

BANGKOK: ARE INDUSTRIES GENERATING A SUSTAINABLE CITY?

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Summary

Economic development is composed of processes of structural transformation such as industrialization and urbanization. Demonstrating Thailand's success in pursuing economic development is the increase in real GDP per capita from \$985 in 1960 to \$6,970 in 1990. However, this has not been without negative side effects, especially in the central node of the economy, Bangkok. Indeed, industrial pollution and urban environmental degradation are presently prominent features of Bangkok.

Industry is a major source of air and water pollution in the megacity. Its significance cannot be denied as over 75 percent of manufacturing value added originates in the Bangkok Metropolitan Region and over one half of the 52,000 manufacturing firms are located in the region (according to World Bank estimates). Government, businesses, NGOs and the public at large have recognized that future growth of the megacity and, hence, Thailand is not feasible if the environment is ignored. Efforts are being made in all sectors to mesh economic development and the environment to attain sustainable development.

The research demonstrates that Thai businesses are actively attempting to produce in an environmentally friendly manner not only for environmental and health reasons, but also to increase their competitiveness in the international economy. Nevertheless, much remains to be accomplished, through concerted efforts from both the public and private sectors, in order for Bangkok to be a "sustainable city". Consequently, policy issues and recommendations are analyzed. The methodology of this research entails interviews and questionnaires of officials in relevant ministries, businesses and NGOs.

1. Introduction

The rapid industrialization of certain developing economies over the past few decades has fuelled the contemporary urban environmental cauldrons of their cities. Hitherto, it seemed that economic development could be pursued without reverence for the environment. However, these megacities are currently creaking and groaning under the unwieldy pressure of rapid industrialization and uncontrolled urbanization. Bangkok is a prime example. The plight of Bangkokians is not to be envied. Bangkok is notorious for its congested roads, as the average peak hour traffic speed does not exceed 12 kilometers per hour. The high concentration of vehicular emissions, energy use and industrial production in the city is the main source of its stifling air pollution. Industries and households equally pollute the surrounding waters, the source of drinking water for the urbanites. Industrial hazardous wastes are also spewing forth and are to attain 6 million tons per year in the first decade of the twenty-first century. Accidents linked to neglect abound with, for example, the spectacular fire and huge explosion in a Bangkok warehouse in the Klong Toey port in 1991. In addition, during the fire, unaccounted for chemicals were discharged into the waterways of the city.

To continue economic development in this manner is counterproductive as it will bring this cherished goal to a grinding halt. The state of most Third World economies, especially Thailand's since the economic crisis of 1997, does not permit them to pursue this avenue of blundering development. To ignore the environment will only provide them with evanescent prosperity. Industries, especially pollution-intensive ones, are to a large extent responsible for the air and water pollutants which are harming the urbanites' health, decreasing their productivity and increasing the loss of amenities in this historical city. Hence, the question: what measures are industries adopting and implementing to generate a sustainable city?

Businesses do not pursue environmental quality objectives for ethical reasons, especially since compliance engenders increased costs (and benefits) for production. Also, as long as companies can push these costs onto society in the form of externalities, there is no rational reason for them to internalize costs. Hence, the necessity for government to play a decisive role in ensuring compliance. Government officials in the various relevant ministries were interviewed to determine exactly what the Thai government is doing to ensure sustainable development. Finally, a small sample set of industries was interviewed to ascertain what initiatives they were undertaking to ensure Bangkok's survival.

2. Urbanization and Environmental Degradation

Urbanization is one of the long-term processes of structural transformation. Urban areas facilitate industrialization and economic development by providing agglomeration economies, economies of scale and the proximity of labor, capital and technology. Cities also simplify the development of social benefits such as education, health facilities, and employment. These factors affect the spatial outlay of a city, the levels of productivity and the terms of trade. In addition, economic development changes the population level by enticing migration. Finally, government policies can enhance or exacerbate this localization process. Urbanization is thus an integral part of the

development process. However, a rapid industrialization-uncontrolled urbanization cycle equally produces a highly negative by-product: urban environmental degradation. Environmental degradation not only destroys amenities, but it also hinders human health and economic productivity and, hence, development.

Urbanization is a highly complex phenomenon composed of numerous facets. The level of urbanization of Thailand, or the proportion of the population that is urban at a point in time, is comparatively low according to the United Nations' estimates. Indeed, it was close to 20% in 1995 and probably won't reach a 60% level until 2025 whereas, for instance, the Republic of Korea had a level of urbanization of over 81% in 1995 and approximately 86% at the turn of the millennium. Thailand remains, on the whole, an agricultural society though its urbanization rates still remain high. Also, the rate of urban growth, which measures how fast cities within the country are growing, is considerably higher in Thailand at 2.2% than in industrialized countries like Japan which has a rate of urban growth of 0.4%.

Urban growth is the consequence of three interrelated phenomena: the natural increase of urban population, migration including rural-to-urban migration and immigration, and the reclassification of city boundaries. The expanding urban population of Bangkok has led city authorities to enlarge the historical city into an Extended Metropolitan Region. The Bangkok Metropolitan Area (BMA) includes Bangkok and the provinces of Phra Nakhon and Thonburi. The BMA is, in addition, part of the new Bangkok Metropolitan Region (BMR) which also includes the surrounding provinces of Nonthaburi, Pathom Thani, Samut Prakan, Samut Sakorn and Nakhon Pathom. Thailand's Seventh National Plan (1992 to 1996) has even further expanded this urban concept into an extended BMR including the administrative districts adjacent to the BMR.

The population of Bangkok is approximately 10 million people, making it a megacity. Bangkok has a high concentration of not only population but also economic development. Indeed, according to one estimate, the BMA accounts for 12 percent of total population; it encompasses 86% of Thailand's GDP in the areas of banking, insurance and real estate; 74 percent of industrial production; 64% of public administration and defense spending; and one third of the national GDP. Bangkok is thus a primate city. The United Nations estimates that Bangkok has an urban primacy rate of over 56%, the highest primacy rate in Southeast Asia, excluding city-states. This primacy makes the state of the environment in Bangkok an essential factor in the country's continued economic development.

The environmental problems of Bangkok are tremendous and multifarious. These problems are affected by natural factors such as topography and meteorology as well as demography (being a megacity), public policies (which are biased towards cities) and finally the level of industrialization. The physical location of Bangkok contributes to its environmental problems. The proximity to the ocean front, coupled with fluctuations in the Chao Phraya River level, and the flat marshy and unstable lands make the city vulnerable to monsoon rains. The area is also exposed to tides that can go upstream bringing with them salinity. This affects the quality of groundwater that is pumped for domestic and industrial use. Bangkok's exploding population and rates of growth compound environmental problems. The concentration of economic and political

activities in the capital city attracts additional potential employees and industries, increasing the environmental impact of economic growth. The type of capital equipment used by industries is consequently an essential element affecting the level of pollution.

According to recent studies, the main atmospheric pollutants in Bangkok are sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon dioxide (CO₂), lead, suspended particulate matter (SPM) and smoke. The monitoring stations in the BMR indicate that SPM concentrations have continuously risen and that the standards are consistently violated. A recent publication by the Pollution Control Department of the Ministry of Science, Technology and Environment (MOSTE) shows that the annual average SPM values exceed the standard value by 11-46 micrograms/m³. The current level of sophistication of these monitoring sites does not permit officials to rule out concern for SO₂ and NO₂. Bangkok has often been singled out for its high levels of lead in the air. However, the government has made significant steps to decrease these levels. Monitoring data show that there was a decrease in ambient lead levels after the introduction of low-leaded and unleaded gasoline in 1992. However, much still remains to be done.

Water is another significant concern in the capital. The Chao Phraya River, which flows through the BMR, is characterized by low dissolved oxygen conditions, especially from its mouth in Samut Prakan (kilometer zero) up to Nothaburi (kilometer 62). The MOSTE recognizes that the overall quality of this portion of the river is in a "deteriorated state, namely, very low dissolved oxygen value, high biological oxygen demand (BOD) and very high total coliform bacteria values". The most polluted portion of the river is in Bangkok from the Klong Toey Port (km 39) to Memorial Bridge (km 48), and is borderline anaerobic. Data from 1992 show that from Bangkok down to the mouth of the river, ambient standards for lead, chromium, ammonia, nitrogen, and nitrates were all exceeded. Heavy metals and ammonia are also found in the upper part of the river close to industrial sites. However, according to information available, none of the standards are violated in the middle section of the Chao Phraya River (km 62-142), the source of Bangkok's drinking water. Water quality is considered "reasonable" in this section, even though total coliform bacteria is "too high to be acceptable".

Finally, the aquifers in the Bangkok region are deteriorating due to two factors. First, directly from pollution, as toxic chemicals and waste leach into the groundwater. This has a direct impact on human health as water is pumped for human consumption. Second, aquifers suffer from over-extraction, land subsidence and salinization. Bangkok overdraws water from its water tables by a conservative estimate of 0.6 to 0.8 million cubic meters per day according to World Bank estimates. One fourth of this water is for drinking purposes, the remainder for industrial use. This over-extraction has caused certain areas of the city to sink between five to ten centimeters per year.

Factors compounding the environmental problems of the megacity are: the lack of a central sewage system causing effluents to be channeled into canals or stormwater drains; inefficient management of water due to unclear property rights, underpriced water, inefficient water systems, and polluted waters; and the dumping of industrial and hazardous wastes. A main factor contributing to Bangkok's air and water pollution problems is industry. Indeed, the BMR contains over 75% of manufacturing value added and over half of the 52 000 manufacturing firms. The World Bank estimated in

1988 that industry's share of SPM in the BMR was 35% and its share of SO₂ was over 46%. Industrial BOD is also a significant problem in the city as well as such manufacturing pollutants as chemicals, heavy metals, oil and grease, phenols and organic solvents. Industrial hazardous wastes are estimated to reach 6 million tons per year by the first decade of the new millennium.

Measuring the costs of pollution is difficult. However, the World Bank devised a health benefits model and the conclusions indicate that a 20 percent reduction in SPM and lead in Bangkok would result in benefits ranging between one hundred to four hundred dollars per person. It also estimated that a ten percent reduction in peak-hour trips would provide an annual benefit of \$400 million. In conclusion, it appears that the rapid industrialization and uncontrolled urbanization of Bangkok, which has transpired since the early 1950s, have engendered tremendous environmental degradation of the megacity. This pollution is causing damage to urbanites' health as well as contributing to the degradation of productivity by increasing health costs and traffic jams. The imminent question, which needs to be answered, is thus: Can this tendency be modified so that Bangkok may pursue development in a sustainable manner?

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Biographical Sketch

Valérie Chambers has a doctorate from The Graduate Institute of International Studies, University of Geneva, and has published articles on the subjects of: international trade and regional groupings; trade of environmental technology in Asian developing countries; and urbanization, industrialization and sustainable development in Asian developing countries. Her current focus of research is on sustainable development and the pulp and paper industries in developing Asia.