

## **Section I – Introduction: Economic development, urbanization and environment in Asia**

### **1. Introduction**

Cities play a central role in the evolution and advance of culture, economy, and politics. The “urbanized” economy expands due to the advantages of economic concentration in cities. Demand for various services emerges and increases the amount of employment in service industries. Then wage gaps with the neighbouring areas and disparities in work opportunities causes a population flow to the city. This influx of people then creates a self-reinforcing cycle, generating more demand for services.

In the case of developing countries, the pace of urbanization is rapid compared to their level of industrialization, resulting in irregular settlements. It has been pointed out that the phenomenon of “over-urbanization” occurs as the urban population swells more than the level of economic development can support. Thus, it is now recognized that poverty is an important driving factor in the growth of cities in developing countries. The types and severities of urban environmental problems differ depending on the development level of “hardware” (infrastructure such as mass transportation systems, water supply and sewerage systems, and waste treatment facilities) and “software” (such as legal systems and market economy mechanisms) for a given level of urban economic activity. With this over-urbanization phenomenon, urban environmental infrastructure is a cause of shortages, and poverty is an important factor preventing the formation of financial mechanisms that could facilitate urban environmental infrastructure improvements (Kidokoro 1998).

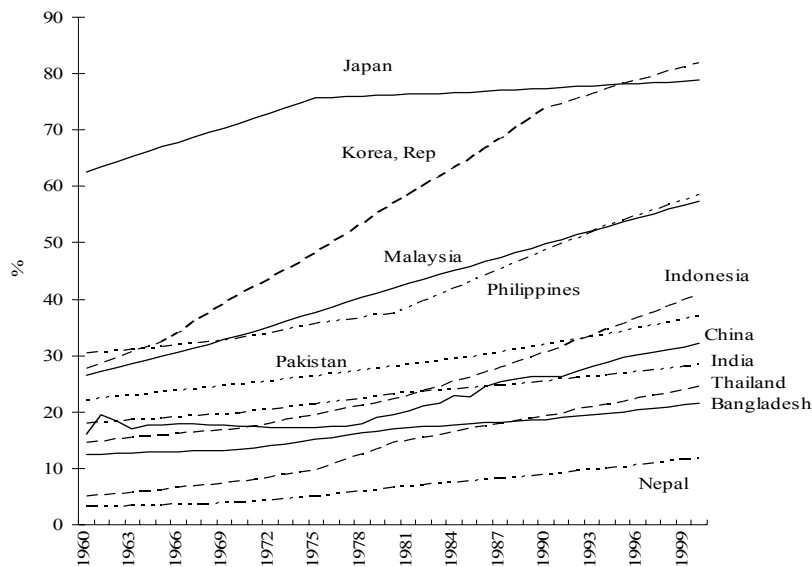
Nevertheless, since the 1980s, the economic growth of cities has been helped along by increases in foreign direct investment (FDI), as cities became connected to the global economy. Factors such as these are changing the patterns of urban growth. While such urban economic growth can be a factor that drives improvements in urban environmental infrastructure, it also encourages urban population growth. Moreover, this can intensify problems associated with both environment and environmental infrastructure. In following sub-sections, the issues related to urbanization, economic growth, environmental problems, and their inter-relationship are discussed.

### **2. Urbanization in Asia**

In the year 2000, about 30% of the population in the Asia region lived in cities (World Bank, 2003). There are, however, major disparities in the pace of urbanization within the region. Figure 1 shows the growth of urbanization in Asia from 1960–1999. As can be seen, urbanization proceeded rapidly first in Japan followed by South Korea during the 1960s; over 79% of the populations of both countries now live in urban areas. In Southeast Asia, urbanization started at a slower rate but gained momentum

during the 1970s and 1980s. In Indonesia, for instance, the annual urbanization rate increased by an average of only 2.5% between 1960 and 1970, but by 5.1% from 1970 to 1980, 7.5 % from 1980 to 1990, and 10.3 % from 1990 to 2000. The urban population represented about 30% of the population in Malaysia and in the Philippines in 1960; it has been growing at 3% to 5% per year, and in 2000, the urban population was just under 60%. In Thailand, as well as in Indonesia, the urban population is around 30% and the urbanization pace is accelerating.

South Asian countries (Nepal, Bangladesh, Pakistan, India) have been experiencing only a gradual rise in their urban populations, but growth has been intensive in several major cities. Urban populations are rising around 3 to 5% per year since the 1960s.



**Figure 1.** Urbanization trends in Asian countries (1960–2000)

Source: World Bank, 2003.

The speed of Asia’s urbanization is without historical precedent. The urbanization of Europe in the 19<sup>th</sup> and 20<sup>th</sup> centuries occurred much more slowly. Moreover, while urbanization in developed countries has reached a stable state, the developing countries in Asia were the main global players in population growth and urbanization in the latter half of the 20<sup>th</sup> century. Since the 1970s, Asia has been engaged in a process of rapid economic growth through industrialization, with urban populations growing rapidly. Rapid urbanization in Asia has been synchronous with dramatic rates of economic growth as well as severe environmental problems.

Asia now has more major cities than any other region in the world. Table 1 shows the distribution of larger cities in Asia compared with the world total. China and India, the most highly populated countries, have the largest number of major cities.

**Table 1.** Population in Asian urban agglomerations of more than 3 and 5 million population, 1990

	More than 5 million		More than 3 million	
	Number of Cities	Population (millions)	Number of Cities	Population (millions)
China	4	36.11	8	50.91
India	4	37.27	7	49.17
Indonesia	1	9.42	2	12.42
Japan	2	31.01	2	31.01
Korea	1	11.33	2	16.08
Pakistan	1	7.67	2	11.75
Philippines	1	8.40	1	8.40
Thailand	1	7.16	1	7.16
Vietnam	-	-	1	3.17
Sub Total	15	148.37	27	190.08
Others	20	190.29	42	268.37
<b>World Total</b>	<b>35</b>	<b>338.66</b>	<b>69</b>	<b>458.45</b>

Source: World Bank 2003, UN-HABITAT 2001

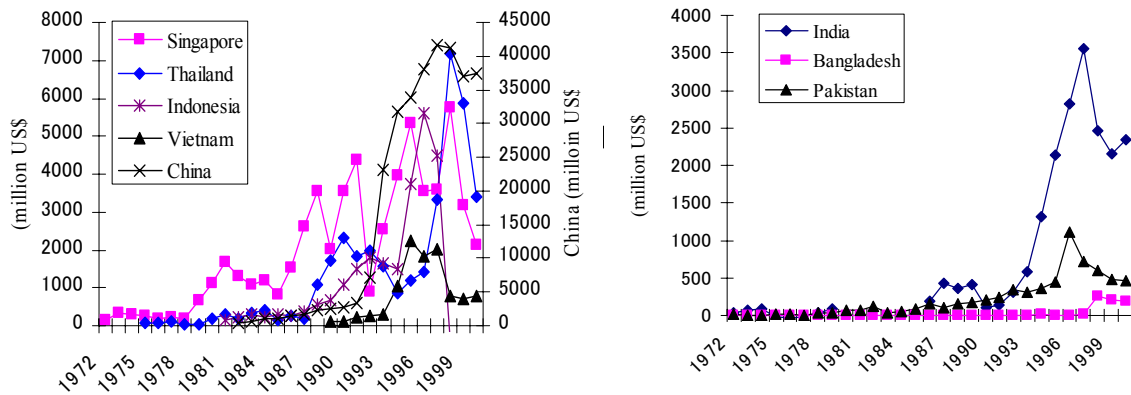
Urbanization has been closely linked with the growth of manufacturing industry. Japan's rapid industrialization started in the 1960s. Twenty years later, South Korea initiated a range of policies aimed at accelerating industrialization. China's Open Door policy was initiated in the late 1970s. It was followed by increasing economic openness and export-led growth models in Malaysia, Philippines, Indonesia, India, and Thailand. Average annual rates of economic growth of 10 % and above were achieved and sustained by some of these countries.

## 2.1 Foreign direct investment and urbanization

The economic growth of Asian cities has been catalyzed by increases in FDI. The rising trend started at the beginning of the 1980s in Singapore and followed by other countries. This has been particularly pronounced in East and Southeast Asian countries (Singapore, Thailand, Indonesia, China, and Vietnam) but has also been evident in South Asia (India and Pakistan). The Asian currency crisis of 1997 produced only a short-term drop in FDI to most of these countries. Figure 2 shows the trends in FDI in major Asian countries.

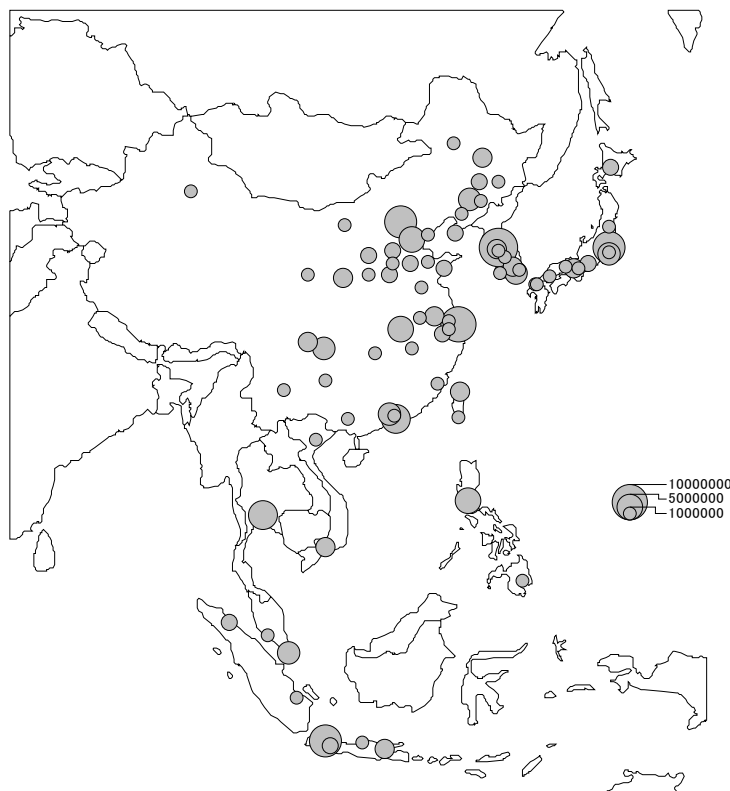
This increase in FDI was a factor promoting economic growth in the regions stated, but a more important factor is the intimate linkage of the development of cities to the global economy. Douglass (1995), Yeung and Lo (1995) and Tasaka (1998) focus on the fact that FDI into East and Southeast Asia created a new international division of labour in this region, and that the cities in this region are developing a new spatially-organized structure that is functionally connected. In other words, they see the rapid economic growth of this region not simply as being achieved due to the higher investment levels, but also due to the functional urban network that is forming. These

are described by Douglass (1995) as “Pacific-Asia urban corridors” and their interconnectedness (Figure 3) is viewed as an additional driver of economic growth.



**Figure 2.** Net Foreign Direct Investment, 1970–2000

Source: World Bank 2003

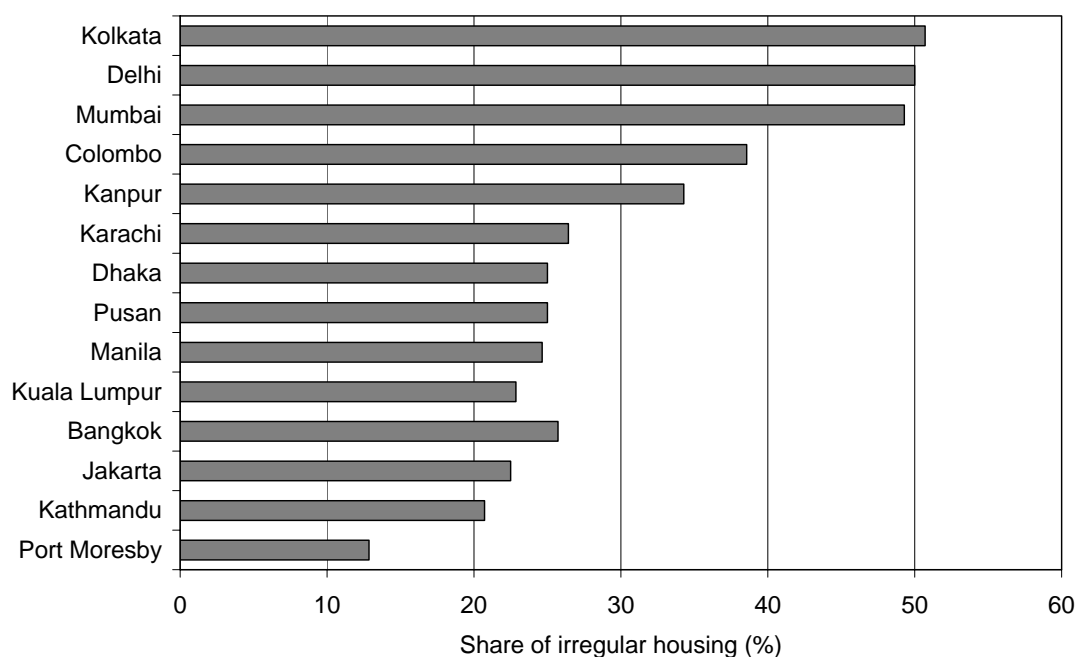


**Figure 3.** Major cities in Asia representing urban corridors

Source of population data: Brinkhoff (2005)

## 2.2 Urban poverty and informal housing

These rapid rates of urbanization and economic growth have also led to pernicious levels of urban poverty in many Asian cities. Rapid urbanization and the consequent growth of the informal sector in low-income areas are a main source, but not the only one, of informal housing<sup>1</sup>, which can be classified as illegal housing, squatter housing, irregular housing, and slums. Irregular or informal settlements give shelter to the majority of urban poor. Figure 4 presents the share of informal housing in major Asian cities.



**Figure 4.** Share of informal housing in major Asian cities

Source: Ministry of Environment, Japan (MOE 1995)

Informal housing settlements are usually considered transitional areas. They are often located on the fringe of cities, on riversides, dumps or under bridges, without infrastructure or with low-quality infrastructure. The lack of control in these areas attracts poor people from inner city or rural migrants in search of work. However, irregular settlements are also found in cities that have already developed economically, as the Hong Kong's squatter areas (Smart 2001). Some illegal and irregular housing is produced by commercial developers or politically influential parties who speculate that property investments will be regularized later (World Bank 2003a).

<sup>1</sup> Housing is described as informal when it does not conform the laws and regulatory frameworks set up in the city in which it occurs (UN-HABITAT 2003)

### **2.3 Dynamics of urbanization**

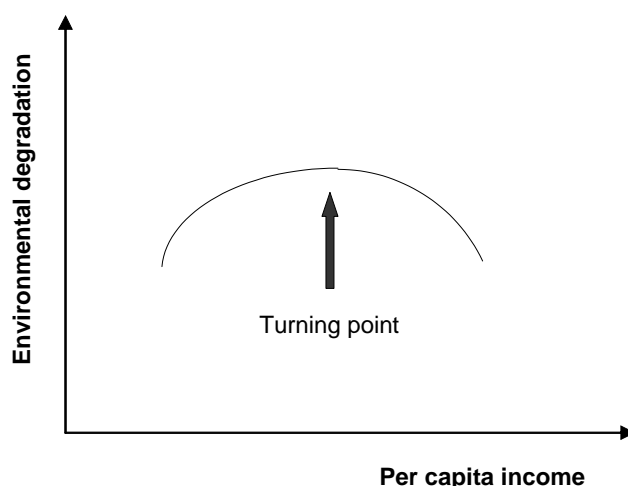
Yeung and Lo (1996) and Tasaka (1998) have shown that the dynamics of urbanization in East Asia and Southeast Asia started to change rapidly in the 1980s. Tasaka (1998) characterizes urbanization in developing countries as “urban involution”, describing the characteristics of urbanization in developing countries by three terms: “concentrated urbanization” (urbanization occurs while the rural population level is higher than that in developed countries); “primate cities” (over-concentration of economic, political and cultural functions in primary cities); and “over-urbanization” (inflow of population beyond a level the city can productively absorb). Among the factors associated with over-urbanization are high levels of unemployment and employment insecurity; large-scale inadequacies of infrastructure such as mass transportation systems, water supply and sewerage systems, and waste treatment facilities; environmental pollution; severe stress on urban governance; and overall poverty levels that hamper the formation of financial mechanisms that could facilitate urban environmental infrastructure improvements (Kidokoro 1998). Designing market-based financing tools for urban centres with substantial levels of urban poverty is a challenge for policymakers in Asian countries and it will be discussed within the Section II.

It is important to bear in mind that besides the mechanisms for urban growth described here, that are other driving forces for the urbanization process in Asia, and they vary in different countries. Urbanization in Asia is not a uniform process.

The changes in the mechanisms of urban growth described above can be seen as imparting a huge impact on urban environmental issues. As the pace of urbanization accelerates, environmental problems may worsen due to inadequate urban environmental infrastructure. On the other hand, the promotion of economic growth could speed up the solutions to environmental problems. The direction of research about these relationships between economic growth and environmental problems will be further discussed below.

### **3. Economic growth and environmental problems**

It is accepted that environmental degradation is inevitable in a growing economy, but it has also been observed that the rate of this degradation does not continue to rise indefinitely. The Environmental Kuznets Curve (EKC) hypothesis states that after continued economic growth and development, the incidence of environmental pollution levels off with GDP growth and then starts to fall. The Kuznets curve was named after Kuznets (1955) who hypothesized that income disparity widens as economies grow, but after a certain income level is reached, the income disparity narrows. The curve takes the form of an inverted U (Figure 5).



**Figure 5.** Environmental Kuznets Curve – an inverted U shaped relationship between environmental degradation and per capita income

Much has been discussed whether the EKC can be discerned when studying various pollutants. Research by Grossman and Krueger (1995) and Cole, Rayner and Bates (1997) are representatives of such work. They show the relationship between income per capita and various air pollutants. The results obtained by Cole, Rayner and Bates (1997) are shown in Table 2.

**Table 2.** Selected pollutants and income at turning point

Pollutant	1985 US\$	
Sulphur dioxide	5,700 -	6,900
Sulphur dioxide (transport)	9,400 -	9,800
Suspended particulates	7,300 -	8,100
Suspended particulates (transport)	15,000 -	18,000
Carbon monoxide	9,900 -	10,100
Nitrogen oxide (industrial)	14,700 -	15,100
Nitrogen oxide (transport)	15,100 -	17,600
Municipal solid waste	monotonic increasing	

Source: Cole, Rayner, and Bates (1997)

Their analysis shows that if transportation is the source of a pollutant, the turning point is delayed. For example, in the case of sulphur dioxide, the turning point is generally between US\$ 5,700 and US\$ 6,900, but if transportation is the source, the turning point rises to between US\$ 9,400 and US\$ 9,800. Different turning points are identified for several pollutants. Although a turning point was found for several air and water pollutants, it was not for generation of household wastes. Municipal solid

waste has been generated in increasing rate representing a serious problem for developed societies and it deserves further attention (see Section II).

There has been some criticism about the analytical methods and interpretations regarding research on the EKC (Stern et al. 1996, Stern 1998, Stern and Common 2001). Stern et al. (1996) criticize the EKC hypothesis for implying that environmental policies are not necessary and that the environment will automatically improve along with economic growth. Stern (1998) asserts that polluting industries in developed countries simply moved overseas to developing countries that had weaker environmental regulations, because environmental regulations at home had become more stringent as the economy grew. Such corporate activity has been described by the Pollution Haven Hypothesis<sup>2</sup>. Along similar lines, Suri and Chapman (1988) point out that even without the trigger of environmental policies, imports of products from overseas increase as the economy grows, so domestic manufacturing industries competing with these imports move overseas in pursuit of cheaper labour, and the resulting decline of domestic manufacturing activity may lead to a reduction in domestic pollution.

In this respect, the focus of recent research is shifting away from trying to prove the existence and timing of a turning point, and to find the mechanisms that lead to improvement in pollution along with economic growth. Panayotou (1997) analyzes panel data on sulphur dioxide (SO<sub>2</sub>) emissions from 30 developed and developing countries from 1982 to 1994. He demonstrates that if the economic level is the same, the environment will be worse the greater the GDP per square kilometre, the higher the share of industry in GDP, and the faster the pace of economic growth. He also considers the impacts of factors such as policies and institutional factors and he uses enforcement of contracts as the representative policy variable for the analysis, which revealed that the degree of quality of institutional arrangements not only makes the turning point occur at an earlier economic level, but also that it tends to suppress the level of pollution. This shows that if the government can use legislation to protect people's property rights from damage caused by pollution and introduce effective environmental regulations, for example, it is possible to mitigate the environmental deterioration associated with economic growth.

Torras and Boyce (1998) raise the issue that some people are forced to endure environmental deterioration, i.e. there is the problem of social inequality, and they investigate the relationship between social inequality and the EKC hypothesis. The targeted environmental indicators are sulphur dioxide, smoke, heavy particles, dissolved oxygen, faecal coliform, access to safe water, and access to sanitation. Besides income, they use descriptive variables such as the Gini Index<sup>3</sup>, which shows income disparity, adult employment rate, political rights,<sup>4</sup> and urbanization rate. Some of the analytical results contradict the hypothesis, but generally, they support it.

---

<sup>2</sup> Pollution Haven Hypothesis refers to the possibility that industries that are highly pollution intensive i.e. dirty industries, have been migrating from developed to the developing economies with weaker environmental standards. On the other hand, the developing countries that are in need of financial resources for industrial development benefit from this migration and became net exporters in these sectors. Additionally, the multinational industries tend to diffuse their greener technology among interparts in the host country, which is stated by the Pollution Halo Hypothesis (Zarsky 1999).

<sup>3</sup> Gini Index measures the extent to which the distribution of income (or consumption) among individuals or households within a country deviates from a perfectly equal distribution. A value of 0 represents perfect equality, a value of 100 perfect inequality.

<sup>4</sup> For political rights, they rate it according a system developed by Finn (1996).



Regarding political rights, they show that for almost all items studied the level of environmental pollution is lower when the political rights are stronger. Concerning income inequality, the analysis shows that the environment (measured by SO<sub>2</sub> and smoke) deteriorates as the Gini Index increases (in other words, as income disparity widens). However, in the case of dissolved oxygen, it indicates that the environment improves as the income disparity widens.

Cole (2003) considers the relationship between trade and the EKC hypothesis in a study targeting several pollutants (sulphur dioxide, nitrous oxide, and carbon dioxide, and biological oxygen demand) in several countries. The analysis shows that the correlation between income and environmental indicators takes the shape of an inverted U. In addition, regarding the correlation with trade, it indicates higher emissions of sulphur dioxide as the degree of trade specialization increases, although those impacts are quite small. Regarding other environmental indicators, almost no impact from trade is evident.

Finally, some theoretical research has been conducted on EKC based on economic theory (Lopez 1994, McConnell 1997). Its hypothesis is that technological innovation and individual preferences relating to the environment are major factors that move an economy toward the turning point.

In this regard, Roca (2003) criticizes as too optimistic the view that higher environmental awareness alone will lead to a better environment. Roca points out that in the process of establishing environmental policy, differences of opinion emerge and a variety of interests collide, due to differences in stakeholder attitudes about environmental improvements. In short, when the interests of different stakeholders cannot be easily reconciled, solutions to environmental problems will be delayed even if individual environmental awareness is high. Thus, models that have no mechanisms to reconcile interests between economic entities are not practical.

Roca's point, stated in a different way, is that if institutional arrangements exist that enable reconciliation between the interests of stakeholders, it is possible to lower the economic development stage at which the turning point occurs. In order to consider this, it is necessary to investigate the ways in which the interests are reconciled, based on actual cases of success in environmental improvement.

In short, variety of factors influence when the peak is reached and how far and quickly the pollution declines as following: economic growth; sources of pollution; policies and regulations; political and social characteristics; and institutional arrangements. Understanding these factors and the relationships between them will help in deriving sustainable solutions to the impending environmental problems in the region, even while rapid growth continues.

Economic growth alone cannot improve environmental quality (Stern, Common, and Barbier 1996). Environmental quality is influenced by many factors, both direct and indirect. Panayotou (1997) demonstrated that with the profile of economic growth remains the same, level of pollution will be worse with greater GDP per square kilometre, higher share of industry in GDP, and faster pace of economic growth. With respect to the enforcement of contracts as a representative policy variable, he concluded that better-quality institutional arrangements not only made the turning point of the EKC occur earlier in economic development, but also tend to reduce the level of pollution. Environmental performance also depends on political rights and income inequalities (Torras and Boyce 1998). The level of environmental pollution is

Torras, M., and J. K. Boyce. 1998. Income, inequality, and pollution: A reassessment of the environmental Kuznets curve. *Ecological Economics* 25 (2): 147-60.

UN-HABITAT. 2001. *The state of the world's cities* 2001. Nairobi: United Nations Centre for Human Settlements (UN-HABITAT).

———. 2003. *The challenges of slums*. London: UN-HABITAT.

World Bank. 2003. *World development indicators* 2002. Washington, DC: World Bank.

———. 2003a. *World development report 2003: Sustainable development in a dynamic world*. New York: Oxford University Press and World Bank.

Yeung, Y., and F. Lo. 1996. Global restructuring and emerging urban corridors in Pacific Asia. In *Emerging world cities in Pacific Asia*, edited by Y. Yeung and F. Lo, 17-47. Hong Kong: United Nations University Press.

Zarsky, L. 1999. Havens, Halos and Spaghetti: Untangling the Evidence About Foreign Direct Investment and the Environment. In OECD (1999) *Foreign Direct Investment and the Environment*. Paris: OECD.

reported to be lower when political rights are stronger in a particular city. Torras and Boyce report that environmental quality (measured by sulphur dioxide and smoke) deteriorates as income disparities widen (as implied by an increased Gini Index ).

In addition to the factors above, technological innovation and individual preferences are major determinants that move an economy toward the EKC turning point (Lopez 1994, McConnell 1997). However, when the interests of different stakeholders cannot be easily reconciled, solutions to environmental problems will be delayed even if individual environmental awareness is high (Roca 2003). Hence, if institutional arrangements exist that enables reconciliation among the interests of stakeholders, it is possible to bring forward the EKC turning point. Shifting from industrial production toward tertiary industries in major cities would also help to reach the EKC turning point earlier. Such trends have been noticed in a few cities though in many of them it is still in the initial stages.

Thus, by establishing necessary institutions, stronger political rights, sound environmental policies and legislation, and multi-stakeholder partnerships, and moving industry outside urban centres, it should be possible to control pollution in Asian cities even as rapid economic growth and urbanization continue. The section II looks at current issues and recent developments in urban environmental management.

#### **4. Outlook**

Changes in the urbanization mechanisms that have been observed since the late-1980s may accelerate the pace of urban economic growth. Nevertheless, research to date about the relationship between economic growth and environmental problems indicates that quality of institutional arrangements and social inequalities have a large impact on environmental improvements. This means that it is not only “hardware” such as urban environmental infrastructure that determines the extent of urban environmental problems, but also the maturity of “software” such as legal systems and mechanisms for income distribution. Research is likely to clarify these facts.

Another important challenge for the future is to find the best ways to reconcile different stakeholder interests. The roles of government and the private sector change significantly when Private Finance Initiatives (PFI) and other approaches are introduced to improve the urban environmental infrastructure, and private corporations take over the role of the provision of public goods—traditionally the role of government. In this regard, in the future, it will also be important to consider the ideal roles of government and the private sector relating to urban environmental management.

Note: Text written by Dr. Hiroaki Shirakawa and Dr. Sudhakar Yedla and edited by Dr. Mara Regina Mendes from the Urban Environmental Management Project of IGES.

## 5. References

- Brinkhoff, T. 2005. *City population*. <http://www.citypopulation.de>. (retrieved January 20, 2005).
- Cole, M. A., Rayner, A. J. and Bates, J. M. 1997. The Environmental Kuznets Curve: An Empirical Analysis. *Environment and Development Economics* 2 (4): 401-416.
- Douglass, C. M. 1995. Global interdependence and urbanization: Planning for the Bangkok Mega-urban region. In *The mega-urban regions of Southeast Asia*, edited by T. G. McGee and I. M. Robinson, 45-79. Vancouver: University of British Columbia Press.
- Grossman G.M, and A. B. Krueger. 1995. Economic Growth and the Environment. *The Quarterly Journal of Economics* 110 (2): 353-77.
- IGIDR (Indira Gandhi Institute for Development Research). 2001. *Analysis of technological options for mitigation of environmental emissions from the urban transport systems in selected Asian cities*. Mumbai, India: IGIDR.
- Kidokoro, T. 1998. Toward development of Asian-type urban management model (in Japanese). In *Global environment and mega-city*, edited by K. Takeuchi and Y. Hayashi, 219-248. Tokyo: Iwanami.
- Lopez, R. 1994. The environment as a factor of production: The effects of economic growth and trade liberalization. *Journal of Environmental Economics and Management* 27: 163-184.
- McConnell, K. 1997. Income and demand for environmental quality. *Environment and Development Economics* 2: 383-399.
- MOE (Ministry of Environment, Japan). 1995. *Environmental white paper*. Tokyo: Government of Japan.
- Panayotou, T. 1997. Demystifying the environmental Kuznets curve: Turning a black box into a policy tool. *Environment and Development Economics* 2: 465-84.
- Roca, J. 2003. Do individual preferences explain the environmental Kuznets curve? *Ecological Economics* 45 (2): 3-10.
- Smart, A. 2001. Unruly places: Urban governance and the persistence of illegality in housing in Hong Kong's urban squatter areas. *American Anthropologist* 103 (1):30-44.
- Stern, D. I., M. S. Common, and E. B. Barbier. 1996. Economic growth and environmental degradation: The environmental Kuznets curve and sustainable development. *World Development* 24 (7): 1151-1160.
- Stern, D. I. 1998. Progress on the environmental Kuznets curve? *Environment and Development Economics* 3: 175-198.
- Stern, D. I., and M. S. Common. 2001. Is there an environmental Kuznets curve for sulfur? *Journal of Environmental Economics and Management* 41: 162-178.
- Suri, V., and Chapman, D. 1998. Economic growth, trade and energy: implications for the environmental Kuznets curve. *Ecological Economics* 25 (2): 195-208
- Tasaka, T. 1998. Bangkok and the world city hypothesis (in Japanese). In *Asian Mega-city: Bangkok*, edited by T. Tasaka. Tokyo: Nihon H