

Communities, Markets and City Government: Innovative Roles for Coastal Cities to Reduce Marine Pollution in the Asia-Pacific

Recommended Citation

Jason Hunter and Lyuba Zarsky, "Communities, Markets and City Government: Innovative Roles for Coastal Cities to Reduce Marine Pollution in the Asia-Pacific", EASSNet, April 01, 1998, <https://nautilus.org/eassnet/communities-markets-and-city-government-innovative-roles-for-coastal-cities-to-reduce-marine-pollution-in-the-asia-pacific/>

Jason Hunter and Lyuba Zarsky
Program Officer and CoDirector
Nautilus Institute
for Security and Sustainable Development

Prepared for
APEC Workshop on Regional Implementation of the
Global Programme of Action for the Protection of the Marine Environment from Land-Based
Activities
April 14-16, 1998
Townsville, Australia

Abstract

As large agglomerations of both people and industry, coastal cities are important sources of marine pollution problems as well as of marine pollution solutions. Coastal cities can play a pivotal and creative role in financing water infrastructure and regulating water pollution by industry. Even if national governments are slow to act, cities can make substantial progress in improving coastal management. The fact that inhabitants of coastal cities must live with the pollution gives citizens and local government authorities strong incentives to reduce pollution. Coastal cities may be more open to civic groups and other NGOs as partners than national governments, which could help to reduce the cost of pollution control and improve enforcement of regulation. They may also be able to sidestep geopolitical constraints which hamstring national governments and take collective action with cities in other nations in protecting shared watersheds, coastal areas, or seas. This paper has three aims. First, to outline of a "new model" of environmental management based on the collaboration of government with markets and communities. Second, to explore how such a model is salient in addressing marine pollution in the two dimensions of: a) increasing investment in water

infrastructure, and b) raising industrial performance in water pollution and conservation. And third, to consider why and how the model might take root in a city government context.

I. The Need for Innovative Approaches Introduction

Globalization is driving a quiet yet pervasive change in how the world is governed. As the quest for economic growth strains national budgets, governments are rapidly decentralizing key areas of governing power to local and municipal levels of administration. While empowering local municipalities with greater political authority and responsibility, a welcome move for many cities, municipalities are now faced with the monumental task of meeting rapidly growing social, economic, and environmental demands.

Cities are further challenged by a combination of weak fiscal regimes, little experience, and often weak governance capacity which is crippling many of the world's cities' ability to maintain basic infrastructure. One area where these policy and economic failures are having the greatest impact on health, economy, and political stability is the challenge of coastal cities to finance, build, and operate their water and sewage infrastructure sustainably. Nowhere is this a greater challenge than in East Asia.

Despite a dramatic shift in national government's attitude toward addressing environmental problems, the region's cities are-and rapidly increasing-primary sources of land-based marine pollution. While there are many reasons why efforts to control municipal pollution are "stuck in the mud," three are especially salient in the Asia Pacific region.

First is the problem of fiscal constraint. Raising environmental performance in general and in water management in particular will require a large investment in infrastructure. Investment requirements span not only "plant and equipment," that is, wastewater management and water delivery systems, but also in developing and maintaining environmental information systems (especially performance indicators) and in technical training. The large investment requirements-awesome at the best of times-are particularly daunting in the context of the Asian financial crisis. Public funding for environmental infrastructure is being slashed, not expanded, especially in Southeast Asia.

Second is the lack of regulatory and policy capacity. Industrial emissions are a significant source of land-based marine pollution. Part of the problem is poor water pricing: industrial (and other) users rarely pay the full cost of water services. In fact, they are typically subsidized. Effective metering systems, however, require investment, which leads back to the problem of fiscal constraint. Even without water price reform, effective regulation of industry could potentially be a low-budget strategy to improve delta, riverine and coastal water quality. However, enforcement of existing regulations-based on a traditional command-and-control model-has proved difficult throughout East Asia (and, indeed, in North America as well). Enforcement problems stem from many sources, including poorly funded environmental bureaucracies, corruption, and, probably most important, poorly designed incentives.

Third is the problem of political will. In the main, the international environmental agenda is dominated by rich countries, whose priorities often differ both from poorer countries. While governmental leaders and bureaucrats may sign agreements and develop "action agendas," there is little effective political demand at home-either from elite or community groups-to implement them. Similarly domestic environmental legislation is often passed, yet rarely enforced. Priorities are more often geared towards rapid economic growth, with little incentive for spending on environmental performance. Moreover, in times of financial difficulty-as seen during the current crisis-infrastructure projects are often the first to be cut as an easy means to increase government revenues. The problem of skewed priorities is compounded by the fact that, in many East Asian countries, there are still few avenues for community and non-governmental organizations (NGOs) to press their concerns. In some cases, governments are nervous or even suspicious of citizen action.

Overcoming these constraints requires innovative approaches to infrastructure financing and environmental regulation and enforcement. It also suggests that meeting these challenges must be linked to the key priorities for water management in East Asia, including the need to provide access to clean water and sewage for a large share of the population, as well as clean water for industrial growth. Finally, it points towards greater community responsibility and action. This paper suggests that coastal cities could play a pivotal and creative role in financing water infrastructure and regulating water pollution by industry. On the one hand, as large agglomerations of both people and industry, coastal cities are important sources of the problem, i.e., land-based sources of marine pollution. Even if national governments were slow to act, cities could make a substantial dent in improving coastal management. Moreover, the fact that they must live with the pollution gives cities particular incentives in reducing it.

On the other hand, cities may have advantages over national governments in taking action on coastal marine

pollution. They may be more open to civic groups and other NGOs as partners, which could help to reduce the cost of pollution reduction and improve enforcement of regulation. Cities could also sidestep geopolitical constraints which hamstring national governments and take collective actions with cities in other nations in protecting shared watersheds, coastal areas, or seas. This paper has four aims. First, it sketches an outline of a "new model" of environmental management based on the collaboration of government with markets and communities. Second, it explores why such a model is especially salient for coastal cities in two dimensions: increasing investment in water infrastructure, and raising industrial performance in water pollution and conservation. Thirdly, it considers why and how the model might best take root in a city government context. Finally, it examines the challenges to implementing these approaches and potential avenues to overcome these barriers. This paper examines these issues through the lens of East Asian cities. With the world's largest concentration of coastal cities, a mixture of developed and developing nations, and rapid economic growth, East Asian cities provide a good cross-section of the challenges cities face, as well as a good test bed for innovative approaches to urban environmental management.

II. Multiple Agents: A New Model of Environmental Management

2.1. Formal Regulation The traditional model of environmental management puts government, usually national government, in the role of regulator and enforcer, as well as financier of public goods and operator of public utilities. Whether in the U.S. or China, the government has traditionally been understood to be in a bilateral relationship-regulator and regulated, provider and consumer-with industry and community. In this "command-and-control" model, government's role is to directly wield sticks and provide carrots and to be the "good parent" in providing public goods.

While it has achieved some success in raising environmental performance in the U.S. and elsewhere, the traditional model is being re-examined because it is expensive and rigid (Ruckelshaus 1998). On the regulatory front, the command-and-control model requires that substantial resources be devoted to enforcement. Moreover, there is no incentive for business to exceed standards. On the public goods front, government services are subject to problems of corruption, capture by sectoral interests, and political determination of prices.

In East Asia, the command-and-control model has not been very effective. While a spate of environmental legislation bloomed in the early 1990s, enforcement has languished, in part due to lack of funds (as well as political will). As providers of public goods, national governments have been constrained by ineffective tax systems, priorities for other kinds of spending (especially military), and corruption-and, more recently, by financial crisis. Moreover, some East Asian countries lack strong traditions of law.

2.2. Informal Regulation

Rather than bilateral governor-governed dyads, the new model of environmental management is based on the concept of multiple agents and multiple incentives (Afsah et al. 1996). It suggests that there are three key agents who interact in setting social norms for environmental management: government, markets and communities. While it can act to directly influence the other sectors, government can also achieve social goals by indirect action; i.e., it can design policies and build capacities which enable communities to act upon markets and thereby raise environmental performance. Specifically, this means that communities can play a role in regulating industry; and markets (and communities) can play a role in the provision of public goods.

Most important, the "triangular model" means that governments can leverage the other two sectors in raising environmental performance. Leveraging is the key to overcoming the three obstacles identified above, viz., fiscal constraint, lack of regulatory capacity, and political will. The role of communities in improving the environmental performance of industry has been termed "informal regulation." According to Afsah et al (1996), "Recent evidence from Asia, Latin America and North America suggests that neighboring communities can have a powerful influence on factories' environmental performance...The agents of informal regulation vary...local religious institutions, social organizations, community leaders, citizens' movements or politicians...Factories negotiate directly with local communities, responding to social norms and/or explicit or implicit threats of social, political or physical sanctions if they fail to reduce the damages caused by their emissions."

Through informal regulation, communities reduce the cost of monitoring and enforcement of regulations. Community groups can also help to identify policy gaps and perverse incentives, provide technical assistance, and gain popular support for government initiatives. In recognizing the role of communities in environmental regulation, governments focus on how to make community intervention and pressure effective. To this end, gathering and disclosing information becomes a key role for government, as well as providing forums in which citizen and industry groups can directly negotiate with each other. Community groups may also play a role as providers of public goods, including

water supply and management. For example, in the slum of Orangi in Karachi, Pakistan, community groups got together to build their own sewers. Contributing both money and labor, the community was able to build underground sewage pipes at a fifth of the cost of government-run projects. Over 12 years, they contributed \$2 million and installed sewers serving over 90,000 homes. The project was launched with a very small grant (World Resources Institute, Box 6.2).

2.3. Markets

The other key agents in the new model are markets, included as providers or partners in the provision of public goods. In water supply and management, especially in developing countries, governments have been grossly ineffective. According to an Asian Development Bank (ADB) study, over 40 percent of Asia's urban population did not have access to adequate sanitation in 1987. Where sewage systems were in place, over 90 percent of the sewage is discharged untreated. Moreover, the system is highly inequitable. Water and sewage hookups-at state subsidized prices-are typically available only to wealthier customers. Forced to pay private vendors for potable water, the poor pay as much as ten times more than wealthier customers (Lohani 1997).

In this context, governments have increasingly turned toward privatization of water utilities. However, given highly subsidized water prices, turning a profit in the water supply business is not easy. Probably the single most potent market-oriented policy initiative-both for conservation and as a way to boost infrastructure investment-would be for governments to surely and steadily nudge water prices towards something like the full cost of provision. Metered water systems with full-cost pricing would provide incentives for water conservation to households and industry alike.

Raising water prices, however, is politically sensitive and subject to reversal, a fact not lost on private investors. In Malaysia, for example, the government has embraced privatization on a scale larger than any other country in East Asia. With 65% of its waste going directly untreated into its waterways, Malaysia privatized its national sewage treatment facilities in 1993 as a way to overcome its financial and technical constraints. Under a concessions agreement, the Indah Water Consortium was asked to upgrade and build new sewerage treatment facilities in a \$2.8 billion contract. Although initial indications show reductions in effluent, progress has been slow due to consumer protests over fees. The government has been forced to step in on several occasions to lower prices (Kohli 1997).

The Malaysian case demonstrates that communities can act not only to further but to undermine governmental goals. Government-market which ignore impacts on and likely responses of communities will be vulnerable to opposition and paralysis. Lack of participation in the design and planning process is one way to trigger opposition. Under a multiple agent model, governments would at least recognize the importance of garnering community support before undertaking important policy initiatives, such as changing water prices.

III. Reducing Land-based Sources of Pollution

The reduction of land-based sources of marine pollution from coastal cities will require two broad initiatives: 1) a large increase in investment in water supply and management infrastructure; and 2) a significant improvement in the environmental performance of industry (and government). Given the obstacles identified in the Introduction, viz., fiscal constraints, lack of regulatory capacity, and lack of political will, it is likely that adoption of the multiple agent model is the only way to address municipal sources of land-based sources of pollution. Two broad applications of this model are described below.

1. Innovative Financing for Water Infrastructure:

The need for investment in water supply and management in Asia is staggering. According to UNEP (1997), as much as 70 percent of the waste effluent discharged into the Pacific has had no prior treatment. Besides ecologically destructive nutrient loading, untreated waste is a major source of sewage-borne pathogens such as cholera, hepatitis, and salmonella (WRI 1996). Bangkok attributes 6 percent of deaths annually to water-borne diseases. The problem is not confined to the region's poorest countries. As late as 1991, the Republic of Korea reported that only a third of municipal wastewater went to treatment plants. Region-wide, the ADB estimates that only 60 percent of the population in urban areas and 40 percent in rural areas have access to safe drinking water, with over 270 million urban residents without adequate sanitation.

Estimating the capital requirements for adequate water and sanitation infrastructure is tricky. In addition to technology and design choices, there is great uncertainty over the future costs of providing water supply for urban areas. In part because of past pollution, new water sources will lie farther from cities and will cost more to reach.

Moreover, there are social choices: even if all agreed that the goal is to service 100 percent of the population, choices must be made as to the rate of meeting demand.

One attempt to estimate water and sanitation investment requirements was undertaken by Paul Weatherley for a 1994 ADB study. Weatherley developed two scenarios-business as usual and accelerated progress. Business-as-usual projected trends of the past seven years to the year 2000. Given that the number of people served decline in the past seven years, this estimate would mean that a smaller percentage of the population would have access to clean water and sanitation-even at the same levels of investment. Under this scenario, Weatherley estimated that, for the developing market countries of the ADB, \$7.8 billion per year would be needed. Under an accelerated progress scenario, wherein a larger percentage of the population would be served than in 1994, the annual capital requirement would be \$13.1 billion (Weatherley 1994, Tables 1.7-1.10).

The traditional approach to water infrastructure financing-public sector and multilateral banks-will not be up to the task. Multilateral funds and bilateral aid budgets are shrinking. Moreover, public sector investment and operation of water supply and sanitation will be both insufficient and non-optimal. "With a few exceptions," concludes a recent study, "the public sector has been a costly and inefficient provider of infrastructure while its social and environmental dimensions received little attention...most public utilities are insolvent and heavily subsidized by the state, yet the quality of service remain poor and the coverage partial" (Panayotou 1997, 1). The only way to meet growing infrastructure needs in general and water management in particular is via increased participation of the private sector. However, infrastructure investment is characterized by political risk, long-term and/or low returns, high overhead costs, and long payback periods. Water and sanitation investment is particularly problematic: the ratio of investment in fixed costs to annual revenues is ten to one (Panayotou 1997, 3). Unlike electricity, which has drawn lively investment in developing countries, water is not very attractive to private investors. "Water and sewerage," says John Briscoe of the World Bank, "is a low-return, high-risk business" (quoted in Economist, March 21-27 1998).

In this context, governments have two options. First, they can keep public ownership of assets but contract out management, operation and/or investment. They can use service contracts, management contracts, lease arrangements and concessions. Second, they can privatize wholly or partially, temporarily or permanently. Among the innovative instruments and mechanisms which have been utilized or proposed are government guarantees, predetermined revenue streams, concessions, joint ownership, and a variety of build-own-transfer or build-own-operate (BOT/BOO) programs.

In such partnerships, one of the key roles of government is to manage and reduce market, technological and/or political risks-on both sides. Besides the specific guarantees it can offer investors, governments must promote good governance at home and ensure high environmental and social performance by private investors. Governments also can act as financial brokers through concessionary tax policies, discretionary funding, and combining a number of public and private investors.

2. Industry Regulation and Community Involvement:

While little data is available, it is evident that industrial effluents are a significant source of land-based marine pollution in Asia. A 1993 World Bank study of Indonesia, for example, concluded that industrial pollution constitutes 25-50% of the total pollution load in different rivers in Java (World Bank, 1993, p. 70). More recently, the ADB estimated that industrial wastewater constitutes an estimated 25% of total discharge in Bangkok and 35% in Manila (Lohani 1997).

Rapid economic growth, much of it based in coastal cities, coupled with little or non-existent enforcement of environmental regulations is widespread throughout East Asian cities. Regulating industries in the traditional way has not been very effective. While the need to improve industrial environmental performance is clear, as outlined below, it also seems obvious that the traditional model of regulation can be only minimally effective.

The multiple agent model, however, points toward new approaches which would utilize communities and consumers as "informal regulators." Indonesia, for example, developed a five tier colored rating system for environmental performance of leading companies. Even the threat of receiving a black (i.e. substandard performance) label served to increase many companies' investment in environmental management. The Philippines' Department of Environment and Natural Resources (DENR) has planned to replicate the Indonesian model with a public disclosure program called EcoWatch. One study of the water pollution levy in China found that, even though the official levy rate was uniform across the country, the effective rate varied significantly across provinces and was highest in urbanized areas, especially eastern coastal regions. The authors concluded that a key factor in determining the effectiveness of the levy

was "community capacity to understand and act on local environmental problems, indexed by measures of information, education and bargaining power" (Afsah et al. 1996).

If communities can play an important role-especially in Asia-in raising industry performance, then the role of government is to develop the capacities of communities. Central to this task is the gathering and disclosure of information. Environmental performance indicators, including water use and water emissions, would be especially effective for both industry and community groups. Such data could be part of a larger plant-based Environment Management System. Public disclosure of the information would be crucial. In addition, governments need to help communities better understand technical information, as well to provide arenas for discussions and negotiation between communities and local industry.

Given the crucial role of information, governments need to consider industry incentives to provide it. Businesses need to be rewarded publicly for good environmental behavior, and shamed for bad. They also need help from governments and community groups in improving their technical and managerial capacities to improve water management. One of the United States Environmental Protection Agency's most effective environmental management tools has been the Toxic Release Inventory (TRI), a 1986 regulation which requires certain industrial sectors to publicly report environmental releases and transfers of chemicals. In 1998 the EPA expanded on this program to involve multiple stakeholders in assisting in the provision of real-time monitoring data to the public with the Environmental Monitoring for Public Access and Community Tracking (EMPACT) program.

IV. Coastal Cities

So far, this paper has argued that a multiple-agent model of environmental management is crucial to addressing coastal marine pollution (and other improvements in environmental performance); and has suggested two applications of the model: innovative infrastructure financing and community regulation of industry. While we have examined the "markets" and "community" legs of the triangular model, we have not yet drawn a face on the "government." This next section will consider the particular benefits of using this approach to tackle the aforementioned problems in the context of cities and municipal governments.

Coastal cities are important sites of land-based sources of marine pollution. Cities in general are dynamic arenas for both population growth and industry. According to the ADB, urban areas account for 80% of economic activity in the Asia Pacific region. In East Asia, 57% of the population lives in urban areas today and 67% will be urbanized by 2015 (Torrie 1997). Strikingly, a substantial portion of this population is living on the coast. Of the world's six coastal cities with a population greater than 10 million, five are in Asia. Half the world's cities with a population of 1-10 million people are in Asia (WRI 1997). In China alone, where the urban population is expected to increase by over 125% in the next twenty five years, over 400 million live on the coast and account for over 60% of China's output (Dua 1997). In addition to their absolute importance in terms of industry and population, cities are points of entry into the globalized economy. Export industries, financial services, and import companies are overwhelming concentrated in cities and mostly coastal cities. At the end of the 20th century, cities have emerged as important international, as well as national, players.

Given their incentives to improve environmental management-people and industry in cities must live with and in the pollution-cities are likely to be quicker to take action than national governments. Moreover, they may be more politically light-footed, with fewer conflicting interests to balance. Cities may be more open to working with civic and community groups, who are often clearly focused on practical goals aimed at improving city life. Even more ideologically-minded NGOs tend to be constructive and proactive when working on a local level.

The concept that cities have particular advantages and opportunities to enhance environmental performance, especially in terms of water and energy management, has gained momentum in the last decade. The U.S. city of Portland, Oregon, may be the farthest ahead in developing municipal programs to promote energy conservation and efficiency. Portland has a sweeping set of initiatives which include working with market and community actors in a variety of ways, ranging from helping to finance energy efficiency home improvements in poor neighborhoods to purchasing electricity from more efficient suppliers to joint partnerships with utilities. The city describes its relationship with utilities as stemming from the "City's roles as educator, partner with private enterprise, financier, regulator, purchaser and aggregator." One of the advantages for cities in taking action on infrastructure financing is that they can use their own credit rating to borrow on international markets. In many cases, cities may have a higher rating than countries. Barcelona, for example, has taken the initiative to maintain and improve its bond rating as Spain's has been on the decline (Anders 1996).

In Asia, the Philippines has led the region in giving greater control to local governments. Under the Philippines Local Government Code of 1991, local governments were given increased autonomy, increased centrally collected shares of revenue to the municipalities, as well as increased power to increase local property taxes as well as issue their own taxes. By giving local authorities the ability to control these revenues, the municipalities have gained a sense of control and created greater incentives to mobilize various sources of revenues.

Manila has used this new-found flexibility to meet the costs, estimated at \$5-7 billion, to upgrade its water and sewage system by granting concessions to private sector concerns. The project will relieve the city of these exorbitant capital costs, the concessionaires have a secure revenue flow, guaranteed by the International Finance Corporation, and the consumers have improved water and environmental quality at lower costs (ADB 1997, Box 5).

In the southern Philippines city of Cebu, local government has teamed up with 40 of the country's largest corporations and NGOs to form the Cebu Investment Promotion Center (CIPC) (APCF 1998). The goal of the consortium is to attract and facilitate foreign private sector involvement in infrastructure projects. Similarly, the city has established the Cebu City Inter-Agency Committee, a NGO/government initiative to address the deleterious impacts of development. Together the two projects have been an integral part of Cebu's development by attracting investment, responding to development challenges and forming partnerships between the private sector, government, and NGOs.

In addition to embracing better water, marine and coastal management practices in their own backyards, cities may have a role in promoting crossboundary marine and coastal management regimes. In Northeast Asia, for example, regional cooperation to develop common coastal zone management protocols has been stymied by geopolitical tensions. Littoral cities in the Sea of Japan/East Sea could collectively and voluntarily move towards common standards and practices.

One drawback of cities as leaders in environmental management is that local governments can be captured by local development, real estate, or other economic interests. Moreover, the accessibility of local action to local community groups is both a strength and a weakness. The involvement of dozens of groups, potentially with conflicting interests, can lead to policy paralysis. To work effectively with both markets and community groups, cities will need to consciously design institutional mechanisms to structure policy and project debate among the three partners (government-markets-community), as well as between businesses and communities. City governments will also need to take very seriously its role in gathering and providing environmental, social and economic information to the public.

Moreover, it is clear that in order to implement any number of these strategies cities must also raise their capacity to govern effectively through international cooperation. A number of international programs to share best practices, know-how, and technology are already underway which should be replicated and expanded. Several efforts in Japan provide fine examples. For example, Kita-Kyushu's technical training center, the Toyama city government's efforts to bring environmental cooperation between cities from the littoral states of the Sea of Japan/East Sea, and the Tokyo Municipal Government's efforts all point to ways cities can cooperate to raise their environmental performance.

At the end of the twentieth century, cities have emerged as important international players. Approaches similar to those outlined above will hopefully provide them with the tools to excel in their new roles in the twenty-first century.

References

Afseh, S., Laplante, B., Wheeler, D. (1996) Controlling Industrial Pollution: A New Paradigm Policy Research Working Paper #1672, World Bank. Available online: http://www.worldbank.org/nipr/work_paper/1672/index.htm.

Anders, Alan L. (1996) Funding Capital Expenditures: how countries around the world do it Government Finance Review Vol. 12, No. 5 (October).

Annez, Patricia and Friendly, Alfred (1996) Cities in the Developing World: Agenda for Action Following Habitat II Finance and Development (December):12-14.

Asian Development Bank (1997) The Development and Management of Asian Megacities Manila: Asian Development Bank.

Asia Pacific Cities Forum (APCF) (1998) APCF Multistakeholder Partnership Case Studies Clarke, Shelly (1997) "Megacities in Crisis?" Resources: The Magazine for Environmental Management (January) <http://www.erm.com/library/resources/index.htm>.

- Cui, Shubong (1996) "Sustainability of the Marine Environment in China," Prepared for The National Environmental Protection Agency (China).
- De Moor, Andre and Calamai, Peter (1997) Subsidizing Unsustainable Development, Undermining the Earth With Public Funds San Jose, Costa Rica: Earth Council.
- Dua, Andre and Esty, Daniel C. (1997) Sustaining the Asia Pacific Miracle: Environmental Protection and Economic Integration Washington DC: Institute for International Economics.
- Economist (1998) Water Hazard, Development and Environment Survey, March 21, pp.5-7.
- Fernandez, Christopher (1997) Indah Water Answers its Critics Asian Water & Sewage <http://www.mtp-online.com.sg/aws/htmlfiles/corporat.htm>.
- Haarmeyer, David and Mody, Ashoka (1997) Private Capital in Water and Sanitation Finance and Development (March):34-37.
- Kohli, H., Mody, A., Walton M. (eds) (1997) Choices for Efficient Private Provision of Infrastructure in East Asia Washington DC: World Bank.
- Linklaen Arriens, W., Bird, J., Berkoff, J., Mosley, P. (eds.) Towards Effective Water Policy in the Asian and Pacific Region Manila: World Bank.
- Lohani, Bindu (1997) "Urban Environmental Management: Criteria and Policy Framework" Speech given at "Asia Pacific Sustainable Cities: Greener Infrastructure and Buildings," Vancouver, Canada, 6-8 May, 1997.
- Mody, Ashoka (1997) Infrastructure Strategies in East Asia: The Untold Story Washington DC: World Bank.
- Panayatou, Theodore (1997) The Role of the Private Sector in Sustainable Infrastructure Development, In Bridges to Sustainability: Business and Government Working Together for a Better Environment Luis Gomez-Echeverri, (ed). A contribution of the Yale/UNDP Program on Public-Private Partnerships Yale School of Forestry and Environmental Studies Bulletin Series, Number 101.
- Potter, Ptiman B. (1997) Transparency and Efficiency in APEC Infrastructure: A Call for Institutional Change Prepared for The Asia Pacific Foundation of Canada.
- Ruckelshaus, William D. (1998) The Environmental Protection System in Transition, Toward a More Desirable Future, Final Report of the Enterprise for the Environment, Washington DC: Center for Strategic and International Studies, January.
- Serageldin, Ismail (1997) Water Supply, Sanitation, and Environmental Sustainability Washington DC: World Bank.
- Torrie, Ralph (1997) "Urban Energy Management and the Cities of APEC - Opportunities and Challenges," Background Paper for the National Round Table on the Environment and the Economy.
- Weatherley, Paul (1994) Major Environmental Problems and Costs of Abatement, in Asia Development Bank: Financing Environmentally Sound Development, Manila: ADB.
- World Bank (1993) "Indonesia Environment and Development: Challenges for the Future" Environment Unit, Country Department III, East Asia and Pacific Region, Report No. 12083-IND.
- World Resources Institute (1996) World Resources 1996-97, The Urban Environment New York: Oxford University Press.
- United Nations Environment Program (1997) Global Environment Outlook New York: Oxford University Press.

View this online at: <https://nautilus.org/eassnet/communities-markets-and-city-government-innovative-roles-for-coastal-cities-to-reduce-marine-pollution-in-the-asia-pacific/>

Nautilus Institute

2342 Shattuck Ave. #300, Berkeley, CA 94704 | Phone: (510) 423-0372 | Email:

nautilus@nautilus.org