

Environmental Sustainability and Services in Developing Global City Regions

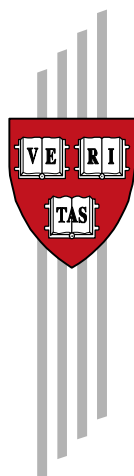
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Abstract

Globalization brings unparalleled challenges and opportunities for global city-regions, both in terms of wealth creation and environmental sustainability. The purpose of this paper is (1) to analyze the environmental challenges of global city-regions, especially in developing countries, where they are more severe; (2) to examine the implications of globalization for these challenges; and (3) to explore public policy options, private sector involvement and innovative, flexible instruments for addressing these challenges. Based on this analysis, the author proposes a new paradigm for the environmental management of global city-regions, driven by the private sector and civil society, with government playing a regulatory and facilitating role.

Keywords: Urban Planning, Environment, Sustainable Development

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Introduction

Global city regions have enormous advantages in terms of economies of scale and conglomeration and ability to attract investment and to create jobs and wealth. At the same time, megacities, and even cities of moderate size, require continuous investment in expansion and maintenance of a broad range of infrastructure and public services if they are to work efficiently and to continue to attract investment and provide a satisfactory quality of life to their expanding and increasingly demanding population. Even in developed countries, providing adequate infrastructure and public services to meet the growing demand and to ensure improving—or at least not deteriorating—environmental quality has always been a challenge.

The faster rate of urbanization creates even tougher challenges for cities in developing countries, which have fewer financial, human, and institutional resources to respond to the growth. The demand for infrastructure and public services quickly outpaces the supply, creating an ever-widening gap between the two. The result is urban slums and shanty-towns that lack even the most basic of services: clean water, sanitation, paved roads, and electricity.

Compounding the failure of urban infrastructure and public services to meet the increasing demands, traffic congestion, deteriorating water and air quality, and uncollected solid waste add to the array of problems facing developing-country megacities.

State-owned utilities and other state enterprises providing these services often find themselves strapped for lack of financial resources, unable to maintain or increase coverage and access, despite—or perhaps because of—governments' efforts to provide subsidized services

affordable to the poor. Since most of the poor have no access to these services, the wealthier urban inhabitants tend to be the main beneficiaries of subsidized water, power, and other services. Both subsidies and underpricing result in excessive and wasteful use by those who have access and in failure to even cover the operating costs of existing services. As a result, infrastructure is not properly maintained and the quality of service deteriorates further, causing users to be even less willing to pay for these services and to seek more reliable alternatives. This, in turn, further deprives public providers of the badly needed revenues in a vicious circle of ratcheting down to lower and lower quality of service that has come to be known euphemistically as a low-level equilibrium trap.

The consequence of this trap is deteriorating environmental quality in cities, with dire consequences for the health and productivity of millions of people who are exposed to harmful pollutants. Damage to property and traffic congestion further diminishes the net wealth and welfare generated by megacities. Yet, as long as the average level of services and job opportunities in cities is better than that in rural areas, rural urban migration continues unabated, putting further pressure on a system that is already unable to cope, totally overwhelming city governments and other public service providers. It is this inability to cope with the expanding demands of growing urban population, along with the absence of negative feedbacks to reverse the process, that is the greatest threat to urban environmental sustainability.

How does globalization (and its concurrents of liberalization and privatization) change the sustainability picture in global city regions? Globalization has the potential to make things better by making available the necessary financial resources, technology, and management to escape the low-level equilibrium trap. On the other hand, globalization may make things worse if it simply increases the demands on the already heavily burdened infrastructure and services

and adds to pollution and congestion while continuing to make the megacities more attractive to rural migrants because of increased employment prospects. Indeed, this is what is happening to most of the developing world's megacities, but there are also some bright examples of innovative approaches to tapping globalization and putting it in the service of environmental improvement and sustainability. While developed-country cities as a group have been more successful in marshalling outside resources to alleviate infrastructure bottlenecks and to improve environmental quality, they are not always a good example for developing countries to follow. Indeed, in some cases, they may be a good example to avoid.

The purpose of this paper is (1) to analyze the environmental challenges of global city-regions, especially in developing countries, where they are more severe; (2) to examine the implications of globalization for these challenges; and (3) to explore public policy options, private sector involvement, and innovative, flexible instruments for addressing these challenges. We focus particularly on the Asian region, because it has been the most active participant in the globalization "game." Examples from Latin American countries, such as Argentina and Chile, who have also been active participants not only at the national level but also at the global city level, are also discussed. Based on this analysis, the paper proposes a new paradigm for environmental management of global city-regions, driven by the private sector and civil society, with government playing a regulatory and facilitating role.

Economic Growth and Urbanization

Megacities are the creation of the immutable process of urbanization, which is in part derived from economic growth and in part from government policies. As per capita income grows, structural change from agriculture to industry also occurs. In fact, the two processes are simultaneous and mutually reinforcing. What drives both economic growth and urban migration

is the movement of resources from low-return activities (agriculture, rural) to high-return activities (industry, urban). The strong relationship between urbanization and GNP per capita for selected Asian countries is seen in Figure 1. Economic boom, accompanied by rapid urbanization and slow growth in the supply of infrastructure and public services (including environmental protection), has caused a precipitous decline in environmental quality, as seen in Figure 2 for the case of the Bangkok global city-region of eight million people: urban congestion, legendary traffic jams, anaerobic water bodies, clogging air pollution, and ubiquitous uncollected solid waste mark Bangkok's golden economic decade, 1985-1995.

Urbanization and Environmental Quality: The Case of Asia

While the level of urbanization in Asia is considerably lower than that of Latin America, it has been growing faster. As a result, Asian cities are growing dirtier, noisier, and ever more congested. Particulate levels are twice the world average and five times the levels in other developing regions. Ambient levels of sulfur dioxide (a precursor of acid rain and a major regional pollutant that damages crops and materials) are 50% higher in Asia than in Latin America (GEMS 1996), corresponding to Asia's higher rates of economic growth during the 1980s and early part of the 1990s. Figures 3 and 4 compare selected Asian cities to selected North American cities, while figures 5 and 6 show the sources of particulate and SO₂ emissions in one Asian global-city airshed. Although Asian emissions of CO₂ (a global pollutant suspected to contribute to global warming) are less than half of the world average in per capita terms, they are growing at four times the world average. Fecal coliform count and suspended solids in Asian rivers are three to four times the world average, while surface waters in urban centers are replete with pathogens, organic material, and heavy metals, exceeding national and WHO standards. Thirteen of the world's fifteen most polluted cities are in Asia.

How well protected are Asians from this increasingly unhealthy environment around them? Despite the rapid, steady growth in income and wealth, one in three Asians still has no access to safe drinking water, and one in two Asians has no access to sanitation services; only in Africa is the situation worse. For those with access to public water supply, service is intermittent and poor, averaging between four and fourteen hours per day, while system leakages exceed 40%. At least one-third of a billion tons—and growing at rates of 3-7% a year—of solid waste remain uncollected, becoming the breeding ground for disease vectors. Millions of tons of hazardous waste are disposed of untreated in dumpsites and landfills, threatening both groundwater and the food chain.

What is the economic cost of environmental damage in Asia? Is there effective demand (willingness to pay) for environmental improvement in Asia? What are the expected benefits from different levels of environmental improvements, and how do they compare with the likely costs?

While there are no comprehensive estimates of the costs of environmental degradation in Asia, existing partial estimates indicate costs in the range of 2-10% of GDP, depending on the comprehensiveness of the estimate. For example, the Chinese Academy of Social Sciences has estimated environmental damages in China in 1990 to be US \$31 billion, or 8.5% of GDP, while Smil (1996) puts the figure between 5.5% and 9.8% of GNP. Far less comprehensive estimates for Indonesia, Pakistan, and the Philippines range between 2% and 3.3%. The Indonesian estimate of 2.0% includes only health effects of particulates and lead levels above WHO standards in Jakarta alone: premature mortality accounts for 80% of the \$844 million damages from particulates, and IQ loss in children for 90% of the \$1,320 million damages from lead emissions (Ostro 1996). Table 1 shows estimates of social costs of different fuels in selected

Asian cities. A reasonable average figure for annual damages and production losses for the typical Asian country would be around 5% of GDP. There are also significant additional welfare losses arising from damages to health, amenity, and existence value not captured by GDP losses.

Economic Growth and Environment

Environmental quality follows an inverted U-shaped curve during the course of economic development. It first deteriorates, during the industrialization process, and then improves during the post-industrial stage, as the center of gravity of the economy moves from industry to services (Panayotou 1993, 1997). However, the environmental price of economic growth is in part policy-determined. It is generally higher when policies subsidize extractive industries, such as capital-intensive industries, and inputs such as energy and water, when property rights are undefined or insecure and externalities pervasive and unmanaged; and when institutions are weak and enforcement is lax. Since all these policy, market, and institutional failures have been present throughout the developing world during the past several decades, it is very likely that megacities paid an unnecessarily high environmental price for their economic growth. While economic growth generated the structural changes, demand shifts, and financial resources for significant environmental improvement—especially in large cities such as Bangkok and Manila that produce about 50% of national GDP—the institutions and policies were not in place to ensure a supply response.

The Ineffectiveness of Current Policies

There is a general perception among developing-country policy makers that people are not willing to pay for environmental improvements, even for such basic services as access to safe drinking water. There is accumulating evidence from surveys and from revealed behavior (e.g.,

water purchases from water vendors and fetching of water from distant sources) that the great majority of households, including the poor, are willing to pay the full costs of improved municipal water supply and indoor sanitation, though not for outdoor sanitation. Defensive expenditures also indicate considerable willingness to pay for improvements in air quality. For instance, in the absence of access to reliable and safe public water supply, hundreds of millions of Asians are buying water from vendors at 3-8 times the price of metered tap water (World Bank 1992). Surveys have found that people in developing countries are as concerned about environmental degradation as people in the developed world and are willing to pay higher prices or to tradeoff growth for environmental protection.

Thus, while willingness to pay may be constrained by market and institutional failures, as in the case of outdoor sanitation, the lack of effective demand is not a binding constraint on environmental improvement. There is significant unmet effective demand because of unresponsive supply (see Figure 7). The public sector has been unresponsive because of underappreciated benefits and perceived high cost, as well as because of institutional weakness and a lack of funds. Excessive centralization of environmental management, lack of public participation, and institutional paternalism prevented individual and collective preferences from influencing public decisions concerning the supply of environmental services. Supply costs are inflated by the choice of costly—and largely ineffective—instruments, such as end-of-the-pipe command-and-control regulations, mandated best-available technologies, and centralized public capital investments, rather than least-cost alternatives such as price reforms, pollution charges, and decentralized provision. For example, the end-of-the-pipe investment program for controlling SO₂ and particulates in China and India is costing 3 to 10 times as much as the least-cost alternatives, because it focuses on power sector investments and ignores lower-cost

alternatives outside the power sector, such as reduction of emissions from coal burning households and industrial boilers. The supply costs of environmental improvements are compounded by the failure to take advantage of the wide variability in control costs among sources and pollutants and to allow the flexibility of response needed to achieve least-cost solutions (see Figure 8).

Environmental infrastructure, such as water supply, sanitation systems, solid waste collection, and wastewater treatment, is severely underfinanced because of inadequate cost recovery (itself the result of not charging users the full cost of supply), and a reluctance to involve the private sector in order to lower cost and to leverage private capital. The private sector itself is unresponsive to the growing demand for improved environmental services because it is either legally prohibited (natural monopolies) or unable to recover costs due to free-riding (public goods).

Sustainable improvements can only be achieved through changes of behavior, which in turn require changes of the incentive structure phasing individual economic agents as consumers and producers. As long as property rights remain ill-defined and insecure, as long as polluting inputs and extractive industries are being subsidized, as long as polluters free-ride on the environment and users of public services free-ride on the treasury, and as long as the dynamics of private sector and the spirit of civil society are bureaucratically constrained from making their full contributions, current trends cannot be reversed, and the gap between economic and environmental performance will continue to grow. Only a policy paradigm shift can put the developing world on the fast track to environmental recovery that parallels its fast track of economic growth. The new policy paradigm involves less government bureaucracy, an enhanced role for the private sector and civil society, and the aggressive pursuit of untapped win-win

policy reforms and high-return investment opportunities that would result in both environmental and economic gains: (a) phasing out of environmentally harmful subsidies, (b) cost-savings from the use of economic instruments, and (c) environmental investments with high returns.

Problems with Publicly Operated Infrastructure

A major rationale and catalyst for increased private sector participation in infrastructure and public sector provision has been provided by the poor performance and mismanagement characterizing most publicly-owned and operated utilities. Well-managed public systems are the exception rather than the rule. A combination of technical, financial, institutional, and environmental problems of public service monopolies have resulted in unreliable service, unsatisfied consumers, poor cost recovery and financially insolvent systems, unnecessary environmental damage, and unacceptable health hazards. The following problems have been identified based on an assessment of public water supply and sanitation systems (Idelovitch and Ringskog 1995) but apply at varying levels to other public services, such as power, telephone, and transport.

- (a) Low-quality service and inadequate coverage (50-75% for water, 30-50% for sanitation); inability to cope with expanding population; the intermittent, low pressure water supply is mirrored in the power sector by frequent brown-outs and a variable electric current.
- (b) Inefficient operational practices and poor maintenance resulting in large water losses, unaccounted-for water, and power losses as high as 40-50% (compared to 10-20% for well-managed systems).
- (c) Excessive and wasteful use. For example, water consumption may reach 500-600 liters per capita, which is twice the norm in metered and well-managed water supply systems; this is largely the result of water pricing, non-marginal cost pricing, and lack of metering.

In the energy sector, underpricing leads to energy intensities (energy use per unit of GDP) that are two to three times the norm for full-cost priced energy.

- (d) Poor cost recovery and financial problems arising from underpricing, limited consumption metering, irregular meter reading and billing not based on actual consumption. Water and electricity tariffs typically do not reflect the incremental costs of future supplies, which results in inadequate funds for expansion. Poor maintenance resulting from poor cost recovery causes in a vicious circle of falling revenues and deteriorating service.
- (e) High labor costs and low labor productivity because of excess staff, generous benefits, and low skills. For example, public water companies often employ 5-10 employees per 1,000 water connections compared with only two to three employees per 1,000 connections for efficient water companies.
- (f) Poor management and inability to attract management talent and qualified technical staff due to non-competitive wages, political appointments, high turnover, lack of disciplined labor force, and lack of incentives to attract qualified managerial and technical staff.
- (g) Large and growing state subsidies that benefit mainly the middle class and the wealthy who are large consumers of water and power while the poor are either not connected or too small users to benefit much from untargeted subsidies.
- (h) Lack of clear regulatory responsibility and conflict of interest between the regulator and operator functions of the public utility. Underperformance or undercompliance is often dealt with by lowering standards rather than by improving operations.
- (i) Public service monopolies are usually among the largest sources of environmental problems, for reasons that range from soft budget constraints and inefficiency to low

tariffs and bureaucratic shielding. Water and electricity tariffs rarely include environmental costs. For example, water rates do not cover the cost of collecting and treating wastewater. Moreover, the general lag of sewage connections behind water supply connections results in sewage being deposited in septic tanks that contaminate shallow aquifers, often a major source of urban water supply.

The poor performance and mismanagement characterizing most publicly owned and operated utilities created the impetus for considering private sector participation. A second and equally important catalyst has been the increasing needs of urban infrastructure (power, water supply and sanitation, roads, ports, telecommunications, etc.) and the inability of the public sector to mobilize these resources. A declining ODA, unsustainable levels of budget deficits and external debts, and the need to maintain fiscal discipline to control inflation and spur economic growth have convinced governments to seek private sector resources.

The Promise and Challenge of Private Sector Participation

The promise of the private sector lies in (a) improved management and higher efficiency and (b) increased access to private capital for maintenance and expansion. The two are related since greater efficiency results in cost savings and greater availability of funds for investment; improved management results in easier access to private capital; and investment of private capital constitutes an added incentive for operational efficiency.

While the potential benefits from private sector participation are clear, the obstacles are often formidable. Infrastructure investments tend to be capital intensive and lumpy; have long gestation and even longer payback periods. For example, in water and sanitation, the ratio of investment in fixed assets to annual tariff revenues is 10 to 1. This means that private financing is contingent upon the existence of long-term capital market and guarantees and rewards offered

for high perceived risks. The private sector risks are many and varied: demand for the services provided may turn out to be lower than expected; tariffs may be too low and not permitted to adjust to reflect costs; the condition of infrastructure may turn out to be worse, delays of construction longer and costs higher than anticipated. Other risks include the financial risk of currency devaluation, legal risks in dispute resolution, and the political risk of asset appropriation. As a result of one or more of these risks, the private contractor may be unable to recover costs and earn a reasonable profit. Indeed, how these risks are quantified and mitigated turns out to be the key to private sector participation in infrastructure projects. The principle is that whoever controls a particular risk best should assume it and be compensated for it.

The public sector that invites private sector participation in areas that have been traditionally reserved for the state also faces risks: procured services may be substandard or costs may turn out to be higher than those charged by the public utility. There are also political risks, arising from public opposition, especially by labor unions. Water supply, sanitation, and power (as well as other utilities) are natural monopolies; it is uneconomical to duplicate the water and sewage pipes or the power lines in city streets, and, therefore, competition is difficult to achieve. Moreover, regulation is necessary to protect against monopolistic practices. Regulation is also necessary to control externalities related to public health and the environment. When the social benefits exceed private benefits, investments must be promoted above what is privately profitable.

The obstacles to private sector participation may appear formidable. Lack of adequate legislation for private sector involvement and non-enforcement of property rights and contracts are common obstacles, as are bureaucratic inertia and lack of confidence in the private sector among policy makers. Other constraints include unfavorable public opinion, fear of foreign

operations, and reluctance to deal with labor problems. The constraints may also be on the supply side, with the private sector showing too little interest to ensure competitive bidding. Despite these obstacles a number of poor and middle income countries succeeded in attracting private sector participation in urban environmental management through a variety of innovative instruments (see Table 2).

Phasing out Distortionary Subsidies

The World Bank (1994) estimated that the cost recovery of urban water supply systems in developing countries averaged 35%, imposing a fiscal burden of \$13 billion a year. Developing country governments, like those of OECD, intervene heavily in their energy markets through direct and indirect producer and consumer subsidies. OECD energy subsidies are estimated to be in the range of \$60-75 billion (OECD forthcoming). Larsen and Shah (1994) have estimated non-OECD energy subsidies to be in the range of \$270-330 billion in 1991, equivalent to 5-7% of GDP. China and India combined energy subsidies were put by the same source at \$36 billion, also in 1991. There are no estimates for the whole region but a figure of \$50 billion would be a conservative estimate. Petroleum prices in China in 1991 were 76% of world prices, in India 44%, while electricity prices were 37% and 54% respectively. In Indonesia, petroleum prices were as low as 37% of the world price. Coal – Asia's dirtiest fuel – responsible for millions of deaths and billions of damages a year, received an 18% subsidy in China and a 38% subsidy in India. Ingram and Fay (1994) estimated that avoidable power losses in the transmission, distribution, and generation stages amount to \$30 billion in developing countries or 0.6% of GDP.

Subsidy removal promises large environmental benefits including reductions of NO_x, SO₂, and CO₂ and in the case of transport fuels reduction of congestion and particulates. In

addition, \$3 billion can be saved from eliminating illegal connections and \$2.5 billion from increased efficiency of use resulting from full-cost pricing. Full-cost pricing could save as much as 30% of residential water consumption and over 60% of industrial consumption¹ while repairs to the distribution systems and elimination of illegal connections can save another 25% of water supply (World Bank 1994). In total, 50% of current water supply in developing countries can be saved and used to supply the uncovered population with better pricing and demand management and only modest investments in repair and expanded distribution systems. With few exceptions, no major investment in new sources of supply would be needed.

In Beijing, for example, 70 million cubic meters of water per year or 15% of current domestic consumption could be saved through improved efficiency in public utilities, leakage repair and recycling of cooling water used in air conditioning at the cost of \$0.02-0.04 per cubic meter. Another 300 million cu.m. per year or 33% of current industrial consumption can be saved by increasing recycling of cooling water in manufacturing and in power plants, at the cost of \$0.02-0.05 per cu.m. (World Bank 1992). For comparison, the cost of the next lowest cost water development project is \$0.11 per cubic meter or more than three times the average cost of water savings through efficiency improvements. The savings equal \$28 million per year and do not exhaust the opportunities for water conservation and increased coverage through demand management. At a price of \$0.08 per cubic meter, installation of water-efficient toilets in households and wastewater recycling in industry become profitable, saving additional quantities of water, still at two-thirds of the cost of water from new water development projects. Table 3 reports estimates of a 65% reduction in SO₂, a 40% reduction in NO_x, and a 7-18% reduction in global CO₂ emissions from removing subsidies in countries such as China and India. Removal of

¹ Assuming a residential water price elasticity of -0.45 and an industrial of 0.9. Bhatia, Cesti, and Winpenny, *op.*

subsidies also removes the incentive to produce energy-intensive products and encourages the production of more energy efficient consumer goods, resulting in further reductions in energy use and air emissions.

The economic benefits from energy subsidy removal are also substantial. Larsen and Shah (1994) estimate that eliminating consumer subsidies of energy in non-OECD countries would raise welfare by \$35 billion. Burniaux, Martin, and Oliveira-Martins (1992) estimate that discounted real income would increase by 1.6% in non-OECD countries, real world income by 0.7% annually while the terms of trade would improve by 0.5% per year. The major exceptions are China, which is expected to experience an average real income loss of 0.7% per year, and the oil exporters. Hope and Singh (1995) present evidence from developing countries that raising energy prices by removing subsidies does not harm competitiveness; GDP growth rates were the same or higher than before the reform. Furthermore, the removal of energy subsidies has public revenue effects (higher public savings, lower deficits) that are supportive of economic growth. While there was a small welfare loss for urban poor using commercial fuels, the overall conclusion is that energy subsidy removal has not harmed the poor (Hope and Singh 1995).

Cost Savings from the Use of Economic Instruments

The very same environmental protection achieved today in Asia through the existing rigid command-and-control regulations can be achieved at a fraction of the current cost, possibly a third or lower, through a more flexible incentive-based system that combines economic and regulatory instruments. Indeed such an environmental policy reform is likely to be both economically less costly and environmentally more effective as countries that make even a partial move (Malaysia, Singapore, Korea, Indonesia, Thailand, and Chile) discover.

cit., report residential elasticities of -0.3 to -0.6 and industrial of -0.4 to 1.4. These are very conservative estimates.

The cost savings in moving from command-and-control to economic instruments or to a mixed system can be demonstrated by comparing the costs of the existing combination of discharge permits and fines on over-standard emissions to a full emissions charge system. Based on a sample of 260 enterprises in Beijing and Tianjin, China, with multiple water pollution sources, for which abatement varied from 0-100% with a median abatement level of 70-80%, Dasgupta *et al.* (1996) derived a marginal cost curve and determined the emission charge that would achieve the current abatement rate for each pollutant. Abatement costs were reduced from \$47 million to \$13 million, a saving of \$34 million from this set of enterprises alone, or a 70% reduction from the command-and-control cost level.

The large cost savings from a shift from command-and-control regulations to least-cost instruments is well-documented in the United States, where most studies show ratios of CAC-cost to least-cost ranging from 2 to 22 (Teitenberg 1990). It is particularly notable that the savings are greatest in the case of particulates, the developing world's most serious and widespread air pollution problem. Even if only two-thirds of the current cost of environmental protection could be saved from a more efficient regulatory system, the effect would be equivalent to that of tripling environmental expenditures under the existing system.

The economic benefits of a more flexible and effective regulatory regime go beyond cost savings to the enhancement of competitiveness. A World Economic Forum survey of business executives in 50 countries reveals a strong correlation between the flexibility of environmental regulations and international competitiveness. Countries that rank high in terms of competitiveness, such as Singapore, Hong Kong, New Zealand, Chile, and Norway, also rank high in terms of the flexibility of environmental regulations, while countries such as Russia, Venezuela, and Hungary that rank low in terms of competitiveness also rank low in terms of the

flexibility of environmental regulations, at least as perceived by investors and business executives (Panayotou and Vincent, 1997).

Environmental Investments with High Economic Returns

The environmental neglect, in the cities of the emerging world, during the take-off process of economic growth left unexploited countless public investment opportunities that at modest cost can yield large economic and environmental benefits. The scope and magnitude of these opportunities is exemplified by the following examples:

- **Water Supply:** In Phuket, Thailand, increased access to water and improvement of service would yield returns in the range of 14-300%. The higher returns are due to the fact that water shortage affects Phuket's lucrative tourist industry. In Gujnamwala, Pakistan, increased access to safe water would yield a 20% rate of return.
- **Energy efficiency improvements in electricity generation in Asia** would result in savings of \$9-13 billion while similar improvements in residential and commercial energy use (including electricity consumption) would result in net savings of \$26-39 billion, not including productivity gains from health improvement and reduced agricultural damages resulting from reduced emissions (ADB 1992, Saunders and Gandhi 1994).
- **Pollution Control:** Investment of \$20 million to reduce of BOD discharges from the top 100 polluters in the Metro Manila area would result in labor productivity gains and reduced fishery losses valued at \$250 million. Investment of \$35 million in fuel reformulation to reduce lead in gasoline and sulfur in diesel would result in productivity gains from avoided illness and reduced damages to forestry and agriculture valued at \$85-160 million (Table 4).

Towards a New Policy Paradigm

It is generally recognized that environmental degradation in developing country megacities has reached unprecedented levels, and it is likely to get worse. It is appreciated that it carries a heavy price in productivity losses, health costs, and human suffering. It is also recognized that it is easier to deal with these problems in a growing rather than a stagnant economy. The need for new legislation and new institutions is widely acknowledged as is the general weakness of enforcement throughout the region. A consensus is emerging that punitive regulation would be less effective than a collaborative effort that encourages industries and communities to set standards and guidelines for their members and to monitor themselves with only spot checks by the regulators. It is increasingly recognized that non-governmental organizations and the civil society have an important role to play in environmental management. It is also beginning to be recognized that consideration of benefits and costs in environmental policies and projects is just as important as it is in economic policies and projects.

The emerging new policy paradigm is one of smaller central government and stronger local and city-region governments capable of good governance and effective management (see table 5). It involves a far greater role for the private sector and civil society in the provision of environmental infrastructure, public services, environmental investments, and even monitoring and enforcement of environmental regulations, areas in which governments and bureaucracies dominated in the past. But this policy shift cannot take place in an institutional and legal vacuum. There is a need for enabling legislation and new rules of the game that would allow greater flexibility of response and wider involvement of the private sector in the provision of environmental services while protecting the public interest and accommodating distributional concerns.

At the same time, it is equally critical to strengthen the capacity of governments to set priorities, to establish and clarify property rights, to undertake reforms and redeploy resources, to introduce flexible yet consistently enforced regulations and economic instruments, to competitively outsource services, and to design and carry out targeted interventions to achieve distributional objectives at least cost. The new policy paradigm envisages only limited and targeted increases in public environmental expenditure, a major overhaul and redeployment of existing resources to increase their efficiency and effectiveness, and considerable mobilization of domestic and external private capital sources to finance the needed environmental improvements.

In order to achieve both environmental improvement and continued economic growth, global-city-regions will do best to adopt the best available policy (BAP) rather than the best available technology (BAT). The best available policy is one that (a) minimizes the costs of environmental protection by judicious choice of instruments and (b) gradually internalizes it to the generators of environmental damage and/or the beneficiaries of environmental improvement. The new policy paradigm leverages limited and targeted public environmental expenditures by tapping the private sector and market competition to supply environmental infrastructure that is least cost, self financed, and well maintained (see Box 1 on the Buenos Aires Consortium for Water Supply and Sanitation). Under this scenario, environmental expenditures can be kept under two percent of GDP with less than half provided by the public sector. Since public environmental expenditures in the developing world are just under one percent, this scenario will not involve substantial increase in the public expenditure on the environment but a significant redeployment of existing resources toward a more targeted and strategic portfolio (see Table 6 for investment and control actions relating to the environmental sustainability of global city regions).

Conclusion

Globalization brings unparalleled challenges and opportunities for global city regions both in terms of wealth creation and environmental sustainability. How the governance of the megacities and of the countries of which they are part manage globalization will determine whether they will be sustainable entities, fully integrated into the global economy while preserving their individuality or will become an unmanaged sprawl of built-up areas imposing externalities on each other and underpinning their long term sustainability and competitiveness. To a considerable extent, this will depend on how much responsibility, authority, and accountability as well as resources devolved from central governments to local governments the private sector and civil society. The experience of a good number of innovative cities in recent years in both the developed and developing world provides grounds for optimism.

Box 1. The Buenos Aires Concession for Water Supply and Sanitation

The Greater Buenos Aires water supply and sanitation system, operated by a public company (*Obras Sanitarias de la Nación*, OSN) was plagued through the years by problems common to public water utilities throughout the developing world. Coverage was only 70% for water supply and 58% for sanitation. The service was of poor quality and unreliable, while only 5% of the wastewater received any treatment before dumping into natural water bodies. Infrastructure was poorly maintained and unaccounted-for water was as high as 45% of the water produced. Water meters were installed at only 20% of the connections; meter reading and billing were highly irregular, and water consumption reached 400-500 liters per capita a day—twice the norm for metered and well-managed systems. The public utility was grossly overstaffed with 8,000 employees, or 8-9 employees per connection compared with 2-3 by efficiently operating systems. At the same time, population growth and urbanization were expanding the demand for additional coverage. The costs of rehabilitation of the deteriorating system and expansion to reach 100% coverage was estimated at several billion dollars over the next 20-30 years, which was clearly beyond the capacity of both the utility and the state to mobilize.

In 1993, the government of Argentina privatized water and sewage services for Greater Buenos Aires as part of a massive privatization program that began in 1990, with World Bank support, and included virtually all public services and federally-owned enterprises such as electricity, telephone, railways, airlines, roads, and ports. The private sector participation option chosen for water and sanitation was a 30-year full concession that allowed the assets to remain under public ownership while the operation, maintenance, rehabilitation, expansion, and wastewater treatment were transferred to a private concessionaire. After a successful process of preparation and bidding, the concession was awarded to *Aguas Argentinas*, a consortium of foreign and local firms led by *Lyonnaise de Feax-Dumez*, that offered a 27% discount to the prevailing public water tariffs. Thus, competition was effective in reducing costs. It also mobilized \$4 billion over the life of the contract to meet the performance targets of the concession, which include 100% coverage in water supply and 90% coverage in sanitation by year 30, a reduction in the unaccounted-for water from 45% to 25%, and an increase in sewage treatment from 4% to 93%. Over the first five years alone, the concessionaire will invest \$1.2 billion, or \$240 million a year—12 times more than the historic annual investment made by the public utility in the last decade. To regulate and control the concession and protect the consumers against monopolistic practices, the government established a regulatory agency, *Ente Tripartito de Obras y Servicios Sanitarios* (ETOSS) with participation of the federal, provincial, and local government with a budget of \$8 million to be financed through a user surcharge 2.7% of the water and sewage bill collected by the concessionaire. The regulatory agency also enforces water and effluent quality standards based on international norms introduced prior to the bidding.

During the first three years of operation, accelerated rehabilitation of the system led to a reduction of water losses from 45% to 25% and coverage increased by 10% with no increase in production. The population receiving sewage services increased by 8%. Prices were reduced initially by 27% but increased by 13.5% in 1994 to further accelerate rehabilitation as provided in contract clause; still, water prices are 17% lower than those charged by the public utility. The staff was reduced by 47% through severance payments by the government and voluntary retirement program by the concessionaire. Labor productivity rose and new recruitment is now underway as the concessionaire is responding to increasing demand for water and sanitation services. The table below summarizes these improvements.

Table 6 Impact of Greater Buenos Aires Water Concession

<i>Indicator of Performance</i>	<i>Change from May 1993 to December 1995</i>
Increase in production capacity (%)	26
Water pipes rehabilitated (kms)	550
Sewers drained (kms)	4,800
Decline in clogged drains (%)	97
Meters upgraded and installed	128,500
Staff reduction (%)	47
Residents with new water connections	642,000
Residents with new sewer connections	342,000

Source: Aquas Argentinas.

While the overall experience has been clearly positive and the model is now being adopted by other Argentine provinces and other countries in Latin America, there have also been teething problems with regard to negotiations with the labor unions and regulation. Indirect labor costs remain high as the concessionaire continues to provide fringe benefits traditionally available to civil servants. The regulatory agency staffed with former utility employees finds it difficult to give up the state's day-to-day management role and focus on its regulatory and contract enforcement role.

The successful privatization of the supply and sewage services in Buenos Aires contains many important lessons for private sector participation in water and sanitation throughout the developing world. First, privatization must receive the endorsement of major stakeholders, enjoy political commitment at the highest level, and be part of a comprehensive program of economic reforms. Second, political, technical, legal, commercial, and financial risks must be assessed and alleviated through appropriate mechanisms. Third, all available options for private sector participation should be considered and the one best suited to the country's political and cultural conditions and the sector's features must be selected; the assets need not be privatized to improve efficiency and attract private capital. Fourth, the regulatory framework and regulatory institution must be established, and the technical and financial feasibility of the concession studied prior to bidding. The regulatory entity must be strong enough to regulate an experienced international concessionaire. Fifth, while adequate preparation and time should be allowed to ensure universal bidding, eligibility should be confined to qualified bidders through a prequalification process. Sixth, sensitive staff reduction issues can be effectively dealt with through attractive retirement packages jointly financed by the government and the concessionaire. A final lesson is that the contract should be realistic and specific to minimize conflicts yet be flexible enough to allow for adjustments for unforeseen or substantially altered circumstances.

Sources: Idelovitch, E. and K. Ringskog, "Private Sector Participation in Water Supply and Sanitation in Latin America," Washington: World Bank (1995) and Crampes C. and A. Estache, "Regulating Concessions: Lessons from the Buenos Aires Concession," in *Public Policy for the Private Sector*, World Bank (Sept. 1996).

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