 2006* (Tokyo: Ministry of the Environment, 2006), p. 22.

[18] Imura and Schreurs, *Environmental Policy in Japan,* p. 267.

Thousand of golf courses are built in remote mountain villages, as well as airports that further destroy habitat.[19] In short, policies have been implemented that focus to a large degree on furthering national development and the material gain of citizens.

South Korea and the Environment

During the 1960s through the 1980s, South Korea achieved high economic growth with an average annual GDP growth rate of approximately 10 per cent. Indeed, South Korea has often been described as an economic miracle – at least, that is, before the Asian financial crisis struck in 1997.

While the industrialization process was successful and the quality of people's lives improved remarkably in a relatively short space of time, South Korea's natural environment was seriously polluted. In particular, the Korean government's ambitious five-year economic plan based on heavy industry and the petrochemical industries, begun in the 1960s, brought about a rapid deterioration in the environment. Air pollution in many cities had already reached a critical level at the end of the 1970s; this was mainly related to the increase of energy use, in particular coal consumption. It has been estimated that coal consumption doubled from ten million tons in the mid-1960s to twenty million tons by the mid-1970s.[20] The other reason was the increase in population, and the rise in the number of factories and cars in urban areas. South Korea's cities came to be more polluted than the other major cities of the world. In 1978, Seoul's level of SO_2 (0.18ppm) was ten times higher than that of New York.[21]

The river and city's water also became highly polluted in the 1970s as a result of industrial effluents, untreated sewage, and acid rain. For example,

---

[19] Ibid.

[20] Moon Chung-in and Lim Sung-hack, "Weaving Through Paradoxes: Democratization, Globalization, and Environment Politics in South Korea," *East Asian Review*, Vol. 15, No. 2 (Summer 2003), pp. 46-47.

[21] 권숙표, "환경오염의 발생과 인구문제", 가족계획연구회 한국인구학회 공동주최 "한국인구문제와 정책방향에 대한 세미나," 1981, pp. 111-28 (Kwon Sukpyo, "The Creation of the Environmental Pollution and Population Problem," Institute for Family Planning, Seoul, 1981).

the Han River which in the 1960s provided residents of Seoul with fresh water for domestic use and for swimming in the summer, was so polluted that it was unsafe to access until the 1990s. The Nakdong River, the second largest river in South Korea, became extremely polluted after the establishment of an industrial complex in the Kumi area. Moreover, contamination of the seaside in Masan resulted in it being called the "sea of death" and was closed to fishing in the 1980s.

The Ulsan-Onsan industrial zone on the southeast coast of the country is another example of the process of industrialization that resulted in serious pollution problems. Established in 1972 as an industrial complex primarily consisting of chemical and petrochemicals plants, it was used to attract foreign investment and the transfer of technology from developed countries. Pollution from this industrial zone, however, led to serious heavy metal poisoning among the people living next to the complex, known as the Onsan disease. The government, worried by the possible negative impact on economic growth if the plant closed, attempted to disguise the problem by calling it a general allergic reaction inherent to the area. It was not until 1988, when the situation became so bad, that the government evacuated (thus not addressing the underlying cause of the problem) the 37,600 people living close to the complex.[22]

In sum, for the authoritarian regimes that ruled South Korea from the 1960s until 1988, the highest priority was placed on economic development. All possible obstacles to economic expansion and growth were suppressed, especially human rights, with rapid industrialization leaving indelible marks on the landscape and the consequences of environmental neglect found in the country's poisoned air and water.[23]

---

[22] S. K. Yoon, "Environmental Health Consequences in Industrial Development in Korea," in World Health Organization, ed., *WHO Commission on Health and Environment, Report of the Panel on Energy* (Geneva: World Health Organization, 1992), p. 113.

[23] See Norman R. Eder, *Poisoned Prosperity: Development, Modernization and the Environment in South Korea* (Armonk, NY: M. E. Sharpe, 1996); Yokshiu F. Lee and Alvin Y. So, eds., *Asia's Environmental Movements: Comparative Perspectives* (Armonk, NY: M. E. Sharpe, 1999), p. 3.

After 1988 and the success of the democracy struggle, the government could no longer monopolize or manipulate knowledge and information concerning environmental issues.[24] Consequently, democratization influenced environmental politics and management in South Korea. According to the 1998 Organization of Economic Cooperation and Development (OECD) report of environmental indicators, South Korea had made improvements in the quality of its environment. For example, carbon dioxide emissions per capita in South Korea decreased from 8.3 tons in 1995 to 7.8 tons in 1997, lower than the OECD average of 10.9 tons.[25] More recently, the government has focused attention on technology development in the field of energy efficiency and domestic renewable energy sources to reduce environmental pollution. However, South Korea's track record in the protection and conservation of nature has not significantly improved, and Korea's biodiversity has experienced a rapid decline due to accelerated urbanization, industrialization, and pollution.[26]

China and the Environment

China has averaged 8–9 per cent economic growth a year over the past three decades and achieved industrialization in a remarkably short period of time. This outstanding achievement has lifted some 400 million people out of poverty and has also resulted in China becoming nearly three times more energy efficient in 2000–02 compared to 1978.[27] However, China's rapid industrialization that has lent it the epithet of the "factory of the world"

---

[24] Moon and Lim, "Weaving Through Paradoxes," p. 57.

[25] Ibid., p. 48.

[26] Jung Kyun Na, "Developing and Implementing National Biodiversity Strategy: Lessons from the Republic of Korea," paper prepared for the 1st Workshop on National Biodiversity Strategies & Action Plans in Northeast and East Central Asia, Experiences and Lessons, April 26-28, 2000, Beijing, China, http://bpsp-neca.brim.ac.cn/calendars/workshop-1/12.html

[27] "Executive Summary," in World Bank and State Environmental Protection Administration, *Cost of Pollution in China: Economic Estimates of Physical Damages* (Washington, D.C.: The World Bank, Rural Development, Natural Resources and Environment Management Unit East Asia and Pacific Region, 2007), www.worldbank.org/eapenvironment

has led to increasing pollution and the destruction of natural resources. Moreover, the Chinese government has not adopted strict policies of environmental control and regulation, a fact which has also served to attract more foreign direct investment. Thus, as the Chinese leadership focused most immediately on ensuring the continuation of rapid economic growth, it largely ignored the environmental consequences, leaving behind a legacy of pollution and destruction.[28]

It is apparent that out of the Northeast Asian countries it is most urgent for China to ameliorate the worst of the environmental ravages, as its population, economic development, and demand for energy are growing much more quickly than in Japan or South Korea. In fact, the current environmental pollution in China resembles that of Japan in the 1960s or South Korea in the 1980s with the combination of rapid industrialization and rapid growth of population. With recorded ambient concentrations in 2004 of 440 milligrams of particulates in eleven Chinese cities, all in China's northwest region, particulates[29] exceeded the Tokyo level in 1968 and approached the levels recorded in Seoul during the late 1980s.[30] The World Bank has brought to China's attention that it is home to sixteen of the twenty most air-polluted cities in the world,[31] with one third of Chinese cities failing to reach the global average standard of air quality.[32]

As a result of air pollution, China's population suffers from high incidences of respiratory diseases (lung cancer, pulmonary heart disease, bron-

---

[28] Elisabeth Economy, "Environmental Enforcement in China," in Kristen A. Day, ed., *China's Environment and the Challenge of Sustainable Development* (Armonk; NY: East Gate Book, 2005), p. 102.

[29] A particle with an aerodynamic diameter of 10 micrometers moves in a gas like a sphere of unit density (1 gram per cubic centimeter) with a diameter of 10 micrometers.

[30] Liang Congjie and Yang Dongping, eds., *The China Environment Yearbook 2005: Crisis and Breakthrough of China's Environment* (Leiden and Boston: Brill, 2007).

[31] Jonathan Watts, "Satellite data reveals Beijing as air pollution capital of world," *Guardian*, October 31, 2005, http://www.guardian.co.uk/news/2005/oct/31/china.pollution (accessed May 23, 2009).

[32] Keith Bradsher and David Barboza, "Pollution from Chinese Coal Casts a Global Shadow," *New York Times*, June 14, 2006, http://www.nytimes.com/2006/06/11/business/worldbusiness/11chinacoal.html

chitis). The World Health Organization (WHO) estimates that diseases triggered by indoor and outdoor air pollution kill some 656,000 Chinese citizens each year.[33] Meanwhile, China is now the world's largest CO_2 emitter, having overtaken the United States in 2007. The assessment at the end of the tenth Five-Year Plan (2001–05) concluded that China's emissions of SO_2 and soot were 42 per cent and 11 per cent higher than the target set at the beginning of the plan.[34] It is further predicted that China will be responsible for 37 per cent of global emissions by 2030.[35] Massive emissions also contribute to acid rain, a direct consequence of air pollution from SO_2 and nitrogen oxide that remains a serious problem in China. Most of China's air pollution and green house gas emissions are largely a result of the fact that total energy consumption in China has increased in recent years, with inefficient energy use and increasing coal consumption. Total energy consumption in China increased by 70 per cent between 2000 and 2005. Coal consumption accounted for 75 per cent of this increase and this proportion is unlikely to change significantly in the coming decades, while the fraction of energy consumption met by hydropower decreased during the 2001–05 period.[36] A further exacerbating factor lies in China's coal being of very low quality – it contains high levels of SO_2. For this reason, the widespread usage of coal for household heat and energy threatens people's health. Documented examples of health effects include numerous cases in Guizhou Province of cancerous skin lesions, deformed limbs, arsenic poisoning, and fluorosis which can soften and disfigure teeth and bones.[37]

---

[33] Anne Minard, "China's Pollution Leaving Mountains High and Dry, Study Finds," *National Geographic*, March 8, 2007, http://news.nationalgeographic.com/news/2007/03/070308-china-pollution.html (accessed May 23, 2009).

[34] The World Bank and State Environmental Protection Administration, "Cost of Pollution in China."

[35] Peter Williams, "Gas emissions 'will double by 2020'," *perth now*, May 1, 2008, http://www.news.com.au/perthnow/story/0,21498,23628603-5005361,00.html (accessed May 24, 2009).

[36] The World Bank and State Environmental Protection Administration, "Cost of Pollution in China."

[37] Frank Wang and Hongfei Li, "Environmental Implications of China's Energy Demands: An Overview," in Day, ed., *China's Environment and the Challenge of Sustainable Development*, p. 183.

Water pollution is also a cause for serious concern in China. Although China has the fifth largest natural flow of water in the world, at 2.8 trillion cubic meters a year in 2000, this constitutes only 2.219 cubic meters per person, just one fourth of the world average of 8,649 cubic meters per person.[38] Nearly half of China's 640 major cities face water shortages; for 100 the situation is severe.[39] Surface water and drinking water quality in China are poor in the most densely populated parts of the country, especially in northern China. About three hundred million people lack access to safe drinking water, and 80 per cent of the length of China's rivers is too polluted for fish and people.[40] It is an alarming statistic, for instance, that one billion tons of untreated sewage is annually dumped into Asia's longest river, the Yangtze, which has damaged human health and increased mortality from infectious diseases. The main underlying reason can be traced to the fact that China's industry produces a huge amount of waste water and water pollution.

Desertification is also one of the most serious environmental problems in China contributing to the destruction of land and wildlife. While the extent of desertification has been curbed from a level of 3436 km² each year at the end of the 1990s to a present level of 1283 km², arable lands are nonetheless decreasing by 300 to 600 thousand hectares yearly and the deterioration of soils is increasing.[41] Natural grasslands are also disappearing by 650 to 700 thousand hectares a year.[42]

---

[38] Shahid Yusuf and Kaoru Nabeshima, *China's Development Priorities* (Washington, D.C.: The World Bank, 2006), p. 24.

[39] World Resources Institute (WRI), "The Environment and China: Water and Air Pollution: Water and Health," http://www.wri.org/publication/content/7833 (accessed April 29, 2009).

[40] Peter H. Gleick, "China and Water," in Peter H. Gleick, ed., *The World's Water, 2008–2009: The Biennial Report on Freshwater Resources* (Washington, D.C.: Island Press, 2008), p. 79.

[41] State Forestry Administration, "Enhancing Forestry Ecological Improvement and Accelerating Development of the Industry," *CHINAGATE*, February 27, 2006, http://chinagate.cn/english/reports/48270.htm (accessed April 30, 2009).

[42] Li Zhi Dong, "Energy and Environmental Problems behind China's High Economic Growth: A Comprehensive Study of Medium- and Long-term Problems,

While the central government admits to some of the environmental degradation having been caused by its policy priorities being placed on national economic development first, counter measures have hitherto been incomplete and the government still views economic development and the acceleration of industrialization as the central tasks of the country. Nevertheless, China's economic burden as a result of premature mortality and morbidity associated with pollution will increase in the future, unless the government tackles the problems as soon as possible. In 2006, the Environmental Protection Administration produced the country's first official estimate of environmental losses. According to its calculations, it would cost US$84 billion (RM302 billion) to clean up the pollution produced in 2004, or three per cent of GDP for that year.[43]

Measures and International Cooperation," *The Institute of Energy Economics*, Japan, March 2003, p. 3, http://eneken.ieej.or.jp/en/data/pdf/188.pdf

[43] "Environmental Costs in China", commentary by the Vice-minister of China's State Environmental Protection Administration, *Environmental Economics*, December 3, 2006, http://www.env-econ.net/2006/12/reducing_enviro.html (accessed May 2, 2009).

Challenges of Sustainable Development in Northeast Asia

The previous section outlined the fact that Japan, South Korea, and China experienced during their respective phases of rapid industrialization, combined with a sharp surge in the consumption of energy resources, severe environmental degradation. Spurred by their desire to catch up with the West economically, these countries concentrated their efforts on industrial development. This section mainly examines how the Northeast Asian countries have responded to environmental degradation as a result of the rapid economic growth and industrialization, and wherein the main problems lie with their responses.

Firstly, all three countries failed to deal with or ignored the victims of development. After the Second World War, Japan put a lot of effort into economic recovery and people sacrificed individual rights and aspirations for the sake of national development. A society developed that had its ideational fountainhead in a military model of social organization and production, which led to Japan's present level of economic development.[44] Even though successive governments undertook a number of policy measures to improve the environmental situation in Japan, this was fundamentally not done with consideration of creating a better and cleaner environment for human beings to live in. The case of South Korea tells a similar story. During its rapid economic development, the Korean government and its people were primarily concerned with economic growth and the escape from poverty. Environmental pollution and its victims were treated with "benign neglect." Thus, economic expansion was the highest priority for the economic development-oriented regime from the 1960s until 1988, and all perceived barriers to that growth were suppressed. Meanwhile, during the process of industrialization in China, the government has primarily focused on high-speed economic growth, which has been regarded as the most im-

[44] Hoshino, "Japan's Post-Second World War environmental problems."

portant factor for maintaining social stability and thus has been seen as more important than any other issues. For this reason, a huge number of people are still suffering from the effects of serious pollution with a lack of government action taken against it. Overall, there has been a strong tendency to disregard ethical considerations in relation to individual rights during the economic growth of the Northeast Asian countries, instead focusing on national development rather than the improvement of conditions for human beings.

Secondly, during most of the periods of high-speed economic growth in the three countries, governments and people have believed that technological development will solve most of the problems. Hence, the implementation of environmental policies concentrated mainly on the improvement of clean technology. In particular, the Japanese environmental policy has traditionally focused on industrial-related issues and has been both business and technology driven.[45] As a result, Japan has become the world's leading country in the field of energy technology, in particular energy efficiency. This has been coupled with a Japanese energy policy that has aimed at lessening dependence on energy imports by improving energy technology. Nevertheless, the Japanese approach to environmental management has been criticized by environmentalists in that other "green" issues such as species and habitat conservation have not been priorities.[46]

Obsessed with rapid economic development, the South Korean government has similarly exhibited a lack of concern for the conservation of natural ecosystems. In general, responding to its environmental problems, South Korea has put a lot of effort into boosting investments in energy conservation to reduce its CO_2 emissions. In July 2008, the South Korean government decided to boost investment in energy efficiency and renewable energy. The Ministry of Knowledge and Economy announced that the country would spend 194.4 billion won (US$193 million) on technologies and

[45] Elin Vinger, *Japanese Environmental Policy and Approach to Environmental Technology* (Östersund: Swedish Institute for Growth Policy Studies, 2008), p. 19.
[46] Ibid, p. 7.

projects, including solar, wind, and bio-fuels.[47] In August 2008, President Lee Myong-bak declared "low carbon, green growth" as Korea's new growth strategy.[48] The government has begun to put money into renewable energy sectors to create a favorable environment for businesses and to boost the domestic market to create more jobs.

In most of China's efforts to solve its environmental problems, meanwhile, there are clear similarities with Japan's and South Korea's experiences in terms of the focus on energy. During the tenth Five-Year Plan period (2001–05), the Chinese government invested more than 2.5 billion Yuan in scientific and technological research dealing with climate change through national science and technology plans.[49] Similarly, it has accorded high priority to the issue of energy and air pollution during the eleventh Five-Year Plan (2006–10). Total emissions will be reduced by 10 per cent and energy efficiency will be raised by 20 per cent.[50] Notwithstanding this, China has failed to adequately safeguard its natural environment from pollution and implement other necessary conservation measures, with the result that many ecosystems and habitats have been damaged if not lost altogether.

A third aspect in which environmental policies have been found wanting lies in the fact that many people and governments in Northeast Asia have pursued material gain devoid of environmental ethics since industrialization. When it comes to contemporary urban lifestyles in Northeast Asia, daily life revolves around the consumption of large quantities of materials and energy. For instance, the Japanese population's desire for convenient 24

---

[47] Ucilia Wang, "South Korea Boosts Renewable-Energy Investments by 60%," *Greentechmedia,* July 28, 2008, http://www.greentechmedia.com/articles/south-korea-to-boost-renewable-energy-investments-by-60-1191.html (accessed May 5, 2009).

[48] "Lee Touts Vision of Green Growth Korea Herald," August 16, 2008, http://www.fuelcellenergy.com/files/08-16-08%20Korea%20Herald%20on%20Green%20Program.pdf (accessed May 5, 2009).

[49] *White Paper: China's Policies and Actions for Addressing Climate Change*, October 2008, http://www.china.org.cn/government/whitepaper/2008-10/29/content16682598.htm (accessed May 8, 2009).

[50] Shi Jiangtao, "Official Denies Plan to Divert Water from Parched Provinces," *South China Morning Post*, July 26, 2008.

hour-a-day shopping has resulted in a high level of vending machine use; there are approximately 2.5 million vending machines in Japan.[51] Making lifestyles more sustainable is a challenge in Northeast Asia, which will entail new patterns of human and institutional behavior. What will happen to the environment is determined not only by environmental policies, but also by how people relate to the natural environment and the economic rationality of environment-friendly behavior. Thus, it is necessary to implement a change in lifestyles. In particular, changing unsustainable consumption and production patterns are vital in order to promote sustainable lifestyles in Northeast Asia. The populations of Northeast Asia should be clearer about what kind of prosperity they want – a healthy lifestyle with modest resources, or polluted surroundings with more material wealth.[52]

Additionally, traditional national approaches are no longer viable as the cross-border effects of various types of pollution must be addressed by collective action. Indeed, transboundary pollution is becoming an increasingly common phenomenon in Northeast Asia. For example, acid rain affects more than 30 per cent of Chinese territory and also reaches as far as the Korean Peninsula and Japan, especially during winter when strong northwesterly winds blow over the region.[53] At the same time, sand storms caused by industrial pollution in China are blown to South Korea and Japan causing hazardous air pollution. These alarming trends mean that it does not suffice to approach the issue of sustainable societies at a national level since many environmental problems cross national boundaries. In recent years, understanding between China, Japan, and South Korea on this fact has witnessed progress. A number of cooperative programs, plans, and forums have been advocated and extended through multiple channels such as the Northeast Asian Conference on Environmental Cooperation (NEAC), the North-East Asia Sub-regional Programme for Environment Cooperation

---

[51] Government of Japan, Environment Agency, *Quality of Environment in Japan 1994*, Chapter 1. "In Search of Environmentally Friendly Lifestyles" (Tokyo: Environment Agency, 1994).

[52] United Nations Environment Programme (UNEP), Regional Resource Centre for Asia and the Pacific, *Environmental Indicators Northeast Asia.*

[53] Li, "Energy and Environmental Problems behind China's High Economic Growth," p. 3.

(NEASPEC), the Tripartite Environment Ministers Meeting (TEMM), the Acid Deposition Monitoring Network in East Asia (EANET), and Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP). Nevertheless, environmental cooperation within the region has been hampered by a lack of effectiveness; environmental institutions are often regarded as weaker than institutions in other regions. Therefore, not only is there a lack of legally binding regulations in regard to the environment, but there is also a dearth of leadership and practical action on the parts of the Northeast Asian governments.

In many respects, there are similarities among China, Japan, and South Korea in dealing with environmental problems. The challenge for them is to find ways to ensure that the old paradigm of environmental management is transformed into a more integrated approach that enables policy to support and reinforce sustainable development. They are, in fact, interconnected as one country alone cannot achieve a satisfactory level of environmental protection. In order to comprehensively tackle environmental problems, environmental technologies alone do not suffice; they only form a part of the solution. People's views and behavior in relation to the environment and approaches to nature conservation are also important. In addition to this, Northeast Asia must adopt mechanisms of regional and global cooperation. Thus, a combination of approaches is necessary to guarantee better environmental quality and sustainable economic development in the region. In short, more advanced considerations of environmental management should be adopted that advocate a harmony between humans and nature, between environmental technology and nature conservation, and between local and regional cooperation.

The Nordic Experience of Sustainable Development

The Nordic countries – Denmark, Finland, Iceland, Norway, and Sweden – are representative of a low-density area in terms of population that displays a rich and clean natural environment with vast forests, mountains, and rivers. Also, many people enjoy a lifestyle that can be termed as "close to nature" with outdoor activities being particularly popular. However, this region experienced serious environmental problems in the 1960s and 70s. In particular, the impact of acid rain and industrial pollution from other countries, mainly Britain and Russia, on the ecosystems of lakes and forests has long been a serious problem in most Nordic countries. To respond to environmental problems, an environmental protection movement became prominent in the 1960s with its aim to enhance awareness of pollution. At the same time, efforts were made to reduce the amount of pollutants through various environmental conservation activities. Moreover, the Nordic countries have dealt with common environmental problems such as acid rain through dialogue and cooperation among governments in improving regional environmental activities. These approaches to environmental management seem to have made these countries successful compared with many other countries.

More specifically, Nordic countries have made great progress over the past four decades in three dimensions of environmental management. Firstly, Nordic countries recognized much earlier than others the importance of sustainable development in achieving harmony between people and the natural environment. Nature conservation has thus traditionally been an important component in this process: forests, coasts, watercourses, and ground water are all important preconditions for human life and sustainable development. In most of the Nordic countries (or at least some of them), forests are an important natural resource, which has a considerable impact on biodiversity and environmental control since forests cover 70–80 per cent of the total land area. Forests are also of great importance for

recreation and outdoor activities, and for people's wellbeing.[54] Efforts have been made recently to strengthen and increase the protection of forests. For example, today about 3.6 per cent of productive forest land in Sweden is protected as national parks, nature reserves, or habitat protection areas.[55] The Nordic countries have a strong record in the establishment of national and urban parks. Indeed, Sweden has the distinction of having created Europe's first set of national parks in 1909. Sweden has so far established a network of 29 national parks, and it is to be expanded by up to a further twelve parks over the next decade. Moreover, Stockholm has the world's first and most extensive city park; Finland has a high number of city parks by world standards; and Greenland has the largest national park in the world.[56] In addition, Sweden, Denmark, and Finland have been deeply involved in projects of environmental protection within the EU framework. Natura 2000 is one such EU project for the protection of environments deemed of value to nature conservation. In Sweden almost 4,000 areas have been selected for the Natura 2000 network.[57]

In addition to this, there has been a rise of environment-friendly lifestyles within the Nordic countries. Most of them have created an efficient and profitable system for saving the environment through large-scale recycling. In particular, Sweden has an outstanding recycling system, with local recycling places, refundable deposit machines for PET bottles and aluminum cans at the supermarket, and pick-ups of papers in every residential area and most apartment buildings. For example, Sweden has managed to

---

[54] Nordic Council of Ministers, *Sustainable Development: New Bearings for the Nordic Countries,* rev. ed. with goals and initiatives for 2005-2008. Tema Nord 2004:568 (Copenhagen: Nordic Council of Ministers, 2004), p. 127.

[55] Government Offices of Sweden, Ministry of the Environment, "Nature conservation and biological diversity," May 13, 2004, http://www.regeringen.se/sb/d/3879 (accessed June 3, 2009).

[56] Nordic Wellbeing, "Outdoor Life, "http://www.nordicwellbeing.com/web/outdoor/more_outdoors/awalk_inthe_park.php (accessed June 5, 2009).

[57] Government Offices of Sweden, Ministry of the Environment, "Nature conservation and biological diversity."

attain plastic bottle recycling rates of around 80 percent.[58] In addition to this, the Nordic lifestyle (although it can be argued in the past, before urbanization, people depended to an even greater extent on nature) can generally be said to be closely linked to nature, playing an important part in people's lives. For instance, many people have summer houses outside of the cities. During weekends or vacations, it is common to get away from the cities to these summer houses and to spend time in natural surroundings. Recently, furthermore, the concept of eco-villages has gained popularity, albeit it their establishment is limited to certain areas. Today, it is estimated that there are 24 eco-villages in the Nordic countries.[59] The concept of eco-villages means alternative small-scale communities, in which people live in close accordance with clean nature and environmental efficiency. The main principle is to build houses as environmentally friendly as possible, using renewable energy whenever feasible, recycling garbage, and bringing human waste back to nature.[60]

Secondly, Nordic countries are world leaders in the field of renewable energy and energy efficiency. CO_2 emissions from 1990 to 2005 could have been as much as 30–50 per cent higher without the penetration of renewables in the energy system and the improvement of energy efficiency.[61] All Nordic countries are currently aiming for greater reductions in greenhouse gas emissions through renewable energy. Hydropower is the most important renewable source of electricity. More than 50 per cent of electricity is produced by means of hydropower.[62] Meanwhile, the generation of wind power accounted for 3087 MW in Denmark, 554 MW in Sweden, 85

---

[58] "All about: Recycling plastics," *CNN News*, April 7, 2008, http://edition.cnn.com/2008/WORLD/asiapcf/04/06/eco.plastics/index.html (accessed September 17, 2009).

[59] Global Eco-village Network-Europe, Search Eco-villages, http://www.gen-europe.org/addresses/EVindex.html (accessed June 5, 2009).

[60] Emil Sergel, "Close to Nature," *Nordic Reach*, http://www.nordicreach.com/its_about/architecture/182/ (accessed June 5, 2009).

[61] Nordic Council of Ministers, *The Impact of Renewables and Energy Efficiency on Greenhouse Gas Emissions*, Tema Nord 2007:558 (Copenhagen: Nordic Council of Ministers, 2007), p. 9.

[62] Jes Fenger, ed., *Impacts of Climate Change on Renewable Energy Sources: Their Role in the Nordic Energy System*, Nord 2007:003 (Copenhagen: Nordic Council of Ministers, 2007), p. 74.

MW in Finland, and 225 MW in Norway at the end of 2005.[63] Denmark has in fact for decades had a strong focus on supporting and promoting wind energy. Moreover, the generation of wind power is also expected to grow significantly in other Nordic countries. In addition to hydropower energy and wind energy, in Sweden the most widely used renewable energy is biomass energy from logging waste, straw, and wood – and also geothermal energy extracted from underground heat. As for bio-fuel energy, the total amount of energy produced with bio-fuels in the Nordic and Baltic countries is currently 900 PJ[64] per year, which accounts for about 20 per cent of total gross domestic energy consumption.[65] On the other hand, measured in terms of energy intensity of the economy, energy efficiency overall has improved in the Nordic countries. The energy intensity of economies, measured in relation to GDP, has declined since 1990.[66] This means that the economies have become more energy efficient, although the improvements cannot necessarily be attributed to energy conservation. At the same time, a mandatory carbon dioxide emissions tax contributed to the improvement of energy efficiency in most Nordic countries. In the case of Denmark, the level of taxation depends on the purpose of the energy use, the type of energy used, and whether an agreement exists between the company and the Energy Agency.

Meanwhile, the electricity markets in the Nordic countries have undergone major changes since the middle of the 1990s. The liberalization process in the middle of the 1990s was followed by an integration of the Nordic markets. Today, the Nordic countries have a common wholesale electricity market.[67] The objectives are to open up national markets for electricity to wide competition, to provide more opportunities for cross-border trade in

---

[63] Ibid., p. 105.

[64] One petajoule (PJ) (1 PJ = 1 X 10 15 joules).

[65] Fenger, ed., *Impacts of Climate Change on Renewable Energy Sources,* p. 136.

[66] Nordic Council of Ministers, *The Impact of Renewable and Energy Efficiency on Greenhouse Gas Emissions,* pp. 61-62.

[67] Nordic Energy Regulator (Nord REG), "The Development on the Nordic Electricity Market," https://www.nordicenergyregulators.org/The-Development-on-the-Nordic-Electricity-Market/ (accessed September 15, 2009)

energy services, and to provide more choice for consumers.[68] Another ambition of the establishment of an energy market in terms of renewable energy, in particular the Nordic countries, lies in harnessing, for instance, Sweden's bio potential and Norway's hydro potential, as both are large and available at rather low cost. In thus doing, these countries are trying to adopt a new system through the trade of electricity produced by the potential renewable sources of each country.

Thirdly, the Nordic countries have acknowledged that sustainable development cannot be achieved by one country in isolation. Their aim, therefore, is to complement their national strategies with a common regional strategy for sustainable development.[69] For more effective cooperation, they are using the same methods to monitor pollution, and have established many institutions and organizations in the areas of climate change, air pollution, energy efficiency, and common energy markets. The Nordic Council, for example, which was established in 1952, is a forum for intergovernmental cooperation between the Nordic countries. The five Nordic countries all signed the Geneva Convention on Long-range Transboundary Air Pollution (CLRTAP) in 1979.[70] Since then, the convention has been extended by eight protocols specifying measures to cut emissions of air pollutants. For the Nordic countries it is also important to focus on maritime regional cooperation, especially related to the ecosystem of the Baltic Sea. The Convention on the Protection of the Marine Environment of the Baltic Sea Area, known as the Helsinki Convention, was signed in 1974 by the then seven Baltic coastal states, and the second convention was signed in 1992 by all the states bordering on the Baltic Sea and the European Community.[71] Through the Convention, the Baltic Sea States established the Baltic Marine

---

[68] Brigid Gavin and Sangsoo Lee, "Regional Energy Cooperation: Lessons from European Experience," *Asia-Europe Journal,* Vol. 5, No. 3 (September 2007), p. 11.

[69] Nordic Council of Ministers, *Sustainable Development: New Bearings for the Nordic Countries,* pp. 7-11.

[70] Anders Brandth Pedersen, et al., *Nordic perspectives on the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone,* Tema Nord 2008:572 *(Copenhagen:* Nordic Council of Ministers, 2008), pp. 15-17.

[71] Helsinki Commission, "About HELCOM," http://www.helcom.fi/helcom/en_GB/aboutus/ (accessed June 5, 2009).

Environment Protection Commission, known as the Helsinki Commission (HELCOM). Recognizing the importance of a long-term perspective, the Helsinki Commission adopted the Baltic Sea Joint Comprehensive Environmental Action Programme in 1992.[72] The Baltic Sea Region Energy Cooperation (BASREC) is organized as part of the cooperation, administered by the Council of the Baltic Sea States (CBSS) and was established in 2002.[73]

[72] Ibid.

[73] Joanne Maher, et al., *The Europa World Year Book 2003* (London: Europa Publications, 2003), p. 180.

Lessons from the Nordic Experience

As the approach of environmental management in Northeast Asia is appreciably different from the Nordic countries in many respects, this chapter examines in what areas it could provide a model of sustainable development. It is therefore contended that it is worth studying how Nordic countries perform in achieving sustainable societies so as to derive lessons for how the Northeast Asian countries could deal with their own environmental problems.

First of all, by comparing Northeast Asia with the Nordic countries, we can distinguish differences between the two regions in terms of the main purposes of their environmental policies. The prime objectives of environmental policy in the Nordic countries are basically to create a better environment for human beings through an attempt to reduce or prevent damage. Meanwhile, the concept of sustainable development in Northeast Asia is frequently used as a tool for economic development. Environmental policies have therefore mostly focused on the industrial sector, especially on new energy-saving technologies.

Nevertheless, finding a good balance between humans and nature is worthy of consideration for the future of the countries of Northeast Asia, so that people have the opportunity to enjoy nature more. It is clear that people there are also increasingly seeking an affluent life in terms of a good environment and nature, in addition to improving their material wealth. In this context, there is a lesson that can be drawn from the Nordic countries about the direction of sustainable development in meeting human needs, which includes providing a clean environment for people and achieving harmony in society between humans and nature. There are many crowded, overbuilt cities with large populations in Northeast Asia, such as Tokyo, Beijing, Shanghai, and Seoul, whose citizens do not enjoy a green and clean nature. In the Swedish capital of Stockholm, meanwhile, 40 per cent of the city is considered “green” meaning that there is a high degree of accessibili-

ty to green areas for the city's residents,[74] a model which can be of value to Northeast Asia where there is a lack of green areas in the urban environment. In this context, the establishment of many national and city parks in Northeast Asia could represent one of the best ways to preserve nature, control urban pollution, and provide space for people where they can enjoy nature.

On the other hand, in order to ensure a development pattern that will bring about an improvement of the environment, it is essential that the Nordic idea of environmentally-friendly lifestyles becomes useful object lessons in respect to future developmental processes in Northeast Asia, where the current way of life is influenced by a material-first culture with mass consumption habits. For example, China gets through a staggering 3 billion plastic bags a day; and uses up 37 million barrels of oil a year to make them.[75] In contrast, many Nordic countries have levied taxes on or prohibited the sale of materials, such as non-reusable bottles, to avoid using products that have a negative impact on the environment. Moreover, the Nordic recycling system based on a mandatory refundable deposit program contributes to source reduction. Meanwhile, in Japan, bottles, papers, and aluminum cans are distributed without a deposit system and the unrecycled materials treated in landfill sites have been a main factor of soil contamination. As an environmental aspect, therefore, a deposit system, which helps achieve a higher recycling rate, can be considered in Japan.

Another example of the Nordic eco-village could also be a lesson in environmentally-friendly lifestyles for Northeast Asia. The eco-village is a relatively new concept and it has not yet been introduced in Northeast Asia. However, the concept of eco-villages could have the potential to reduce some of the negative social influences in Northeast Asia characterized by excessive materialism. Practically, eco-villages can also serve as a wider goal for a reduction in the use of fossil fuels and natural resources, and they may also encourage a sense of connection between humans and nature.

---

[74] "Current Outdoor Feature," *Outdoor Life*, http://www.nordicwellbeing.com/web/outdoor/current_feature.php (accessed June 3, 2009).

[75] "All about: Recycling plastics," *CNN News*, April 7, 2008, http://edition.cnn.com/2008/WORLD/asiapcf/04/06/eco.plastics/index.html (accessed September 17, 2009).

Furthermore, a Northeast Asian eco-village could draw inspiration from traditional Asian cultures, which were more in tune with the environment and a sustainable lifestyle. Traditionally, in Northeast Asia, houses were usually built facing the south with mountains to the north so as to fence off cold winds and maximize the use of sunlight. In the heating system, the Korean *ondol* is a good example of energy efficiency: it warms up a house using exhaust-gas channels built under the earthen floor, which is connected to the cooking fireplace in the kitchen. Just cooking twice a day was enough to warm up the house all day long.[76]

One of the most valuable lessons that Northeast Asia can learn is from the Nordic environment-friendly energy policy, such as through the promotion of renewable energy and the creation of a common renewable energy market. In the Nordic countries, investment in technology for development of renewable energy sources has contributed not only to the reduction of greenhouse gases, but also to the overall efficiency of energy in the economy. Furthermore, the Nordic countries have made significant progress toward the liberalization and integration of national renewable energy markets. This is aimed at building a more sustainable energy system by assuring the inter-connectiveness of renewable energy systems between countries within a regional framework. Although most of the governments in Northeast Asia are expanding their investments toward extending new and renewable energy systems, the latter still constitute only a small share of total energy supply with reliance on coal for power generation in China and South Korea still contributing to high levels of pollution. Yet in China, there is huge potential for renewable energy. China is one of the richest countries in terms of solar and biomass energy resources in the world. The total radiation China receives amounts to between 3340–8400 MJ/m2/year and the average value is 5852 MJ/m2/year.[77]

---

[76] Jung Wk Kim, "The Environmental Impact of Industrialization in East Asia and Strategies toward Sustainable Development," *Sustainability Science*, Vol. 1, No. 1 (October 2006), pp. 107-14.

[77] Milli-Joule per square meter per year. Korea Energy Economics Institute, "Energy Cooperation in Northeast Asia: A Study on the Potential for Advancement into the Northeast Asia New and Renewables Market," 2005, pp. 5-6.

However, the main problem is that renewable energy sources such as bio-fuel, wind power, and solar energy carry a higher cost than that of conventional energy sources such as oil, coal, and natural gas. This serves as a barrier that prevents the introduction of renewable energy in Chinese households. In the case of the Nordic countries, most countries have implemented a CO_2 tax and compensation program at the government level for promoting renewable energies, which so far has been very successful. The governments of the Northeast Asian countries should also more actively and effectively pursue regulations that seek to contain the damages caused by fossil fuels, such as through a CO_2 tax. Furthermore, a common renewable energy market should also be considered in a possible future agenda for discussion between China, Japan, and South Korea, especially since the renewable energy industry in Northeast Asia is anticipated to grow rapidly in the future. Establishing a common renewable energy market in Northeast Asia would also greatly help increase the opportunities to export advanced technologies of renewable energy from Japan to China, as well as enable Japan and South Korea to enter the large Chinese energy market.

Finally, there is another lesson that can be learned from the Nordic development of cooperative approaches among neighboring countries in environmental protection. It provides useful examples of how regional cooperation can be structured and implemented in the case of Northeast Asia. Given the problem of cross-border pollution in the region, it is necessary that Japan and South Korea both support China to reduce the use of coal resources, which contributes to excessive emission levels of dust and soot in China, and to help enlarge the range of renewable resources China consumes. However, progress has been slow in the adoption of the necessary policies and programs with regard to regional environmental cooperation in Northeast Asia.[78] This is because there is a lack of strong institutional mechanisms for regional cooperation and existing institutions are still weak in their coordination of regional programs. Considering the weaknesses of en-

[78] Task Force for the Preparation of WSSD in Asia and the Pacific, *North-East Asia Sub-regional Report for the World Summit on Sustainable Development* (July 2001), http://www.rrcap.unep.org/wssd/documents/01NEA%20Report.pdf

vironmental cooperative mechanisms, enhancing cooperation in Northeast Asia may prove difficult. To develop a common regional strategy to protect the regional environment through a strong institution, such as the Nordic Council, the Helsinki Commission (HELCOM) and the Council of the Baltic Sea States (CBSS), will nevertheless be a crucial factor for success.

Conclusion

Given various global, regional, and domestic environmental problems, environmental security has climbed up the policy agenda to a position of major importance in both the Nordic countries and Northeast Asia. However, they have promoted different conceptions of sustainable development in policy actions to tackle their environmental problems. The Nordic countries have gained considerable expertise on the way to creating sustainable societies, as well as regional structures for environmental cooperation. By contrast, so far Northeast Asian countries have not been successfully moving toward creating sustainable societies, and regional cooperation is still in its infancy in Northeast Asia. In this context, it is necessary that considerations of environmental management in Northeast Asia are broadened to encompass three dimensions, as encapsulated in the Nordic countries: that is, harmony between human beings and nature, between environmental technology and nature conservation, and between material and green lifestyles. Moreover, this management should be approached at multiple levels ranging from the individual to the national, and from the regional level to the global.

Although Northeast Asia can learn much from the Nordic model of sustainable development, this does not mean that these countries must go the same way. The countries of Northeast Asia can also draw from their traditional ethics and formulate a new ethic to create their own sustainable societies. It is now an urgent challenge to find ways to ensure sustainable development by means of a new environmental ethic. Individually, people in Northeast Asia should enhance their awareness of the importance of the environment and practice environmentally-friendly behavior such as through reducing the wasteful consumption of products and natural resources. At the national level, governments in Northeast Asia should change their perception of national development by taking an approach based more upon sustainable development with the welfare of human beings and nature conservation as priorities, instead of the paradigm of economic development first and a technology-centric attitude. Northeast Asia

should also be focused on reform of the concept of regional cooperation and invest more in environmental policies that are of mutual benefit for these countries. In order to effectively improve environmental cooperation in Northeast Asia, however, there is a need for a stronger political will and leadership that has hitherto been lacking.

In assessing the long-term future of Northeast Asia, in many respects there exists potential to progress toward environmental sustainability, similar to the situation of Nordic countries today, in the direction of sustainable development. Firstly, it is estimated that the total population in Northeast Asia will decrease gradually in the future; in particular, the populations in Japan and South Korea will decrease at the fastest rate with both countries exhibiting the lowest birth rates in the world. With fewer people, this may augur well for the environment as the consumption of resources and energy will decrease. Secondly, governments in Northeast Asia have realized that the quality of the environment is important for their citizens, and there are a growing number of people who are increasingly seeking better lives not only in terms of personal wealth but ones rooted in a better quality of life based on clean air, water, and nature. Thirdly, as regional cooperation has become more visible to some extent in Northeast Asia, there is now optimism that environmental co-operation can also make more progress. All these factors are expected to provide strong driving forces to create a sustainable society in Northeast Asia. The Nordic model therefore could be very useful for Northeast Asian countries as they start to draw up a road map for sustainable development.

About the Author

Dr. Sangsoo Lee is a Research Fellow with the project on Conflict Management and Energy in Northeast Asia at the Institute for Security and Development Policy. He holds an MA and PhD in Northeast Asian Studies from Beijing University.