

PN-NSN-373  
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# **THE ROLE OF THE CITY IN ENVIRONMENTAL MANAGEMENT**

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**September 1992**

# Contents

<b>Executive Summary.....</b>	<b>ii</b>
<b>Introduction.....</b>	<b>1</b>
<b>I. Impact of Urban Development on the Environment.....</b>	<b>2</b>
<b>Relationship of Urbanization to Deforestation.....</b>	<b>3</b>
<b>Relationship of Urbanization to Birth Rates.....</b>	<b>4</b>
<b>Relationship of Urbanization to Pollution Control.....</b>	<b>5</b>
<b>Complementary Roles of Public &amp; Private Investment.....</b>	<b>6</b>
<b>Impacts of Residential vs. Industrial Wastes.....</b>	<b>8</b>
<b>Role of Environmental Protection     as an Investment in Urban Infrastructure.....</b>	<b>9</b>
<b>II. Strategies for Urban Environmental Management.....</b>	<b>11</b>
<b>Setting Urban Environmental Priorities.....</b>	<b>12</b>
<b>Increasing Public Awareness and Participation.....</b>	<b>19</b>
<b>Improving Enforcement and Cost Recovery.....</b>	<b>23</b>
<b>Creating Public Private Partnerships.....</b>	<b>29</b>
<b>Conclusion.....</b>	<b>32</b>

## **Executive Summary**

**Cities can play a vital role in environmental management. Not only can well managed - environmentally sustainable - cities contribute to the health, welfare, and productive capacity of their own citizens, but they can also make a major contribution to the world environment.**

**This paper rejects the common theme that urbanization and economic development are antithetical to environmental quality and argues to strengthen the role of cities in waste management and protection of the environment. Cities have become dynamic centers of economic growth and development: providing jobs, education, and markets and often producing more than twice their proportional share of GNP. If this growth can be sustained and if these cities can help to manage the wastes and pollution that threaten to engulf them, then those same cities can provide one of the most important contributions to a sustainable world environment.**

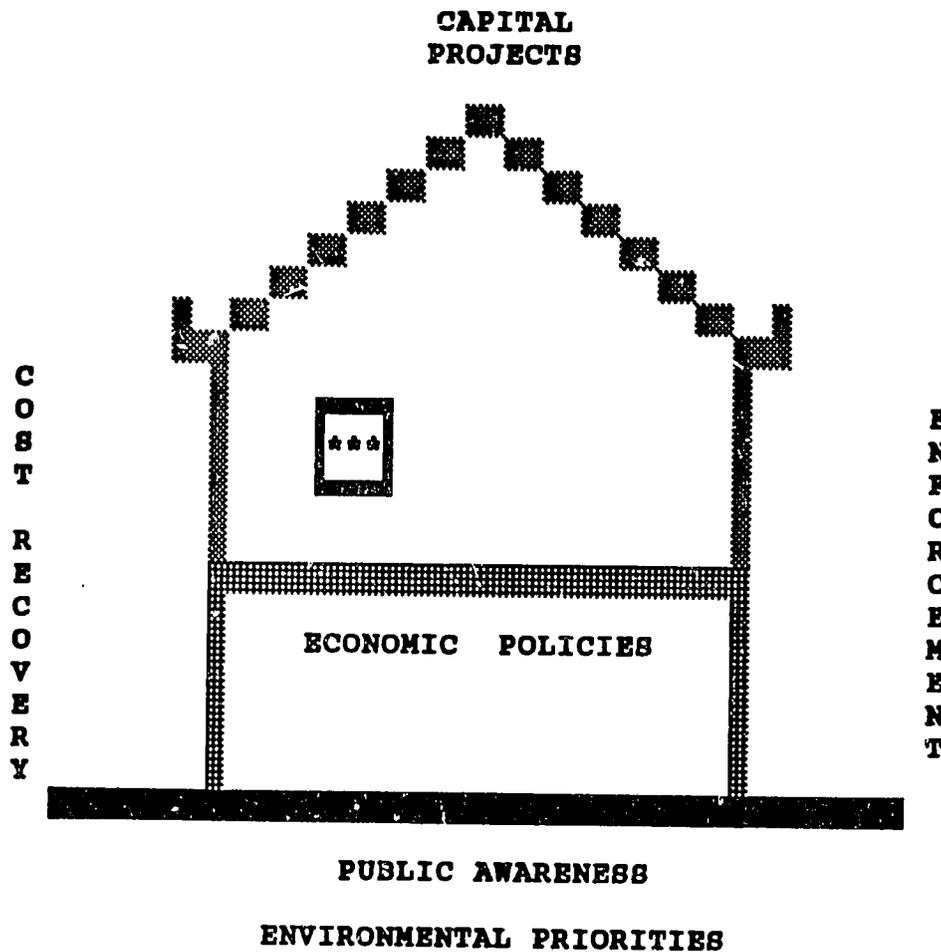
**Environmental quality in rapidly growing areas is really a matter of choice. Management, not chance, is the determining factor in deciding whether urban growth will help or harm the environment. Cities can capitalize on the same trends and resources which lead to economic growth and use them to invest in environmental infrastructure which will make that growth sustainable. To manage the life of a city is ultimately to choose a future: to identify priority objectives and the risks that threaten them and then to mobilize resources effectively with which to meet those threats.**

**Countries throughout Asia have made remarkable progress in establishing ministries of environment and adopting policies and standards but the crucial work of enforcement and implementation lies ahead. Celso Roque, writing for the Asia Development Bank, observed: "The most critical component of the policy cycle is the implementation system. This is where policies become action. It is at this stage, where resources are mobilized..." Consistent failure in implementation threatens to erode the credibility not only of the policies but of their advocates as well.**

**This paper recognizes the important policy role already played by national agencies and lays out a strategic framework for improving implementation by strengthening the role of the city in environmental management. The major elements include:**

- ◆ Establishing urban environmental priorities,**
- ◆ Increasing public awareness and participation,**
- ◆ Improving enforcement and cost recovery, and**
- ◆ Increasing the role of the private sector and NGOs in the provision of environmental services.**

# Strategic Framework for Urban Environmental Management



These objectives and the activities which support them provide an integrated framework leading from underlying policies, to supportive institutions, to private sector investment in environmental infrastructure. Capital projects provide the "Cap" to the environmental program.

Built on a foundation of sound environmental programs and policies. Environmental protection is an investment in urban infrastructure. It is not a luxury good, not a subject limited to rural natural resource ecosystems and not an arcane specialty requiring totally new skills and new methodologies. Most of the technical skills required are those already employed in other infrastructure investment areas: land use planning, project management, cost recovery and enforcement of the rules of the game. More specifically, it is an investment in the economic carrying capacity of urban areas. It increases the number of people, number of economic activities and the standard of living that an urban region can support.

\*\*\* "Window" on the future

# **The Role of the City in Environmental Management**

## **Introduction**

The environmental movement has become a crazy quilt of often competing factions. The "Greens," concerned with forests and natural resources, and the "Blues," concerned with rivers, oceans and coastal areas sometimes find it difficult to find common ground with the "Browns," concerned with managing the urban and industrial environment.

This artificial distinction among environmental factions has obscured one of the most important lessons about the environment. Even the United Nations Conference on Environment and Development (UNCED) spent comparatively little time on the role of the city. Left unsaid at UNCED was the fact that the development of sustainable cities can be one of the most important factors in creating workable solutions to world environmental problems.

Environmental protection is ultimately an investment in the sustainability of the economy. It increases the number of people, number of economic activities, and standard of living that a region can support. Cities have consistently proven themselves to be one of mankind's most efficient institutions for mobilizing resources to make the required investments. In direct contrast to their poor reputation among many environmentalists, well managed cities are potentially the most environmentally desirable form of human settlement. While urban areas are increasingly recognized as major engines of economic growth (often providing more than 60% of the GDP), it is less widely recognized that urban development also plays a major role in protecting the environment that reaches far beyond the city's boundaries.

This paper explores the city's role in the environment and has three basic purposes:

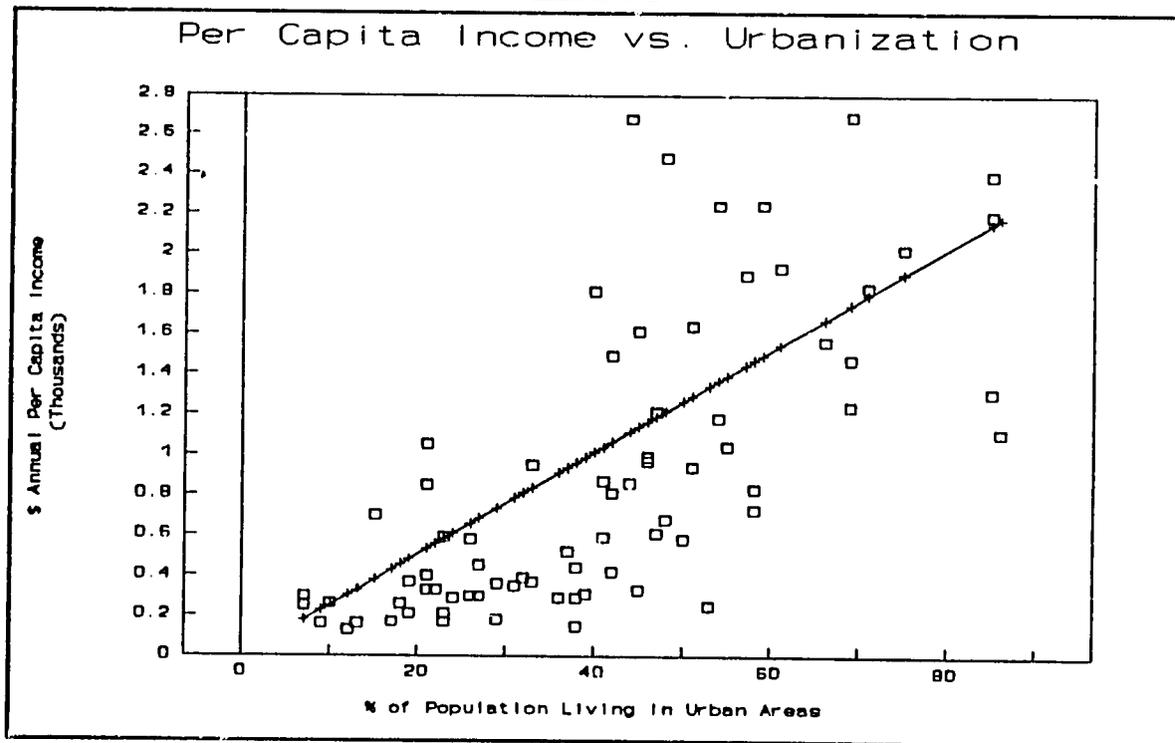
- 1) To review basic myths and misunderstandings which limit the effectiveness of environmental programs,
- 2) To show why we should be cautiously optimistic about the environmental future and the potential role of the city, and
- 3) To present a strategy for improving the environment through increasing the role of the city in environmental management.

## Impact of Urban Development on the Environment

While we routinely observe many of the negative impacts of poorly managed cities, potential positive impacts are more often hidden. Sustainable cities can be both economically viable and make an important contribution to environmental quality.

As shown in exhibit 1, there is a strong correlation between urbanization and economic development. While this economic benefit has been recognized for some time, less widely recognized have been the potential environmental benefits of urbanization. Cities are by far the largest and most efficient generators of new jobs providing off farm employment that decreases the pressure to cultivate marginal, easily erodible lands. Urban areas, relying on urban infrastructure and easy access to markets and supplies, can create service and manufacturing jobs at far less cost than their rural counterparts. Off farm employment provides new opportunities for surplus farmers while allowing those who remain on the land the opportunity to consolidate the most suitable land parcels for more sustainable and, more efficient farming.

Exhibit 1<sup>1</sup>

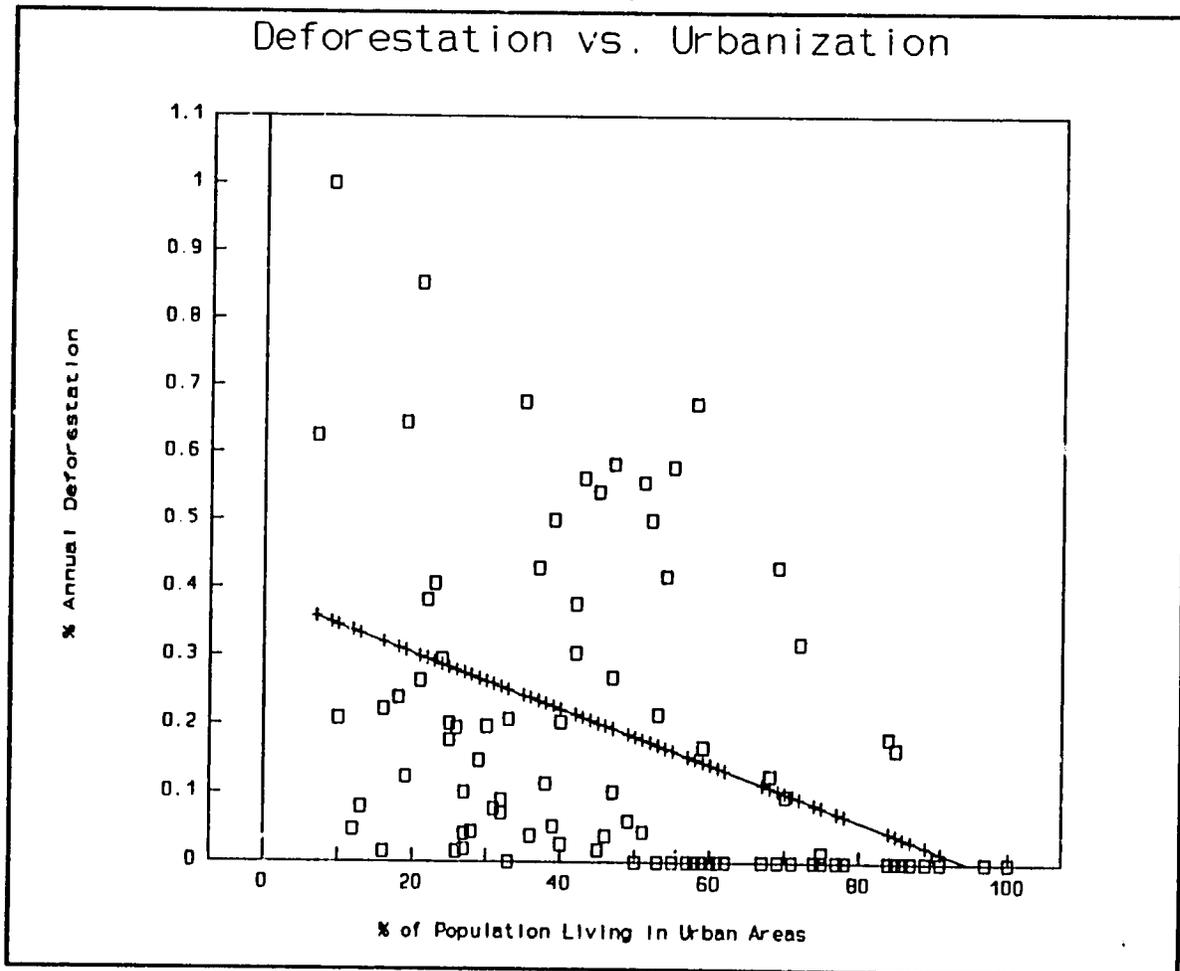


<sup>1</sup> Each block represents one country plotted by per capita income and % urban. Source of data: World Development Report 1991: The Challenge of Development

## Relationship of Urbanization to Deforestation

Exhibit 2 graphically illustrates that countries with higher percentages of urbanization typically have lower rates of deforestation. More than 60% of deforestation in Asia is caused, not by commercial logging, but by land hungry farmers lacking alternative employment. As Indira Gandhi observed: "Poverty is the worst pollutant." Without jobs, impoverished workers clear forests, denude pasture land, and attempt to plow steep hillsides to pursue inefficient and unsustainable employment. Land used in this fashion produces little food, destroys wildlife habitat and endangers downstream farms and villages.

Exhibit 2<sup>2</sup>



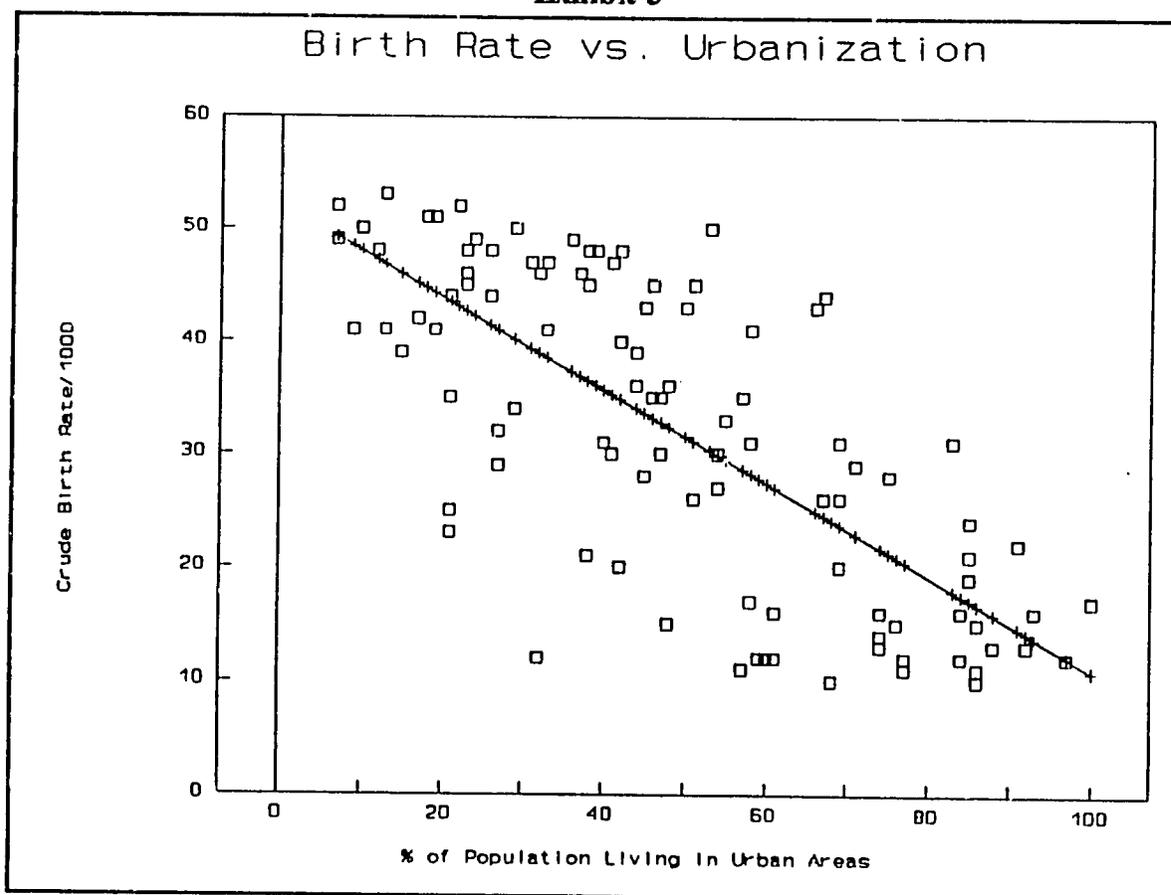
While many factors are obviously involved, the trends are unmistakable. Urban areas, as efficient providers of off-farm employment, reduce the pressures on the countryside.

<sup>2</sup> Graph derived from data provided by World Development Report 1991: The Challenge of Development, World Bank

## Relationship of Urbanization to Birth Rates

Rising population pressure, straining already limited resources, is one of the most serious threats to the environment<sup>3</sup>. As shown in exhibit 3, the decline in birth rates correlates very closely with urbanization. While many factors are obviously associated with population growth, most of these factors (including education, income, and health care) are also closely associated with urbanization. As a consequence, the average birth rate in rural areas is three or four times the birth rate in urban areas. Although cultural attitudes are obviously an important factor, when race and religion are held constant, urban areas still consistently have far lower birth rates than rural areas, even within the same country.

Exhibit 3<sup>4</sup>



<sup>3</sup> Jacques Costeau, As quoted in Bangkok Post from UNCED Conference; June 5, 1992

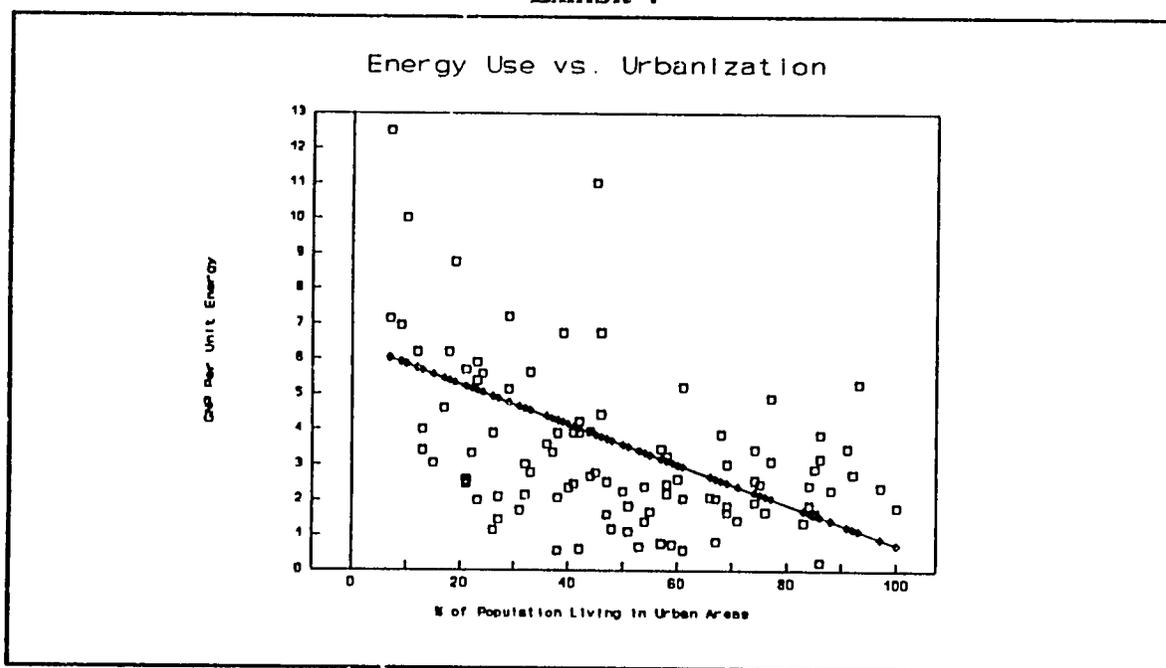
<sup>4</sup> Graph created from data provided by: World Development Report 1991: The Challenge of Development, World Bank

## Relationship of Urbanization to Pollution Control and Energy Conservation Efficiency

Although popular wisdom often regards the rural economy as generating far less environmental damage than the urban industrial one, this is no longer true if we compare these areas on the basis of equivalent value of goods and services produced. Rural India produces four times as much CO<sub>2</sub> per unit of GNP as urban Italy. Similarly, at current levels of energy efficiency, rural China would have to burn eleven times as many BTUs of fuel as urban Japan to produce the same equivalent value of goods and services. This is by no means intended as a justification for the pollution and waste often generated by wealthy countries. If our intent is to raise incomes while minimizing the adverse impacts to the environment, however, then we must recognize that we can usually achieve this goal more efficiently in urban areas.

Exhibit 4 illustrates the correlation between the degree of urbanization and energy efficiency. Similar relationships also exist between urbanization and increased control of SO<sub>2</sub> emissions. The evidence is increasingly clear that the economies of scale and infrastructure efficiencies available in large urban areas can also be effective in reducing harm to the environment.

Exhibit 4<sup>5</sup>



<sup>5</sup> Graph created from data provided by: World Development Report 1991; The Challenge of Development, World Bank

Per capita expenditures on environmental protection are also consistently higher in urban areas than in rural ones - both in absolute terms and as a percentage of GNP. Thus while urban people do generate more waste, they also have greater capacity to pay for effective collection, treatment and disposal.

Most cities continue to have major environmental problems and urbanization often exacerbates them, but the fact remains that environmental quality can also improve right along with economic growth and urbanization. It is a matter of choice rather than chance. The difference often lies in the effectiveness of environmental management and the role played by the city in that task. Helping to improve the capacity of cities to manage waste and achieve sustainable development may be the most effective way to improve the world environment.

### **Complementary Roles of Public and Private Investment**

Popular wisdom so strongly regards urban growth as the cause of environmental problems that few bother to look for the real cause. The review of recent development history in one high growth city is illustrative.

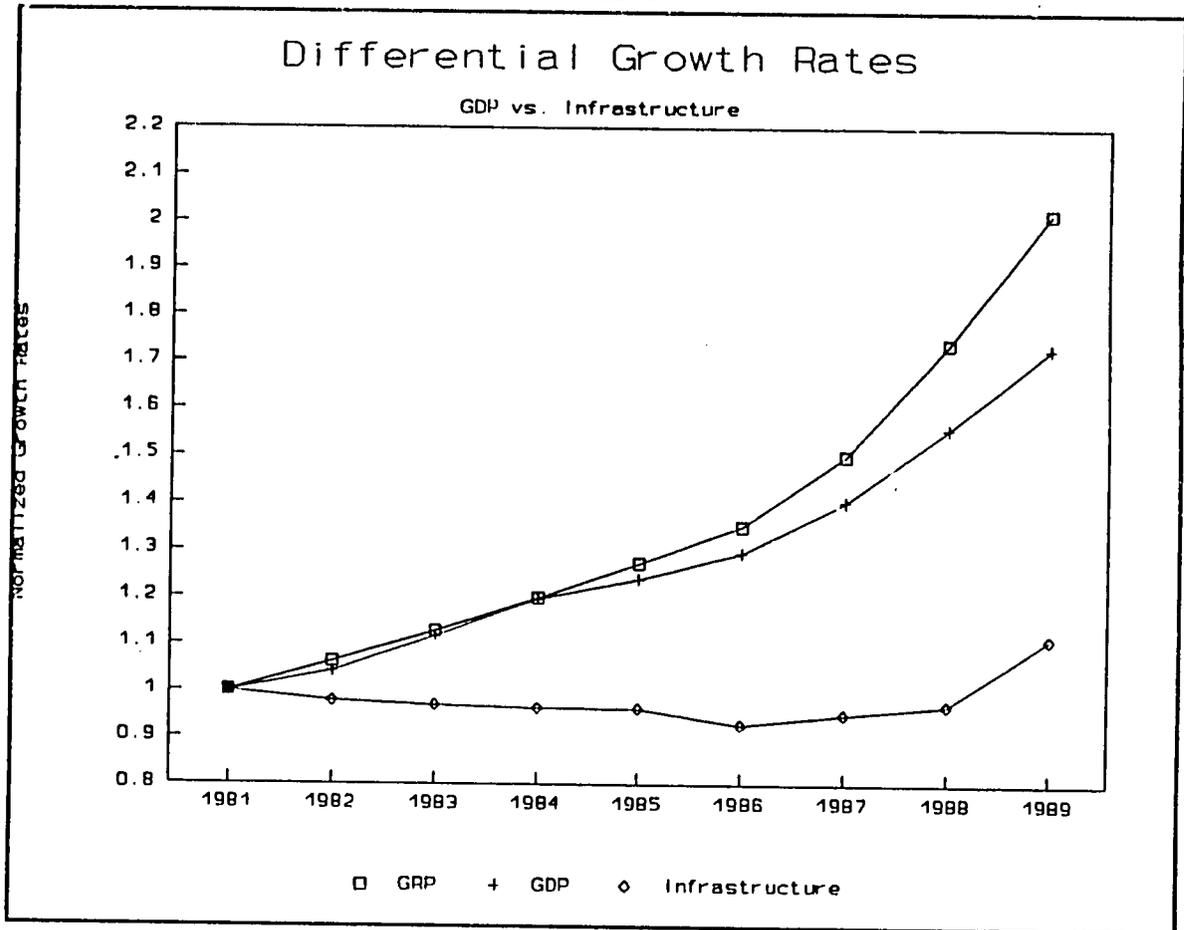
- ◆ High density development without adequate provision of mass transit and road networks led to traffic congestion.
- ◆ High water demand without adequate investment in municipal water supply led to excessive ground water pumping and consequent land subsidence.
- ◆ High density development without public awareness of the need for drainage and sewerage has led to inevitable flooding and water pollution.
- ◆ Industrial development without adequate pollution control, investment and enforcement has led to increased air, water, and solid waste pollution.

These problems were not the inevitable consequences of urban growth, but the result of failure to develop adequate institutional mechanisms to assure that those who benefit from new development also pay for the necessary infrastructure and pollution controls needed to protect the environment.

Exhibit 5 shows comparative growth rates in the Bangkok Metropolitan Region (BMR) during recent years. It strongly suggests that environmental degradation is not so much the consequence of urban and industrial growth as it is the very predictable result of failure to supply urban and environmental infrastructure consistent with the demands of economic growth. During these years the GDP of Bangkok more than doubled while the annual investments in infrastructure barely kept pace with inflation. Private car ownership quadrupled while the number of buses available for service actually declined.

As shown in the following chart, the real culprit, the real cause of the environmental deficit was not growth per se but the growing gap between public and private investment.

**Exhibit 5<sup>6</sup>**



In most rapidly growing cities in Asia, developers, manufacturers, and landowners reap major benefits, not only from their own investments but from the public infrastructure which made it possible. Furthermore, they do so without shouldering the full cost that their development imposes on the community environment. Failure to require developers and consumers to pay their full costs ultimately becomes a subsidy to destructive development.

<sup>6</sup> Banasopit Mekvichai, David Foster, et al; Urbanization and Environment: Managing the Conflict, Thai Development Research Institute, 1990.

## Impact of Residential vs. Industrial Wastes

While industrial pollution consistently gets the lion's share of attention, in most Asian cities the vast majority of pollution comes from non-industrial sources. The largest waste generators are individual citizens, households, and automobiles. Households are by far the largest generators of solid waste. Furthermore, over 70% of the waste discharged to the Chao Praya River of Bangkok, the Cilliwong River in Jakarta, and the Pasig River in Manila is the result of improperly treated human and household waste.<sup>7</sup> This same pattern is repeated again almost every developing country in Asia.<sup>8</sup> Levels of fecal coliform exceed health standards in streams and canals in every major city in every developing country in Asia. Similarly, as shown in exhibit 6, domestic (non-industrial) urban sources are the major contributors of all five of the criteria air pollutants and represent over half of three of them.

**Exhibit 6**  
**Sources of Air Pollution in Bangkok by Percent<sup>9</sup>**

	<u>TSP</u> <sup>10</sup>	<u>SO<sub>2</sub></u>	<u>NO<sub>x</sub></u>	<u>HC</u>	<u>CO</u>	<u>Pb</u>
<b>Transportation</b>	3	15	23	46	60	45
<b>Households</b>	28	9	20	13	1	25
<b>Services</b>	9	13	10	13	0	0

While most of us are far more comfortable placing the blame on industrial "point sources," we as individual citizens are often the most serious threat to the environment. This is true not only as generators of waste but often as a result of improper land use, excessive pumping of groundwater, poor drainage and cultivation practices. If cities are to achieve real environmental improvements, then urban managers must develop effective means to control residential as well as industrial pollution.

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<sup>7</sup> Domestic Wastewater and Water Pollution Problems in Bangkok and its Vicinity  
Office of the National Environmental Board, Thailand, 1987

<sup>8</sup> Tropical Research & Development Inc. Sustainable Urban and Industrial Environmental Management Review Annex, 1991

<sup>9</sup> Thailand, Natural Resources Profile, Thai Development Research Institute, Dhira Phantumvanit, 1987

<sup>10</sup> These six air pollutants are the most common in urban areas. TSP refers to common dust or total suspended particulates. SO<sub>2</sub> is sulfur dioxide. NO<sub>x</sub> refers to oxides of nitrogen. HC refers to hydrocarbons (a precursor of ozone). CO is the symbol of carbon monoxide and Pb is the symbol for lead.

## **Role of Environmental Protection as an Investment in Urban Infrastructure**

Environmental Protection is an investment. Properly managed, it pays dividends. Poorly managed, it creates losses. Although Environmental Protection may be something of a new found interest for urban managers, it is far more like than unlike the other activities in which they routinely participate. Like any other infrastructure investment; it requires, planning, financial analysis, appropriate technology, training and a sound program for cost recovery and enforcement.

Both development and environmental experts often regard environmental protection and economic development as polar opposites in a zero sum game and conventional wisdom holds that we cannot accomplish one goal without sacrificing the other. Although sometimes true in the short run, when urban leaders recognize the importance of clean air, water, and other natural resources as vital inputs in sustainable development, it can be readily seen that economic development requires an investment in the environment as well. Ironically, many of the Eastern European countries that sought to sacrifice environmental quality for the sake of economic development actually wound up failing miserably at both.

Properly implemented, protection of water quality is a cost effective investment in the fishing industry, tourist industry, water supply, and health of the work force and other citizens. Protection of the air quality pays similar dividends in human health, crop production, and durability of materials. Furthermore, many of the ingredients being thrown away as pollutants are in fact valuable products themselves. Properly treated sludge from waste treatment plants is increasingly recycled as valuable fertilizer. Many private industries have also learned that pollution prevention pays. Cement dust blown away, for example, is an air pollutant. Cement dust recaptured and processed can often generate revenue far greater than the cost of the pollution control equipment. Refinery operators tell similar stories about their valuable "waste streams" of chemical byproducts.

While it is certainly true that environmental problems impact whole regions and ultimately must be addressed as regional (if not global) issues, it is usually the cities that must first confront the harsh realities of environmental degradation. The comparatively limited population and slow growth of rural areas often disguises the true scarcity of natural resources. For these reasons, in Germany, Japan, Great Britain and the U.S. the urban areas have traditionally taken the lead, both in creating environmental problems and in responding to them. It is not by accident that California, one of the most rapidly urbanizing states in the U.S., has also taken the lead in environmental control. With such rapid urban growth now projected for many developing countries, pollution problems that the U.S. and Europe have been gradually confronting over the last forty years must be addressed in developing countries in less than half that time.

Sustainable economic development, if it is to avoid premature exhaustion of financial resources, requires a clear mechanism for cost recovery and clear delineation of responsibilities for capital resource management. Similarly, if development is to be environmentally sustainable, there must be clear enforceable regulations regarding pollution control and natural resource management.

Environmental Protection is an investment in urban infrastructure. It is not a luxury good, not a subject limited to rural natural resource ecosystems and not an arcane specialty requiring totally new skills and new methodologies. Most of the technical skills required are those already employed in other infrastructure investment areas: land use planning, project management, cost recovery and enforcement of the rules of the game. More specifically, it is an investment in the economic carrying capacity of urban areas. It increases the number of people, number of economic activities and the standard of living that an urban region can support.

## **Strategies for Urban Environmental Management**

Effective environmental programs require concerted action at many levels. Programs to protect the stratospheric ozone layer require international action. Furthermore, because pollution doesn't stop at state boundaries and because industries can sometimes play off one jurisdiction against another, national standards and policies may be required even for more localized pollutants. When it comes to implementation, however, there appears to be no substitute for local involvement.

As observed in the U.S., Germany and Japan, national organizations are great for establishing environmental standards and policies. Most successful implementation and enforcement programs, however, require strong involvement on the part of local leadership to complement the work of national actors. Standards are meaningless unless there is compliance and compliance without incentives, monitoring, inspection, and enforcement is illusory.

At one time environmental advocates felt the solution to these problems lay solely with the creation of independent and untainted environmental agencies. According to that philosophy, those agencies should be detached objective reviewers freed from other political or financial concerns. Increasingly it is now recognized, however, that although such organizations may have an important role, they are not able to fulfill the task alone.

To be effective, environmental concerns must be factored in at the planning and design stage, not just in a final environmental impact statement (EIS).<sup>11</sup> Environmental programs can ultimately be no stronger than the public that supports them and enlisting that support requires involvement by the leaders of the people most directly impacted. They, in turn, must work to involve the people most directly affected: the business community, the residents, workers, and particularly the parents of children at risk.

Enforcement is difficult at best, but to do it long distance is like having a doctor trying to diagnose his patients over the telephone. Haphazard enforcement simply subsidizes the polluter at the expense of the law abiding and environmentally concerned. It is only when local citizens and their leaders become involved that real implementation and achievement of environmental goals become possible.

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<sup>11</sup> Kingsley, G. Thomas; Urban Institute, Washington D.C.; Unpublished paper on environmental management, Spring 1992.

Management is ultimately the careful identification of priorities and the efficient marshalling of resources with which to meet them. The next sections of this paper review four key steps in this management process including:

- 1) Setting Urban Environmental Priorities,
- 2) Increasing Public Awareness and Participation,
- 3) Improving Enforcement and Cost Recovery, and
- 4) Increasing the Role of the Private Sector in the Provision of Environmental Services.

### **Setting Urban Environmental Priorities**

At the core of effective management lies the identification of primary objectives. Environmental resources are far too limited and environmental issues far too serious to fail to examine carefully environmental priorities. Experience has shown that these priorities can vary significantly from one country to another and even from one community to another. Those who seek to establish priorities simply by copying their agendas from other countries or by following blindly after fashionable issues can quickly wind up spending large sums of precious resources while achieving very little in real risk reduction.

Urban environmental damages fall in three major categories:

- A) Impact on Human Health,
- B) Impact on Property and Productive Capacity, and
- C) Impact on Aesthetic and Amenity Values.

The true costs of any impact is, therefore, the sum of the impacts in all three categories. While the third category, amenity values, is usually the most difficult to measure, it is often most readily visible in polluted and congested cities. The World Bank points out that this difficulty in measurement makes public involvement in setting priorities all the more important.<sup>12</sup>

Exhibit 7 provides a summary of principal health and productivity consequences of environmental mismanagement.

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<sup>12</sup> Draft World Bank Report: "Development and the Environment", February 1992

## Exhibit 7<sup>13</sup>

Principal Health and Productivity Consequences of Environmental Mis-management		
	HEALTH	PRODUCTIVITY
Water pollution and scarcity	Pollution contributes to over 3 million deaths and billions of illnesses annually; scarcity results in poor household hygiene and added health risks.	Declining fisheries; increased household time and municipal costs to provide safe water; aquifer depletion resulting in irreversible compaction; economic activity constrained by water shortages.
Air pollution	Many acute and chronic health impacts: excessive urban particulate matter levels are responsible for 300,000 - 700,000 premature deaths annually, and half of childhood chronic coughing; millions of women and children in poor rural areas affected by smokey indoor air.	Vehicle and industrial activity prohibitions during critical episodes; acid rain impact on forests and water bodies.
Solid and hazardous wastes	Rotting garbage spreads diseases and blocks drains. Hazardous waste risks are typically local but often acute.	Pollution of groundwater resources
Soil degradation	Reduced nutrition for poor farmers on depleted soils. Greater susceptibility to drought.	Field productivity losses in range of 0.5-1.5 percent of GNP common on tropical soils; offsite siltation of reservoirs, and canals
Deforestation	Localized flooding leading to death and disease.	Loss of sustainable logging potential, erosion prevention, watershed stability and carbon sequestration.
Loss of biodiversity	Potential loss of new drugs.	Reduction of ecosystem adaptability and loss of genetic resources.
Atmospheric changes	Possible shifts in vector-borne diseases; risks from climatic natural disasters; ozone depletion may account annually for 300,000 extra cases of skin cancer worldwide, resulting in 3,000-15,000 premature deaths; and 1.7 million cases of eye damage.	Sea-rise damage to coastal investments; regional changes in agricultural productivity; disruption of marine food chain.

<sup>13</sup> Draft World Bank Report: "Development and the Environment", February, 1992

Environmental priority setting is actually composed of two important parts: (1) Assessing relative risks among foreseeable environmental threats to the community and (2) Determining the relative cost and effectiveness of reducing those risks. Ultimately the objective becomes one of identifying those potential activities which will achieve the greatest environmental risk reduction for the least possible cost. Studies by the U.S. Environmental Protection Agency have identified numerous situations where the cost per unit risk reduced for one program is more than ten times greater than for another. Put another way; the same dollar spent on a cost effective high priority task may achieve ten times as much benefit.

### **Need for Risk Assessment**

USAID and USEPA have identified "focussing on the right problem" as a critical environmental issue. Recognizing that not every problem can be a priority for every country, the Bank takes the view that "the highest environmental priorities are those that directly affect the welfare of large numbers of people." It then concludes that inadequate attention is often paid to key basic local issues of water supply and sanitation, urban air pollution, indoor air pollution, and severe land degradation.

The number of people impacted, severity of impact, and reversibility of impact are all critical factors in identifying priority problems and the results are often counter intuitive. The most serious pollutant may not be the one which receives the most publicity and may not even be the one with the most violations of the legal standard.

- ◆ Studies of the Bangkok Metropolitan area revealed that not-with-standing concern over hazardous waste and the ubiquitous water pollution problems; air pollution, primarily air borne lead, was the most serious health threat. Because of the adverse impacts and large number of people exposed, the analysts calculated that air borne lead was potentially 100 times more serious than water or hazardous waste pollution.
- ◆ Similar studies in several Pennsylvania (in the U.S.) cities found that although ground level ozone was the most common violator, fine particulates (soot from power plants) posed the most serious health threat.
- ◆ Studies in another American city in west Virginia found that in response to the community's concern over bacterial contamination, the water was so heavily treated with chlorine that the city now experienced an even greater health risk of cancer caused by the excessive chlorine.
- ◆ Preliminary indications in India and Korea are now that one of the most serious environmental health threats may well be that posed by indoor air pollution caused by poorly ventilated cooking and heating fires.

The relative priority of urban environmental problems is also heavily dependent on their impact on the options available.

- ◆ Water pollution is serious under almost any circumstance but it is most serious when there are no other sources of potable water available. Thus water pollution might be a first priority problem if it contaminated the primary aquifer or if there was no reliable supply of municipal water, but a somewhat lower priority if most homes had ready access to safe water.
- ◆ Similarly, hazardous waste which threatened to impact the food, air, or water of large numbers of people would be far more serious than if those same people had feasible options which allowed them to reduce that risk of contamination.
- ◆ Because most citizens can often find alternative sources of food or water but few can avoid breathing polluted air, air pollution is increasingly being seen as a high priority problem particularly in New Delhi, Bombay, Bangkok, Manila and Jakarta.

### **Impacts on the Poor**

Relative priorities also depend heavily on the nature of the population most severely impacted. Unfortunately, in most cases pollution tends to impact most heavily on those least able to avoid it. Euisoon Shin (Yonsei University, Seoul Korea) points out that:

"Poorer households' unstable and inadequate incomes underlie their inability to move away from dangerous and polluted residential areas. Inadequate diets exacerbate the environmental health risks by lowering resistance to many diseases. Thus, while a lack of piped water, drains, and garbage removal service may be the main cause of deteriorating environmental conditions and of the high incidence of diseases, inadequate incomes and poor quality diets increase the related health threats."

Water and solid waste pollution are typically most severe in the poorest communities and those most severely affected are the young, the old and the infirm. If, as Magsaysay has said: "Those who have less in life should have more in law," then we have a special obligation to provide for their environmental safety.

## **Efficiency**

The efficiency of pollution control programs depends both on the total cost of environmental damage and the relative ease with which the threat can be reduced. Both these factors vary widely.

- ◆ Lead pollution in urban areas, for example, typically comes from two main sources: (1) lead compounds used in house paints and utensils and (2) lead in gasoline. Lead based paints are now being phased out in most Asian countries but the danger remains in many old houses. While the relative threat from both of these sources is roughly the same, studies by USEPA suggest that it would cost more than 10 times as much to achieve equivalent risk reduction through scraping old paint as through reducing the lead content of gasoline.<sup>14</sup>
- ◆ Reducing the risk of bacterial contamination from polluted water can be achieved both by providing a reliable source of clean water and by treating waste water from homes before it enters public drains and rivers. Although some risk will obviously continue as long as the public waterways are polluted, supply of clean water remains the first priority and most cost effective means to reduce exposure.<sup>15</sup>

Special consideration is also due to pollutants which impose high costs by severely restricting the range of options available.

- ◆ Hazardous wastes (including heavy metals) constitute only a tiny proportion of the total waste stream in Mexico City, but failure to control those wastes now threatens to preclude the otherwise profitable recycling of city waste for fertilizer.
- ◆ The booming computer, jewelry, and electroplating industries in Thailand, Indonesia, and the Philippines often discharge waste solvents and heavy metals directly into urban drains, not only contaminating the rivers but also precluding cost effective recycling as a viable option for the municipality as well.

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<sup>14</sup> Comparative Cost Analysis of Lead Reduction Alternatives, USEPA, 1975

<sup>15</sup> Sermopol Ratasuk, Senior Project Engineer, Asia Development Bank

## **Economic Impacts**

While attention is most commonly drawn to the health and aesthetic impacts of urban environmental degradation, the sheer economic cost can also be severe. These include damages from flooding, traffic congestion, crop and aquaculture losses due to pollution, and lost worker productivity and medical expense due to increased illness.

The reported value of these losses can vary substantially depending on the assumptions involved but even the most conservative estimates are still substantial. The cost of traffic congestion in Bangkok, for example varies from \$272 million per year to over one billion depending on the value imputed to the time spent in traffic. Conservative estimates for congestion losses in a number of Asian cities are shown in Exhibit 8. In addition to these costs, severe financial losses have been shown in a wide variety urban studies in Asia including:

- ◆ The Thai Development Research Institute estimated the impact of flooding in Bangkok at \$275 million.
- ◆ Air pollution near urban areas can reduce the value of rice and soy bean production by more than 20%.
- ◆ Studies at the East-West Center in Hawaii estimated fishery loss from polluted water in urban rivers and bays easily exceed \$100 million.
- ◆ Tourism, consistently one of the largest earners of foreign exchange, is increasingly threatened by reports of trash, untreated sewage, and threat of epidemic disease.
- ◆ Studies by USEPA and USAID estimate the annual cost of the health impact of air borne lead pollution in Bangkok (including increased illness, lost productivity, death, and lost intelligence in children) at \$40 to 100 million.<sup>16</sup> Euisoon Shin extrapolated from these studies to estimate the cost of all air pollutants in Bangkok as high as \$400 million per year.<sup>17</sup>
- ◆ Residents of Jakarta spend roughly 1% of the city GNP just to boil water for home use.<sup>18</sup>

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<sup>16</sup> USAID. 1990 Ranking Environmental Health Risks in Bangkok, Thailand. Washington D.C.: Office of Housing and Urban Programs, USAID

<sup>17</sup> Shin, Euisoon, et. al. 1992. Economic Valuation of Environmental Problems

<sup>18</sup> World Bank, World Development Report, 1992

### Exhibit 8

#### Estimated \$ Losses Due to Traffic Jams<sup>19</sup>

<u>City</u>	<u>Annual Cost of Time Delay (US \$)</u>	<u>Percent of Regional GNP</u>
Bangkok	272 million	2.1
Hongkong	293 million	.6
Jakarta	68 million	.9
Kuala Lumpur	68 million	1.8
Manila	51 million	.7
Seoul	154 million	.4
Singapore	305 million	1.6

#### Summing Up

The example above emphasizes the importance of counting the cost of all environmental impacts. In some cities the cost of air pollution from traffic alone might not appear to warrant a major program but when the cost of air pollution, plus lost time in traffic, plus reduced crop yields in surrounding fields, plus decreased attractiveness to tourists all can add to a very persuasive argument for improved traffic management. In direct contrast to the often repeated claim that "cities can not afford to protect their environment," the informed observer may conclude that the city can no longer "afford" to ignore the environment.

Setting environmental priorities proceeds by adding up all observable impacts and comparing those with the estimated costs of control. While some environmental analysts will object on the grounds that costs of control are usually easier to measure than the costs of the impacts, in most cases even this admittedly biased accounting will lead to substantially more support for environmental management.

Who sets the priorities becomes critical. This paper strongly supports the role of the local governments as the best judge and enforcer of environmental priorities. Increased public awareness and participation becomes an important tool to involve local government and define its role.

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<sup>19</sup> Euisoon Shin, Economic Valuation of Urban Environmental Problems, The World Bank, January 1992

## **Increasing Public Awareness and Participation**

Effective environmental protection is ultimately a question of public access. People can only maintain access to a clean, healthy and sustainable environment if they also have access to the information, policies and regulations intended to protect the environment.

There are undoubtedly some fields such as heart surgery or the piloting of an airplane where the requisite expertise rests in the expert hands of a few and the rest of us are literally along for the ride. This is not, however, the case with the environment. Protection of the urban environment requires public participation. This participation requires that the public be fully aware of the causes and consequences of environmental neglect and potential opportunities for improvement. Real environmental protection requires not just the highly skilled "surgeon" or "pilot," but parents, students, and community leaders who know the value of the environment and can impart those values to those around them.

Most environmental programs are only as strong as the environmentally informed public which supports them. In practically every country with a strong environmental program one can also point to an equally strong public and NGO movement behind it. Conversely, where public awareness and support are lacking, there are almost no genuinely effective environmental programs regardless of their environmental policies or pollution standards. The development of strong environmental agencies and enforcement programs in Japan, Western Europe and the U.S. has been directly correlated with the growth of "Green" Parties and successful NGO lobbies. In these countries, the NGOs monitor progress, research environmental issues, recommend solutions and help to inform the public.

This finding on the importance of local participation in environmental programs is fully consistent with the findings of USAID and UNDP in a variety of related areas:

- ◆ Public awareness campaigns in Surabaya and Phuket were major factors in persuading citizens and officials to make the changes needed to implement waste management programs.
- ◆ Forestry programs in Nepal were consistent failures until program designers developed means to involve local communities and give them a meaningful stake in the survival of the nearby forests.

Countries in ASEAN and South Asia have recently achieved major success in developing Ministries of Environment, environmental policies and standards but these organizations and activities can not be maintained in a vacuum. The lack of effective enforcement in most developing countries is often referred to by local citizens and expat consultants alike as a "lack of political will." This explanation has become almost too convenient and provides no hint of a solution. In fact, this lack of "political will" can most often be traced to a lack of public awareness and community involvement.

The recognized strength of the U.S. Environmental Protection Agency may be illustrative. Despite EPA's large budget, highly trained staff, and broad legal authority; its real "political will" most often comes from the public awareness and NGO strength which support it. For example, when EPA proposes new regulations for pollution control it is almost invariably attacked by the owners and managers of the pollution sources to be controlled for being "too stringent, too expensive, and too burdensome." This opposition is so strong that it would threaten to force EPA to back down, were it not for the fact that NGOs in support of stronger controls often criticize the same proposal for being "too lenient." Through this competitive process the public has access to the full debate and can join in support of the regulations that are most appropriate.

In spite of the importance of increasing awareness and involving the public to garner public support, most environmental ministries still isolate themselves and their decision making processes. One significant example is the EIA (Environmental Impact Assessment). The EIA process has proven to be an effective tool for key decision makers to collect and weigh information about the likely environmental consequences of investment decisions before those decisions become final. Even more importantly, where it has been used most effectively, it has provided an opportunity for the public to consider the environmental impacts and bring information of its own to the table for consideration. Unfortunately, many countries in Asia see this EIA process as a forum only for the elite and highly specialized. Not only is the public denied access but the environmental decision makers are denied the potentially powerful political support that could come from an enlightened public. Important exceptions to this trend, however, are increasingly becoming evident:

- ◆ Most countries are beginning to expand both the amount of information available and the number of people allowed access.
- ◆ Under the EIA system now employed in Malaysia, draft copies of the environmental impact statements are made available in public libraries and interested parties are invited to make comments.<sup>20</sup>
- ◆ The Philippines is also considering holding public hearings on important EIAs.

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<sup>20</sup> Goh Kiam Seng, Regional Director of UNEP for Asia and Pacific

Other countries in the region have also adopted a variety of creative means to increase public awareness:

- ◆ Thailand developed an environmental education program for its schools and started a popular television series dedicated to the environment.
- ◆ Indonesia has initiated contests among its cities to provide recognition of environmental progress.
- ◆ Several communities in the Philippines initiated a speech contest on causes and consequences of river pollution.
- ◆ The National Water Supply and Drainage Board in Sri Lanka recruited and trained volunteers to teach water sanitation to local citizens.
- ◆ Magic Eyes, an urban environmental NGO in Thailand, has initiated a very successful campaign to encourage people to pick up litter with the slogan: "Magic Eyes are watching you."
- ◆ A river clean up campaign in the Philippines helped increase awareness of environmental problems by organizing boat trips focussing on both polluted and clean areas.
- ◆ Newspapers throughout the region have dramatically increased their coverage of environmental issues and many have adopted special environmental columns or features.

### **Need for Improved Environmental Data and Information**

Despite progress, problems remain with the general level of information about the environment and many environmental NGOs do not fully trust in the information that is available. Monitoring stations are limited and the laboratories which report their findings often fail to satisfy an increasingly suspicious public. One respected NGO recently suggested, for example, that the single greatest need was for an independent laboratory which could periodically check the findings provided by government laboratories.

Environmental monitoring is simply the measuring and tracking of adverse impacts on the environment. Monitoring equipment is currently very limited and the access to data often restricted. Where this information is closeted among a few elite decision makers it is of little value. Experience from Indonesia has shown that this information can be of most value when it is also made available to the media and the NGO community. Then those institutions can monitor both the environmental quality and the effectiveness of those organizations charged with protecting the environment.

While some highly sophisticated monitoring equipment is both necessary and expensive, this equipment can often be supplemented with less expensive techniques for preliminary investigations:

- ◆ Many states in the U.S. still employ "smoke readers," individuals trained to visually measure the opacity of smoke at a distance. These individuals are qualified to testify at a hearing and their information can be used as evidence of air pollution violations.
- ◆ Students with minimal equipment can take photographs and samples of solid waste and waste water.
- ◆ Many water quality tests which previously could be performed only in the laboratory can now be accomplished with comparatively inexpensive portable kits.

Although long term experience clearly indicates that public awareness and public involvement are critical to environmental success, the World Bank points out that this involvement can also be a time consuming and troublesome process.<sup>21</sup> Local participation can also reinforce local power structures and lead to local vetoes over otherwise highly desirable regional projects.

While this problem can be serious, NGO experience in the U.S. suggests at least one way to counter this problem. Electric utilities faced with a never ending NIMBY (not in my back yard) syndrome over the locating of new production facilities began involving regional and national environmental groups in their decision making process early on and found the net effect very helpful.<sup>22</sup> These larger environmental groups were not so easily controlled by parochial interests as their purely local cousins and yet their participation added important insights and environmental credibility to the overall process.

The experience of a wide range of organizations confirms that attempts to add a veneer of public participation after all relevant decisions have been made is a recipe for trouble. If, however, decision makers are prepared to inform and seek participation as the process evolves and carefully select NGOs on the basis of their knowledge and representativeness, then the process can greatly enhance the support and success of environmental programs. As will be seen in the following section, this public support and participation is particularly critical for enforcement and cost recovery.

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<sup>21</sup> World Development Report, February 1992

<sup>22</sup> Florida Power and Light, "Participation of Environmental Citizens Groups in the Decision Making Process", 1975

## **Improving Enforcement & Cost Recovery**

Environmental enforcement and cost recovery are simultaneously often the most important ingredients in environmental management and the most often neglected. Carl Bartone describes enforcement as the "weakest link in the environmental management chain."<sup>23</sup> Effective enforcement is essentially the dedication by a society to follow through on the commitments it has made. Similarly, effective mechanisms to recover costs for environmental services represent the only means to provide and maintain those services.

Attractive as it may sound, "it's not easy being green." There are many cost effective opportunities for pollution prevention. In the absence of an effective public pressure, financial charges, taxes or criminal sanctions however, even the most cost effective pollution control technology will often be ignored. Those few who voluntarily comply still must compete with those who don't and ultimately, in the absence of sound enforcement, the "good guys" subsidize the polluters.

One of the most common causes of failure of environmental programs has been the failure to establish appropriate fees, fine and enforcement mechanisms, and the lack of "political will" to impose them. Ironically, despite growing recognition that poor enforcement is a common cause of failure, it is still one of the least studied environmental activities and often the least supported by donor agencies.

Extensive arguments continue about the true costs of pollution control. As often happens, many of these arguments are extreme and counter productive. Many industrial representatives will argue that pollution control costs are so high and unreasonable that enforcement of these standards will deter new industrial investment and cause existing industries to relocate elsewhere.

In fact, pollution control costs are typically below two percent of total manufacturing costs and far less than the cost of labor, materials, equipment and other costs of production. As a consequence, extensive studies have shown that industries rarely choose their investment sites on the basis of environmental standards and enforcement.<sup>24</sup>

At the other extreme, some would argue that pollution control costs are so small that no impact analysis is needed and that industries should voluntarily control their pollution. This argument neglects the fact that even 1% can represent a major share of total profits and that this can provide a major incentive for many pollution sources to seek to ignore the environmental requirements, particularly if their competitors are also ignoring them.

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<sup>23</sup> Bartone, Carl; American Planning Association, Autumn 1991

<sup>24</sup> Duerkin, Christopher; Conservation Foundation

Exhibit 7<sup>25</sup> provides a sample of pollution control costs in the U.S. as a share of total costs and in comparison to average profits.

### Exhibit 7

#### Pollution Control Costs

<u>Industry</u>	<u>Average Profits</u>	<u>Average Environmental Costs</u>
Automotive Industry	3.1%	2.0%
Chemicals	7.4%	2.8%
Consumer Goods	5.0%	1.9%
Electronics	5.6%	1.4%

Suffice it to say that pollution control costs are sufficiently high to persuade many companies to try to avoid them. This is particularly true if the reasons for the control requirements have never been fully understood, they feel their competitors are not complying and nobody is watching. In fact, because most pollution problems are the consequence of large numbers of waste generators discharging wastes into a limited resource, the success or failure in controlling just one source of pollution may really not make a detectable difference. Unfortunately when several pollution generators draw this conclusion at the same time, their cumulative failures will have disastrous effects.

The goal of environmental programs is to cause the users of environmental resources; private households, automobile owners, government officials and managers/owners of private manufacturing facilities; to reflect the true value of environmental resources into their every day decision making. The objective of enforcement is not to close firms or even punish polluters but rather to assure compliance with environmental standards. Rules and regulations can be adopted and control equipment can even be purchased but if the rules are not followed or the equipment not properly operated and maintained, then little or no improvement is achieved.

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<sup>25</sup> "Achieving Economic Benefits Through Effective Environmental Management: examples from the United States" Presented at the Conference of Federation of Indian Chambers of Commerce and Industry, New Delhi, January 1992

Both Jakarta and Bangkok, for example have regulations imposing fees on the pumping of groundwater but these are rarely collected and major environmental problems (ground subsidence, salt water intrusion, etc.) are directly linked to excessive use of ground water. India imposed strict regulations on factories discharging waste into the Ganges but when the allowed time for compliance had passed with little action toward meeting the standards, the factories were simply given "no cost" extensions to allow even more time to come into compliance. Hotels throughout the region are required to treat their wastewater before discharging it into the drains and rivers and yet even where the equipment has been installed, it is routinely found to be malfunctioning. Every country in the region has laws prohibiting uncontrolled waste dumping and discharge and yet most countries are still experiencing increases in pollution levels.

The purpose of enforcement is to assure compliance with appropriate standards and regulations. Failure to require such compliance is ultimately a subsidy to the polluter and a penalty on those who voluntarily comply. Not only does the law abiding firm take on additional costs and responsibilities not shared by his competitor, but his own efforts are denigrated by the seeming lack of concern. Furthermore, as the public often has little knowledge as to which industries are complying and which are in violation, their wrath is often turned equally on both.

Despite these problems, there are increasing signs of active, creative programs for improving enforcement. Most of the successful ones involve some form of public participation.

### **Examples of Successful Enforcement Activities**

- ◆ The Philippines has begun a unique multi-sector enforcement team which includes community leaders on inspection visits to local industries. These leaders including teachers, businessmen, priests and NGO representatives are trained and deputized by environmental inspectors and then accompany them on site visits. After the inspections, the government inspectors may return to their offices but the volunteer leaders remain in the community to monitor progress.
- ◆ In Indonesia the Ministry of Environment has begun listing names of the most serious offenders of water pollution laws and publishing them in the newspapers where they may be held up to public scrutiny.
- ◆ In India private citizens may bring suit against violators of environmental laws and against the government for failure to uphold them.
- ◆ In Thailand the newspapers have taken the lead in exposing environmental problems including hazardous waste at Klong Toey and spills from sugar factories in Khon Kaen.

- ◆ Several communities in the Philippines identified weaknesses in their local solid waste ordinances which made prosecution almost impossible. They then revised the law to make residents and businesses presumptively liable for any trash found on their property.
- ◆ The Center for Environmental Planning and Technology in India is examining the feasibility of establishing an independent team of certified environmental auditors. These professionals, modeled after certified public accountants, would provide regular independent inspections and reports to certify the degree of compliance with relevant environmental standards.
- ◆ NGOs in Thailand have begun identifying riverside restaurants willing to make special efforts to assure that wastes from the restaurant do not pollute the river. These restaurants are then endorsed by the NGOs and may be given a special emblem certifying their compliance.
- ◆ In several countries in the region, even where enforcement authorities lack the real power needed to impose significant penalties or close down environmental violators, they have found that they can still exert some influence. They achieve this by withdrawing permits of chronic violators and then exposing them to the police and community pressures.

### **The Use of Pricing Policies to Enforce Rules and Recover Costs**

The concept of "Polluter Pays" has been widely trumpeted as a policy for environmental management but few municipalities have actually fulfilled it. Where it has been carefully implemented, it has been remarkably successful and many more opportunities remain to employ this strategy. Many environmentalists and resource economists believe that one of the most effective things we can do for the environment is simply to "get the prices right."

- ◆ In the case of water conservation, one can pass a myriad of rules about what constitutes good water use but these are usually of little value where water is considered inexpensive. By contrast, if the cost paid for water approximates the cost of supplying it, then the user will have a constant incentive to use water wisely.
- ◆ In Thailand many hotels along the Eastern Seaboard, long notorious for poor waste treatment, are now efficiently treating and recycling their water for irrigation. They make this effort not because of a stepped up government inspection program but because the cost of buying fresh water now exceeds the cost of waste treatment.

- ◆ The Natural Resources Defense Council, a U.S. based NGO, has consistently found that the most cost effective source of new energy is usually energy conservation. Programs which assure that energy is priced at or above the cost of production, together with effective information and financing programs can generally result in more kilowatt hours of electricity saved per dollar expenditure than even the most efficient source of power generation. Conversely, programs which subsidize electric power, no matter how well intended, invariably lead to less efficient use, increased demand, and increased production costs.
- ◆ In the U.S., where environmental policy makers relied on rules and design changes to promote a switch to unleaded gasoline, the change took more than five years. In Thailand, where the price to the consumer of leaded gasoline reflects some of the environmental damages and is thus higher than that for unleaded, a comparable change was achieved in less than five months.
- ◆ Singapore has applied this same basic concept to traffic control in its once heavily congested central business district in the form of "Road Pricing." Recognizing that demand for road space by owners of private cars far exceeds the available supply, Singapore has established higher prices for downtown road use during rush hour. Not only does this system relieve congestion but it provides additional revenue to help pay for mass transit.
- ◆ Studies in the U.S., Western Europe and Japan have repeatedly shown savings of 50% to 75% of the cost of traditional pollution control when industries are given adequate incentives to reduce pollution discharge but allowed the flexibility to determine the location and method of control.
- ◆ The seventh plan recently adopted by the National Economic and Social Development Board for Thailand applies this same concept to land use. Property developers who insist on developing land competing for scarce environmental resources may soon be required to pay an environmental impact fee. This fee will not only direct investment toward more desirable locations but (where the financial advantages of a particular location still exceed the added cost) the additional revenues will automatically be available to provide some of the necessary infrastructure.
- ◆ The rapidly growing city of Orlando Florida (in the U.S.) developed a system of impact fees which are paid by property developers. These fees are then used to pay for the expansion of the municipal waste water treatment system. The more rapidly the city grows, the more money comes in for waste treatment.

- ◆ **Property taxes themselves are a form of pricing policy. Where they are sufficient to encourage wise land use and provide revenue to support necessary infrastructure, they can have major environmental benefits. They can encourage efficient land use, discourage speculation, and assure adequate revenues to support required infrastructure.**
- ◆ **Market driven land costs, where barriers to development have been minimized, can often be far more effective than any regulation in promoting the supply and development of serviced land.**

**Pricing policies can also be effective in solid waste programs. The trick is to establish a price for the waste material sufficient to encourage recovery. Scavengers already recover bottles, cans and many other recyclable materials but often fail to recover toxic materials and other major sources of air and water pollution. To achieve this end additional incentives may be required.**

- ◆ **Many European countries have been successful in recovering used batteries by imposing a deposit on them similar to that often required for bottles.**
- ◆ **Waste oil is frequently thrown away by the roadside and becomes a water pollutant. Guam has established a market for used oil thus providing the incentive for recovery.**
- ◆ **Freon (a chlorofluorocarbon) regularly leaks from used air conditioners but there is little incentive for mechanics to retrieve the substance because of its relatively cheap price. A refundable deposit on freon when sold would provide the necessary motivation.**

**No environmental policy or regulation can be effective without strong enforcement. Unfortunately without public access and support, enforcement is often little more than an afterthought. Enforcement agencies in Asia are often understaffed, underpaid, and overwhelmed with the task of enforcing strong regulations with weak authority and limited public support.**

## **Creating Public Private Partnerships**

Local governments in Asia are often severely limited in their ability to raise capital for new urban infrastructure. Competing demands from such diverse fields as education, health care, and police protection make it difficult to secure funding for necessary expansion in water supply, waste water and solid waste collection and disposal. Furthermore, most local governments have only limited experience in the "business" of efficiently managing and collecting for these services.

At the same time, however, private enterprises have some real advantages over government agencies. These can include lower production costs, more efficiency in service delivery, enhanced capacity to maintain capital equipment,<sup>26</sup> and often easier access to foreign capital and expertise. These organizations, with fewer bureaucratic restraints can also often make decisions faster and be more responsive to consumer choices. Contracting out the construction, operation and maintenance of environmental infrastructure also allows governments access to specialized skills and allows incremental adjustments as requirements change. Even where private sector provision of public services fails to be more efficient, it still offers at least one major advantage: It usually is far easier to close down a failed private sector operation than a public sector one.

Private sector participation need not mean the end of public sector involvement in these activities. In fact, it can often allow public agencies to expand significantly their impact by freeing up limited resources to concentrate on those activities which they can do best. Private operation of waste collection and treatment, for example, allows public agency personnel to concentrate on monitoring, inspection, and enforcement. Public agencies can also focus on research into innovative approaches while contracting out the more traditional ones. Similarly, many agencies have effectively divided existing services; contracting out power generation, for example, while retaining responsibility for distribution. The responses are as varied as the creative organizations which generated them:

- ◆ Near Kanchanaburi, Thailand, citizens in several communities complained about the pollution of their water supplies by nearby sugar mills. In response to community concerns, the Ministry of Industry; in conjunction with the Office of the National Environmental Board; built waste water treatment facilities which evolved into a unique public-private partnership. The facilities were initially designed and financed by government agencies but then purchased and operated by the sugar mill association itself. The government continues its role in monitoring and enforcement but all decisions on cost sharing, fees, operation and maintenance are made by the private association. All wastes now discharged into public waterways are in full compliance and the government has recovered all its expenditures.

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<sup>26</sup> Dennis A. Rondinelli, "Decentralizing Urban Development Programs: A Framework for Analysis," Washington, D.C.: U.S. Agency for International Development, 1990

- ◆ In Karachi and Calcutta, per passenger costs of bus services run by private companies are less than 40% of those of public systems and in Jakarta and Ankara, they were about half.<sup>27</sup>
- ◆ Many components of the water services in Santiago, Chile are contracted out to private companies giving the city the highest productivity in water supply of any city in Latin America.
- ◆ The USEPA has recently completed a study of over twenty successful public private partnerships involving environmental services in American cities. These include waste water, water supply, and solid waste and involve a wide variety of partnership contracts each tailored to the needs of the particular city. Some provide complete private finance, design, construction, operation and maintenance; while others share operation with a public agency. In almost every case there were significant savings in time and money.
- ◆ Solid waste collection in many Malaysian cities has been successfully privatized providing both improved service and reduced government expenditures.
- ◆ Private sector organizations have expressed strong interest in providing municipal water supply at competitive prices in Surabaya. Under this arrangement the private sector would build, finance, and operate the water supply system and then transfer the entire system back to the local government after an agreed upon number of years.
- ◆ Thonburi, in Thailand, is not ready to privatize their entire water supply system but they are looking to privatize the operation and maintenance of the water treatment plant.
- ◆ Private investors in Indonesia and Thailand have long supported the construction and operation of expressways and other toll roads.
- ◆ Indonesia and the Philippines are investigating the possibility of allowing the "co-generation" of electric power. This will allow factories and solid waste incinerators to convert excess steam to electricity and then sell that electricity back to the Electrical Generating Authority of Thailand. This will not only increase the electricity available but provide environmental benefits as well.

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<sup>27</sup> World Bank, "Developing the Private Sector: A Challenge for the World Bank Group" Washington, D.C.: World Bank, 1989

- ◆ Thailand, which already has one hazardous waste treatment facility built and operated by the private sector is exploring further options to expand this concept. One promising proposal is to impose a charge on the generation of hazardous wastes but then refund part of that charge when the waste is satisfactorily delivered to a certified private waste disposal facility. In this instance the government would inspect both the waste generator and the disposal facility but the transport and treatment of wastes would be left in private hands.
- ◆ A research group in India is exploring an innovative public-private partnership in monitoring and inspections. The concept would be to have public agencies train and certify private sector environmental engineers who would then be paid by private companies to audit the environmental performance of their companies just as a CPA (certified public accountant) audits their financial performance. This information would then be made available to potential investors, government agencies and NGOs concerned about the performance of the company.

While many urban infrastructure agencies are already very impressive, the opportunities for further efficiency improvements in environmental services are enormous. The World Bank, after reviewing forty years of experience, identifies institutional failure as the most common cause of poor performance. For example, the number of employees per 1,000 water connections in Western Europe is two to three while the number in Latin America is ten to twenty. Even so, in cities like Caracas and Mexico City at least 30 percent of the connections are not registered. Similarly in Bangkok and Jakarta almost half of the water supply is unaccounted for, either through leaks, improper connections or failure to collect bills. Furthermore, in many Asian cities despite often massive subsidies, the poorest 30 percent of the population have no access to municipal water. Recent experience in Africa and Latin America show that major improvements in collection rates can be achieved through privatization. In Guinea, for example, collection rates after privatization rose from 15 percent to 70 percent after only eighteen months.

When the private sector is employed in conjunction with careful analysis of local environmental priorities, a sound public awareness program, and good enforcement and cost recovery it can definitely improve the provision of environmental infrastructure. While privatization is obviously not a panacea, experience through out the world has shown it to be an effective tool for helping cities to mobilize resources and provide badly needed services to their citizens.

## **Conclusion**

The city has a major role in environmental management. It is not the villain as it has so often been portrayed and it need not be the victim. Sustainable cities and the economic development which they promote can contribute not only to the welfare of their own citizens but to the world environment as well. City leaders: government officials, private sector, and NGOs can contribute in ways not possible to national organizations alone. Their active participation is needed in the selection of environmental priorities and in the mobilizing of resources to invest in a sustainable environment.

Environmental protection is ultimately an investment. Properly managed, it pays dividends. Poorly managed, it creates losses. It is not a luxury good, not a subject limited to rural natural resource ecosystems and not an arcane specialty requiring totally new skills and new methodologies. Most of the technical skills required are those already employed in other urban investment areas. More specifically, it is an investment in the economic carrying capacity of urban areas. It increases the number of people, number of economic activities and the standard of living that an urban region can support.

Asian countries have made enormous strides in the adoption of environmental regulations, standards and goals, but without active participation at the city level, achievement of those goals may be impossible. Implementation of environmental goals requires careful determination of local priorities as well as public awareness, local support for enforcement and cost recovery, and an active partnership with the private and NGO sectors. The critical task ahead is to identify and share the skills, techniques, and resources which can make this implementation possible.