

Industrializing Cities and the Environment in Pacific Asia: Toward a Policy Framework and Agenda for Action

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1. OVERVIEW

The purpose of this discussion is to develop a policy framework for addressing Pacific Asia's urban-industrial environmental crisis.¹ The economic importance of the twin processes of urban and industrial growth is not in doubt. Taken together, the benefits of urbanization and industrialization are manifested in rising incomes and levels of material welfare with a reduction in shares of population below basic needs poverty lines throughout the market-oriented economies of East and Southeast Asia.²

These benefits have been achieved at very high environmental costs, however, and one of the most challenging issues of the present and future of East and Southeast Asia (Pacific Asia) is how to drastically reduce the already serious environmental consequences of urban-industrial growth and concentration. Urban-industrial development represents a quantum increase in the uses of energy and natural resources, with the appropriation of the resources to service them and the impacts of the waste they create them now taking place on a global as well as a local scale. In the Pacific Asia context of dense human settlements – more than 30,000 people per square kilometer in many cities – these increases have translated into high concentrations of pollution and environmental degradation that are affecting the lives of the inhabitants of cities, rural hinterlands and the world as a whole. Yet only a fraction of the industrial production expected to be occurring in Pacific Asia in just 2 decades is in place today.³ With most of the mega-urban regions that are the foci of industrialization as well as the development of expanding service sectors continuing to double in population size every 15-20 years, the use of resources for city-building, business and daily living adds to industrial pollution to far out-pace capacities to cope with the growing environmental stress and degradation.

To address the issues of environmental management under accelerated urbanization and industrialization, that is, the rapid growth of burgeoning cities as well as the growth of industry and manufacturing, the discussion that follows presents an overview of the Pacific Asia urban transition and a summary of the ways in which both industrial and urban growth jointly create impacts on a wide variety of environmental issues. Section II assesses current environmental conditions in the region, with a view toward identifying the most serious problems and their sources. Section III asks what is at stake if current trends are projected into the future without any significant improvements in environmental management capacities in cities. Questions of personal health and well-being of populations living in cities, environmental sustainability, economic vitality and competitiveness, livable cities, and environmental justice are put on the table as being among the most widely perceived concerns for public policy. Section IV moves into the policy arena by focusing on raising institutional capacities around new forms of urban governance that include local government, private sector and civic organizations in collaborative initiatives for environmental management.

The Pacific Asia Urban Transition

The urbanization process underway in Pacific Asia is the most dynamic in the world. Over the next quarter of a century about one-third of the world's total increase in urban population will accrue to this region, and by the end of this period approximately a third of the world's urban population will also be found in Pacific Asia cities. The accelerated urban-industrial growth that is underway is bringing an equally rapid transition from rural to urban societies. From levels as low or under 20 percent urban in the 1960s, more than half of the population of this region will be residing in cities within the next two decades. In the already highly industrial economies, notably Japan, Korea, and Taiwan, the urban transition is near completion, and rural populations

are declining in absolute terms, with similar expectations for some of the second round of NIEs (newly industrializing economies) in Southeast Asia in the coming years.

The greatest shares of urban population increases are gravitating to extended metropolitan “mega-urban regions” that have populations now moving beyond 15 million and up to 80 million (the Pearl River Delta) people residing in complex urban fields of interaction (Robinson and McGee 1995, Ginsburg *et al.*, 1991). These “science-fiction” size agglomerations of human activity are the cities of tomorrow. Their sheer scale and complexity challenges all conventional concepts of cities and methods of planning and managing them.

The urban transition is not only manifested in new wealth and higher incomes for many. Along with the emergence of urban middle and working classes has come the rise of civil society as a political force that, over time, has gone beyond a singular focus on economic benefits to push for a variety of political and social reforms. Urbanization is not merely a movement of people into more densely constructed forms of habitation but also represents social transformations that are championing democratic political systems, transparent relations between government, business and citizens, and more livable habitats.

Urban-industrial Impacts on the Environment

Much of the environmental stress in expanding urban regions – as well as in resource-providing regions -- is directly related to industry and industrial processes, including:

- water, air and ground pollution, including hazardous and toxic waste, heavy metals; shift from organic to non-biodegradable wastes in production;
- use of chemicals and other resources affecting workers and conditions at work sites;
- depletion of energy and environmental resources (water, timber, minerals) directly used in industrial transformative and assembly processes;

- energy and environmental resource requirements for product use (e.g., leaded gasoline for automobiles); and
- noise, smells and other neighborhood disturbances such as high volume of trucking for industrial production and distribution from production sites.

Most of these forms of environmental degradation and pollution have point sources that are readily identifiable. They also generally involve private sector operations that respond to incentives and regulations related to profit-motivations and market forces, and are thus amenable to performance drivers discussed by Angel *et al.* (1998).

There are, however, more varied and far-reaching impacts that are indirectly related to industrialization that are imbedded in urbanization and often neither have easily identifiable individual point sources nor respond to market incentives to improve the environment. These include:

- poor environmental conditions of worker housing and their communities, including slum formation and intensive environmental degradation associated with it;
- air pollution from increased traffic between residence and workplaces, schools, shopping;
- appropriation and depletion of environmental resources for urban use, such as rural reservoirs for urban water supplies;
- water and land pollution from multiple proximal sources, including household sewerage and solid waste disposal;
- noise from traffic and construction;
- loss of prime agricultural land, coastal ecologies, regional forests and upland vegetation around (larger) cities targeted for resource extraction, industrial location, infrastructure (such as airports and multi-media super corridors) and housing development;

As these examples show, the urban-industrial matrix of interrelationships is manifold and so intertwined that the dividing line between urban and industrial sources of environmental pollution and degradation is ultimately an arbitrary one. And although environmental degradation is occurring in cities that are not rapidly industrializing, the reality is that urbanization in the open economies of Pacific Asia is being substantially driven by industrialization, and where industrialization has taken off, local and global environmental risks are exceptionally high from interdependent urban and industrial sources.

II. CURRENT ENVIRONMENTAL CONDITIONS

As discussed, distinguishing between industrial and urban impacts on the environment is often difficult and artificial. In this section, this distinction is put aside to allow for a broader inventory of environmental problems facing cities in East and Southeast Asia. The intention is to identify relative magnitudes and severity of pollution and environmental stress affecting industrializing cities.

The point of departure for assessing current and future impacts of urban-industrial growth in Pacific Asia cities is that all projections indicate that unless drastic improvements in urban and industrial environmental management occur, the environment of cities, nations and the world will be seriously, if not irreversibly, affected. Pollution levels associated with urban and industrial growth in this region have been increasing faster than even the high 6-10 percent per annum national economic growth rates over the past few decades (Brandon 1994). Energy demand is doubling about every decade, and projections show that by 2005 Asia as a whole (including South Asia) will be producing more sulfur dioxide than Europe and America combined (*The Economist* 1993).

Even reducing pollution increases to rates of economic growth is thought by some to be a signal achievement (Brandon 1994). However, initial observations on the current finance-driven economic crisis that has swept through Pacific Asia indicate that for several key issues, notably slum formation and declining monitoring capacities of governments, the gap between economic growth and increases in levels of environmental degradation is widening. In other words, under either high growth or crisis scenarios, the overall costs of environmental degradation can be expected to continue to rise precipitously.

Table 1 summarizes key issues and sources of pollution and environmental degradation common to most industrializing urban areas in East and Southeast Asia. These include air pollution, water quality and supply, solid and hazardous waste, land pollution, traffic, land-use mixes and urban form, and the special issue of slums and squatter settlements.

Air Pollution

Concerning air quality, in all but a few cities the major source of air pollution is from vehicular traffic and, secondarily, industrial emissions. Over the past decade in booming metropolitan regions the construction of office buildings and high-rise condominiums also generated such high levels of dust in the air as well as noise that they became targets of organized citizen protest. In Pacific Asia, with the exception of China, which heavily relies on coal, the consumption of fossil fuel for electricity has grown faster than national economic growth rates (Brandon 1994). Energy demand is doubling every decade with the consequence that total emissions of air pollutants – particulates and precursors to acid rain, carbon dioxide -- are also rapidly increasing. If current trends are projected forward, East and Southeast Asia will be producing more sulfur dioxide by the end of the next decade than Europe and the U.S. combined (Brandon 1994).

Table 1 Urban Environment Agenda: Priorities, Sources and Locations

Environmental Concern	Commonly Identified Sources
<p><u>Air Quality:</u></p> <ul style="list-style-type: none"> • TSP levels • CO levels 	<ul style="list-style-type: none"> • vehicle emissions • industrial emissions • construction
<p><u>Water Quality</u></p> <ul style="list-style-type: none"> • BOD levels • toxic substances 	<ul style="list-style-type: none"> • untreated dumping of household waste • untreated commercial & industrial waste
<p><u>Water Supply</u></p> <ul style="list-style-type: none"> • shortages • excessive depletion (subsidence & salination) 	<ul style="list-style-type: none"> • leakage & lack of integrated water resource management • steadily increasing urban water requirements • locating of water consumptive activities in arid regions
<p><u>Solid & Hazardous Waste</u></p> <ul style="list-style-type: none"> • accumulation of uncollected wastes • improper disposal • toxic wastes released untreated 	<ul style="list-style-type: none"> • increasing household & commercial solid waste and industrial hazardous waste • too few vehicles for waste collection • insufficient disposal capacity for solid & hazardous waste • inappropriate disposal methods • virtually no separation of waste at source, especially hazardous waste • NIMBY protests against new sites
<p><u>Land Pollution</u></p> <ul style="list-style-type: none"> • soil contamination • food contamination • ground water contamination 	<ul style="list-style-type: none"> • existing and old factories • old and open dumps • gas stations, auto repairs, photo shops, dry-cleaning shops
<p><u>Traffic</u></p> <ul style="list-style-type: none"> • congestion • noise 	<ul style="list-style-type: none"> • increase in vehicle ownership • ribbon expansion along arterial roads • dispersal of employment & housing • poor road networks • inadequate alternative transportation
<p><u>Land Use</u></p> <ul style="list-style-type: none"> • ecologically unsustainable uses • incompatible land use mix • lag in environmental infrastructure • loss of greenery, amenities, & unique identities 	<ul style="list-style-type: none"> • unguided & unregulated development practices: general plans breached, lack of Specific Plans, spill-over development. • uncoordinated land development: conflicting plans by government agencies • ineffective land valuation methods: lack of value capture • inability to obtain easeways • conservation narrowly defined
<p><u>Slums</u></p> <ul style="list-style-type: none"> • growing number • unhealthy locations • lack basic infrastructure 	<ul style="list-style-type: none"> • land prices rising faster than GNP/capita • insecure land entitlement • inappropriate housing options (far from sources of livelihood; inappropriate designs) • lack of access to credit • inadequate provision of serviced land for low-income housing

Source: Douglass and Lee 1996, Kruger/NESDB 1996.

Exhaust from motor vehicle use is the leading source of air pollution in Southeast Asia. Citing higher production costs, manufacturers and governments have resisted calls to use the most efficient engine designs and cleanest fuels for vehicles being produced for Asia markets

(Brandon 1994). Several of Asia's newly industrialized countries, notably South Korea, Taiwan, Malaysia and even Indonesia, are now exporters of motor vehicles, and most of the remaining have large-scale motor vehicle assembly plants representing major world car makers. The number of vehicles is far outpacing economic growth, doubling every three years in Korea and Thailand and every four years in China. Pollution levels are aggravated by the high-polluting characteristics of the large diesel and two-stroke vehicle population. The health and productivity costs of pollution amount to billions of dollars a year in the large Asian cities. For Bangkok, annual costs of air pollution are estimated to be as much as \$3 billion; for Kuala Lumpur and the Klang Valley as much as \$1.6 billion; and almost \$1 billion in Jakarta (World Bank 1992).⁴ In the early 1990s, air pollutants were estimated to be increasing two to three times faster than the economies of Indonesia, Philippines and Thailand.⁵

Water Quality and Supply

Although the issues of water supply and quality are difficult to separate, in terms of supply alone most metropolitan regions in Pacific Asia are at or are nearing crisis points. Not only are urban populations growing rapidly, but also the physical areas covered by cities leading to a loss of ground cover and deforestation of uplands around cities plus contamination of aquifers and seepage of seawater under cities has rapidly diminished supply sources. In some cities, such as Bandung, transnational textile companies are found to be a major source of ground water depletion through illegal well construction, leaving *kampung* totally without any or with severely depleted well water supplies. The water obtained from the wells of the *kampung* located near industrial sites were found to be colored, odorous, and the cause of skin irritations (Dharmapatni and Hastu 1994). In addition, in many cities about half of water supplied by municipal systems

is lost through the distribution system. Whether through pipe leakage or pilfering by illegal connections, this level of unaccounted water losses are substantial.

The contamination of water supply by uncontrolled spillage from industry, residences and commercial land users means that in most cities the water that is supplied is no longer suitable for drinking. Households in cities from Seoul to Bangkok are increasingly purchasing bottled water, which is itself of mixed reliability and not monitored very well. In most cities in Asia only a small fraction of the population and city is served by sewerage systems, and alternatives such as septic tanks have not prevented disposal of wastes into urban waterways. Even in areas that are served with sewerage, more than 90 percent of the wastewater is discharged without treatment (WHO 1992).

Environmental degradation in and around cities, particularly related to deforestation and covering of ground with cement and asphalt surfaces, has created the paradoxical problems of extreme water shortages in dry seasons and dangerous flooding in wet seasons. Annual flooding in many cities has reached crisis proportions. Subsidence is also marked, with saltwater intrusions reaching several kilometers inland in Jakarta, where piped water in central locations is not longer usable for consumption.

With most of the major cities in Asia located on coastal plains where once large rivers ran to the ocean, urban and industrial water contamination is seriously impacting coastal zone ecologies and economic activities such as fishing. Polluting industrial wastes discharged by some 30,000 small factories into rivers and streams flow into Jakarta Bay. These include the effluents from thousands of small batik factories that undergo little or no treatment prior to discharge. Mercury levels are second only to the concentrations once recorded in Japan's Minamata Bay.⁶

Similar experiences are occurring in most cities. More than 1,000 illegally-registered factories in Bangkok's Raj Burana district, which include textile, chromium-coating, and food processing plants, are discharging harmful industrial wastes into waterways. The portion of the mighty Chao Phraya River that runs through Bangkok no longer supports life, has a strong foul smell and deprives residents of water for their daily use. World Bank (1992) estimates that in Indonesia, the Philippines, and Thailand, toxic and water-based pollutants from industry are growing three to five times faster than the GDP. Air pollutants and biochemical oxygen-demand substances are increasing two to three times faster than the economy.

Solid and Toxic Waste

Solid waste disposal represents another crisis of Asia's cities. Finding new landfill sites has become a major preoccupation of most governments, especially with the rise of NIMBY consciousness among in middle class neighborhoods and gated communities. Toxic chemical waste discharged into land and water from industries is almost wholly unmonitored in many countries. Municipal garbage systems are expanding, but even where urban-wide systems are operating, many lower-income communities remain without pick-up services. Scavenging in many cities remains a major contributor to solid waste recovery and recycling, though these activities are often discouraged by governments and inhibited by closed-truck municipal collection systems. Some countries, such as South Korea and Taiwan, have adopted strict regulations on separating household waste for municipal pick-up, but in most countries no separation of wastes is required or facilitated by public waste collecting systems.

The state of ground pollution is virtually unknown in most cities. Public systems of monitoring are not in place.

Traffic Congestion

As noted, vehicular traffic is considered in many large cities to be the largest source of air pollution. As many Asia cities move toward a suburbanization mode of expansion, commuting to work is a major contributor to this problem. With cities expanding and infrastructure development further connecting smaller cities in the vicinity of metropolitan core cities, larger proportion of daytime working populations are increasingly likely to commute from suburban homes to central area places of work. Motor vehicles numbers in East and Southeast Asia are doubling about every seven years, with cars produced for this region burning among the most polluting and health-endangering fuels still in use (UNESCAP 1993). The resulting air pollution is greatly magnified by what have become monumental levels of traffic congestion and time spent in traffic with idling engines.

Few cities have developed mass or effective public transportation alternatives such as Singapore has done since the early 19970s. The majority of higher-income commuters in all but a few cities use private modes of transportation, while lower income commuters travel on inadequate and often poorly maintained bus and limited commuter train lines. In most large cities in Southeast Asia, exhaust from idling cars caught in what has become day-long “rush hour” contributes more to air pollution than does industrial production. Although this relationship may change as industrialization proceeds, growth rates of car ownership and inability of governments to keep pace with road construction and the provision of public transportation solutions suggest that traffic congestion will continue to be a major contributor to air pollution in the coming decades.

Land-use Mixes and Urban Form

The concentration of industrial and population growth in large, rapidly expanding metropolitan regions raises the question of how the form of the city can be guided in a more

environmentally sustainable, resource conserving way. At the neighborhood and community scale, this issue tends to focus on zoning and other incentives for compatible land-use mixes to avoid, for example, the construction of noxious or noisy factories next to schools or hospitals. In most of East and Southeast Asia, zoning is either not used as a policy tool or is unevenly applied in practice even where land-use plans have been adopted by governments. Small-scale and micro-manufacturing operations -- cottage industries, individual enterprises, and very small-scale subcontractors -- are integrated into residential neighborhoods. While potentially desirable as a means of keeping communities from turning into sterile suburban "bedtowns," noise and waste from these operations can be dangerous to neighborhood residents. Many are firetraps, and major fires have destroyed property and killed workers in factories in Bangkok and cities in Malaysia and Indonesia in recent years.

At a higher spatial scale the issue of shaping the form of the city focuses on two dimensions of urban growth: how to guide urban expansion away from environmentally critical areas, and how to make cities that use environmental resources more efficiently. Environmentally critical areas typically include:

- uplands around cities where settlement and deforestation greatly increasing flood-drought syndromes;
- land over aquifers that tends to result in ground water pollution and land subsidence;
- coastal zones where loss of ecological integrity has severe impacts on fishing and other marine activities including tourism;
- rich, irrigated agricultural land – and the rural housing it incorporates -- that, due to traditional land ownership customs and controls on agricultural prices, is undervalued by the market;

- preservation of open spaces in the city.
- forest areas in and around cities
- watercourses in cities

The goal of greater environmental efficiency points toward ways to build cities that reduce the scale and intensity of movement of people in their daily uses of urban space. Such concepts as ecocities, carrying capacity, design with nature, bioregionalism, compact cities, linear cities, and multi-polar cities are among the proposals that are being put forth that address this concern in various ways (Suryodipuro 1995). A key element of all concepts is the capacity to coordinate transportation, land-use – especially the location of places of work -- and housing development in space.

Without attention to reducing environmental impacts of urban growth by guiding the spatial organization of cities, current patterns of urban expansion suggest a number of critical problems will increase. These include: alternating peaks of flooding and water shortages; subsidence of cities and salination of water tables; irreversible loss of vital coastal and upland ecologies and of productive agricultural land and open spaces; increasing traffic congestion and hours spent commuting; high concentrations of industry in environmentally unsound locations and concentrations.

Slum and Squatter Settlements

The most severe consequences of pollution and environmental degradation tend to fall on low-income neighborhoods. Although average incomes have risen tremendously in the industrialized and industrializing economies of East and Southeast Asia, slum or squatter settlements still persist in even those with the highest income (UNESCAP 1993, Douglass 1993,

1998a).⁷ When such issues as housing and environmentally clean neighborhoods for lower-income communities are included in poverty questions, the record is extremely mixed.

Where low-income communities have been improved, it has largely been through massive provision of housing by governments, such as in Singapore, Hong Kong, and, more recently, Korea. In both the Singapore and Hong Kong cases, however, rural-urban migration has been tightly controlled or non-existent. Only Korea's 2 million housing construction program launched in 1989 has taken place in a context of migration from other regions of the country to the targeted city. This policy was, however, initiated after Korea's urban transition was virtually completed and migration had become inter-urban rather than rural-urban. In most cities there is no public policy on providing land serviced with environmental infrastructure for low-income households, and policies for delivering low-cost housing have not reached a significant share of the urban poor. Unless measures of poverty begin to take the quality of basic environmental resources such as access to clean water into account, many of the most serious threats to the lives of poor people will remain unaccounted. The situation will be further aggravated in the future when growing populations and other pressures on land supply in cities and land scarcity will mean that land for low-income settlements and squatters will be more limited than it was in earlier decades of urban growth.

III. WHAT IS AT STAKE? INTERPRETING FUTURE SCENARIOS

What is at stake in addressing the many aspects of urban-industrial pollution and environmental degradation? Among the themes concerning the future of the countries in question and the economies of what has become one of the world's most vital regional economies, five stand out as being among the most important and widely identified. These include (in no

particular order): personal health and well-being, environmental sustainability, economic vitality and competitive advantage, livable cities, social justice and poverty.

Personal Health and Well-being

One is the concern for human health and well-being, which points to the mounting health-related personal and financial costs associated with polluted environments. Breathing lead from gasoline burned in congested traffic has been linked to as many as 500,000 cases of hypertension and 400 deaths a year in Bangkok. The estimated human health and economic costs of air and water pollution are estimated to be around US\$120 million each year in Manila (Douglass and Lee 1996). Air pollution in Seoul is detrimental to health on most days of the week (Kim 1994). Death rates from lung cancer are four to seven times the national average in cities in China (Williams 1994). In each of the cities of Bangkok and Jakarta, air pollution is responsible for 1,000 to 2,000 deaths a year; 25,000 to 100,000 doctor's visits or hospitalization; and millions to hundreds of millions of "restricted activity" and "respiratory symptom" days (Brandon 1994).

Water supply contamination poses exceptionally serious health threats to especially the urban poor. Households that lack solid waste collection services often dump waste in open areas and waterways, creating vector breeding sites and polluted water that are the major sources of incidences of malaria, dengue fever, gastro-intestinal diseases and diarrhea, which remain the leading causes of infant mortality in Asian cities (Harpham, *et al.* 1990).

Environmental Sustainability

The deep environmental impacts and inefficiencies of urban and industrial growth reach from neighborhood to city, nation and world. Depletion of increasingly scarce water supplies; destruction of remote forest regions; disruption of food chains; and global warming (Brown *et al.* 1998) are among the major concerns that reveal that the "ecological footprint" of cities

reaches across continents and world regions. Given magnitude of current and projected increases in pollution from urban-industrial growth in the Pacific Asia, the *de facto* policy of “pollute-now-pay-later” is of concern to people within and beyond this region (Angel *et al.* 1998).

Economic Vitality and Competitive Advantage

Loss of economic vitality (productivity and innovative capacities) as well as competitive advantage from environmental deterioration has several facets. In Southeast Asia, one of the most important, though as yet not well researched, is the potentially declining attraction of environmentally degraded cities to foreign investment, which has been the principal driving force of industrialization in the economies of this region. Some cities, such as Bangkok and Manila, have been reported to be such cases. With metropolitan regions cities accounting for half or more of the GNP in Asian countries, their fate is also that of the national economy.

In a more direct manner with regard to existing firms, health costs extend beyond personal well-being to include time lost from work and insurance costs borne by private enterprise. The cost of all known pollution Asia’s metropolitan regions is estimated to be close to 10 percent of urban GDP, which in several countries is equal to 5 percent of the national GDP.

Health problems caused by pollution are estimated to cost as much as \$3 billion a year in lost productivity in Bangkok alone (*Economist* 1993). In Metro Manila, the combined productivity losses from air and water pollution are estimated to be around \$120 million each year (World Bank 1994). With pollution levels increasing 10-20 percent per year in some energy, industry, and transport subsectors, these costs to productivity are expected to rise not only in the form of health costs and mortality, but also in trends of reduced output in extractive industrial sectors due to dwindling resources, and irreversible loss of biodiversity and overall environmental quality (Brandon 1994).⁸

The threat of environmental degradation to the economic performance of Pacific Asia is important not only to this region, but because of the global focus on East and Southeast Asia as the principal source of industrialization beyond OECD countries, it takes on much wider implications for the progress of industrialization and urbanization in developing countries.⁹

Livable Cities

Extended outward from individuals to households, neighborhoods, communities and urban life spaces is the concern that the pursuit economic growth has not created livable cities. A central attribute of this concept is a clean environment, including access safe drinking water, clean waterways, effective solid waste disposal and management, clean air and unpolluted land. Green spaces, smoothly flowing transportation systems and greatly reduced traffic congestion are also often viewed as being part of a good urban environment.

With the possible exception of Singapore, which has coordinated urban development with environmental management needs from the beginning, the record in Pacific Asia is far from the ideal. Rivers, land and air have been polluted beyond all minimum standards set by governments for health and safety. With few land-use controls, industries are locating next to residential areas, and traffic congestion is adversely affecting routine use of the city and access to daily urban functions. Issues surrounding the idea of livable cities have become the rallying points for the emergence of environmental movements in Asia, and have thus become the most politically salient ones related to environmental management (Lee 1995; Ho 1997; Kim 1994; Hsiao 1995; Hsiao and Liu 1999).

Environmental Justice

A well-recognized pattern of the consequences of pollution and environmental damage is the uneven impacts on various social strata and groups, especially the urban poor. This pattern

appears for at least three reasons. In Asia's principal cities, where land price increases far outpace both per capita income and minimum wage increases, land available to the poor is often that which has been severely environmentally degraded or which is located adjacent to polluting industries. Secondly, more affluent communities are able to push environmentally undesirable activities, such as landfill sites for solid waste disposal, onto poorer communities. Third, the poor are generally excluded from decisionmaking about environmental issues. The resulting pattern is one of environmentally degraded slums being created not simply by their residents but systemically by the larger political and economic context of access to clean neighborhoods.

The socially uneven burden of environmental degradation has raised the issue of environmental justice. The three general objectives have been associated with this issue and the movements it has spawned. They include: healthy communities for all citizens, rights of redress and access to legal institutions, and citizen participation with government and business in decisionmaking on environmental matters. Each is to be pursued without regard to levels of income, ethnicity, race or any other socially discriminatory basis. It thus entails at least two levels of action: general improvements in the environments of life-spaces for everyone, and solidarity with the poor and other vulnerable communities to ensure equity in access to better environments.

In sum, given the expected enormous increases in urban and industrial impacts on the environment in what are in many areas already dire situations, there is a manifest need to find innovative ways to dramatically raise local capacities for reversing trajectories of environmental deterioration. Decisions that governments, citizens and businesses make in the next few years will decide if environment degradation and pollution can be brought within sustainable boundaries or continue to accelerate.

IV. POLICY FRAMEWORK, DRIVERS AND DIRECTIONS

The structural-spatial intertwining of industrialization and urbanization asks for a more comprehensive, strategic policy framework to parallel those of the more typical sectoral and single-issue oriented approaches. Environmental impacts of single activities are compounded in geographical space as industries and urban communities alike contribute to air, water and land pollution. These activities also compete for land use and development, which calls for not only finding appropriate land use mixes, but also raises important questions about how to keep urban-industrial growth from expanding into fragile ecological zones and scarce stocks of highly productive agricultural land or in an environmentally destructive and inefficient urban sprawl.

In a situation in which environmental degradation is already severe, but also in which nine-tenths of the expected industrial capacity is not yet in place and major urban regions are doubling in the area and population every 15 years or less, harnessing this transformation at this juncture in history is of crucial importance. In a potentially more positive vein, given that most of the urban and industrial space of the future has not yet been created, there are also significant opportunities for improving urban environmental management as cities expand outward into rural hinterlands.

The principal question in this regard is how to scale up environmental management capabilities to reach the level and pace of environmental pollution and degradation occurring in Pacific Asia. A feature shared by Asia Pacific cities is that environmental deterioration and pollution are worsening at rates that are in excess of both population and economic growth rates. Economic growth alone has not been found to ameliorate environmental problems. Although there is some association between sectoral shifts during the course of economic growth toward cleaner technologies in some industries, when seen from a larger urban-industrial perspective,

levels of energy and resource consumption continue to exponentially increase. Inefficiencies in energy and resource use, often associated with the failure of the market to internalize the true costs of environmental resources, add to the quantum jumps in their consumption and production of waste. Such conditions define an environmental crisis that, in lieu of fundamental shifts in policies and actions, is already producing unlivable cities and is reaching to larger scales that threaten the environmental sustainability of this world economic region and beyond.

The urban-industrial transformation now underway in Pacific Asia is an encompassing social, political and economic process involving not only quantum increases in the use of energy and natural resources, but also fundamental changes in governmental and societal institutions. Command and control styles of planning associated with the “developmental state” of the 1960s and 1970s are yielding to more democratic and inclusive forms of governance. Policy tools have, however, lagged behind the rise of new urban and national politics and potential management institutions. Most are based on segmented, often adversarial relations among government, private enterprise and civil society. Likewise, environmental management suffers from attempts to institute regulatory controls in settings where enforcement capacities are weak and non-compliance is routine. The principal question in this regard is how to develop new institutional capacities in parallel with on-going political reforms toward a broader sharing of decisionmaking in public policy and implementation.

It should be recognized that in the longer-term transformation underway, urban issues and urban environmental problems will outlast and will become greater than those directly associated with the manufacturing sector in the region. Higher income countries in Asia, such as Korea and Japan have already passed the point at which manufacturing is a growing percentage of the GNP and employment, with the service sector now dominating expansion of both (Sung *et al.* 1995).

In the case of Korea this sectoral transition occurred in less than three decades. The Seoul metropolitan region continues to grow in scale and population numbers even though manufacturing has already reached its peak and producer services are replacing lower-end manufacturing that is being relocated to lower income countries. While industrial pollution will continue to be a major dimension of pollution, there is a need to go beyond attending to industrial sites as the principal focus for environmental management and, instead, to look at expected sources of pollution and environmental degradation in the context of the urban transition that has no automatic turning point away from quantum increases in natural resource and energy consumption or waste production.

With these perspectives in mind, and understanding the environmental issues related to manufacturing and industry do not subsume those of urban development, the focus here is on the particular historical period now being witnessed in several Pacific Asia countries, namely, one marked by simultaneous accelerated processes of urbanization and industrialization. The spatial overlap of these two processes is self-evident. Most industry gravitates to larger urban regions, and many of the concerns of urban governments are related to locational patterns of industry, particularly resource intensive and polluting industry, near other urban activities. Labor must be housed, and producer services that add to urban pollution also appear in great numbers in cities. Large shares of transportation, notably the increase in use of fossil fuel powered vehicles, within and among cities is similarly devoted to supporting industrial production and distribution of industrial products. The concern here is thus not with industrial or manufacturing sites alone, but more generally with the impacts of manufacturing and industrial activities on the urban matrix of living and working.

Though environmental conditions are worsening almost everywhere, cities show significant variations among in terms of sectoral mix and severity of environmental problems. Political commitments to addressing these problems and the degree of engagement of businesses and citizens in mobilizing social and political energies toward addressing environmental concerns vary substantially as well. Capacities to move intentions to action in government and in society at large are equally diverse. These observations, along with the realization that neither world powers nor central governments can be expected to effectively manage environmental questions of local cities and regions across a national landscape, suggest three cornerstones for a policy framework for redirecting current trajectories away from their environmentally destructive course. First, there is a manifest need for a localization of capacity-building at the urban and sub-national regional scale. This involves enhancing capacities to prioritize, develop policies, and embark upon innovative programs for more efficient and reduced resource use, pollution reduction, and improved environmental monitoring.

Second, the principal focus of localization is collaborative governance. An inclusive term involving civil society and private enterprise as well as the state, collaborative governance is a means to create societal synergies for vastly increasing capacities for innovation and problem solving (Evans 1997). Third, forming and strengthening inter-city networks is needed for technical exchanges of innovations and for political-economic efforts to stem the “bidding down” process that includes lowering environmental standards as a means of attracting global industrial investment.

Localization of Capacity-Building

Several reasons can be put forth to call for a localization of capacity-building to deal with urban-industrial environmental issues. First, variations among localities in constellations of

types of industries and industrial organization are high. These variations emanate from international as well as local scales. At a global scale, some segments of transnational production are undergoing radical transformations, while others continue to be characterized by older forms of organization, technology and production. When seen in real geographical terms, the general tendency has been for more polluting industries to be located in lower-income economies, not only because of relatively low environmental management capacities in these countries, but also due to the older, more polluting technologies being transferred with the investment.

In terms of indigenous enterprises, manufacturing in many cities, especially but not only in Southeast Asia, is characteristically found in shop houses and older commercial areas associated with particular ethnic groups. Although each enterprise may be small in size, the collective levels of pollution from them can be substantial yet difficult to monitor and even more difficult to regulate. Thus in Asia's cities the range of industrial and manufacturing enterprises run from local and global sweatshops, which expand work by adding labor rather than technology, to higher-technology fordist assembly-line operations and post-fordist systems of flexible specialization. Increasingly, too, commodity systems reaching from agricultural fields to biotechnology-based industrial processes are making inter-sectoral integration more vertically complex at all spatial scales.

In environmental terms, the implications of these trends, which are realized in actual industrial location patterns in cities and regions, are that policies need to be tailored to locationally specific types and ranges of technological and organizational possibilities. Dealing with a setting, such as that of Hong Kong, which continues to be composed of very small-scale enterprises and remains heavily into world textile and clothing production, contrasts with that of

Korea's industrial structure dominated by the huge *chaebol* conglomerates that engage in heavy industry as well as light manufacturing.

Second, while the world may be concerned about, for example, Bangkok's environmental problems, taking action is fundamentally a localized process. Variations in environmental situations are great among cities even within the same country, and, historically, central governments have not revealed a capacity to either flexibly adjust policies and standards to local variations or to equitably distribute resources among cities. Further, taking action is not simply a matter of governments realizing the need for improved urban and industrial environments, but is vitally a political process that emanates from local pressures and interests.

To the extent that these sources of validating environmental policies are not included in policy formulation and implementation, the gap between policy rhetoric and local possibilities for action remains wide. Localization of decisionmaking is the main channel for bringing civil society and other local stakeholders into the political process. Generally, the failure to localize decisionmaking has also meant that local communities have been unable to engage businesses in their areas in public discussions on environmental concerns. In lieu of a local government with substantive political authority, national political solutions tend to bypass or ignore local community inputs, and neither communities nor businesses are able by themselves to organize efforts to mutually work out solutions to environmental problems at the local level.

Much of the discussion on localization of capacity building is being furthered under the banner of decentralization, and almost without exception governments throughout the region have adopted policies to decentralize decisionmaking powers and management capacities to local urban and regional scales. In some cases, such as in Korea and Taiwan, progress in this direction has been impressive. In most other instances, however, decentralization in practice remains a

form of deconcentration of administrative tasks still tightly controlled by central bureaus rather than authentic devolution of effective governmental capacities.

A process of decentralization to build local capacities would entail at least three aspects: (1) increased local decisionmaking and management authority; (2) greater financial resources and autonomy at the local level, and (3) vastly increased manpower and personnel skills to engage in partnerships, streamlined regulatory processes and monitoring of the environment. In each of these aspects there are tremendous needs in cities throughout Pacific Asia. Even with increased authority to make and carry out environmental policies, initiatives may quickly fail due to acute skilled manpower shortages or financial management capacities of local governments. While the speed of decentralization and local capacity-building will depend on national and local political processes, international and other supportive organizations could great assist environmental management efforts through the promotion of local workshops and manpower training in this area.

Collaborative Governance

democratization and governance

If policymaking on the environment is to be channeled toward more inclusive, problem-solving engagement in the public domain, mechanisms must be expanded to enlarge political communities through participatory processes. Moving in this direction focuses attention on the question of governance. In contrast to the term government, which centers on the organization of the state apparatus, governance casts a wider net to capture the processes by which public decisions are made and put into practice. This includes relationships among government (the state), civil society (including NGOs) and economic enterprises (private sector) (Friedmann 1998). Focusing on governance is not for the sake of resolving environmental questions alone,

but rather to link solutions to environmental questions to the promotion of more open, transparent and democratic political processes. Analysis of environmental movements in Asia shows that democratization and social mobilization for proactive engagement in resolving environmental issues go hand in hand. Advancement toward more inclusive public decisionmaking also carries the potential to more directly incorporate questions of environmental justice associated with urban poverty onto policy agenda.

In this light, the emphasis here is placed on collaborative governance, namely, the capacity to go beyond reactive, sometimes violent, confrontations by building a broad societal process for proactive agreements for joint action among government, civil society and the private sector. One of the major trends over the past decade in Pacific Asia in this regard has been the outright rejection of autocratic regimes in several countries and significant political reform toward more open politics in others. The return to elected government in the Philippines more than a decade ago was a signal event in this regard. More recently, Korea and Taiwan have instituted direct election of governments under multi-party systems. In Thailand following major social protests in 1992, the military has moved to arms-length distance from government. The recent ousting of the Suharto New Order Government in Indonesia also serves notice of a new, although as yet unresolved, relationship between the state and civil society. Although dominated by one party political machines in several countries, elected governments are no longer the exception in the Asia Pacific region, and even non-elected governments are having to widen the scope for public discourse over political affairs. All of these trends suggest a much greater possibility for collaborative governance than ever before. In most cases, however, a further strengthening of the capacity and capability of civil society is needed before the citizens can effectively engage the state and for-profit business interests in addressing environmental issues.

Following fundamental reforms that allow for direct elections and accountability of public officials, the rise of civil society in some countries has already become a potent force in promoting environmental improvements and more livable cities (Friedmann 1988, Evans 1999). In settings where political reform and more flexible approaches toward urban management are combined, policy arenas are shifting out of bureaucracies and toward collaborative forms of management among government, private sector and civil society organizations. Although democratization remains illusive in others, a trend toward reducing the presence of government in command planning and regulation of urban activities, including land use and the environment is readily observed throughout the region. In many cities, municipal governments are realizing that bearing the costs of environmental regulation on their own is unsustainable. Command and control mechanisms require growing amounts of resources, both financial and human, that challenges the budgetary limits of local governments (Ooi 1998).

This phenomenon entails the emergence of both a broad urban middle class and the organization of a growing wage labor force – and a widening unemployed population in countries now experiencing economic reversals. These, in turn, are intricately linked to the globalization of urban economies through export-oriented industrialization as well as to greater access to information afforded to the general public about domestic and international political affairs and to education and living experiences abroad. Urban population in Pacific Asia are now able to know much more about their own governments and alternative perspectives -- even in situations in which governments continue to try to suppress such information.

As a consequence, popular sentiments have moved beyond the desire for higher material welfare to include aspirations for accountable governments, democratic practices, and a translation of economic gains into more livable urban habitats and socially just societies.

Citizens everywhere are also becoming more effective in challenging the ways in which cities are being planned and managed. Environmental movements have emerged in significant numbers over the past decade, and many have gone beyond demonstrations and protests to form their own organizations for longer-term planning around environmental issues (*AJEM* 1994; Lee 1995; KNCFH 1996; Ho 1997; Lee 1998). Conflict over such issues as the location of environmental infrastructure and services, industry and mega-infrastructure projects such as airports, rail lines and highways are increasingly common. The countless projects involved in creating industrial spaces and constructing mega-urban regions have become principal sources of political mobilization and confrontation throughout the Asia Pacific. It is fair to say that environmental issues and conflict among special interest groups, classes and communities will drive much of the future of urban politics in Pacific Asia. How to transform this social energy into a positive source of collaborative planning is of fundamental importance to the future of Pacific Asia cities.

At the same time that state-civil society relations are being transformed, private sector interests are becoming more effective in insisting that governments move away from overt, red-tape regulation of the city and toward state-private sector “partnerships” and privatization as the new mechanisms not only for urban concerns but also for sustaining economic growth. The current economic crisis in Asia has further pointed toward the need for basic reform in state-private sector relations, both in terms of eliminating collusion between state and privileged enterprises and in terms of more less cumbersome forms of regulation. As with civil society, there is a manifest need for greater transparency in regulatory processes related to economic enterprises.

Governments are thus increasingly being drawn into creating more inclusive forms of governance. As part of a process of democratization, this trend can be seen as being desirable in its own terms. It is also a necessity for practical reasons: without collaboration with citizens and business interests, programs and projects meet resistance or are undermined by non-compliance.

Variations in government responses to the rise of civil society and to calls for more transparent relations with the private sector are great. In several countries non-government organizations are flowering and have taken on positive mediating roles between state and society. As noted, locally elected governments have also been instituted for cities in, for example, Korea, Taiwan, Thailand and the Philippines. In other countries democratic reforms remain limited, but even in these cases there is growing popular resolve for political reform and more participatory governance. Where political reforms have been most cavalierly ignored or countered, such as in Burma, political crises continue to overwhelm and forestall improvements in all other social and economic issues.

Building synergistic capacities

In an era of slowed economic growth and severely compromised government resources, a key dilemma in Asia is how to drastically raise the capacity to manage environmental problems without incurring public costs that are far beyond the revenue base of government. To achieve longer term benefits at the lowest cost, governments now need to do more with regard to providing environmental infrastructure and services. Under current economic reversals throughout the region, expectations for increasing levels of expenditure are, however, unrealistic. Evidence over the past year suggests that, in fact, the opposite trend of declining capacities to spend on environmental management is common, especially in the countries of Southeast Asia

where industrial growth is incipient and per capita incomes are still significantly below those of Japan and the first generation of newly industrialized economies.

Unless such dramatic enhancements are achieved with relatively low public costs, neither the economic or environmental future of the region is bright. The thesis here is that accomplishing this scaling up of capacity can be done, but not by any one set or actors alone. It must instead be found through creative synergies among them.

Left to their own motives and methods, government, civil society and private enterprise are often more likely to produce counter-productive or limited outcomes than they are to successfully address environmental management problems. Government, in not engaging either citizens or businesses in policymaking, has a tendency to exaggerate its capacity to regulate, even though in the Asia context this has proven to be ineffective due to non-compliance and lack of enforcement capacity. Regulations are themselves reflective of the bureaucratic forms of organization that produce them, which results in contradictory standards, lengthy permit processes and seemingly capricious dispensations. This results in a cynical attitude both within government as well as among citizens and businesses which sees government as being effete with regard to environmental management in general and subject to privileged treatment for corporate interests and elites in particular.

At the same time, a central problem of the market is the well-known one of profit incentives of individual enterprises resulting in a pushing environmental costs onto societies at large. Markets fail to fully value the environment and its resources in either the short or long term. Paradoxically, it is also now well known that cleaning up the environment might be cheaper than the current costs of pollution to both industry and society. An estimated full cost valuation of all pollution in large Asian cities is 5-10 percent of urban GDP, while the cost of

cleanup is estimated to be only about 2-3 percent of GDP (World Bank 1992, Brandon 1994). Yet as Table 2 indicates, no government is spending at the levels needed, and individual enterprises do not on their own have the incentives to internalize costs and thus reduce resource use and waste production. As mentioned, actual spending has decreasing significantly in several countries over the past two years. The actual amount reaching the local level in cities might even be smaller.

A major hindrances to the search for means other than simply spending more on the environment is the lack of collaborative institutional arrangements among principal actors – government, civil society and private enterprise. As summarized in Table 3, each of these actors has different motives or drivers that lead them to use and manage environmental resources. Government, for example, is driven by the twofold, but often contradictory, need to sustain its revenue base from the economy and to secure its political base by responding to, for example, popular protest movements.

Table 2
Government Spending on Environmental Infrastructure and Services
as % GDP, 1997

SUB-REGION Country	Share (%) GDP Spent by Government on the Environment (1997)
EAST ASIA	
Japan	1.8
China	Less than 0.5
Taiwan	1.0
South Korea	1.3
SOUTHEAST ASIA	
Indonesia	Less than 0.5
Malaysia	0.9
Singapore	1.2
Philippines	0.5
Thailand	0.8
Vietnam	0.1

Source: AET (1999), *Environment in Asia*. <http://www.asianenviro.com/>

Its principal powers are to regulate political, economic and social behavior, which in most Asian countries is carried out in a command style of policy making and implementation with little consistent participation of either business or citizen groups. Because tensions are rife between gaining support of various groups of businesses and strata of citizens, the general tendency of government has been to selectively enforce regulations and to respond to only the most overt forms of social mobilization and protest. In many other instances, the capacity of the state to enforce its regulations is in doubt not only because of the limited pool of trained personnel but also the support facilities to enable them to do their work. While some business sectors complain of favoritism and citizens become cynical about corporate-government relations, the condition of the environment deteriorates due to non-compliance and sporadic enforcement. Even when they are evenly applied, regulatory approaches can also show a lack of appreciation of the need for private enterprise to remain profitable in a globally competitive world where the location of industry in one country over another is sensitive to costs imposed by environmental regulation.

**Table 3 Non-Collaborative Drivers, Actions and Tendencies:
among Government, Civil Society and Private Sector**

Source of Action	Drivers	Types of Actions	Tendencies
Government	(2) Need to secure state revenues (3) Need for legitimization	'Corporatist' command Planning through regulations/subsidies influenced by social pressures for environmental improvement	Ineffective/Selective Enforcement; Non-compliance high; ad hoc responses to citizen demands; democratization and rise of civil society bring environment more clearly onto political agenda.
Civil Society	(1) Desire for more livable habitats (2) Access to environmental	(1) Confrontation, vigilante actions, (2) Self-reliance in environmental management	Reactive solutions – "Nimbism"; socially uneven sharing of burdens; Management limited by scale of response

Business/ Private Enterprise	resources, infrastructure and services.		
	(1) Prices and Profit Motive	(1) Systematic undervaluation of environmental resources; technological advances in resource conservation dependent on price signals	(1) Inefficient use of environmental resources, large-scale pollution and degradation
	(2) “Good Neighbor” ethic	(2) e.g., Voluntary use of recycled materials;	(2) Estimated 10% of U.S. firms

In contrast to government, the drivers for action among citizens emerge from desires for more livable communities and cities and, especially among the poor, for access to such basic environmental resources as clean water that invariably entail supporting infrastructure and services. Without government support, many of the actions take the form of protest movements and reactive drives to force government to, for example, compel industries to stop polluting, desist from locating undesirable facilities in local areas, or achieve environmental justice in the form of clean environments for slum areas. Because the general process of economic growth is also a socially stratifying one marked by the appearance of an increasingly politically vocal urban middle class, a strong tendency emerges to focus on reactive NIMBY (not in my backyard) protests that, in effect, seek to locate such environment projects as locating new landfill sites away from richer to poorer neighborhoods or out to rural areas. In some cases, such as in Taipei, such efforts to beautify central urban areas resulted in the demolition of slums to make way for large city parks. In such cases, the results are not an increased capacity to manage the environment but rather a shifting of impacts from one area to another.

The principal driver of business interests is well known, namely profit motive that responds to price signals. As noted, since the market is generally incapable of internalizing the true costs of appropriating finite environmental resources and polluting air, water and land, the tendency to

undervalue resources and pollution impacts is high, environmental resources are inefficiently used, and thus urban-industrial growth becomes a major cause of environmental degradation. With some enterprises better situated than others to avoid government regulatory sanctions, state-business relations tend not to be transparent and appear to be subject to significant levels of corruption and rent-seeking behavior. Adopting policies to use price incentives as a driver for getting industry to use less resources and improve end-of-pipe treatment has great promise in many areas related to industrial sites and production processes, and environmental services have themselves become a source of private sector expansion.

Yet from an urban perspective, limitations of a policy that focuses only on industrial production and production sites can be substantial. The difficulties in using inter-industry competition as a means for improving urban environments are many. First, in many cases government regulations are still the key to internalizing these prices into production costs. In cases in which new technologies do not offer clear cost savings over current practices, or where non-compliance with environmental regulations results in fines so modest that polluting is still cheaper, industries can be expected to remain unlikely to reduce their environmental impacts unless regulations are put in place. The question in this regard is the extent to which industry and government can work together to achieve both realistic and meaningful regularity agreements.

Secondly, manufacturers in many Asian cities, where industrial structures often consist of leagues of extremely small-scale establishments operating at very low levels of profit as sub-contractors to larger local or transnational enterprises, are unlikely themselves to invest in cost-saving environmental technologies, and those used by large enterprises may be irrelevant to their needs. Third, many industrial impacts are not directly related to production processes but instead

derive from environmentally unsound land development or after sales product use (such as automobiles). On the latter point, the environmental friendliness of products might be sensitive, for example, to changes in consumer demand for less polluting products, but in Asia the evidence to date suggests that this remains a minor phenomenon. Finally, some of the most severe forms of urban pollution are not from industry but from households, services such as restaurants, and automobile users. Human waste, water pollution from garbage dumping and air pollution from vehicular traffic top the list of environmental problems.

Many of these activities are not subject to waste reduction or price incentives related to the market. Unlike industry, which is almost exclusively in the domain of a private for-profit sector, the city must cast the net more broadly in terms of driving forces for better environmental management. To the extent that much of the infrastructure of cities – roads, parks and other public spaces, for example -- consists of public goods and services that do not respond to profit incentives, other performance drivers than those of the market are needed. Similarly, to the extent that households cannot be induced through profit motives to, e.g., separate wastes, other mechanisms need to be included in the repertoire of drivers. The major problem in this regard is how to identify drivers that do not rest solely on state (government) regulatory powers but can instead be more positive in engaging civil society and for-profit enterprises in environmental management. Thus while reducing environmental resource use at industrial, manufacturing or assembly plant sites through market-oriented price incentives is laudable and has substantial promise, it must be seen as a partial approach to the quest for cleaner urban environments.

Neither state, civil society nor the business community is a monolith. Within each there is a range of discouraging and encouraging agencies and people. In the private sector, for example, some percentage – thought by some to be 10 percent in the United States – of enterprises have

manifest “good neighbor” ethics that result in conscious efforts to recycle waste materials and promote environmental consciousness among employees (Henderson 1997). Nonetheless, as long as such positive forces remain exceptional rather than normal, current trends toward deepening environmental crisis cannot be expected to be attenuated or reversed.

Creating collaborative synergies

The absence of authentic collaborative mechanisms among major stakeholders in the urban and industrial environment leads to limited, insufficient responses to growing environmental problems. In contrast, where energies of stakeholders can be combined through collaborative efforts, they can begin to resolve these problems in surprisingly positive ways. Drivers in this sense become combinations of drivers of each actor that are transformed from reactive, single-focus and adversarial contests to proactive, multi-stranded and cooperative outcomes. The drivers of each do not change, nor can they be expected to change in the real world. They are instead harnessed and redirected for mutual benefits for improved environmental outcomes. The following four cases show the benefits of substantially increased capacity through collaborative efforts involving citizens, government and business.

Waste collection in slum settlements. A common problem for slum and squatter settlements is that government trash and garbage collecting services cannot enter into communities to pick up refuse because lanes are too narrow for their vehicles. By organizing households to bring refuse to collection points at the edge of communities where trucks have access, community and government can combine energies to resolve a major environmental problem through most Asian cities. Case studies show that chief bottlenecks in this regard are seemingly simple but often difficult to overcome. They include government refusal to provide pick-up services to communities of questionable legal status, which is often a secondary effect of

government's not wanting to appear to be validating the existence of slum and squatter settlements (Douglass 1992). In such cases, the larger issue returns to questions of citizen rights and inclusive governance. On the community side, bottlenecks include the inability of households to organize routine trash collection along lanes or to obtain even a small parcel of land as a trash collection point. In either the case of government or community action, the principal point to be made is that both parties must act together. One side acting alone will lead to failure. Yet where they have joined in partnerships, as in a recent case in Bandung, the successes have been remarkably positive and catalytic (Dharmapatni and Hastu 1994).

Land readjustment. Another common problem in Asian cities is that the spatial configuration of the privately owned parcels of land in a given area do not include or readily allow for the provision or alignment of land needed for roads with drainage, sewerage or environmental infrastructure and services. Government and land owners working together can, however, pool land and redistribute it among the owners to allow for this infrastructure. Although owners receive less land than before, windfall increases in property values from infrastructure improvements yield a winning outcome for both private land interests and improved environmental management. Whereas government can seek to directly regulate land developers by, for examples, set-back rules or land-building ratios, such actions are not able to guide larger-scale community development. Similarly, whereas governments can exercise rights of eminent domain to appropriate land for roads and other public goods, in many Asian cities the land prices are so high that government budgets are severely stressed just to compensate owners for road right-of-ways. In Tokyo in the late 1980s, for example, 90 percent of the cost of road construction was absorbed by the cost of land purchase (Douglass 1993). Partnerships in the form of land readjustment thus make providing infrastructure more affordable and less of a

constraint on improving the environment, particularly at the urban fringe where land is for the first time being developed for urban expansion.

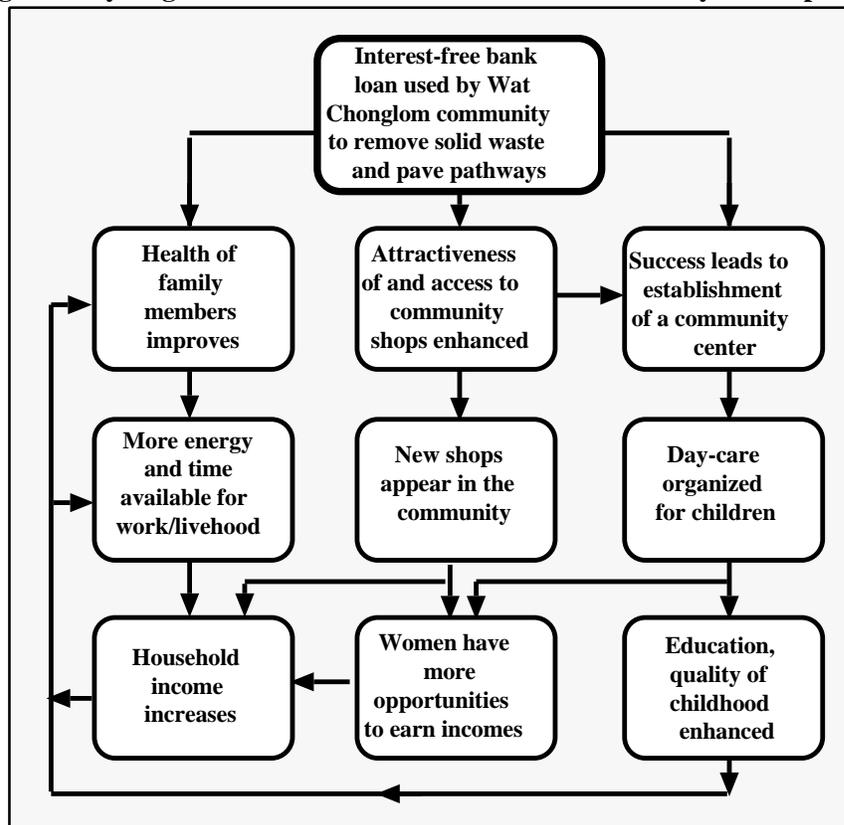
Private-public-community collaboration for community improvement. Slum upgrading is often attempted by government agencies with communities acting as passive recipients that perhaps supply free labor power but not much more. The general results are that improvements are expensive on a per household basis, reach very few communities due to costs and bureaucratic procedures, and do not match the priorities of residents. Among the most successful efforts is the Kampung Improvement Program (KIP) in Indonesia, which is credited with upgrading hundreds of low-income communities through site and service projects including drainage, lane construction and communal toilettes (Douglass and Lee 1996). But even with this record of success, only long-established settlements were included in the program, leaving the newer settlements appearing at the edge of cities unserved and, through its top-down style of planning, also neglecting many of the poorest sections of communities. No private sector involvement is included except as paid subcontractors for government projects.

An alternative form of collaborative planning involving private sector, public university professors and a slum community emerged in Bangkok in the late 1980s. Bangkok has more than 1,000 slums, with a common feature among them being severely deteriorated environments. In 1990 two professors from Mahidol University secured an agreement from Citibank to provide a pool of \$50,000 for interest free loans for community development (Ard-Am and Soonthorndhada 1994; Douglass *et al.* 1999). One community, Wat Chonglom, agreed to be the recipient of loans from this fund. Although the community was unable to raise such funds on its own, once they were received it initiated its first project: cleaning up the trash and waste that for years had been collecting under the community, which was built over a low-lying area subject to

frequent flooding. The success of this campaign gave pride to the community and enthused it to adopt a continuing string of projects: completing piped water connections to all houses, building a two-story community hall complete with a children’s day care center, and making improvements in individual houses, to name a few.

The cumulative positive effect of the success of this project, which led to immediate improvements in the environment and personal health, is illustrated in Figure 1. Every new activity added to the potential of the community to both improve the well-being of its households and generate new income-earning opportunities. With lanes safe to walk and the ambiance decidedly improved, small shops started springing up in the community. Beauty shops, video rental stores, food stalls and mini dry goods stores appeared in the front of homes along the pathways. Many were owned and run by women. Reversing the conventional belief that income gains must come before environmental improvements, the Wat Chonglom story shows how environmental improvements create economic growth (Douglass *et al.* 1999).

Figure 1 Synergistic Outcomes of Collaborative Community Development



Source: after Douglass and Zoghlin 1994.

The community was subsequently identified as “Community of the Year” in Bangkok, with government adopting it as a model for other communities. What is of interest here is how three forces – private sector resources, university-based community activists, and the desire of a community to improve itself – created a synergy that transformed a slum into a clean, healthy and thriving community within the space of about 2-3 years. The community was able to pay every loan back on time without a single default; the estimated cost to Citibank for being a good neighbor was thus just the foregone interest on the loan of less than \$10,000 per year. With such a small amount of support, a community of about 1,000 people was able to reverse a process of steady environmental deterioration and create a virtuous process of steady environmental improvements and community vitality.

Solid waste recycling. Large segments of the urban population in Pacific Asia are directly involved in solid waste recycling. In most cities these activities are highly organized and include a hierarchy of waste pickers, petty buyers and brokers, small shops that transform waste into new products, and larger buyers that include industries such as paper manufacturing. Ignored as “scavenging,” these activities are crucial to environmental management in cities throughout the region. In Jakarta, for example, they are estimated to reduce urban refuse by at least one-third (Douglass 1993). In large cities in Vietnam the estimates are even higher; waste recycling has, in fact, become a significant portion of the urban economy (Digregorio 1993). In recycling wastes, they also reduce resource depletion through re-use of resources.

Despite the benefits to the environment of the city, these activities remain limited as income sources for the poorer waste pickers. They also tend to decline rapidly as governments invariably expand city-wide closed container garbage truck services that prevent waste

“harvesting” between curbside sources and landfill sites. Although more orderly from an urban household point of view, the closed truck system thus diminishes recycling and adds to the daily amount of waste that is chronically in search of new landfill sites. Income from lowest levels of waste picking is also limited due to the lack of space and capital available to waste picker to transform collected waste into saleable commodities.

To address these issues, the City of Bandung initiated in the 1970s a program of assistance to waste pickers. Called “Jati Dua” the program found land and provided for modest credit to these people, who in turn organized their own production association at the new site where waste was collected. Early reports found that incomes went up significantly and recycling was further encouraged. Unfortunately, the private owner of the land terminated the project by not extending permission to use it, and no other sites could be found for the low-income recyclers to continue their enterprise. Nonetheless, the Jati Dua project provided a window on the types of opportunities for petty industries to both increase incomes and reduce solid waste disposal. The key was collaboration between government assistance in providing resources that were beyond the means of the waste pickers but then leaving the industry to the pickers to operate in the urban economy.

There are many other successes of the types summarized above in cities throughout the world. Their common trait is that barriers to collaboration caused by what are often seen as opposing interests and competing agenda have been overcome, releasing a synergistic capacity for rapid and substantial environmental improvements that, in many cases, were thought to be improbable in the pre-existing climate.

Intercity Networks

As proportions of people living in cities climbs over the half-way point in East Asia, urban areas also account for increasing shares of national economic growth. Even now in almost all countries, one or a few mega-urban regions account for very large shares – as much as half or more -- of the GDP. Organizational, communications and transportation networks among these cities have grown significantly over the past two decades and are beginning to span the entire Pacific Asia region from Northeast to Southeast Asia and beyond. The ease and frequency of interaction now makes it possible for cities to use a variety of media and venues for exchanging ideas and information about environmental problems and their possible solutions. The recent Mayors' Asia-Pacific Environmental Summit held in Honolulu was an important indication of government and private sector interest in collaboration among cities.

What was also evident from the conference is the array of technologies available for ameliorating environmental pollution in key problem areas facing Asia's cities. As one of the world's fastest growing industries, environmental technologies and services have a potential of adding to the economic growth of these cities and their nations. Yet the chief obstacles in making these technologies available is not simply costs, but rather the lack of awareness about them and the absence of institutional arrangements to transfer learning and technologies from one locale to another. Also neglected is the NGO sector, which can bring important insights into urban environmental problems to bear on private sector-government interaction. NGOs such as consumer groups can also have greater impact on not only engaging the market through businesses in improving environmental performance, but also by influencing consumer behavior.

On all of these matters, concerted attention on fostering intercity networks can have high pay-offs in terms of raising awareness of common problems, availability of technologies, and opportunities for collaborative innovations across urban and national boundaries. Building such

networks is also consistent with “performance focused” environmental management. As summarized by Metzemaum (1998:ix), performance oriented environmental management, which calls for a local-level setting of performance measurements and supporting information systems, can benefit greatly from exchanges through intercity networks:

The dynamic capacity of performance measurement is unleashed when it is used to compare the performance of one performer to another because it creates a mechanism that automatically updates performance expectations whenever new measurements are taken, thereby motivating continual performance improvement without necessitating a complicated and often lengthy decision-making apparatus to update targets. This is an approach that nearly a hundred localities, working with the International City/County Management Association, are testing.

In other words, cities can facilitate improvements in other cities through sharing of performance achievements, which can be used to stimulate improvements among all cities. Such achievements can be further spotlighted by such practices as a giving national and international awards to “best cities” in various environmental management categories.

A perhaps more problematic issue that can be addressed through intercity collaboration is that of intercity competition for economic investment in manufacturing and services. Given that their economic health is part of an intensive international competition for investment, cities face a number of difficulties in sustaining their economies. One difficulty arises from the changing nature of comparative advantage in an increasingly globalized system of production, distribution and finance within corporate networks rather than among nations. Tremendous reductions in transportation costs have radically changed the notion and reality of comparative advantage away from being anchored in natural resource endowments and toward competition to attract globally footloose industrial capital through “created assets.” In the broadest sense, cities themselves are the spatial arena for these created assets, which range from specific industrial requirements for reliable electricity and water supplies, diverse labor supply, and transportation infrastructure to

higher order functions such as hospitals and universities, parks and amenities, and centers for hosting international conferences and spectacular world events.

As part of this process, inter-city competition is shifting world economic integration away from nation-states and toward intercity networks through which the global economy is articulated. This includes a shift toward cities as the basic units of policymaking about global economic interaction. Thus municipal governments are now charged with devising their own strategies for globalization and to engage in overt campaigns to attract world investment. As the stakes in the competition increase, so does the scale of projects to win the competition. In Pacific Asia this translates into mega-infrastructure projects such as world hub airports, high speed trains, “Manhattan” skylines, large new towns with gated communities, and a plethora of amenities such as golf courses, museums, and convention centers.

Funding such ventures has driven some cities, such as Osaka, close to bankruptcy under the weight of high project costs and diminished revenues from investors. A related concern is that cities will become trapped in a bidding-down process of competition for investment that will entail relaxing environmental measures and their enforcement beyond the point at which urban environments can be sustained. This short-term horizon on economic growth may prove disastrous in the longer term for both the environment and the economy. Paradoxically, as investment seeks out high amenity locations but cannot be readily tapped to provide these amenities, a city’s comparative advantage may deteriorate. As concluded by the World Bank (1993), urban regions that cannot successfully sustain their environments may begin to be abandoned in favor of other ‘new’ regions where environmental deterioration is not as great. In some cities, such as Bangkok, Manila and Jakarta, there is already growing awareness and

concern that deteriorating environments have begun to erode the capacity to continue to attract investment.

The problem is how to maintain a long-term capacity to host citizens and businesses alike while also meeting the short-term, highly competitive demands for de-regulation, subsidies and other give-aways to would-be investors that seem to threaten capacities for improving environmental management and keeping industrial investment. This dilemma in the relationship between industrialization and the urban environment is arguably the most important of all the issue confronting cities. One response is to develop capacities in intercity networks to reach agreements about environmental management with regard to global investors. Again, the use of performance oriented approaches could offer both a means for cities to raise their environmental quality while flexibly allowing investors to develop their own means of reducing resource use and limiting pollution.

V. TOWARD AN AGENDA FOR ACTION: PROCESS AND PERFORMANCE

The concept of “policy” in the context of urban environmental management concerns actions taken in the public domain. This does not mean that governments are the sole or even principal actors, but rather that decisionmaking and action are open to public discourse, scrutiny and participation of diverse private, civic and governmental interests. In effect, the policies that emerge are implicitly, if not explicitly, negotiated agreements among actors having different interests and incentives (drivers) for environmental management. Based on this understanding, the proposal for action here joins in an on-going paradigm shift away from centering public policy on government regulation and toward more participatory forms of self-regulation, responsibility and positive incentives as well as regulatory controls. As detailed above, the focus

for this paradigm shift is on localization of governance to environmentally guide Asia through its urban transition.

Even without collaboration each type of actor has a role to play in environmental management. In most cities, effective regulation by government of land use and environmental resource use is needed. Though sometimes violent, the mobilization of citizens against the state and against flagrantly polluting industries has brought significant changes in government policy and practices. Price signals and the “good neighbor” ethic are also important drivers to tap for improving environmental management practices. Yet each has severe limitations in what can be accomplished. State regulation without broad willingness to comply, self-reliant communities trying to improve their environments without government or private sector support, and dependence on price signals or voluntary action by business to reduce resource use has each failed on its own to create a process of environmental improvement sufficient to the monumental tasks at hand. In many instances, it can be said that they may have had contrary effects that have led to a worsening of environmental quality.

Having made the case that synergistic associations between state-society-business are the keys to making substantial improvements in the environment, the question arises about how such associations emerge. While there is no single point of entry for initiating this process, what is instructive from the experiences of several cities, such as Seoul and Taipei, is that the rise of environmental movements and collaboration around environmental issues went hand in hand with democratic reforms. In the case of Korea, for example, environmental issues were both the sources of the “moral high ground” for popular mobilization and the recipient of increased policy attention once democratic reforms were undertaken.¹⁰ In other words, there is ultimately little separation between the tasks of improving the urban environment and progress toward

localization and more democratic forms of governance. In this context, the challenge is to go beyond reactive conflict and toward proactive collaboration in coming to terms with the environmental deterioration of Asia's cities. The information revolution, the rise of civil society, the widening global marketplace for environmental technologies all suggest a greater potential for cities to learn from within and with each other.

In the first instance, the focus of the discussion here is on how to translate the needs for localization, collaborative governance and intercity exchanges into an agenda for action. The recommendations emerge at two levels. The first concerns supporting the creation of institutional structures and organizations. As discussed, this entails support for localization of government capacities to manage the environment, broadening the scope of governance at the local level, and promoting intercity exchanges among all actors, including government, private sector and civil society organizations. All of these actions are associated with what can be summarized as establishing the process for environmental management.

The second is concerned with performance dimensions of environmental management. It focuses on how a collaborative process can facilitate and be enhanced by performance driven forms of environmental management that avoid the extremes of command style planning and unregulated development. Both process and performance orientations are needed, and each can help to reinforce the other.

Policy and Implementation Process

As detailed above, for environmental management to begin to reverse trends of environmental deterioration related to urban and industrial growth, one of the most critical needs is to create a more open, inclusive and locally aware process of decisionmaking and implementation. Supportive actions include:

Localization calls for support for (1) enhancing the revenue base of local governments for environmental management,¹¹ (2) government personnel training in areas of environmental management, particularly with regard to setting up much needed systems of monitoring various kinds of pollution and environmental degradation; and (3) supporting policies at the central government level for political decentralization and increased capacity for decisionmaking at local levels.

Collaborative governance calls for devolution of governmental powers to municipal levels and institutionalizing democratic practices. An area of much needed support is training government, community and business personnel in skills of mediation, negotiation and facilitation. Creating openness and transparency of government-business-community relations through legal and rights of access to information is another important area for support. Information systems such as GIS mapping environmental problems over the city, open public fora on environmental issues, education programs, and celebrations such as civic awards for best practices are all considerations for support to enhance awareness and collaboration.

Intercity networks entails establishing new “horizontal” linkages among cities that can more directly set in motion a process of exchange of ideas among those people from local governments, businesses and communities who know best about urban problems and are also more likely to commit themselves to improving the urban environment. Sponsoring national and international urban conferences, perhaps with rotating city secretariats, that explicitly include local government, business and community organizations is one major way to promote these networks. Rotating responsibilities over different areas of expertise among cities could assist in capacity-building as well. Setting up bulletin boards and other forms of internet-based information and discussion fora is another way to support and sustain such networks. Within the

category of information exchange, there is a manifest need for support to create baseline data across an array of environmental issues, including the human health impacts and implicit costs to local economies of environmental degradation.

A process emanating from these types of actions enhances environmental management in a somewhat paradoxical way: because the drivers of each are different and push for different dimensions of performance, to be effective collaborative agreements will include elements of each. Thus while government might be driven toward trying to induce companies to recycle wastes, industry would want to try to insure that profits are maintained, and citizen groups might be concerned with the location of waste recycling plants. Together they represent a potential for integrating environmental management with economic growth and more livable cities. Alone, they represent single driver, single dimension objectives that, as discussed above, have been shown to have equally partial outcomes.

Performance Orientation

How do governance and other aspects of the process summarized above relates to the idea of “performance” focused environmental protection? The most direct answer is that to the extent that stakeholders have a genuine interest in outcomes, and that power is distributed among them, the older form of command-regulate approaches toward environmental management will give way to a mutual concern for collaboration to continuously improve performance. Business, citizens, governments working together from city to city will challenge each other to adopt innovative ways of reducing resource use and pollution. There is, however, a need to consider a re-orientation of information gathering concerning performance indicators in ways that will enable cities and citizens to be informed of how programs are performing.

Since such collaboration works best when decisionmaking systems are transparent, decentralized and shared among many actors, it also direct attention toward accountability through, in part, calling for accessible performance measures. That is, instead of insisting on a single “standard” way improving environmental management, a performance orientation more flexibly allows for a multitude of ways to achieve improvements (Metzemaum 1998). A focus on performance calls for a substantial increase in information, including its creation, dissemination and accessibility. This is also consistent with the three overarching needs for building social capacities for environmental management, namely, localization, inclusive governments and networks among cities within and among nations. As stated by Metzemaum (1998:viii):

An effective performance focused system can improve the way we address public problems in several complementary ways – by boosting outcomes, strengthening accountability, and enhancing the transparency of processes and decisions that affect the public’s well-being.

Improving performance focuses attention on innovation and enhancing the capacity for innovation, which is the core of what has been called “learning societies” that, in their basic form, thrives from meshing of local or experiential knowledge with more specialized knowledge of environmental “experts.” Such mutual learning in a continuous process of problem solving is also an outcome of building high levels of social capital through cooperative action (Woolcock 1997).

Adopting a performance orientation can include three types of measurements of environmental management successes and failures (Metzemaum 1998). The most traditional is setting targets to achieve. They can also be used to establish benchmarks for similar activities to try to achieve in the same city or other cities within a country or internationally. Third, they can

be used to reflect on the value of programs and to help pinpoint bottlenecks and areas in need of improvement. Each has a role in collaborative governance and environmental management.

Although some enthusiasts of performance-focused management state that performance can be given precedence over process (Metzembaum 1998), process and performance orientations both need attention, and both are ultimately interdependent. Process here is taken to mean building the institutional basis for undertaking four key tasks:

- (1) assessing conditions and prioritizing problems to be tackled,
- (2) analyzing and understanding the sources of these problems,
- (3) developing policies and identifying policy tools to link solutions to priority problems,
- (4) devising organizational means for taking action and proceeding to implementation.

Combining these aspects of a planning and management creates an iterative process involving feedback loops that do not necessarily follow in a pre-determined order. Each nonetheless constitutes a realm of knowledge and action that must be included in any environmental management process. All too often there is a leap from the description of environmental conditions to the formulation of policies without a clear understanding of underlying forces creating the problems. Blaming the poor for creating environmentally degraded communities is, for example, a common policy stance that lacks clear foundation in actual cause and effect relations. The poor are often compelled by circumstances to locate on already degraded land or near industries that are the major sources of land and water pollution. They also expend hours of household labor time to obtaining basic environmental resources such as clean water.

Similarly, policies need to be linked to realistic expectations for successful implementation. This is where the idea of drivers becomes central. Without a clear understanding of motives and

incentives of businesses, households, or other actors who are expected to comply with policies, policies become little more than statements of intentions or hopes.

Finally, process is important in that it reveals who is and is not included in decisionmaking and taking action. It would be deceptive to argue that performance standards can be treated separately from who is included in setting the standards. Yet this question of inclusion is not readily addressed by a performance orientation alone. The results can be that closed decisionmaking, which is usually associated with partial information as well, about performance criteria leads to poor understanding of problems and elitist agenda for action. Process must be attended to as an integral part of environmental management.

The promise of performance-based management is to allow the process to be in the hands of stakeholders who are committed to solving problems, will respond to the drivers in a constructive way, and who are willing to act. In this sense, it does not substitute for but rather adds another layer to the process. It can be used in prioritization by helping to assess gaps between existing conditions in one city and improvements achieved in comparable cities elsewhere. Its most important role, however, is in fostering a more dynamic process of implementation by sharing insights from high performance that can spur improvements elsewhere and, in this sense, become part of the drivers by continuously raising expected outcomes to higher levels and using exemplary accomplishments as examples for others.

Focusing on performance rather than on input standards opens environmental management to a wider degree of collaborative innovation. It also potentially allows for a shift toward a more flexible approach within what has been called the “environmental management option hierarchy,” which, in using the example of industrial production, rests on giving source reduction and source elimination highest priority, followed by recycling and reuse, and with treatment of

effluents and emissions considered as the least desirable waste management strategy.¹² It also allows for more integrated waste management, which in contrast to hierarchy approaches, allows a community to mix and match options according to its needs and resources.¹³

There are many entry points for combining support for better management processes with performance-oriented environmental planning. One is community-based management. Despite the plethora of low-cost technologies and infrastructure now available, communities can be readily found to have inoperative water pumps, drainage that has fallen into disrepair, and broken pipes. The reasons for these failures is not just lack of funds, although this is usually one of the deficiencies. Rather, the systems fail due to lack of community input and inclusion in identifying technologies appropriate to their needs and capacities for maintenance. Well-known tendencies for communities to receive costly and difficult to maintain technologies from government persist. With few exceptions the technologies currently in use in developing countries are the same as those employed in the developed countries: piped water, full internal plumbing, and conventional water-borne sewerage. The result is poor access to water supply and sanitation services.

Projects with strong community input are shown to be the most successful in reaching the greatest number of the poor and having long-lasting services (McGarry, 1987). The participation of women, who are the major system users, in the design, construction, and sustained effective use and management of projects, has been particularly recognized as critical to the success of many community level environmental improvement initiatives.

Similar observations can be made about private sector and government collaboration. In almost all countries in the Pacific Asia region, governments are the principal buyers of environmental technology and services, with amounts under current and new programs ranging

from \$2 billion to \$20 billion or more (AET 1999). Where processes are transparent, collaboration in finding solutions is genuine, and performance orientation is adopted, chances for more rapid, appropriate responses are possible. A missing element, however, is often the exclusion of actual users of environmental infrastructure and services. There is thus still a need to include communities, civic organizations and other users in the process. As the many environmental movements in Asia demonstrate, continuing to plan for environmental management through government as regulator and private sector as provider of services without consultation with users risks increasing political costs which, without alternative processes being devised, results in a slow-down and reactive form of environmental management.

Reorienting project design and implementation methods to incorporate participation of users in decisionmaking is not easy. Government must adopt new ways of thinking about its regulatory role, business needs to look more closely at the driver of profit motive to discover ways to be a better environmental neighbor, and urban residents need to go beyond fractured NIMBY responses to environmental issues. The proposal here is that these needs will not be met unless the drivers of each interact in real political spheres that work to mediate and resolve conflicts to reach collaborative agreements and performance expectations, including who will bear costs as well as receive benefits.

Agenda Directions

Since the thrust of the framework developed here is that the actual prioritization of environmental issues and the particular technologies and performance standards that are adopted are the subjects for localized decisionmaking, devising an agenda for these matters lies outside of this framework for policy formulation and action. With this caveat in mind, it is still possible to outline a number of directions for consideration. The underlying interest is to promote a rapid

scaling up responses in a way that favors reduction of the use of environmental resources over end-of-pipe waste treatment, but also ensures that improvements in waste treatment are accomplished. This would include adopting less resource-intensive production processes, limiting use of non-recyclable, non-degradable, or high-polluting materials, and recycling wastes for re-use.

Drawing from Section II above, the most critical direction for taking action in cities in the Asia Pacific region are industrial pollution, outdoor and indoor air pollution; water supply, poor sanitation; solid waste management; and industrial location and urban form. Issues of slum improvement are subsumed under these headings.

Industrial pollution

A reorientation of policies on industrial pollution prevention focuses on minimizing waste through recycling industrial waste, disposal systems, and promoting “green industries.” More attention is also needed on hazardous waste storage, transport and treatment, with a particular concern for small-scale industries that are producing highly polluting or hazardous wastes. Among the forms of collaborative support are:

- increase availability of targeted low-interest loans to assist smaller-scale producers to adopt green technologies.
- present green performance awards to producers with high performance achievement.
- promote a strong environmental ethic among producers through business organizations, awards, and information campaigns.
- share in maintenance of industry-related environmental infrastructure such as water treatment facilities shared by many producers.

- support public-private collaboration in research and development on innovations in environmental infrastructure, production processes, waste treatment through cost-sharing, grant funding, and networking with technology research institutes at universities.
- promote marketing of “green” products; and forming government-private partnerships in research and development on clean and economically competitive technologies.
- establish firm recycling targets as part of performance standards.
- assist efforts to recycle industrial inputs on-site through technical support and such techniques as reduced charges for collecting waste that is separated before pick up.
- support integrated waste recycling programs among low-income waste recyclers by securing sites for recycling, technical assistance on transforming wastes into new commodities, and low-cost credit for recycling cooperatives.

Air Pollution¹⁴

In addition to policies on air pollution directed toward industry, concerted attention is needed to substantially reduce air pollution associated with gasoline and diesel fuel vehicles. In many cities, automobile pollution is even more serious than industrial pollution. The most significant improvements could be achieved through:

- accelerating efforts to diversify modes of transport by creating alternative, less polluting, modes of urban transportation other than the automobile. This approach has become a top priority for expanding metropolitan regions, but for political and cost reasons, it continues to lag in practice in many countries. Expanding bus services, including longer-distance express buses for commuters from fringe areas is a key need.
- creating incentives for more fuel efficient automobile engines to meet higher emissions standards and to encourage introduction of cleaner vehicles.

- improving transportation infrastructure and traffic management – including better urban design (see below) to reduce chronic traffic congestion.
- targeting specific types of high-pollution vehicles, such as two-stroke motor cycles and diesel fueled cars, trucks and buses for improvements in emission performances. Introducing effective vehicle inspection and maintenance programs should be considered.¹⁵
- selectively using vehicle tax, fuel tax and road user charges as a means of internalizing environmental costs into vehicle use costs. Higher parking fees are also often suggested for the same reason and in recognition of the high levels of subsidies for automobile use that are hidden in public infrastructure and other programs.

Water supply and sanitation

The International Drinking Water and Sanitation Decade, which in the target year of 1990 was supposed to find cities in developing countries with full access to water supply and sanitation for all residents, was found to be seriously behind expectations. Reasons for the lackluster performances were those discussed above: absence of government support, weak capacities for planning and implementation, shortage of trained personnel, indecisiveness about appropriate technologies, insufficient local financial resources, and lack of community participation.

More positively, awareness of the seriousness of the health problems associated with inadequate water supply and sanitation facilities did increase during the Decade, and international collaboration on water supply and sanitation services did begin to advance along with the advent of new, low-cost technologies. Among the new understandings was the need to give greater emphasis to local capacities by stressing the need for community management and

more appropriate technologies and standards, both of which emphasize collaborative processes and a shift from standard technologies to performance standards.¹⁶ Among the more important areas for support are:

- Greater focus on operations and maintenance is especially needed in water supply, which suffers from very large shares of unaccounted water leakage in Asia's cities. Emphasis is currently being given to the construction of new infrastructure, but maintenance and repair are severely underfunded and are without sufficiently trained personnel and management systems.
- Clean river programs are needed both as a means of reducing health risks associated with the many activities that take place along Asia's waterways and as a means of increasing reliable water supplies for urban residents at large. Most of the waterways passing through Asia's great cities are highly polluted, with many no longer sustaining aquatic life.
- At community and household scales reducing leakage and unaccounted water losses can be pursued through installing, promptly servicing and recalibrating meters; updating and reviewing consumer records to estimate consumption when meters are unserviceable; and the streamlining procedures to assist the expansion of registered connections.
- Water charges can be increased toward full cost recovery in most cities.¹⁷ In both rural and urban areas, water remains one of the most undervalued environmental resources. With the exception of Singapore and the Philippines, the average water tariffs in countries in the region have not been able to cover average operating costs of clean water delivery. Studies show that even poorer households would be better served if modest charges were levied.¹⁸

- Site and service upgrading is greatly needed in most low-income communities. Following from the example of the Kampung Improvement Program (KIP) in Indonesia and the Orangi Pilot Project (OPP) in Pakistan, sanitation can be substantially improved by community upgrading in key areas: construction of drainage channels, physically separation of water pipes from drainage channels to prevent seepage of sewage into water supplies, and widened lanes to allow for trash collection.
- City-wide systems of sewage control and treatment are lacking in most cities in the region, and as cities expand the shares of urban households and businesses covered are diminishing. Though very expensive, the alternatives are also problematic. Septic tanks, while cheaper to install and maintain, have generally been of limited value due to inadequate systems to ensure that waste periodically collected from them is not disposed into rivers. Most cities will have to confront the need to expand sewerage systems while also improving the servicing of septic tank systems.

Solid Waste

In addition to industry-oriented actions, approaches for solid waste reduction and recycling include:

Reduction in resource use

- levy taxes or fines to discourage the use of non-recyclable, non-degradable, or high-polluting materials.
- provide positive incentives to adopt waste reduction techniques and processes.
- launch public education campaigns geared towards schools, business and government departments to bring about a change in high-waste lifestyles.

Resource recovery and recycling

- encourage resource recovery by promoting and assisting source separation.
- establish voluntary or mandatory recycling targets.
- support promising resource recovery efforts, monitor and evaluate their progress, disseminate information, and provide technical assistance.
- provide technical assistance to enterprises interested in resource recovery.
- provide investment grants, soft loans, or tax credits for resource recovery activities in the private sector.
- introduce landfill surcharge taxes or closure taxes to provide for pollution monitoring and control and to fund resource recovery activities.
- publish bulletins on materials or products available from resource recovery facilities or industries, and those desired by other industries.
- provide tax credits to industries that use recycled materials.
- establish procurement guidelines and specifications that encourage use of products that include recycled materials or refurbished parts.
- remove subsidies for virgin materials and/or products that compete with those that are recyclable.
- stabilize markets for recyclable materials through, e.g., price supports.
- assist waste pickers to increase their capacity to transform waste materials into new marketable products.

Land Pollution

Land pollution is perhaps the most neglected of all environmental issues in Pacific Asia cities. Regulations against polluting land by uncontrolled dumping of toxic and other wastes are often rudimentary, sporadically enforced, and rarely monitored systematically. The extent of soil

contamination from leachate in uncontrolled landfills and improper chemical and hazardous waste disposal is largely unknown, but is undoubtedly extensive given the lax industrial control and the lack of appropriate disposal facilities. Severe soil contamination can lead to severe and long-term health impacts associated with food and ground water contamination. In addition to industrial production sites, major sources of soil contamination include abandoned factories, old dump site, and commercial and service activities such as gas stations and auto repair shops.¹⁹

In addition to creating regulatory frameworks and engaging industries in improving performance, an immediate need is to create an inventory of the extent of ground pollution itself. Locations where past activities are suspected of involving land pollution should be mapped and investigated as to the type and extent of pollution. Similar inventories need to be made for existing industrial areas.

Industrial location and urban form

One of the most critical and complex environmental issues in need of collaborative planning approaches is how to guide industrial location and urban form in rapidly expanding mega-urban regions (Ginsburg *et al.* 1991, McGee and Robinson 1995). A region-wide spatial focus moves beyond a particularization of environmental impacts that isolates each from another and instead calls for a more strategic view of the juxtapositions of land development and use with regional ecologies. Critical environmental assessments are needed, for example, to judge whether concentrating certain industries to provide environmental infrastructure at lower costs is to be preferred over more dispersed patterns. With few exceptions, governments have begun to abandon policies to slow down the growth of metropolitan regions and are instead searching for means to accommodate the increasing numbers of people and enterprises that are moving to and

locating in them. To do this entails managing not only the development of individual parcels of land but also the larger regional space.

Concepts such as ecocities, carrying capacity, design with nature, bioregionalism, compact cities, linear cities, and multi-polar cities, have been coined to signal the magnitude of the issues involved (Suryodipuro 1995; Douglass and Lee 1996). The environmental goals of most of these ideas include:

- limiting energy (fossil fuel) consumption by allowing households to live close to work places and by reducing idle time waiting in congested traffic, or by developing public transport as the alternative. Whereas home to work time reduction would necessitate the development of worker housing near industrial sites, reducing idling time and congesting is likely to be more contingent on achieving public consensus on the adverse impacts of high dependence on private modes of transport and a willingness to fund transport systems that typically require subsidies to run.
- directing development away from environmentally fragile areas such as regional aquifers, steep upland slopes, and coastal mangroves. Regulations against development in conservation areas and forest preserves, particularly in water shed regions surrounding rapidly expanding metropolitan regions, also need to be strictly monitored and enforced. Sufficient (if minimal) supplies of public land should be maintained to ensure medium-term expansion of open spaces (parks, urban forests) in pace with urban growth and expansion.
- preventing expansion into rich irrigated agricultural land. Many of the largest and most rapidly growing cities are located in lowland delta regions with the most fertile and well-irrigated agricultural lands of their nations. The loss of agricultural land to urban uses is

not simply the result of conversion to the best and highest use of land as determined by the market. In many instances, agricultural land productivity is severely diminished by industrial pollution, by diversion of water to subsidized urban uses, and by the cutting off access roads and loss of storage facilities resulting from uncontrolled land development on the urban fringe. Direct prevention of conversion of land is usually the principal policy advocate, although land readjustment and other collaborative approaches among land owners, developers and government might be appropriate in certain circumstances. Whatever approach is to be taken, open public discussions with stakeholder involvement should be part of the process.

- incorporating open spaces in urban design.
- inhibiting the location of incompatible land uses, such as schools and heavy industry, next to each other.

One key to any of these plans is to coordinate transportation with land development in a way that avoids the “master plan” approach that has had few successes and instead uses the allocation of public infrastructure as part of a spatially and environmentally sensitive system of incentives to guide rather than command urban growth. Even in Singapore, where master plans have been adopted and implemented, plans are continuously revised to meet changing social, economic and political realities. Approaches include those to:

- Combine transportation expansion with land-use development. The development of transportation corridors is one of the most decisive forces directing the expansion of cities, but it is only possible to harness this force if industrial location and other land-use decisions are combined with it.²⁰ Several governments have adopted zoning policies to discourage, for example, industrial concentration in core metropolitan areas. More

ambitious approaches include the construction of new towns combined with transportation corridor development to create multi-polar urban regions.

- Adopt industrial location incentives. Policies to influence the location of industry have been the mainstay of regional development strategies in most countries over the past several decades. Commonly used tools are of two types: industrial estates and related infrastructure provided at designated locations, and financial incentives such as tax holidays or wage subsidies offered to firms who choose to locate in targeted areas or zones.
- adopt region-wide land-use frameworks (regulations, location incentives) to steer urban expansion away from environmentally unsound directions.
- establish green spaces (e.g., city parks, urban agriculture, urban forest) by providing incentives and security of utilization of idle land along riverbanks, railway tracks and roads.
- discourage the loss of prime agricultural and irrigated land by guiding urban development to alternative locations and/or by requiring the developers to share their equity with the replaced farmers.
- improve land administration and monitoring systems by strengthening local government personnel and by improving geographic information systems on land development.
- promote regional and integrated management concepts of water resources management, such as river basin management and management of surface and groundwater.
- provide serviced land for housing. Housing occupies the largest share of urban land in all cities. Yet most housing in many countries is constructed outside of the market on land that is not serviced with basic infrastructure such as paved streets or lanes, drainage,

piped water delivery, electricity and other amenities. most of whom must find land for housing through non-market means or through housing sub-markets in slums. In these situations, the underlying need is neither housing nor land per se, but rather serviced land for housing, namely, land that is prepared with basic infrastructure and services. Strengthening community-based programs, such as in the Wat Chonglom example previously discussed, is a collaborative approach toward upgrading existing communities. Negotiated agreement with housing sector developers to include serviced land for low-cost housing in large-scale development schemes is a possible approach at the urban fringe.

VI. ENVIRONMENTAL MANAGEMENT WITH SLOW ECONOMIC GROWTH

Any approach to policy must account for both the objectives of intervention and the prevailing conditions in which policies are to be carried out. In Pacific Asia the many objectives associated with improving environmental quality are being pursued along with those of pursuing economic growth, alleviating poverty, advancing basic human and civic rights, and, in the urban context, making cities more livable. This multitude of pursuits is occurring in rapidly changing and turbulent times. Among the most profound changes is the urban transition itself, which is bringing hundreds of thousands of people and thousands of new enterprises to larger cities every year and, in several societies, unrelenting depopulation of rural areas. The environmental implications of shift from rural to urban economies and living are immense in all aspects of environmental management, from energy demand, natural resource appropriation, to production of waste and pollution of air, land and water. Although progress is being made through a number of exemplary practices, most countries remain ill-prepared for the magnitude of urban

and industry-related environmental stress that has only just begun and is expected to experience exponential increases.

Much of the international concern over this growing environmental stress focuses on the global effects of pollution – global warming, massive deforestation for urban and industrial use, potentially catastrophic impacts on the economies and societies everywhere. For most people, however, the concerns are revealed through local origins and impacts where actions taken have real targets and potentially higher and immediate pay-offs. Policy and environmental management nonetheless continues to emanate from on high at national and international levels which, though important, leaves urban populations to either accept or react against them. Industrial decisions concerning where to locate and what environmental performance standards will be adopted are also kept between business and government, with governments having insufficient capacities to carry out their roles in validating standards and monitoring compliance. In other words, from a social mobilization point of view, current arrangements for decisionmaking and action are poorly suited to managing the environmental future of most cities.

In addition to low institutional capacities, the recent collapse and uncertain recovery of major Pacific Asia economies has accentuated the need for new approaches toward urban-industrial environmental management. Contrary to some expectations, for example, the downturn in industrial production due to falling markets has not led to diminishing levels of industrial pollution, but, as revealed in the case of Indonesia, has instead seen a rise of about 15 percent (Afsah 1998). The reasons are the most troubling: the lower regulatory capacities of financially strapped, downsized governments have allowed producers to dump untreated wastes with less fear of being caught or subject to fines or other sanctions. These trends are taking place in a context of dramatically increased levels of poverty and unemployment, greatly reduced

spending on urban and environmental infrastructure, and a general diversion of attention away from urban management.

In assessing the impacts of the economic reversals, the US-AEP study by Afsah (1998) concludes that “effective policies will require increased reliance on community and market incentives and voluntary programs to control pollution.” In so doing, environmental management must establish a basis in collaboration rather than in either master plans or regulatory control, unfettered markets or citizen mobilization for neighborhood protection alone. The proposal made here for collaborative solutions, which entails both a greater localization of capacity-building for sustaining management processes and a more horizontal networking of cities to promote innovation for ever-improving performance, are put forth in this light. Through the drivers that the proposed forms of collaboration combine, policymaking about the environment is also more likely to be responsive to questions of economic vitality, environmental justice, and livable urban habitats.

The proposal for more collaborative management does not mean that governments can withdraw from direct involvement in resolving environmental issues. To the contrary, government capacities to enforce regulations and agreements, to assist in monitoring performance, to act as a source of mediation and conflict resolution among businesses and communities need to be substantially improved. Equivalencies of shares of GDP devoted to environmental infrastructure and services, whether from government, private sector, or community self-help, will also have to be increased over time to close gaps between current and expected geometrical increases in environmental stress.

For all stakeholders in government, business and civil society, commitments and responsibilities need to begin to reach radically higher levels in a relatively short space of time.

Based on a understanding of the driving motives of different stakeholders, the proposal made in this paper is that the social, economic and political synergies needed to make these gains can best be realized through a localization of capacity building, collaborative governance, and building of intercity networks of exchange of experiences, innovations, and levels of performance. The task at hand is not simply to give government more authority or to compel industry to absorb environmental costs, but rather to engage all actors in an on-going process of managing the environmental dimension of the urban transition.

Notes

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1. Pacific Asia is used interchangeably with East and Southeast Asia in this paper.
 2. Just as industrialization spurs the growth of cities, cities provide necessary spatial structures to support industrial production and distribution. With industrial growth bringing quantum increases in material goods, employment and income, urbanization provides high agglomeration economies for industrial performance and sites for the concentration of supporting services for producers and consumers. Cities also form the built environment for raising levels of household consumption, including access to higher order services and amenities. At a higher spatial scale, national and international systems of cities form the spatial matrix for communications, transportation and trade that facilitate and accelerate globalization.
 3. In the case of Indonesia, for example, 80 percent of the industrial capacity projected to be in place in the next 15 years is not yet installed (*Economist* 1993).
 4. These amounts include the costs assigned to mortality and morbidity but do not include losses due to congestion, such as fuel spent, time wasted, and production delayed, which would add another 20-40 percent to the estimates (Brandon 1994).
 5. The amount of sulfur dioxide, nitrogen dioxide and total suspended particulates in the air -- three of the most dangerous industrial pollutants -- increased by a factor of ten in Thailand, eight in the Philippines and five in Indonesia between 1975 and 1988. Five of the seven cities in the world with the worst air pollution are in Asia (*The Economist* 1993)
 6. Shrimp samples taken from Jakarta Bay and nearby fish ponds contain as much as 3.7 micrograms of the poisonous metal mercury per gram of meat -- more than seven times the acceptable limit set by the World Health Organization.
 7. Bangkok has more than 1,000 slums totaling more than 1 million people. In Seoul, even though the government carried out a direct policy of destroying squatter settlements from the 1960s onward, in 1990 there were still officially 105 squatter settlements with a total of approximately 150,000 people (Kim 1994). Others (Clifford 1998), however, claim that as late as the mid-1980s as much as 20 percent of the population of Seoul lived in slum or illegal settlement areas.
 8. Electricity consumption -- the most rapidly growing energy sector and one that is largely dependent on fossil fuels -- grew in Korea by 27 percent a year between 1980 and 1990, compared with 9 percent GDP growth. In Malaysia the two figures were 17 percent and 6 percent; for Indonesia, 12 percent and 6 percent (Brandon 1994).
 9. With the debt crisis in the Third World from the mid-1970s the number of would-be newly-industrializing countries in the world began shrinking (Athukorala 1989). Of the all-time-high \$97 billion in direct foreign investment going to developing countries in 1994, about two-thirds was absorbed in East and Southeast Asia. China led the way with 40 percent of the total. All other developing countries regions were lagging behind their previous records, and the recent resurgence in selected Latin American countries is attributed to the selling off of publicly-owned assets through privatization programs rather than to the creation of new assets or production potential (UNCTAD 1995, Douglass 1998b).
 10. Environmental movements in Seoul were largely underground and led by either university radicals or Christian religious organizations until the late 1980s when fundamental democratic reforms created openings for a flowering of civil society environment organizations. By 1993 at least 175 groups had been formed around environmental issues in Korea, and newspaper reports of incidents of citizen mobilization on these issues increased from less than 500 in the 1982-1986 period to almost 9,000 per year by the early 1990s (Lee 1992:12). In 1995 the consolidation of various environmental groups led to the foundation of the Korea Federation for Environmental Movement, which claimed 20,000 members and 21 local chapters. Along with local elections held for the first time in the same year, 2 environmental candidates won mayoral elections. Environmental movements were also able to compel the national government to re-organize environmental planning bureaus and adopt an environmental impact assessment system. The overall result has been the adoption of stricter standards by the government, and more information is now made available to citizens about environmental conditions (Kim 1994).

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11. Comparative studies show that an average of about 90 percent of public revenues is collected and spent by national governments in developing countries; for high-income countries, the level averages about 65 percent (Oates 1993). In many instances, municipal governments in developing countries have no capacity to engage in such routines as collecting property taxes or recouping expenditures through locally initiated cost-recovery programs.
 12. Waste management can be seen to have a parallel hierarchy of options, with reduction of wastes ranked at the top, followed by reuse and recycling, incineration with energy recovery, and incineration of unsorted wastes and landfilling
 13. Whereas the integrated approach defines solid waste as “garbage that needs to be disposed,” the hierarchy approach considers solid waste as a potential resource tied into the production cycle. Consequently, the former tends to emphasize the development of new technologies and pollution control systems, searching for capital intensive high-tech programs. On the other hand, the latter is inclined toward labor-intensive, low-tech options.
 14. Indoor air pollution is not discussed here. See Douglass and Lee (1996).
 15. Singapore has introduced a comprehensive motor vehicle control program that aims at improving the emission control devices on vehicles and fuel quality to reduce emissions. Emission standards for both petrol and diesel vehicles have been set at levels comparable to that in the U.S. and Europe. Moreover, all vehicles are required to undergo periodic inspections to ensure exhaust emissions at idle mode remain within the set standards.
 16. Research shows that a wide range of household and community systems could greatly improve the sanitation conditions at affordable costs to the urban poor (Sinnatamby 1990). These involve low-cost, locally manufactured hardware (plumbing, sanitary sheds, concrete caps for pit latrines) that can be installed using labor-intensive techniques. The technologies range from improved ventilated pit latrines to simple modifications of standard sewerage designs (Campbell 1989). Costs per household of several of these options are only one-tenth to one-twentieth those of the conventional sewerage systems (Hardoy et al. 1992).
 17. In 1990 only nine of twenty-six countries surveyed in Asia had been able to achieve full cost recovery in water supply operations (Lee 1992)
 18. Evidence also shows that buying from water vendors costs substantially more than the per unit water costs borne by households served by piped water systems in the same area. The poor may pay as much as 30 percent of their income for water whereas the well-to-do pay less than 2 percent (Okun 1988). Supplying free or almost free piped water therefore often produces inequitable results, with better-off consumers with house connections receiving the benefits.
 19. Hazardous wastes from leaked or dumped petrol and wastewater from photoshops and dry cleaning fluids are equivalent to around 8 percent of the total hazardous waste thought to be produced in Bangkok. Some high technology industries, such as semi-conductor factories that use chemicals to clean computer parts, are also notable source of ground pollution in cities where export-oriented assembly operations have appeared.
 20. Curitiba, Brazil, is often considered to be the premier example of using transportation to guide urban growth. One of the more interesting experiences in Asia that has included industrial location, land-use planning and transportation is the “Jakarta Out” strategy adopted in Indonesia to steer urban expansion in a least environmentally damaging East-West corridor to avoid expansion either toward upland areas in the South or along fragile coastal ecologies along the northern coast (Douglass 1991, 1998c). Industrial location was guided rather than commanded by the public sector development of a new international airport, arterial east-west toll highways, and large-scale industrial estates along the east-west corridor. Private sector participation in building new towns around the centers at both ends of the corridor served to anchor the urban-industrial expansion and create a more polycentric pattern of urban expansion.

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