

Dynamics of Development Process – Why are the Issues Unique in the Developing Cities of Asia?

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Abstract

Rapidness in economic growth in Asian Countries resulting in increased per capita income of the urban dwellers has been largely responsible for “consumption based environmental problems in cities”. While cities in this growing region still fall short in providing much needed infrastructure such as waste management mechanism, increasing income levels are posing a “quantity” threat. This combination of “quality” and “quantity” aspects of the problem makes the conventional model of solutions fail. This paper addresses these dynamics in Asian region and concludes that waste management needs to be addressed for both “enhancing the service” by innovative financial mechanisms and awareness campaigns and “waste reduction” by improving the recycle and reuse – which can be achieved only by regulating and “creating awareness”.

Introduction

Economic development and the environment are two inseparable entities integrated in their functionalities and philosophies. While the environment supplies necessary resources and receive wastes from economic activity (production and consumption), economic activity as an intermediate means brings-in the necessary “processed products” meeting the needs (however greedy they are) of people. This interaction is as deep rooted as the philosophies of civilization. However this interaction, like the civilization itself, is a dynamic process. Although this argument of dynamic interaction holds good for any geographical unit, this article focuses on “urban center” as they are the epicenters of growth. Growth at different levels interacts with the environment at different degrees and gives rise to varied problems/issues. The present article attempts to have a critical look at this dynamics of interaction and suggest possible pathways for a sustainable planning of cities in Asia.

Cities, Economic Growth and Environmental Issues – Dynamics of their Interaction

At different stages of economic growth, cities face different kinds of environmental problems. For instance, cities with less development are faced with a problem of lack of sanitation and water supply facilities resulting in unhygienic conditions and spread of communicable diseases. With increasing economic growth such problems disappear gradually giving rise to different problems such as industrial wastewater and air pollution

Figure 1 and 2 presents such a pattern observed in the case of China for IMR and SO_x, respective indicators for poverty-stage related and industrial-stage related environmental issues. As cities experience further economic growth these environmental problems give way to rapid growth and rich lifestyle related problems such as increased waste generation, higher energy use, and more such “resources” related problems. Figure 2 and 3 presents such a pattern of environmental problem setting. Many developed and developing cities in Asia have undergone these stages and at the present time they are facing different kind of environmental problems according to their respective levels of economic growth.

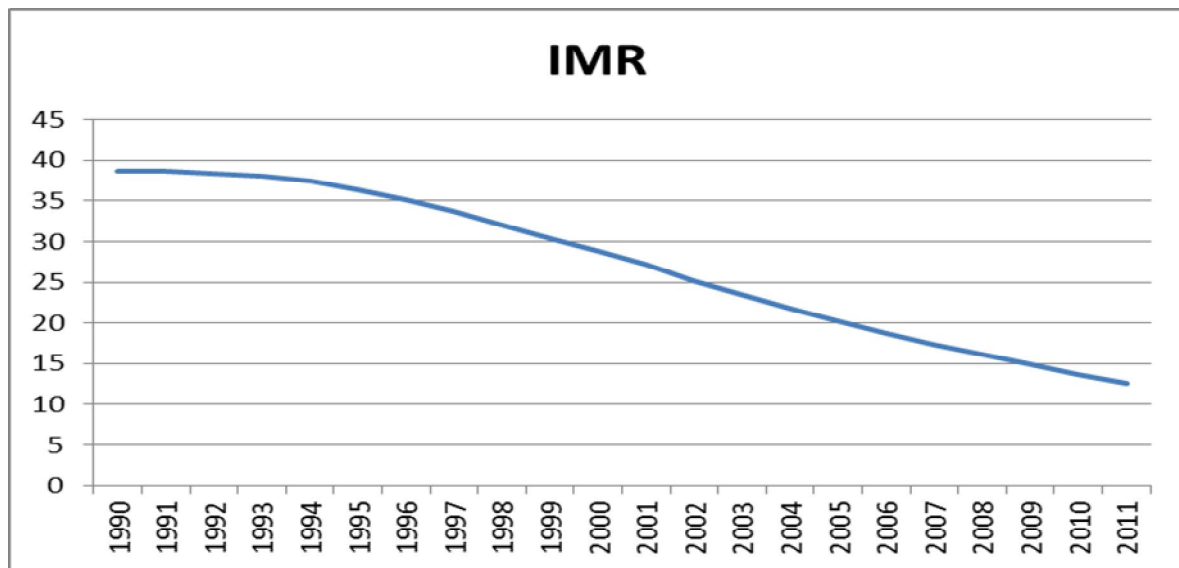


Figure 1: Pattern of IMR in China Over a Period of 1990-2011
 (Data source: <http://unstats.un.org/unsd/mdg/SeriesDetail.aspx?srid=562>)

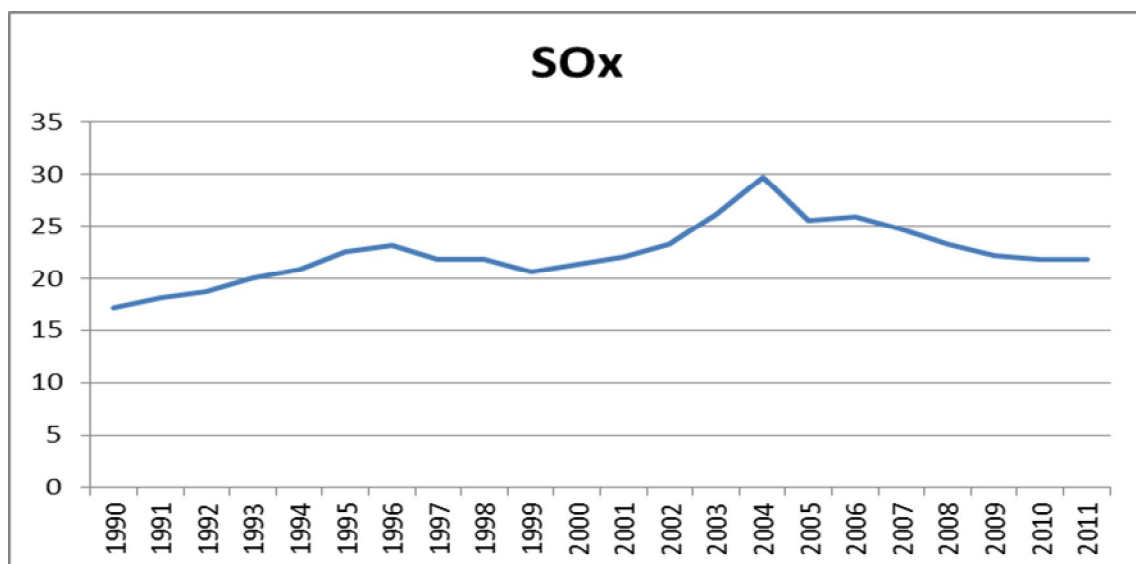


Figure 2: Pattern of Emission of SO_x (Million Gm) in China Over a Period of 1990-2011

(Data source: <http://sedac.ciesin.columbia.edu/data/set/haso2-anthro-sulfur-dioxide-emissions-1850-2005-v2-86/data-download>)

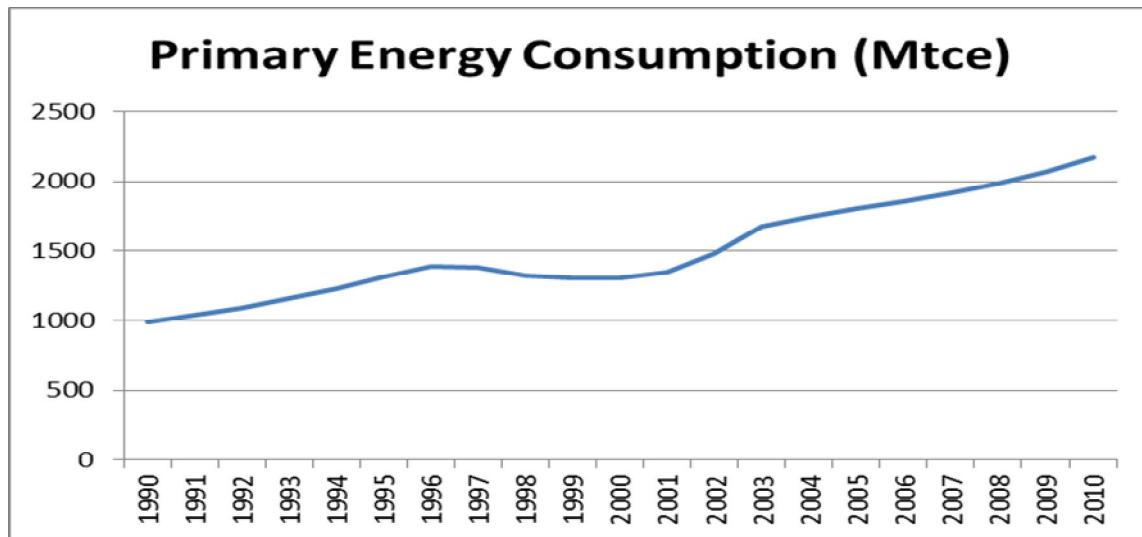


Figure 3: Pattern of Primary Energy Consumption in China Over a Period of 1990-2011

(Data Source: Crompton and Wu;

http://www.uwa.edu.au/_data/assets/pdf_file/0003/102567/04_22_Crompton_Wu.pdf)

Table 1 shows the intensity of problems typifying poverty-related, industry-related, rapid growth-related and rich life style-related issues. IMR as an indicator for poverty stage issues is significant in countries with poor economic status. Country with progressive industrialization has shown significant SO_x issues as compared to the other indicators such as IMR and Energy consumption. Countries with very high percapita income have issues of energy consumption significant over the indicators of the other stages.

Table 1: Stage Model Indicators for China, India, Japan and the US for the year 2005

	Poverty-related Indicator	Production Related Indicator	Consumption Related Indicator	GNI PPP per cap US\$
	IMR	Per capita SOX (gram)	Percapita Energy Consumption (KgOe)	
India	55.8	5.685	513	3100
China	18.6	19.628	960	5530
Japan	2.8	6.53	4058	30040
USA	6.8	4.4202	7943	39710

Source: Compiled from http://www.prb.org/pdf05/05WorldDataSheet_Eng.pdf

Figure 4, developed based on Environmental Kuznets Curve (EKC) that explains (Panayotou, 1997) the interaction between economic development and the environment depicts the dynamic nature of such environmental problems pertaining to the changing economic backdrop.

These environmental problems, based on their economic drivers can be categorized into *poverty* related, *production* related and *consumption* related (Bai 2003). Countries/cities try to get rid of poverty by producing goods as much as possible. In this process of growth (by producing) the country/city gains economic strength and develop the necessary infrastructure for the people and also to further augment its growth. During this process, which in traditional cases of Europe is dominated by industrial production, environmental problems stemming from industries dominate. As the country/city develops further attempts are made to augment the necessary infrastructure to contain the poor-production related environmental issues. The growing economic status of the country as well as the people results in the increasing priority for environment and thus, the issues of concern both environmentally and otherwise get transformed from *production* related into *consumption* related issues. This traditional path of transformation is presented in Figure 5.

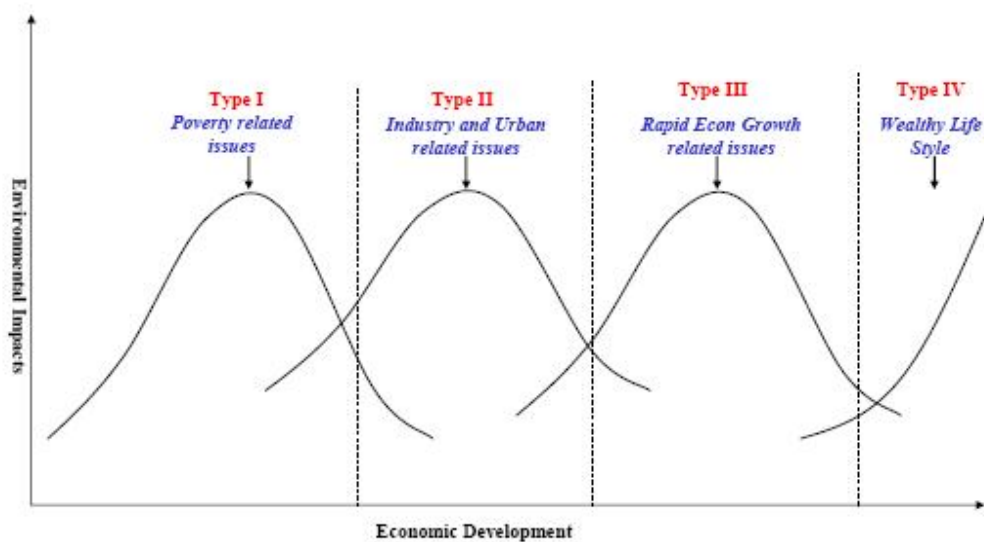


Figure 4: Types of environmental problems faced at different times and economic status of a country/City (Based on Yedla, 2002; Yedla, 2006)

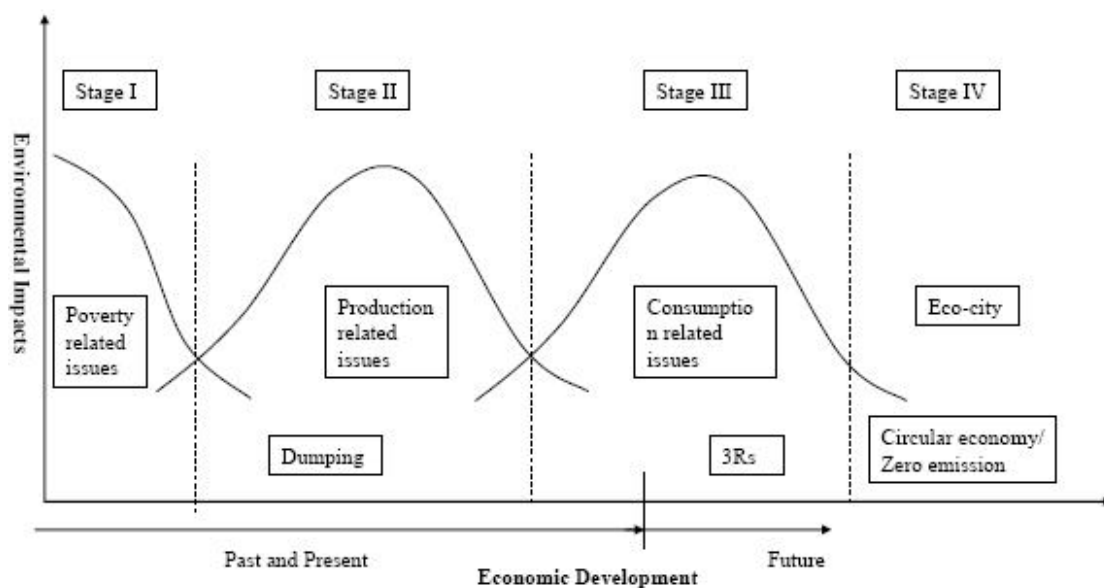


Figure 5: Stage model that explains the evolution of environmental problems vis-à-vis economic development (Developed from Bai, 2002; Yedla, 2002)

Rapid Growth – Dynamics of Asian Cities

Sectoral contribution to the economy not only influences the economic growth, and its sustainability but also the kind of environmental issues stemming from economic prosperity of the country/city. The *rate of transformation* of the environmental issues depend on the *rate of economic growth* (though not uniquely), which in turn is largely influenced by the contributions from different sectors (Imura et al., 2005). Steep sloped curves of economic growth driven by the services sector could potentially leave gaps in the infrastructure development (Sylvie, 2001), while the individual incomes, choices and consumption patterns continue to change at a similar phase of the economy. Here one can draw an example of Singapore to counter this argument. However, it is a well believed and documented fact that the dynamics could vary significantly between a “State” and a “City State”. Such gaps, which can be traced in Asian developing countries, are unprecedented in the western literature where the economic growth is more production centered. Economic growth in Asian region is also typified by the increasing size of cities which is not the case with the Western World. These are the potential traps that the urban centers can be dragged into as they undergo rapid growth. Such gaps could result in increasing need for the services such as municipal solid waste (MSW) management, urban mobility where infrastructure fails to support. Such a situation eventually leads to unsustainable patterns like “high growth in personal vehicles”, improper dumping of garbage in the neighboring cities/towns etc.

MSW Management – Issues in the Cities from Developed and the Developing Countries

Municipal Solid waste (MSW) generation rates are linked to economic status of a country/city. Therefore, MSW indicators such as per capita waste generation would not be significant in the early stages of development for any country/city. Such economies suffer from lack of proper sanitation facilities, infrastructure, and individual awareness that are needed for efficient collection, transportation and disposal efficiency of MSW management. Therefore, handling of waste in developing cities even at small rates of generation becomes a Herculean task to the city governments leading to many human and environmental complications (Goel, 2008; Yedla and Park, 2009). Non-segregation of waste at source, which indicates poor awareness among citizens, makes the system inefficient in retrieving recyclables. As the formal system fails in delivering this important civic service, informal system takes on with hundreds of thousands of rag pickers involved in retrieval of re-cycleable materials from garbage (IGES, 2011). Another striking bottleneck is the poor financial status of cities in the developing Asia (where they spend about 40-60% of their budget on waste management and attempts a zero recovery of the service cost) plagued with “no contribution from the citizens” for the management of waste. Bottom line is that the cities in developing countries of Asia fail to manage efficiently even the small quantity of waste generated resulting in a poor quality of service.

On the other hand developed countries/cities, due to their higher income levels and lack of incentives to conserve, generate higher quantities of solid waste (For India average waste per capita is 0.5 kg where as for the US it is 2.5 kg) (Annepu, 2012). Developed countries, with their efficient system of MSW management, good participation from citizens both in segregation and financial contribution and perfectly designed and implemented recycling schemes, don't suffer from poor and unhygienic MSW management but are faced with a challenge of handling huge quantities of solid waste generated (Mendes and Imura,

2004). In order to handle the scarcity of land and other resources, cities in the developed countries are forced to adopt strategies such as waste minimization, resources recycling, and policies towards material cycle societies. The response strategies to address the problems of waste management are different for developed countries and the developing countries. While developed countries are to deal with the quantity of waste developing countries have to work towards improving the quality of service of waste management.

According to the stage model presented by Bai (2003), the problem of “quantity” of waste handling should gain significance only after cities reach the stage of consumption-related problems, which in itself is an indicator of having reached the economically developed stage. At this stage, the waste handling problem stems from the quantity of waste to be handled, rather than the quality of waste management service. As cities go through the economic development process, they acquire the necessary infrastructure to handle the waste generated. Cities at the developed stage usually have a lower organic content in their municipal solid waste (Annepu, 2012; AILSG) and have formal recycling systems in place, and therefore it would be relatively easy to handle the waste if it were not for the quantity.

Developing Cities in Asian – A Case of Peculiar Nature

Developing Asian cities, due to the increased contribution of the services sector to GDP, have started experiencing increasing per capita income and hence an additional waste generation (Helix and Bemard, 2006). Influence of western throwaway culture has only added to the otherwise increasing waste generation. While infrastructure development is a function of economic growth rate, the services sector’s driven GDP unlike the traditional manufacturing driven GDPs, results in relatively higher per capita incomes in urban centers. The rate of growth in the individual per capita income outgrows the rate of infrastructure development. Hence, cities fail to keep up the phase of augmenting their infrastructure to handle the increasing piles of garbage though they are on “higher growth rate curves”. Even before the growth in infrastructure and the necessary awareness of waste handling at household level is achieved, rate of waste generation increases, resulting in issues such as higher volumes of garbage to be handled; higher degree of moisture in MSW (indicative of a poor economy) and also dumped reusables/recyclables (due to the increasing throwaway culture); unsegregated waste dumped in open; uncollected waste on the streets; mounting open dumps; loss of valuable resources; and lack of funds to handle the waste etc.

This peculiar situation has left the cities which are already plagued by financial crisis and system’s inefficiency, with huge quantities of garbage to be handled and having high organic content. With poor awareness levels and participation from the public as well as the workers, which could be linked to the economic development status of the country/city, poor awareness and participation and the high organic content of the waste, it is a Herculean task for the municipalities to handle the garbage in terms of both quality and quantity.

Concluding Remarks

While the developing cities, to improve their “system”, need measures such as inclusive valuation and accounting, innovative financial mechanisms, segregation at source by improving awareness, augment informal sector, improve infrastructure for waste collection & transportation, proper waste disposal practices, the developed cities need to control the heaps of garbage by means of waste reduction measures, resources recycling, recovery of material from waste, and employing 3Rs (Reduce, Reuse and Recycle)

etc. This is a unique and unprecedented situation in Asian Cities where both these aspects needed to be addressed at the same time. It means to attempt higher end waste management measures which needs higher degree of awareness and finances, in a geographical unit where citizens put very low priority on environment, having poor awareness, systems having very low efficiencies and cramped with financial crises. Solutions for such situations could not be drawn from the west, but to devise tailor made solutions for the peculiarity in the situation. Drawing an integrated approach to waste management where both measures for service (waste management) quality improvement and resources conservation measures such as 3Rs (Reduce, Reuse and Recycle) are given consideration is a challenge for the present generation of researchers and also City level policy makers in this region.

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