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CONTENTS

PREFACE	VII
ACKNOWLEDGMENTS	IX
ABBREVIATIONS AND ACRONYMS	XII
EXECUTIVE SUMMARY	XIII
THE CHANGING ENVIRONMENT	1
Economic Transformation	3
State of the Environment in the Region	5
Land and Forests	5
Water Resources	6
Air Quality	7
Urban Population	8
Counting the Toll	10
Looking Ahead	12
DRIVING FORCES OF CHANGE	15
Population Explosion	18
Urbanization and Industrialization	19
Income Growth and Inequality	20
Technological Changes	21
Governance	22
Institutions, Policy, and the Market	24
Toward Sustainable Development	25
OPTIONS AND OPPORTUNITIES	27
Adoption of Proven Policy Alternatives	30
Development Investment Opportunities	30
New Urban-Industrial Investment Opportunities	32
Development and Deployment of New Technologies	32
Advances in Energy Use and Supply	34
Strengthening the Societal Drivers of Improved Environmental Performance	35
Civil Society and Public Pressure	35
Globalization and Environment	36
Courts	38
Enhanced Inclusive Governance and Institutional Reform	38
Regional and International Governance	40
Building Opportunities for Policy Integration	41
TOWARD POLICY INTEGRATION	43
Mounting Pressure for Policy Responses	45
Policy Integration	46
Entry Points for Policy Integration	47

CONTENTS

Managing Economic Fundamentals	47
Establishing a Regulatory Regime	47
Resource Pricing	47
Using Market-Based Instruments	49
Removing Pricing Barriers to Technology Adoption	49
Intrasectoral Policy Integration	49
Intersectoral Policy Integration	53
International Trade and Investment	54
Governance	56
A Framework for Policy Integration	58
Toward an Action Agenda	60
CALL TO ACTION	61
Regional Policy Recommendations	63
Economic Reform Actions	65
Institutional Reform Actions	66
Governance Reform Actions	68
Sector-specific Actions	69
Land and Forest Sector	69
Water Sector	69
Urban Sector	70
Industry Sector	71
Energy Sector	71
Conclusions	72
LITERATURE CITED	73
Web Sources	79
APPENDICES	81
1 Abstracts of Background Papers	83
2 AEO Workshop Participants	89

LIST OF BOXES

1-1	Relation of Poverty and Population Growth	4
1-2	Scarce Availability of Freshwater	6
1-3	Water Quality: Polluted River Systems in Asia	6
1-4	Urban Air Quality: Dark Skies	7
1-5	Health Impacts of Biofuels Consumption	7
1-7	RAINS-Asia Model Forecast	8
1-6	Increase in Energy Consumption	8
1-8	Global Environmental Impacts	9
1-9	Urban Water Quality	9
1-10	Unique Challenges in the Pacific DMCs	10
1-11	A Look at the Statistics	11
1-12	Health Aspects of Haze	12
1-13	Costs of Environmental Degradation in Asia	12
1-14	The High Cost of Losing Ecosystems	13
2-1	Population Boom Impacts Environment	18
2-2	Impacts of Industrialization	20
2-3	Industrialization and SMEs	20
2-4	Consumption Patterns	21
2-5	High Cost of Inefficient Power Distribution	21
2-6	Role of Civil Society	23
2-7	Regional and International Governance Trends	23
2-8	Environmental Expenditures by GDP	24
2-9	Limited Environmental Disclosure	25
2-10	Emerging Trends	25
3-1	Proven Environmental Policies in the Region	31
3-2	Technology Change as Opportunity	32
3-3	Cleaner Production Advantages	33
3-4	Technology Advances Provide Opportunities	34
3-5	Alternative Energy Requirements	35
3-6	Civil Society's Emerging Influence	35
3-7	Information and Free Press	36
3-8	Community Mobilization	36
3-9	Emerging Certification of "Green" Products and Services	37
3-10	Agenda 21 and Civil Society	37
3-11	Government Decentralization Movement	39
3-12	Government and Community Partnerships	39
3-13	Transboundary Environmental Links Illustrated	40
3-14	Male' Declaration on Air Pollution's Transboundary Effects	40
3-15	Negotiated Reductions of Environmental Pollution	41
3-16	Carbon Trading Initiated	41
4-1	Goal and Definition of Policy Integration	46
4-2	Intrasectoral Integration Illustrated	50
4-3	Approaches for Intrasectoral Policy Integration	52
4-4	Managing Ecosystem Demand	54
4-5	International Treaties and Trade and Investment	55
4-6	Intellectual Property Rights Responses	56
4-7	Amendments in Law Required	57

CONTENTS

4-8	How to Enhance the Role of Civil Society	58
5-1	Vision for the Future	64
5-2	Upcoming AEO Series	72

LIST OF FIGURES

2-1	Actual (1998) and Projected (2015) Population by Subregion	18
2-2	Population of Large Cities in the Region including those Projected to Exceed Five Million by 2015	19
4-1	Types of Resource Values	48
4-2	Recommended Charging Structure	48
4-3	Integrated Economic and Environmental Planning	58
4-4	Subnational Prototype Planning Model	59

LIST OF TABLES

4-1	Entry Points for Policy Integration by Driving Forces	59
5-1	Examples of Market-based Instruments for Environmental Protection	66

PREFACE

Asian Environment Outlook (AEO), a report by the Asian Development Bank (ADB), provides in-depth policy analyses of salient environmental issues common to many of ADB's developing member countries (DMCs). Specifically, AEO is a series of reports that will provide periodic review of DMC's environmental and developmental policies, tools, and opportunities for ADB to help DMCs achieve their stated environmental objectives.

AEO 2001 report is the first publication of the AEO Series. It presents the results of analyses of past economic development policies and their impacts on the environment and provides a set of entry points as a framework to improve the environmental performance and help reduce poverty in the Asia and Pacific region. It is expected that the AEO Series will become a biennial ADB publication in the future. DMC government decision makers, planners, and environmental executives and specialists from international assistance agencies are expected to use the information presented in the AEO Series as a basis for formulating environmentally sound development policies and programs. AEO 2001 recommends specific actions to policy makers for achieving environmentally sustainable development.

The AEO 2001 is a work in progress. It includes this report, a number of cross-sectoral and sector-specific reports, and eight country-specific policy analysis reports. The preparation of AEO 2001 has provided ADB a unique opportunity to gather a diverse group of DMC officials, staff from ADB and other international assistance agencies, representatives of nongovernment organizations (NGO) and research institutions, and private sector representatives to discuss what has and has not worked over the last two decades and identify new approaches to tackling environmental problems in the region. The preparation process included a series of workshops in eight DMCs. During these workshops, sector development policy agenda was reviewed by national experts to identify policies that are actually causing environmental problems or inhibiting remediation progress.

Earlier drafts of the AEO 2001 report have been the subject of a number of dialogues and consultations, including discussion at (i) the Environment Seminar in conjunction with ADB's 33rd Annual Meeting of the Board of Governors in Chiang Mai, Thailand in May 2000 and (ii) a two-day consultation session with a selected panel of experts at ADB, Manila in August 2000. The results of such dialogues and consultations were fine-tuned and synthesized during workshops held at the Rocky Mountain Institute in Aspen, Colorado and at the ADB Institute in Tokyo, Japan in September 2000.

The report provides insight into the state of the environment in the Asia and Pacific region: rapid environmental degradation, associated poverty issues, and lack of political will to remedy environmental issues are of continuing serious concern. It describes a situation of continuing environmental degradation, unhealthy air and water condition, escalating demands for energy and other resource inputs, and increasing certainty that climate change and other global environmental problems will have substantial negative impacts upon the region. It also examines the driving forces that underlie this pattern of environmental decline

and identifies opportunities within the region to shift the trajectory of economic development to a pathway that is more environmentally sustainable. The report concludes with a call to action for DMCs and identifies initiatives that policy makers can take to jointly pursue the goals of reducing poverty and improving environmental quality in the region.

The AEO 2001 is being published at a time when ADB is increasing its emphasis on policy-based lending. These policy-based interventions in various sectors will provide a range of opportunities for integrating environmental and developmental policies and for implementing the vision of sustainable development in the region. ADB is also focusing on performance-based lending; therefore, the recommendation that environmental concerns be incorporated into the set of performance criteria to be used in evaluating lending outcomes is especially welcome. ADB already incorporates environmental protection into all of its programs and projects. The preparation of this AEO report has provided the opportunity to examine how best to enhance and strengthen these procedures.

ADB invites you to consider the challenges and opportunities discussed in AEO 2001 and join us in mapping out the pathways to an economically secure and sustainable future for all people in the region. We seek your insight and input for future reports within the AEO Series. We also seek general inputs on the work of ADB in supporting the efforts of DMCs to reduce poverty and improve the environment for current and future generations. Log on to the AEO website <<http://www.adb.org/environment/aeo>> for an opportunity to review and comment on the AEO Series through the website's interactive features.

Rolf Zelius
Chief
Office of Environment and Social Development

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AEO	Asian Environment Outlook
APS	Arizona Public Services
ASEAN	Association of Southeast Asian Nations
BMR	Bangkok Metropolitan Region
Btu	British thermal unit
CEPIS	Country Environmental Policy Integration Study
CFC	chlorofluorocarbon
CO ₂	carbon dioxide
CPIE	Cleaner Production for Industrial Efficiency
CTO	certifiable offsets
DMC	developing member country
ECANET	Environmental Communication Asia Network
EDB	Economic Development Board of Singapore
EIA	environmental impact assessment
FAO	Food and Agriculture Organization
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GHG	greenhouse gas
GNP	gross national product
ha	hectare
IIASA	International Institute for Applied Systems Analysis
IPCC	Intergovernmental Panel on Climate Change
ITRI	Industrial Technology Research Institute
JTC	Jurong Town Corporation
km ²	square kilometer
LTSF	long-term strategic framework
MBI	market-based instrument
NGO	nongovernment organization
OECD	Organization for Economic Cooperation and Development
POP	persistent organic pollutant
PROPER	Program for Performance Rating
SME	small and medium enterprise
TSP	total suspended particulates
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
US-AEP	US-Asia Environmental Partnership
US EPA	United States Environmental Protection Agency
WHO	World Health Organization
WMO	World Meteorological Organization
WTO	World Trade Organization



EXECUTIVE SUMMARY

The Asian Environment Outlook (AEO) 2001 is organized into five chapters. The first three chapters provide an overview of how and why environmental degradation has occurred in the Asia and Pacific region and identify environmentally sustainable options and opportunities. The remaining two chapters discuss new approaches for policy integration and a call to action to adopt alternative policies. Chapter 1 discusses the economic transformation in the region and its environmental and social impacts on land, water, air, and human health. Chapter 2 explores the underlying driving forces that resulted in environmental problems in the region and the path these forces will take if no changes occur. Chapter 3 presents options and opportunities to redirect the current development trajectory implicated by these driving forces and illustrates positive initiatives that are being implemented in the region. Chapter 4 discusses the most important and immediate change that can be adopted by the region's policy makers — mainstreaming of environmental concerns across and within sectors into all levels of economic development planning through five entry points. Chapter 5 then challenges decision makers in the developing member countries (DMCs) of the Asian Development Bank (ADB) to confront issues raised by this report and identifies a consensus view on priorities for action.

This Executive Summary briefly discusses the highlights of each chapter of the AEO 2001 report and the overall conclusions. Detailed discussions on cross-sectoral, sectoral, and country-specific policy recommendations will be included in future editions of the AEO 2001 and the AEO website at <http://www.adb.org/environment/aeo>.

Over the past four decades, the Asia and Pacific region's rich resources have undergone dramatic changes resulting from accelerated economic and social transformation. Socio-economic changes such as large increases in population, agricultural output, industrial production and capital, and advances in science and technology have transformed the region's natural resource base, both as a source of material inputs and as a sink for pollution and other negative outputs associated with economic activity. Environmental degradation in the region is pervasive, accelerating, and unabated. At risk are people's health and livelihoods, the survival of species, and ecosystem services that are the basis for long-term economic development. Economic development and poverty reduction are increasingly constrained by environmental concerns, including degradation of fisheries and forests, scarcity of freshwater, and poor human health as a result of air and water pollution. Intensified crop and livestock production combined with

misdirected incentives have contributed to increased production of chemical and organic wastes (and accompanying health risks), natural resource and biodiversity loss, and soil erosion.

Pressure on land in the Asia and Pacific region is most severe as compared to the other regions in the world. Countries in the region have lost 70 to 90 percent of their original wildlife habitat to agriculture, infrastructure development, deforestation, and land degradation. The most severe losses have been in Bangladesh, India, Indonesia, Philippines, Sri Lanka, and Viet Nam. The Philippines and Viet Nam have lost about 70 and 50 percent of their mangrove forests, respectively, and 75 percent of the Asia and Pacific region's marine protected areas are considered to be under high potential threat from coastal development.

Particularly affected are the region's rural poor who are dependent on agriculture and its ancillary activities. Many countries in the region already face an acute shortage of

productive land resources that can support its growing population. In 1990, approximately 850 million hectares (ha) had some degree of land degradation, representing more than 28 percent of the region's land area. According to the United Nations Environment Programme (UNEP), there are 350 million ha of degraded land in India, Pakistan, and People's Republic of China (PRC), most of which are grasslands. About 1,320 million people, or 39 percent of the region's population, live in areas prone to drought and desertification.

Several initiatives in the region are combating this trend. Community-based forest management has been adopted as the national strategy for the management and sustainable development of forest resources in the Philippines. At present, more than 500,000 ha of well-stocked, national forests have been turned over to communities, mostly of indigenous peoples. Decentralized forest management systems are also being successfully adopted in Nepal and Papua New Guinea. Reforestation programs have had considerable success in reducing the loss of forest cover in Thailand and elsewhere and forest regeneration has been significant in Orissa and West Bengal (Poffenberger and McGean 1998).

Lack of clean water is another severe environmental problem in many parts of the region and directly impacts human health and slows the development of economies. The explosive growth in populations and economies has had the greatest impact on the availability and quality of the region's freshwater resources. Water quality has steadily slipped, degraded by sewage, industrial effluent, urban and agricultural runoff, and saline intrusion. Levels of suspended solids in the region's rivers almost quadrupled since the late 1970s, and rivers typically contain four times the world average and 20 times the Organization for Economic Cooperation and Development (OECD)-recommended levels of suspended solids. Eroded sediment carried by runoff fouls rivers in Pakistan, the PRC, Western India, and other arid regions. Biochemical oxygen demand, a key indicator of overall water quality, is 1.4 times the level recommended by OECD. The fecal coliform level, an indicator of the health risk from human waste, is three times the world average and 50 times higher than the level recommended by the World Health Organization (WHO). As a result, one in three Asians and Pacific Islanders has no access to a safe drinking water source (that operates at least part of the day) within 200 meters of the home. Access to safe drinking water is worst in South and Southeast Asia, where almost one in two persons has no access to sanitation services and only 10 percent of sewage is treated at a primary level.

Air pollution levels in the region's large cities are among the highest in the world and climbing, producing serious human health impacts. Of the 15 cities in the world with the highest levels of particulate matter, 12 are located in the Asia and Pacific region. One study in Delhi conducted from 1991 to 1994 projected that an increase of 100 micrograms per cubic meter of particulate matter would result in a loss of life equivalent to 1,385 lives in a year distributed among varying age groups. At the time of the study, readings of particulate matter in Delhi were 378 micrograms per cubic meter, approximately 5 times the WHO annual average standard. In a majority of the region's most populated cities, measures of pollution levels exceed WHO guidelines by wide margins. Of the 15 cities in the world with the highest levels of sulfur dioxide, 6 are located in Asia. The region's emissions of sulfur and nitrogen oxides in 2030 are projected to be three to four times their 1990 levels. Unlike the effects of water pollution, which are borne mainly by the poor, no resident of any major city in the region is safe from the effects of air pollution. However, the poor are disproportionately exposed to air pollution, living along roads and in industrial areas, thus suffering the highest concentration of air pollutants almost constantly.

Another contributor to air pollution is burning wood fuels and low quality coal, which pose a number of air quality and human health problems. The Asia and Pacific region is by far the world's largest consumer of wood fuels, accounting for nearly 44 percent of global consumption. Indoor air pollution from biomass smoke is one of the largest environmental risk factors for ill health of any kind. Four to five million child-deaths are attributed to acute respiratory infection each year. Studies in India, Nepal, and Papua New Guinea show that nonsmoking women who have cooked on biomass stoves for many years exhibit a higher prevalence of chronic lung diseases (such as asthma and chronic bronchitis) than nonsmoking women who don't cook on biomass stoves. These studies also reveal a 50 percent increase in stillbirths in women exposed to indoor smoke during pregnancy in Western India.

Industrial growth and urban expansion have greatly contributed to and increased the generation and accumulation of solid and hazardous wastes in many DMCs, outstripping the collection efficiency and disposal capacity of many municipalities. Kolkata, which generates about 2,500 metric tons of waste per day, has developed effective collection and disposal systems that capture 95 percent of the waste stream. Most cities collect 70 to 80 percent of solid wastes, leaving an average of about 1,000 tons per day uncollected in cities such as Manila and Jakarta. Cities such as Dhaka and Ka-

rachi collect less than 50 percent. The balance ends up in drains and rivers, exacerbating flooding, or in vacant lots or roadsides, where it impacts public health by providing habitat for rodents, flies, and other disease vectors. Roughly two-thirds of the population in South Asia lack access to adequate systems of sanitation. This lack of sanitation also adversely impact water quality in cities. Poor sanitation and dirty water cause more than 500,000 infant deaths a year in the region, as well as a huge burden of illness and disability. In 1990, the region accounted for about 40 percent of the total global diarrhea episodes in children under five years of age. In Southeast Asia alone, diarrhea-related diseases killed more than 1 million people in 1999, nearly half of all deaths from such cases in the world. Most of the fatalities resulted from poor sanitation and dirty water. Changes in the region are being made to turn these alarming trends around, for example Indonesia and Thailand implemented low-cost projects that involved public-private-community participation to successful upgrading of waste disposal and sanitation systems. One such project is the Kampung Improvement Program in Indonesia.

In an attempt to combat this environmental degradation and its impacts on human health, over the last two decades, the DMCs have established legal systems and institutions to oversee environmental protection. However, reviews of environmental performance in the region in late 1990s revealed that the environmental quality would deteriorate further if environmental governance agencies continue to operate in a “business-as-usual” manner. ADB published *Emerging Asia*, a landmark study of economic and environmental prospects for the region, four years ago. *Emerging Asia* concluded that the root cause of the poor state of the environment in the region was a failure of policy and of institutions. With a few notable exceptions, DMCs have failed to make environmental protection a policy priority and put in place policy frameworks and institutional resources that would ensure compliance with stated environmental goals. Experiences of the past decade suggest that this diagnosis is generally valid. When environmental protection systems are substantially strengthened, pollution, land degradation, and other negative environmental processes are reduced, and environmental quality begin to improve. Examples of this protection include Shanghai and Philippines, where communities and local governments work together to improve overall environmental quality.

The pace of policy reform in the region has been slow and uneven. For most of the developing economies in the region, incremental policy reform has been over-ridden by the effects of continuing population and economic growth,

urbanization, and attendant increased production and consumption. The population of Asia is expected to increase by about 700 million over the next 15 years, with approximately 50 percent of the population living in cities by 2020. To support this growing population, DMCs clearly need to make fundamental changes in policy making.

Poverty reduction is the overarching goal of ADB’s development strategy. Environmental policy is crucial in meeting this goal. The poor are often most directly dependent upon forests, fisheries, and other natural resources threatened by depletion and degradation. The poor are also especially vulnerable to lack of access to clean water and inadequate sanitation systems within cities. Of special concern is the finding that poor environmental quality and heavy dependence on limited natural resources is emerging as a major, concrete constraint to future economic growth. Because balanced economic growth is crucial to efforts to reduce poverty within the region over the next two decades, increased attention must be paid to the constraints that depleted and degraded natural resources will place on such growth.

Environmental problems are not confined to national boundaries, as the problems of forest fire, smoke, and haze within Southeast Asia and concerns over international transfer of hazardous wastes demonstrate. Of critical concern over the next decade is the role the Asia and Pacific region will play in addressing greenhouse gas emissions and attendant global warming and climate change. The scientific community has established with growing certainty that the burning of fossil fuels and other human activities are affecting the earth’s atmosphere in ways that will result in substantial global warming. The globally averaged surface temperature of the earth is predicted to increase between 1.4°C and 5.8°C by 2100. Rising sea levels, which are predicted to accompany global warming, will pose particular threats to low-lying areas and islands in the Pacific Ocean and elsewhere. Although OECD countries are currently the largest emitters of greenhouse gas emissions, emission rates are growing more rapidly in the Asia and Pacific region than anywhere else in the world. The region is expected to replace OECD countries as the largest source of greenhouse gas emissions worldwide in about 2015.

The key conclusion of this report is that a new approach is required to integrate the design and implementation of environmental policy within the region. For far too long the blueprints of an alternative development future have gone unimplemented and good ideas have become missed opportunities. Current practice has been to depend upon a stand-alone environmental agency as the institution primarily,

if not entirely, responsible for environmental protection. Even under the best of circumstances, environmental agencies typically lack the authority and influence necessary to place environmental concerns high on the policy agenda, let alone influence rapidly changing patterns of economic development within the region. Environmental concerns must be integrated across sectors and within sectors and mainstreamed into economic development policy. Stand-alone environmental agencies are necessary but not sufficient for ensuring environmental improvement. Powerful economic agencies, such as ministries of finance, industry, and agriculture, must adopt environmental goals and measure performance against these goals. Institutions of science and technology must support technology upgrading and clean production initiatives that yield both economic and environmental performance improvements. Taipei, China and a few other countries have demonstrated how investments in science and technology infrastructure and the development of public-private partnerships in research and technology can substantially accelerate the process of technology upgrade within industrial economies and yield both environmental and economic benefits (Rock 1995). The environmental protection must be considered as a factor in the basic decision making processes of firms, farms, and households, and policy makers must provide the tools through which these parties can respond positively to increased pressures for environmental improvement.

This report proposes a vision of the suggested development trajectory for the Asia and Pacific region under which: (i) consumption is based on services rather than ownership of assets; (ii) ecosystem services are valued and protected; (iii) natural resources and environmental management are decentralized, with stakeholders at the local level and citizens taking a role in management; (iv) precautionary principles are applied to new technologies subject to strategic environmental assessment and public debate; and (v) biodiversity is protected. Under this scenario, new and revitalized public institutions could play a significant role in developing, implementing, and enforcing environmental policies, and identify ways in which contemporaneous development of economic and environmental policies support common objectives, particularly at local and regional levels.

The report identifies three core elements of a new approach to meet the stated vision for the suggested development trajectory in the region. First, the concept of environmental and development policy integration is fundamental to successfully moving forward with policy reforms. This requires infusing environmental objectives

into national and regional economic development plans and processes, and achieving environmental goals through the actions of corresponding public sector development authorities and private sector interests instead of depending exclusively on national environmental (enforcement) agencies. Second, development by design is the guiding instrument for sustainable development. National, subnational, urban, and industrial development require guidance and monitoring in accordance with publicly accepted, integrated environmental and economic development plans. Third, an abiding political will is essential to translate national environmental rhetoric into action if: (i) a minimum level of environmental compliance is to be achieved, (ii) commensurate budgets and human resources are to be provided, and (iii) the subsidies that lead to resource degradation are to be eliminated.

In order to successfully meet environmental and development challenges, this report recommends that policy makers harness the powerful forces of change sweeping through the region and the globe. Governance reform, the rapid rate of technology change, new private financing and investment, and increasing access to information on a global scale present exciting opportunities to shape the pattern of development over the next two decades. The challenge for policy makers is to ensure that policies and institutions are put in place that channel these powerful forces of change to positive ends such as poverty reduction, socio-economic welfare improvements, and environmental quality improvements.

By its nature, this report cannot provide full coverage of all of the environmental issues that are of concern to the DMCs. The report also cannot give due attention to the balance of issues and priorities within individual countries of the region. The goal of this first AEO 2001 publication is to define a framework for response and action, and not to provide a detailed and exhaustive list of specific initiatives. Primary attention is paid to national policy and to the articulation between national policy and international and local initiatives. However, it is important to consider each particular economic, social, and development context. What works in one context may not be the most efficient or effective approach under a different context. One of the reasons that environmental protection has not been more effective in the Asia and Pacific region over the past two decades is the tendency to uncritically adopt models of environmental policy developed under the very different economic and development context of mature industrial economies within OECD countries. Although the basic principles of effective environmental regulation, such as the

need for clear environmental standards that are consistently enforced, are widely shared, the precise tools of implementation may need to vary from one country to another.

ADB is committed and prepared to assist DMCs in facing these new challenges. Ensuring sustainable economic growth, which implies environmental soundness, is one of the core areas of intervention in ADB's long-term strategic framework for 2001 through 2015. ADB's other two core areas include: (i) inclusive social development, which includes investments in social support programs and a policy reform agenda that will promote equity and empowerment; and (ii) improved governance for effective policies and institutions that will support public sector management at all levels, legal and judicial reform, improved public accoun-

tability, and procedures for more effective participation in decision making (including civil society) to promote equitable and inclusive growth.

As the region's capacity to support human activity becomes increasingly stressed, policy makers and leaders within the region will discover that integrated solutions that transcend traditional disciplines and approaches are clearly more effective than parochial solutions that divide regions, institutions, infrastructure, and technology. Applying the principles of policy integration through realizing the five entry points presented in Chapter 4 of this report should set the stage for redirecting the driving forces for environmental change on the path of a new development trajectory in the region.



CHAPTER

7

THE CHANGING ENVIRONMENT



THE CHANGING ENVIRONMENT



Economic change has been supported in part by the region's natural resource base, both as a source of material inputs and a sink for pollution and other negative outputs from economic activity.

The Asia and Pacific region is rich in natural resources. The forests, rivers, lakes, wetlands, coral reefs, and other ecosystems in the region are biological powerhouses. The region includes the second largest rain forest complex, more than half of the world's coral reefs, and about 17 percent of the most important wetland areas in the world. This rich habitat is home to much of the planet's biological diversity. Of the 12 "megadiverse" countries identified, four are in the Asia and Pacific region: Australia, Indonesia, Malaysia, and People's Republic of China (PRC) (McNeeley and others 1990). The region's rivers, coastal and marine fisheries, mangroves, and coral reefs are among the most diverse and productive in the world. Southeast Asia is also the hub of diversity for wild and domestic cereal and fruit species (ASEAN 1997). The tropical moist forests in Southeast Asia host 20-25 percent of the earth's plant species and the greatest variety of animals. The true value of this biological diversity defies conventional methods of quantification. The region's ecosystems provide services that range from the maintenance of global biogeochemical cycles, to sources of export revenue, and sources of food and income for the poor.

This chapter discusses the economic transformation in the region and its environmental and social impacts, the current state of the environment, the toll of environmental problems on the people and economy of the region, and a look at future problems.

ECONOMIC TRANSFORMATION

Over the past four decades, the region's rich resources have undergone dramatic changes resulting from accelerated economic and social transformation. Large increases in population, agricultural output, industrial production and capital, and advances in science and technology have transformed the economic foundations of most countries within the region. Economic change has been supported in part by the region's natural resource base, both as a source of material inputs and a sink for pollution, and other negative outputs from economic activity. Now these processes of development have put the region's unrivaled natural resources at great risk. Environmental degradation in the region is pervasive, accelerating, and unabated. At risk are people's health and livelihoods, the survival of species, and ecosystem services that are the basis for long-term economic development. Economic development and poverty reduction are increasingly constrained by environmental concerns, including degradation of fisheries and forests, scarcity of freshwater, and poor human health and premature death as a result of air and water pollution.

The region includes the second largest rainforest complex, more than half of the world's coral reefs, and about 17 percent of the most important wetland areas in the world.

During the 1960s, the economies of most South and Southeast Asia underwent a remarkable transformation that boosted agricultural production and fundamentally changed rural Asia. Diversification, commercialization, and advances in crop production technology fueled agricultural growth in many of the Asian Development Bank (ADB) developing member countries (DMCs) and were instrumental in reducing poverty in the area (ADB 1997 and 1998). The Green Revolution that began in the late 1960s was a welcome remedy to food shortages and the startling population growth in Asia, Latin America, and Northern Africa. The remarkable efforts of international agricultural research and extension organizations resulted in new, high-yielding crop varieties and new water and soil conservation techniques. These efforts were followed by investments in rural infrastructure and irrigation, increased inputs such as fertilizers and pesticides, and resulted in the implementation of policies that regulated agricultural trade, commerce, and credit.

Agricultural intensification was just one aspect of an overall economic transformation of developing economies within the region. Even with substantial increases in agricultural productivity, the relative contribution of agriculture to gross domestic product (GDP) actually declined in many DMCs. For example, in Indonesia, the agricultural share of GDP declined from 35 percent in 1970 to 20 percent in 1996.

Industrialization and urbanization also became the dominant forces behind economic growth in the DMCs in Southeast Asia and India. By the mid-1980s, the flow of international capital and intensified export-oriented trade helped create large urban centers that were commercial, financial, and industrial giants. The region now has nine cities with populations each exceeding 10 million people.

The economic transformation has been accompanied by a significant decline in poverty, especially in the high-growth economies of East Asia (see Box 1-1). Poverty rates in most East and South Asian countries that benefited from the Green Revolution dropped significantly as a result of higher agricultural productivity and greater urban employment opportunities. In many cases, these changes resulted in higher living standards.

From the beginning, it was clear that rapid growth in the Asia and Pacific region was being achieved only at high environmental cost. Except for Japan, the Republic of Korea, and Taipei, China (each of whom effectively configured institutional reforms to better accommodate the Green Revolution), increased agricultural productivity was associated with (i) widened disparities in income and social

services, particularly in South Asia; (ii) intransigent poverty; and (iii) a one-sided focus on irrigated agricultural and high-potential areas that neglected rainfed agricultural areas (ADB 2000a). Intensified crop and livestock production combined with misdirected incentives contributed to increased chemical and organic wastes (and accompanying health risks), forest and biodiversity loss, and soil erosion.

Government policies also promoted inappropriate irrigation processes and inadequate drainage systems that resulted in large-scale salinization, water logging, and eutrophication in agro-ecosystems. Fisheries, the other major food source in the region, are also under tremendous pressure, particularly in rivers, lakes, and coastal areas affected by pollution from land-based activities. Fisheries face serious decline in catch, and poorly conceived aquaculture systems provide examples of some of the region's most spectacular economic and ecological debacles.

In most cases, rapid industrialization and urbanization took place without adequate attention to environmental concerns, resulting in massive industrial pollution of the region's air and waterways and escalating demands for energy and other material and resource inputs. *Megacity Management in the Asian and Pacific Region* provides a detailed account of rapid, large-scale urbanization and its environmental consequences (Stubbs and Clarke 1996). Although cities offer many residents considerable opportunities (in education, entertainment, income, etc.), for a higher quality of life than rural areas, they are also becoming increasingly unhealthy places because of air and water pollution. Cities are also major consumers of energy and materials. In cities lacking adequate urban infrastructure, major environmental problems emerged in sanitation, water supply, transportation, and waste disposal. Failure to provide

Box 1-1. Relation of Poverty and Population Growth

In 1975, almost 60 percent of Asia and Pacific islanders lived in poverty. By 1995, this figure had declined to 33 percent. Despite explosive population growth, the absolute number of poor declined by 28 percent, from 1,149 million in 1975 to 824 million in 1995. In South Asia, however, an incremental decline in the percentage of the population in poverty was insufficient to offset population growth during the 1990s, and the total number in poverty actually increased over this decade. As the 20th century came to a close, approximately 900 million people in developing Asia subsisted on incomes of less than \$1* per day (measured in purchasing-power-parity dollars).

*All currency measurements provided in US dollars

Sources: ADB 1998; ADB 2000(e)

economic opportunity and basic environmental services to urban and rural poor could have destabilizing environmental, political, and economic consequences of global proportions.

Environmental degradation especially impacted the poor and undermined to some degree the broad-based social welfare benefits of economic growth. Typically, it is the poor who are most immediately dependent on threatened fisheries, forests, and other natural resource systems for their livelihoods. The health effects of declining air and water quality especially impact the urban poor who lack access to clean water and adequate sanitation. Also, the poor are often the most vulnerable to natural disasters.

Over the past 15 years, and in response to mounting environmental problems, many countries in the Asia and Pacific region strengthened environmental regulatory institutions. In a few countries in the Asia and Pacific region, strong and well-financed environmental regulatory institutions were in place and demonstrated considerable success in reducing air and water pollution and addressing other environmental problems. In most cases, however, the pace of policy and institutional reform has been desperately slow and lacked the financial resources and political will necessary to address environmental problems. Modest gains from incremental policy reform have been overwhelmed by intensive economic growth and rapid urbanization and industrialization (Angel and Rock 2000).

Collectively, this environmental degradation constitutes a substantial constraint on future economic development within the region and a major obstacle to efforts to eradicate severe poverty in the DMCs. The Asia and Pacific region is not alone in facing these environmental pressures. But of all the regions of the world, it is within this region that the dynamics of economic growth and environmental degradation interact most forcefully, presenting an urgent challenge for policy makers to shift the trajectory of development to pathways that result in improved social welfare and restore rather than degrade the region's life support systems.

STATE OF THE ENVIRONMENT IN THE REGION

The state of the environment in the region includes problems such as soil degradation, scarcity of freshwater, climate change, loss of forest cover, loss of biodiversity, and declining urban air and water quality. The rich biological resources of the Asia and Pacific region have been exploited on a massive scale.

LAND AND FORESTS

By 1985, countries in the region had already lost 70-90 percent of their original wildlife habitat to agriculture, infrastructure development, deforestation, and land degradation (MacKinnon and MacKinnon 1986). The most severe losses have been in Bangladesh, India, Philippines, Sri Lanka, and Viet Nam. The region is home to 22 percent of the world's threatened plant species (IUCN and IIED 1993). This undoubtedly is a conservative estimate because the Asia and Pacific region remains largely unstudied compared to many other regions. The Philippines and Viet Nam have lost

about 70 and 50 percent of their mangrove forests, respectively, and 75 percent of Asia's marine protected areas are considered to be under high potential threat from coastal development (WRI 1998). Tropical forests are of particular concern because of high rates of species richness and endemism. Wilson (1998) estimates that roughly 40 percent of the land that can support closed tropical forests is now devoid of forest cover, primarily as a result of human actions. Forest cover is declining at a rate of approximately 1 percent per year.

Pressure on the land in Asia is the most severe in the world. Particularly affected are the region's rural poor who are dependent on agriculture and its ancillary activities.

Many countries in the region already face an acute shortage of productive land resources that can support its growing population. According to the United Nations Environmental Programme (UNEP), in 1990, approximately 850 million hectare (ha) had some degree of land degradation, representing more than 28 percent of the region's land area. There are 350 million ha of degraded land in India, Pakistan,

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Environmental degradation constitutes a substantial constraint on future economic development and a major obstacle to efforts to eradicate severe poverty within the region.

and PRC, most of which are grasslands (UNEP 1999). About 1,320 million people or 39 percent of the region's population, live in areas prone to drought and desertification (UNEP 1997).

WATER RESOURCES

Under current development conditions, safe supplies of freshwater are at risk in many countries of the region. The explosive growth in populations and economies has had the greatest impact on the region's freshwater resources (see Box 1-2). Freshwater withdrawals increased more in Asia during the past century than in any other part of the world, and these withdrawals have resulted in supply and water quality problems. Lack of an adequate supply of clean water is the most severe environmental problem in many parts of the region, and the lack of clean water impacts human health and slows the development of economies. Water utilization rates will increase further in many other parts of the region in the next quarter century as populations and economies grow.

Irrigation in Asia accounts for 80-85 percent of total freshwater withdrawals. The large-scale irrigation schemes implemented during the Green Revolution are extremely inefficient, delivering as little as 40 percent of the water to crops. Subsidies exacerbate the problem by encouraging the expansion of inefficient supply systems and by discouraging demand-side behavior that would improve water delivery services. Expansion of the total land area under irrigation is continuing, albeit at a slower rate than in prior decades (UN-ESCAP 1999).

The development of water resources has disrupted the full spectrum of freshwater ecosystem services. Dams and

reservoirs coupled with extensive deforestation in some watersheds have reduced stream water levels, lowered water tables, degraded riparian wetlands, diminished freshwater aquatic diversity, and increased flood damage. Excessive demand for groundwater in coastal cities such as Bangkok, Dhaka, Jakarta, Karachi, and Manila has led to saline intrusion and ground subsidence.

Water quality has been steadily fouled by sewage, industrial effluent, urban and agricultural runoff, and saline intrusion (see Box 1-3). Levels of suspended solids in Asia's rivers almost quadrupled since the late 1970s. In Asia's rivers, the median fecal coliform level, an indicator of the health risk from human waste, is three times the world average and 50 times higher than the level recommended by the World Health Organization (WHO). As a result, one in three Asians has no access to a safe drinking water source (that operates at least part of the day) within 200 meters of the home. Access to safe drinking water is worst in South and Southeast Asia, where almost one in two Asians has no access to sanitation services and only 10 percent of sewage is treated at a primary level (ADB 1997).

In many parts of the region, economic development is most active in coastal zones, putting enormous pressures on coastal ecosystems and fisheries. Problems within coastal areas include widespread poverty; declining fisheries' productivity from over-harvesting, destructive fishing, and

In 1990, approximately 850 million ha were degraded to varying degrees. There are 350 million ha of degraded land in India, Pakistan, and PRC. About 1,320 million people or 39 percent of the region's population live in areas prone to drought and desertification.

Box 1-2. Scarce Availability of Freshwater

Although the region is accountable for about 36 percent of global runoff, it has the lowest per capita availability of freshwater. India, Pakistan, and Republic of Korea exceed the threshold of "high water-stress" conditions, which occurs when the ratio of use to availability exceeds 40 percent. In South Asia, the use of available freshwater resources will soon reach 50 percent, and in northern portions of Mongolia and PRC, utilization rates have reached 25 percent. India already has an estimated water deficit of more than 100 billion cubic meters per year.

Source: Worldwatch Institute 2000

Box 1-3. Water Quality: Polluted River Systems in Asia

Health problems are growing because of poor water quality. More than half of the world's major rivers are either polluted or running dry. The fouling of waterways and surrounding river basins contributed to the total of 25 million people who were made refugees as a result of environmental problems in 1999. The Yellow River in the PRC's most important agricultural region is severely polluted and ran dry (in its lower reaches) 226 days of the year in 1997. In another part of the region, the Amu Darya's and Syr Darya's flow into the Aral Sea has been reduced by three-quarters and has caused a catastrophic regression of -53 feet in the sea's water level between 1962 and 1994. The Aral Sea area suffers the highest rate of infant mortality because poor water flow and fertilizer runoff have fouled the seabed.

Source: World Commission on Water for the 21st Century 1999

loss of habitat; increasing environmental damage through shoreline development, land reclamation, and pollution; reduced access of traditional users to fishing grounds; and damage to tropical marine ecosystems from global climate change and rising sea levels (especially degradation of coral reefs from increased sea surface temperatures, coastal erosion, and flooding in coastal areas). The decline of coastal ecosystems is of particular concern in the Asia and Pacific region because populations are concentrated in coastal areas (Olsen and Christie 2000). Nearly one-half of the world's coastal population—477 million people—is housed in an urban agglomeration on Asian shores (GEO 2000). In Southeast Asia, about 250 million people live within 100 kilometers of a coastline (Bryant and others 1998).

AIR QUALITY

Air pollution levels in the region's most populated cities are among the highest in the world and climbing, causing serious human health impacts (see Box 1-4). Unlike the effects of water pollution, which are borne mainly by the poor, no resident of any major city in the region is safe from the effects of air pollution. However, the poor are disproportionately exposed to air pollution, living along roads and in industrial areas, thus suffering the highest concentration of air pollutants almost constantly.

The combustion of fossil fuels is the largest source of air pollution in urban areas. In the vast majority of Asian cities, transportation is the major source of pollution. The number of cars in Asia is growing exponentially. In Delhi and Manila, for example, the number of cars has doubled every 7 years (ADB 1999).

Wood fuels and low quality coal pose a number of environmental and human health problems. Indoor air pollution from the smoke of burning wood fuels is one of the largest environmental risk factors for ill health of any kind (see Box 1-5). Developing countries consume about 77 percent of the world's supply of wood fuels. Although, wood fuels account for 7 percent of the world's energy supply, Asia is by far the biggest consumer of wood fuels, accounting for nearly 44 percent of global consumption (FAO 2000). WHO estimates that 1.5 billion people live in unhealthy air. Four million to five million child deaths are attributed to acute respiratory infection each year. Studies in India, Nepal, and Papua New Guinea show that non-smoking women who have cooked on biomass stoves for

many years exhibit a high prevalence of chronic lung diseases (such as asthma and chronic bronchitis). These studies also revealed a 50 percent increase in stillbirths in women exposed to indoor smoke during pregnancy in Western India (World Bank 2000).

The swift expansion of commercial energy use in many countries has increased the reliance on energy imports, particularly crude oil. Only four countries in Asia are energy self-sufficient—Brunei, Indonesia, Malaysia, and Viet Nam. All these nations are major oil exporters. Hong Kong, China; Japan; Republic of Korea; Philippines; PRC; and Singapore all rely on imports for more than half of their commercial energy supply.

Among the 41 cities ranked by the total range and average level of particulate pollution, 13 of the dirtiest 15 were in Asia.

Box 1-4. Urban Air Quality: Dark Skies

The air in Asia's cities is among the most polluted in the world. The levels of ambient particulates—smoke particles and dust, which cause respiratory disease—are generally twice the world average and more than five times as high as in industrial countries and Latin America. Throughout Asia, lead emissions from vehicles are also well above safe levels. Ambient levels of sulfur dioxide—an important cross-border pollutant that contributes to acid rain, which in turn damages crops and eats away at synthetic structures—are 50 percent higher in Asia than in either Africa or Latin America. They are, however, still only one third of the level in industrial countries.

Levels of air pollution substantially exceed the international standards for air quality set by the World Health Organization (WHO). Ten of Asia's 11 large cities exceed WHO guidelines for particulate matter by a factor of at least three, four exceed acceptable lead levels, and three exceed acceptable ozone and sulfur dioxide levels. Among the 41 cities ranked by the total range and average level of particulate pollution, 13 of the dirtiest 15 were in Asia.

Source: ADB 1997

Box 1-5. Health Impacts of Biofuels Consumption

Indoor air pollution results from household use of biofuels. Burning wood fuel releases carbon monoxide, nitrogen oxides, benzene, formaldehyde, aromatics, and particulate matter. Particulate concentrations often exceed 10-100 times the health standard in the United States. Prolonged exposure to these substances is a major health issue in many DMCs.

Source: Kammen 1995

Energy use is increasing rapidly in the region (see Box 1-6) and is expected to double again over the next 20 years, from 84.5 quadrillion British thermal units (Btu) in 2000 to 177.9 quadrillion Btu in 2020 (U.S. Department of Energy 1999). Asia already consumes one-third of the world's commercial fuels and a much greater share of traditional fuels. Asia holds one-third of the world's coal reserves and relies on coal for about 40 percent of its commercial energy. Per capita use of commercial energy more than doubled during the past two decades. Electrification is also increasing at an average annual rate of 16 percent (Cleveland 2001).

Box 1-6. Increase in Energy Consumption

Driven by the rapid expansion of Asian economies, commercial energy use in Asia grew to an average annual rate of 5.9 percent from 1980 to 1998. This rate of growth is significantly faster than the rates for the Organization for Economic Cooperation and Development (OECD) nations (0.9 percent) and the world (1.8 percent) over the same period.

Source: Cleveland 2001

A heavy dependence on fossil fuels in the region is accompanied by substantial air pollution and escalating greenhouse gas (GHG) emissions (see Box 1-7). Another significant contributor to air pollution is the effects of aerosols on the ozone layer. A recent study in India is determining the impacts of the accumulation of aerosol or "brown cloud" to the atmosphere. Emissions of sulfur dioxide in the PRC will double over the next 20 years. The resulting acid deposition could cause widespread degradation of aquatic and terrestrial ecosystems in large sections of southern and eastern PRC, northern and eastern India, the Korean peninsula, and northern and central Thailand.

Box 1-7. RAINS-Asia Model Forecast

The RAINS-Asia model developed at International Institute for Applied Systems Analysis (IIASA), forecasts a grim scenario for the region. Most scenarios of energy use in Asia include a continued reliance on the abundant coal resources in the region. The RAINS model forecasts a very significant increase in the emission of oxides of nitrogen and sulfur by 2020. As a result, the breach of critical acid deposition thresholds will increase. If this scenario materializes, the impacts on ecosystems and human health will far outstrip the impacts to date.

The impacts of air pollution and its contribution to climate change are not limited by regional or country

boundaries. These impacts are of global concern because for the first time in history, human actions are on a scale that threatens global life support systems (see Box 1-8).

URBAN POPULATION

The urban population in Asia is growing significantly. By the year 2020, an additional 1.5 billion people will be added to Asia's urban centers (ADB 2000e). Such a massive number of people will need adequate infrastructure and services, prominent among them being water supply, housing, and sanitation facilities. An adequate facility for solid waste disposal is required to ensure an urban environment conducive to the well-being and productivity of residents.

Declining urban environmental quality has occurred despite considerable efforts in urban planning during the last three decades. Urban development master plans for most cities have been prepared for wastewater collection and treatment, drainage, solid waste management, land use, and (in a few cases) air quality management. Few of these plans have been implemented, mainly because of the lack of management, control, and financial resources. For example, the first wastewater management plan for Bangkok prepared in 1965 required an investment of a few hundred million dollars. A meaningful level of wastewater management throughout the city today would cost more than 3 billion dollars. As a result of the lack of investment, most major urban areas have limited environmental infrastructure and the costs of meeting these urgent infrastructure needs are phenomenal. Other cities, such as Ho Chi Minh City and several of the large PRC and Indian cities, are serviced today by infrastructure designed to meet the population and industry needs of the mid-1960s. A similar situation, although requiring less capital, applies to solid waste management. Many Asian cities have dramatically improved solid waste collection but at the turn of the century many found that they had no place to dispose of the wastes. Waste minimization efforts would reduce capital investments required for wastewater and solid waste conveyance and treatment, but the capital requirements are still huge.

For most large cities in the region, sustaining an adequate and safe supply of water for domestic and industrial uses is a major problem. Virtually all surface waters in the region have become severely degraded upon entering urban waterways (see Box 1-9). Only in limited cases has surface water quality demonstrably improved over time. The major source of water pollution in some cities is domestic waste. However, there are many watercourses where the industrial pollution load is high with "black spot" industries that cause localized problems. Sewer systems in many major cities in

Box 1-8. Global Environmental Impacts

The most significant global problems are climate change, human inputs to the nitrogen cycle, the depletion of stratospheric ozone, the transnational movement of toxic substances, the loss of biodiversity, and ocean degradation. Countries in the Asia and Pacific region contribute to global environmental problems and in turn are among the most vulnerable to their effects.

The most serious global concern is climate change. The global average surface temperature of the earth has risen by approximately 0.6°C since the late 19th century. The atmospheric concentration of carbon dioxide (CO₂) has increased by 31 percent since 1750. There is a growing scientific consensus that human activity has made a discernible contribution to this change. Various activities release greenhouse gases (GHG) such as CO₂, methane, chlorofluorocarbons (CFC), and nitrous oxide, which trap heat energy released by the earth. The globally averaged surface temperature is projected to increase by 1.4 to 5.8 °C by 2100.

Much of the increase in atmospheric GHG concentrations stems from historic fossil fuel use in industrial nations. About three quarters of the anthropogenic emissions of CO₂ during the past 20 years are due to fossil fuel burning. The United States is the largest emitter of GHGs in the world, accounting for about 19 percent of total emissions, but Asia plays an important and growing role in climate change. Nations in the region contribute 38 percent of global CO₂ emissions from commercial energy use. Asia's heavy dependence on carbon-intensive fuels such as coal and oil has produced an annual rate of growth in CO₂ emissions that was twice the average world rate of 2.6 percent per year from 1975 to 1995. Industrial release of CO₂ grew 60 percent faster in Asia than the rest of the world over the last few decades. However, CO₂ emissions per capita are low, little more than half the world average and barely more than 10 percent of the level in North America in 1995.

Two global issues are related to the movement of toxic and hazardous substances. The first is the transboundary transportation of these substances. More than 400 million tons of hazardous wastes are generated every year, and a significant portion is transported across national borders. Developing countries frequently lack the technical knowledge and equipment for safely managing and treating hazardous wastes. They are concerned about their use as dumping grounds for wastes that other countries export because of higher domestic costs or regulatory control. Developing countries are also concerned about the potential health risks posed by imported hazardous wastes that are recycled into new products. The second global issue relates to longrange, airborne persistent organic pollutants (POP). POPs cause serious health effects in humans and wildlife, especially in the Arctic region because they tend to migrate north and south from tropical regions toward the poles.

Sources: US EPA 1997; ADB 1997

Box 1-9. Urban Water Quality

The pollution of water bodies in Bangkok has reached extreme levels in the Bangkok Metropolitan Region (BMR). The BMR, which contains about 80 percent of Thailand's industrial base has an existing population of about 10 million and a projected population in 2025 of almost 23 million. The majority of household, commercial, and industrial wastewater in the BMR is discharged into the stormwater drainage system with no treatment, or with pretreatment only. The existing wastewater generation from all sources within the BMR is about 4.5 million cubic meters per day and will increase to about 6 million cubic meters per day by the year 2015.

Chao Lake is one of the five largest freshwater lakes in China, and is the major source of potable water supply for Hefei and Chaohu cities. In recent years, the rapid development of industrial and urban areas, coupled with changes in agricultural practices, has caused environmental degradation of the lake. Most of the rivers feeding into the lake do not meet the standards for the lowest classification Class V, as a result of ammonia, biochemical oxygen demand (BOD), and chemical oxygen demand (COD).

Pasig River, in Manila, connects the Laguna Lake to Manila Bay, and passes through all major districts of highly urbanized Metro Manila. The river and its major tributaries have been designated as Class C, suitable for fishery and recreation. Currently, however, the river does not meet these standards due to excessive pollution loads, especially during the dry season. At these times, the river is biologically dead and has the appearance of diluted sewage. BODs as high as 80 to 120 mg/L have been reported with dissolved oxygen dropping to zero. Colliform counts exceed the standards by several hundred to several thousand degrees.

Source: ADB 1997

the region are inadequate to support a high-density urban environment. In most cities, sewage is often discharged directly to drains or waterways, or at best, is disposed of in individual septic tanks that are not regularly emptied or maintained. The result is untreated overflow of domestic wastewater that pollutes both groundwater and watercourses.

Another major urban environmental issue is flooding and land subsidence. For example, Bangkok is in a flat lowland area associated with a typical monsoon rain regime whose runoff frequently exceeds the Chao Phraya river drainage capacity, a problem that is exacerbated by the progressive filling in of the “khlongs” (or canals) as the urban area expands. Flooding is therefore a historical problem and one of the most difficult and costly problems to resolve. Further, excess groundwater extraction needed to supply freshwater to urban and industrial areas produced remarkable land subsidence effects in parts of Bangkok (measured during the 1980s at 0.6 to 5.1 centimeters per year). Land subsidence increased the probability as well as worsened the impact of flooding. Similar conditions are reported in some PRC river basins, where availability of clean surface water has reached crisis conditions resulting in the massive drawdown of water tables (Gunaratnam 2000).

Industrial growth and urban expansion have greatly contributed to and increased the generation and accumulation of solid and hazardous wastes in many DMCs, outrunning the collection efficiency and disposal capacity of many municipalities. Some cities have significantly improved solid waste management. For example, Kolkata, which generates about 2,500 metric tons of waste per day, has developed effective collection and disposal systems that capture 95 percent of the waste stream. Most cities collect 70 to 80 percent of solid wastes, leaving an average of about 1,000 tons per day uncollected in cities such as Jakarta and Manila. Other cities such as Dhaka and Karachi collect less than 50 percent. The balance ends up in drains and rivers, exacerbating flooding, or in vacant lots or roadsides, where it impacts public health by providing habitat for rodents, flies, and other disease vectors.

Urban environmental challenges are unique in the Pacific islands (see Box 1-10). Except for Fiji Islands, common features of these countries include poverty, remoteness and isolation, openness, susceptibility to natural disasters and environmental change, limited diversification, and limited capacity. Traditional ways of managing natural resources are disappearing. The most crucial environmental issues are in the areas of (i) natural resources conservation — because of rapid deforestation and unsustainable and destructive exploitation of marine and mineral resources;

Box 1-10. Unique Challenges in the Pacific DMCs

Pacific DMCs are unique in their own right and as a consequence pose unique challenges. Despite their relative homogeneity in socio-economic characteristics, these countries vary widely in size, population, and output. Based on their resource profiles and growth prospects, these countries have been grouped into three categories: (i) the Melanesian DMCs (Papua New Guinea, Solomon Islands, and Vanuatu) are resource rich but relatively poor, with high population growth rates; (ii) the more economically advanced DMCs (Cook Islands, Federated States of Micronesia, Fiji Islands, Samoa, and Tonga) have a higher skill base, moderate resource potential, and relatively low poverty; and (iii) the island atoll DMCs (Kiribati, Marshall Islands, Nauru, and Tuvalu) are severely disadvantaged by their smallness, isolation, and weak resource base.

(ii) waste management and pollution prevention — because of lack of systematic waste disposal, pollution of surface water and groundwater, and lack of management of toxic wastes including pesticides, waste oil, and heavy metals; and (iii) climate change and sea level rise— because most people in these countries live in low-lying coastal areas that are particularly vulnerable to climate change.

COUNTING THE TOLL

People in the Asia and Pacific region have paid a heavy toll for the degradation of the region’s natural environment, a cost measured in human health and economic terms. Natural resource degradation and pollution have far-reaching impacts on the health and welfare of the poor (Qadri 2001). The number of people killed or harmed by pollution is so large and the numbers have been repeated so often that many are anaesthetized by the magnitude of the problem. Suffice it to say that pollution-related health problems in the region are one of the world’s most serious public health problems, one truly worthy of the cliché “crisis” (see Box 1-11).

Deteriorating environmental quality is a leading contributor to poverty in the Asia and Pacific region. Inadequate health conditions caused by poor sanitation, drainage and air quality undermine the ability of the region’s poor to pursue economic opportunities. Illness increases family costs and reduces family incomes. Chronic illness in children inhibits child development and education, and can create life-long vocational problems. The lack of infrastructure for water, waste management and transport in poor communities increases time dedicated by residents to these basic needs and reduces their economic productivity. Floods, smog, and traffic congestion reduce the productivity of entire urban and regional economies.

Box 1-11. A Look at the Statistics

According to WHO, dirty water and poor sanitation cause more than 500,000 infant deaths a year in the region, as well as a huge burden of illness and disability. In 1990, the region accounted for about 40 percent of the total global diarrhea episodes in children under five years of age. In Southeast Asia alone, diarrhea-related diseases killed more than 1 million people in 1999, nearly half of all deaths from such cases in the world. Most of the fatalities resulted from exposure to contaminated water and poor sanitation. Roughly two-thirds of the population of South Asia lack access to adequate systems of sanitation.

Recent major studies confirm the damaging effects of air pollution to human health. These effects include premature death, as well as increases in the incidence of chronic heart and lung diseases. A World Bank study in 1997 illustrates the positive significant relationship between particulate pollution and daily nontraumatic deaths, as well as deaths from certain causes (respiratory and cardiovascular problems) and for certain age groups. In Delhi, where the study was conducted, it was projected that a 100 micrograms per cubic meter increase in total suspended particulates (TSP) would result in a loss of about 51,403 life years. This is equivalent to about 1,385 lives in a year, distributed among different age groups. During the study period (between 1991-1994), the average TSP level in Delhi was 378 micrograms per cubic meter — approximately 5 times the WHO annual average standard. Furthermore, TSP levels in Delhi during the period exceeded the WHO 24-hour standard on 97 percent of all days on which readings were taken.

Sources: WHO 1992; UNDP 1999; World Bank 1997

Urban air pollution exacts a heavy toll on human health and the quality of urban life. Fatalities in Bangladesh, India, Indonesia, and Nepal account for about 40 percent of the global mortality in young children caused by pneumonia (WHO 1993). Air pollution in South Asian cities causes nearly 100,000 premature deaths per year and over 1 billion work days of lost or reduced productivity. The PRC's two largest cities, Beijing and Shanghai, regularly exceed emissions for multiple pollutants by double the safe amount recommended by WHO. Levels of smoke and dust, major causes of respiratory diseases, are frequently measured in PRC cities at levels as high as twice the world average. These levels are as much as five times higher than the norm in most European and North American urban areas. In the PRC's 11 largest cities, smoke and small particles from burning coal are thought to be the primary cause of more than 50,000 premature deaths and 400,000 new cases of chronic respiratory illness every year. In the city of Shenyang, for example, 17 percent of deaths are attributed to the effects of air pollution (UNDP 2000a). Smoke and dust in large cities and in the region are a major cause of respiratory diseases (see Box 1-12). Smoke and dust in large cities are generally twice the world average and more than five times as high as in Latin America (ADB 1997).

The economic costs of depletion and degradation of ecosystem services undoubtedly are as severe as the direct health impacts, but because they are more difficult to

integrate into systems of national accounts, there have been few attempts to quantify these environmental costs in the Asia and Pacific region. These costs include the depletion of subsoil assets (such as minerals and fossil fuels), the effects of soil erosion on agricultural productivity, and a few of the health effects from air and water pollution.

Environmental degradation has economic as well as noneconomic costs. These costs manifest in several forms: adverse impacts on human health, loss of productivity, and lower overall well-being (see Box 1-13). In Asia, estimates of economic costs of environmental degradation range from 1-9 percent of a country's gross national product (GNP), depending on the country and the impacts included in the estimates (ADB 1997). In the PRC, the

overall cost of damage to agriculture, production, and natural resources from air and water pollution is estimated to exceed 8 percent of the GDP (World Bank 1997). Noneconomic costs that affect welfare, but not GNP, are even larger, but are often difficult to value (ADB 1997). The GNP estimates should be viewed as rock-bottom minimum estimates of the value of depletion because they are dominated by oil reserves that are easy to measure and because they exclude the vast array of ecosystem services essential to life. More than anything, the estimates reveal our ignorance and the need for wholesale new approaches for collecting, organizing, and synthesizing environmental data.

Some of the most interesting estimates of the economic values of ecosystem services in Asia are related to coastal

Air pollution in South Asian cities causes nearly 100,000 premature deaths per year and over 1 billion work days of lost or reduced productivity.

Box 1-12. Health Aspects of Haze

According to the United Nations Development Programme (UNDP), the haze of 1997 from forest fires in Indonesia cost the people of Southeast Asia \$1.4 billion, mostly in short-term health costs. More than 40,000 persons were hospitalized for respiratory and other haze-related ailments. The long-term impacts on health of exposed children and the elderly remain to be determined. ADB estimates that a total of 757 million tons of CO₂ were produced during the 1997 and 1998 fires. The total cost of the carbon released into the atmosphere (based on \$7 per metric ton) was calculated to be \$1.446 billion. This figure is conservative. Other estimates have put the amount of CO₂ produced at 3.7 billion tons, or nearly five times the level reported by the ADB.

Sources: UNDP 1999; ADB 1999

Box 1-13. Costs of Environmental Degradation in Asia

Studies in the region have indicated partial estimates of the economic costs of environmental degradation in selected economies at different times.

- ◆ In PRC, for example, Smil (1996) estimated that productivity losses caused by soil erosion, deforestation, and land degradation; water shortage; and destruction of wetlands have amounted to between \$13.9 billion and \$26.6 billion, equivalent to 3.8 to 7.3 percent of its 1990 GNP.
- ◆ In Jakarta, Indonesia, studies of Ostro (1994) and DeShazo (1996) estimated the annual cost to have reached \$2.16 billion (equivalent to 2 percent of GNP) from the health effects of particulates and lead that have exceeded levels of WHO standards.
- ◆ A study by O'Connor (1994) on the effects of the same pollutants in Thailand revealed an annual loss of \$1.6 billion, representing 2 percent of GNP.
- ◆ In Pakistan, the health impacts of air and water pollution and productivity losses from deforestation and soil erosion were estimated at \$1.71 billion, or 3.3 percent of GNP, in the early 1990s.
- ◆ The result of a 1993 World Bank Study in the Philippines showed that health and productivity losses from water and air pollution around Manila in the early 1990s amounted to between \$335 million and \$410 million, or 0.8 to 1 percent of GNP.

Source: ADB 2000d

resources (Cesar 1996) (see Box 1-14). For example, 1 square kilometer (km²) of sustainably managed coral reefs can support the annual food requirements of 2,500 people. Economic values can be divided into use values — direct (goods) and indirect (services) use, and non-use values — option value (future use), bequest value (generational use), and existence value (preservation and knowledge) (White and Cruz-Trinidad 1998). Various environmental economic techniques have been developed to estimate these when standard cost-benefit analyses prove inadequate.

LOOKING AHEAD

It is difficult to predict with any certainty the future direction of different environmental problems in the DMCs. Under a status quo scenario, unless revitalized DMC economic activities stimulate environmental investment, it is generally agreed that environmental degradation will accelerate (Brandon and Ramankutty 1993; O'Connor 1994), perhaps presenting serious national crises (ADB 1997; Kato 1997; Panayotou 1996). Environmental degradation is likely to emerge as a major constraint on future economic development and poverty reduction within the region.

Governments in the Asia and Pacific region have been inconsistent, unpredictable, and at times, unfair regulators. In general, they have failed to develop information systems and databases essential to effective and fair regulation. Rules and regulations are poorly defined and frequently not enforced. Subsidies have been extensively used by DMC governments to benefit particular consumer classes (such as the poor, rural consumers, and residential consumers) and activities (such as irrigation and manufacturing fertilizer). But these subsidies tend to benefit the rich instead of the poor and damage the environment (ADB 2000). Continuation of poor environmental governance will condemn the Asia and Pacific region to a level of environmental degradation that will make the region barely livable.

Although industry is already the lead sector in most Asian economies, the next decades will see a significant expansion and replacement of the industrial capital stock. If the status quo remains, regional industry may follow the same destructive path taken earlier by the industrialized nations. Much of the growth may be highly polluting, especially from small and medium enterprises (SME), and it will concentrate in large cities where the combined loading from industrial and municipal wastes will overwhelm already weak municipal infrastructures.

Box 1-14. The High Cost of Losing Ecosystems

Short-term benefits to individuals from destroying coral reefs are high: \$33,000 per km² for poison fishing; \$15,000 per km² for blast fishing; and \$121,000 to \$430,000 per km² for coral mining. However, societal costs from the loss of ecosystem services are even higher: \$34,000 to \$306,000 per km² from blast fishing in Indonesia, depending on the tourism value of the area; up to \$6.6 million per km² for coral mining in Sri Lanka; and \$40 million to \$160 million for complete replacement of coastal protection functions. Even a relatively degraded coral reef and mangrove complex at Olango Island in the Philippines has annual net revenues of \$38,000 to \$63,000 per km², and an investment of less than \$100,000 per year would increase revenues from fisheries and tourism by \$1.4 million per year. Although only 5 percent of the Philippines' 27,000 km² of reef is in excellent condition, coral reefs contribute at least \$1.35 billion annually to the economy.

Sources: Cesar 1996; White and Cruz-Trinidad 1998

The future of the global environment in upcoming decades depends on increased national participation in and compliance with international agreements and on the laws operating at national and global levels. One important dimension of such international agreements is the international transfer of technology, information, and know-how among countries.

To bring about the fundamental changes in behavior needed to make both present and impending investment in the Asia and Pacific region sustainable, developing countries must implement a number of interrelated reforms that are discussed in the subsequent chapters of this report. Chapter

The future of the global environment in upcoming decades depends on increased national participation in and compliance with international agreements and on the laws operating at national and global levels.

2 explores the underlying driving forces that resulted in environmental problems in the region and the path these forces will take us. Chapter 3 discusses opportunities to redirect the current trajectory implicated by these driving forces and outlines an alternative vision for the Asia and Pacific region's future. Chapter 4 shows that the most important and immediate change that can be adopted by the region's policy makers is to integrate environmental concerns into mainstream economic development planning at all levels. Chapter 5 then challenges these policy makers to confront the issues raised by this report and identifies priorities for action.



CHAPTER

2

**DRIVING FORCES
OF CHANGE**



DRIVING FORCES OF CHANGE



Prospects for a livable future in the region remain at best clouded with uncertainty if the driving forces that are causing the deterioration of the environment continue on a destructive trajectory.

As discussed in Chapter 1, environmental degradation is a constraint on future growth within the Asia and Pacific region and a barrier to efforts to eradicate severe poverty. Prospects for a livable future in the region remain clouded with uncertainty if the driving forces that are causing the deterioration of the environment continue on a destructive trajectory. Environmental quality cannot be achieved by addressing only isolated symptoms. Prescriptions for change must be aimed at the behavior, governance, economic fundamentals, and development of integrated approaches that will have lasting impacts on the root causes of environmental degradation.

This chapter discusses the impacts of driving forces on the environment in the region: population growth, urbanization and industrialization, income growth and inequality, technological changes, governance, institutions, policy, and the market. It also discusses building opportunities based on these emerging trends.

Many powerful driving forces of change in the Asia and Pacific region are neither inherently good nor bad for the environment. The environmental impacts of intensified international flows of capital and technology, for example, depend very much on the energy, materials, and pollution intensity of the technologies involved, from power plants to industrial machinery. Environmental outcomes depend on how these driving forces of change are channeled and harnessed to achieve different societal ends.

The driving forces underlying patterns of poor environmental quality and extensive environmental degradation in the Asia and Pacific region include the following:

- ◆ A growing population that demands more energy, materials, and ecosystem services
- ◆ Extensive urbanization and industrialization
- ◆ Income growth, unequal distribution of wealth, and widespread poverty
- ◆ Use of technologies that are based on inefficient energy and material use and that generate and release excessive waste
- ◆ Lack of participation of civil society and the private sector, and forms of governance that exclude the majority of stakeholders
- ◆ Weak institutions and inappropriate policies that promote inefficiencies and fail to capture the externalities of economic activity

Documenting the processes underlying environmental degradation is only a first step. It is necessary to take the next step of defining effective points of leverage over these

Environmental outcomes depend on how these driving forces of change are channeled and harnessed to achieve different societal ends.

powerful drivers of change, including the geographical scales at which critical decisions are made concerning these processes. One source of concern within the region is a perception that the locus of control over many key dynamics (such as investment, consumption patterns, and technology change) is increasingly shifting outside of the DMCs through the process of economic globalization.

POPULATION EXPLOSION

The relationship between demographic forces and the environment is complex. Certainly, population growth that exceeds the capacity of ecosystems will undermine efforts to improve environmental quality. Lack of integration of population and economic development policies exacerbates the adverse impact of population growth on the natural environment and poverty. Much of the rapid population growth projected for the next two decades will occur in areas already under severe environmental stress and areas that face substantial resource constraints to increased food production (see Box 2-1). In other areas, population growth will significantly contribute to increased consumption of energy and materials. Where population growth has stabilized, changes in income and consumption patterns will also contribute more to increased energy and materials use.

Much of the rapid population growth projected for the next two decades will occur in areas already under severe environmental stress.

next 20 years. In South Asia, the annual growth rate in population will fall from 2.2 percent (1975 through 1997) to 1.5 percent (1997 through 2015). But even with this drop in the annual growth rate, the total population will increase substantially. The resource demands of population growth remain one of the most significant drivers of environmental degradation within the region.

Almost all countries in the Asia and Pacific region are experiencing a demographic transition from high to low fertility and mortality rates. In South Asia, infant and child mortality is falling fast, resulting in a greater share of youth in the population and an expanding active labor force (ADB 1997).

In much of East Asia, by contrast, the next 25 years will result in a significant “greying” of the population as the economically dependent segment of the population grows at a faster rate than the active labor force. These demographic shifts will have multiple indirect impacts on the environment ranging from shifting patterns of consumption to labor supply for future economic development. The important point is that the impact of demographic transition (economically active population compared to economically dependent population) on the environment is largely contingent on the economic opportunities available within each of the DMCs.

Box 2-1. Population Boom Impacts Environment

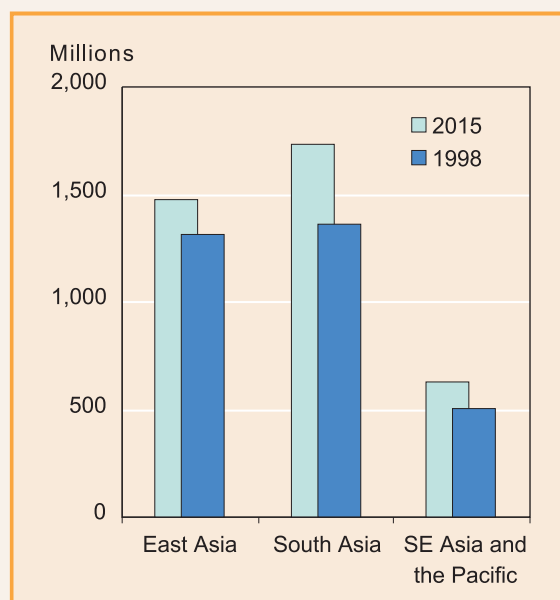
The largest increase in population will occur in the relatively poor economies of South Asia. The population of South Asia is expected to increase from 1,340 million in 1997 to 1,737 million in 2015, placing additional major pressures on land, water, and other natural resources.

Source: UNDP 1999

Four aspects of population impact the environment: (i) resource demands directly resulting from increased population; (ii) changes in labor productivity and consumption patterns resulting from demographic shifts (age distribution); (iii) population migration patterns; and (iv) population densities that exceed local capacities to manage environmental effects.

Over the next 15 years, approximately 700 million people will be added to the population of Asia (see Figure 2-1). Population growth rates are expected to decline significantly within the region over this time period. The United Nations predicts that population growth in East Asia will fall from the 1.3 percent annual growth rate sustained over the past two decades to 0.7 percent annually over the

Figure 2-1. Actual (1998) and Projected (2015) Population by Subregion



Source: Human Development Report 2000

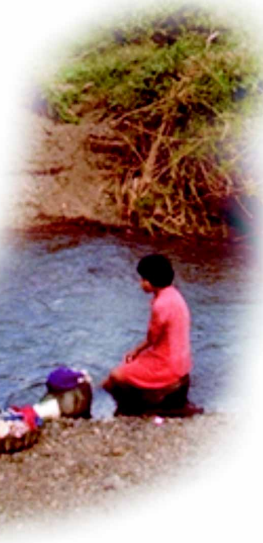
Population migration has in many cases intensified environmental challenges within the region. The most significant migration pattern in the region is rural to urban migration in individual countries. There is also significant international migration to high-growth, industrializing countries. Urban and rural migrations are major obstacles to adequate management of urban environmental concerns. Also, rural migrants have been driven to rapidly growing cities in search of employment and improved social welfare. This economically disadvantaged population typically settles in environmentally hazardous areas such as riverbanks, swamps, and estuaries. They often have little choice but to engage in unhealthy and hazardous occupations. In addition, limited social and health services reach this portion of the population.

Although migration to urban centers is considerable, population in rural areas also increased substantially. Population growth in rural areas has had a significant impact on agriculture. Agri-cultural land use increased by 13 percent (or 170 million ha) in the last 30 years, largely at the expense of lowland forests and their rich biodiversity. Population densities have been one factor driving land degradation in portions of the Asia and Pacific region (along with weak institutions, inappropriate land tenure systems, and other factors). The Food and Agriculture Organization (FAO) estimates that with virtually no reserves of land with crop production potential, further population growth in South Asia will lead to increased use of marginal land, destabilization of traditional farming systems, and increased migration to urban areas. From 1990 to 2025, available land per capita in Pakistan is projected to fall from 0.17 ha to 0.07 ha, and in India, from 0.20 ha to 0.12 ha.

URBANIZATION AND INDUSTRIALIZATION

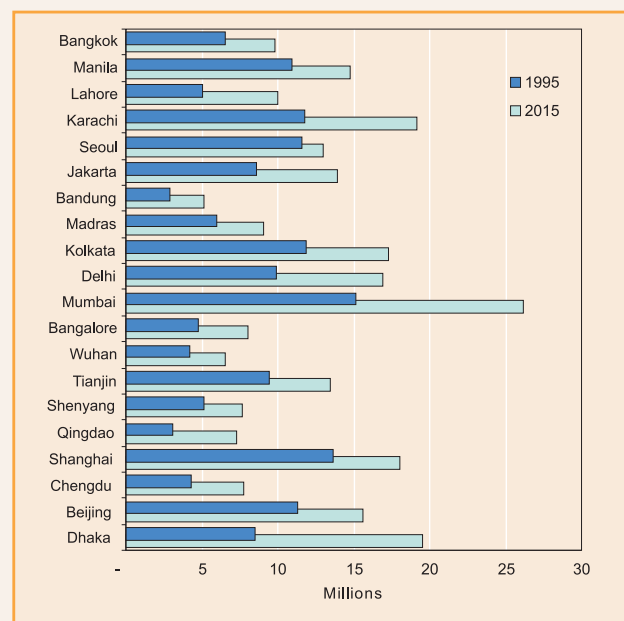
As the population of the Asia and Pacific region has grown, it has also become more urbanized. By 2015, the percentage of the population that is urban is projected to increase to about 48 percent in East Asia and about 46 percent in Southeast Asia and the Pacific. By approximately 2020, over half of Asia's population will live in cities; the urban population will triple from 360 million in 1990 to over a billion in 2020 (UNDP 1999).

Among the fastest growing urban areas in Asia are the cities in South Asia, including Dhaka, Karachi, Kolkata, and Mumbai. By 2015, 20 cities are expected to have population greater than 5 million (see Figure 2-2). Unplanned and rapid urbanization in cities is taking its toll on human health. The speed of population growth in urban areas has outpaced the development of environmental infrastructure and of responsive urban governance in many large cities. Problems range from lack of access to clean water to poor air quality and inability to manage solid wastes. In 1996, only 3.6 percent of Metro Manila's households were connected to a central sewer that discharges directly into Manila Bay (Evans 2001). One of the key infra-structure problems in urban areas is transportation. The number of vehicles is doubling every 7 years in the region, substantially increasing urban air pollution and energy consumption.



Rural migrants typically settle in environmentally hazardous areas such as riverbanks, swamps, and estuaries. They often are also forced into unhealthy and hazardous occupations.

Figure 2-2. Population of Large Cities in the Region including those Projected to Exceed Five Million by 2015



Source: Human Development Report 2000

Unplanned rapid urbanization has been driven by rapid industrialization in most countries in the region, above all in the newly industrializing economies of East and Southeast Asia. Between 1965 and 1996, value-added in manufacturing in East Asia increased at an average annual rate of 9.7 percent, more than three times the world average (World Bank 1998). Over the past 30 years, industrial production has been a major source of pollution in urban areas and a significant driver of intensified resource use (see Box 2-2). Many factors contribute to the impact of industrialization on the environment, including the scale of economic activity; the sectoral composition of industry; the geographical distribution of production; the energy, materials, and pollution intensity of production processes; and the effectiveness of policy in regulating industrial activity. In general, the net effect of these factors has increased energy and materials use and industrial pollution in most DMCs. Rapid increases in industrial production have outweighed any positive benefits achieved through relative shifts into less resource-intensive industries as well as incremental improvements in environmental regulation and enforcement (see Box 2-3).

Energy use in the developing Asia and Pacific region is expected to double over the next two decades [and] will surpass OECD countries as the largest source of GHG emissions worldwide.

now takes place within the region. Asia's share of global output, for example, which was roughly 10 percent in 1950 and 30 percent in 1995, is expected to reach 55 to 60 percent by 2025 (Radelet and Sachs 1997). Growth in higher income economies typically involves geographical dislocation rather

than elimination of resource-intensive activities within the context of extended global production chains. Foreign-direct investment was an important part of the industrialization strategies of many DMCs. Much manufacturing activity has relocated from OECD economies to the developing economies of East and South Asia. This manufacturing activity was associated with materials and pollution-intensive industries such as metal processors and leather tanners. In some cases, foreign investment involved second-generation technologies

that are far less energy- and materials-efficient than those being used in OECD countries.

Under a "business-as-usual" scenario, rapid urban and industrial growth and related increases in transportation-and-consumption related emissions will likely lead to further declines in environmental quality in the large cities.

INCOME GROWTH AND INEQUALITY

As development accelerates, so too does the use of energy and materials. Thus income growth among the DMCs will undoubtedly present additional demands on natural resources and ecosystem services. Demand for energy, water, and other resource inputs is likely to increase substantially, as will resulting pollution and GHG emissions. In many developing Asian and Pacific economies, commercial energy use per capita remains relatively low compared to the usage in more industrialized economies. For example, in 1996, commercial energy use (measured in kilogram oil equivalents) was just 820 kilograms per capita in the four Southeast Asian economies of Indonesia, Malaysia, Philippines, and Thailand, compared to 5,123 kilograms per capita in OECD countries (Rock and others 1999). Energy use in the developing Asia and Pacific region is expected to double over the next two decades. On this basis, by 2020, the Asia and Pacific region will surpass OECD countries as the largest source of GHG emissions worldwide.

The scale of natural resource demands associated with increasing income is mediated by a wide variety of factors. How rising income is used (such as consumption or investment) determines in large part the impact income growth will have on the environment. Consumption patterns in the

Box 2-2. Impacts of Industrialization

Sulfur dioxide emissions per unit of GDP in the PRC fell from 19.9 tons per million yuan in 1981 to 12.4 tons per million yuan in 1993 (in constant 1978 currency values), a significant improvement in pollution efficiency of economic output. Despite this improvement in pollution efficiency, total emissions of sulfur dioxide roughly doubled over this time period because of massive increases in industrial output.

Source: Wang and Liu 1999

Box 2-3. Industrialization and SMEs

Another important aspect of industrialization in the region is the role of small and medium enterprises (SMEs), which may be responsible for most industrial pollution in certain DMCs. SMEs are often outside the environmental regulatory process and represent difficult challenges for environmental policy makers. Traditional approaches to environmental regulation have largely failed to address pollution by SMEs in developing Asia.

Source: Evans and Stevenson 2001

Rapid industrialization has occurred simultaneous with economic globalization in the Asia and Pacific region. Indeed, a growing share of the world's industrial production

Asia and Pacific region are increasingly modeled after those of more industrialized countries (see Box 2-4). This is reflected in the increasing use of private automobiles and other durable consumer goods such as air conditioners, washing machines, and televisions. The use of wood products, especially paper, is also increasing dramatically.

Box 2-4. Consumption Patterns

The number of cars in East Asia, for example, increased 14-fold from 1975 to 1993, more than seven times the global average rate of increase. In the region, the “good life” is defined as the ever-increasing consumption of luxury goods and services, not the satisfaction of basic needs and wants such as clean water, fuel for heating and cooking, rudimentary health and education services, and a secure and vital local economy.

Source: UNDP 1998

Globalization of information and consumption patterns has accentuated these tendencies toward the worldwide adoption of a culture of material consumption. Expenditures on advertising grew by several hundred percent across the region in the 1990s (UNDP 1998). Transnational corporations, which face saturated markets for consumer goods within advanced industrial economies, have identified developing Asian and Pacific economies as the major opportunity for market expansion.

The experience of industrialized countries has shown that rising incomes are associated with a structural shift in the economy that favors certain dimensions of local environmental quality, such as urban air quality. This is the basis for the so-called “inverse-Kuznets curve” on environmental quality. Resource-intensive industries give way to more knowledge-intensive industries, and the service sector rises in importance relative to the manufacturing sectors. The assumption is that these sectors of the economy produce output using less energy and materials and generate less waste. In addition, higher incomes result in greater ability and propensity to pay for environmental improvements. These results, however, apply to only a limited set of environmental indicators. Thus, energy use, solid waste generation, and GHG emissions continue to grow rapidly even in countries with high per capita incomes. In addition, the hypothesized relationship between income growth and environmental quality presupposes the emergence of ambitious environmental performance goals, effective

environmental regulatory institutions, and strong public pressure for improved environmental quality, all of which are lacking in many countries in the Asia and Pacific region.

The impact of income growth on the environment may depend substantially on the degree to which growth is broad-based. Conversely, income growth is accompanied by deepening income inequality. When growth is not broad-based, opportunities are missed to reduce poverty and the vulnerability of the poor to a host of environmental concerns.

TECHNOLOGICAL CHANGES

In many cases, technological changes have ameliorated the environmental and resource effects of economic growth. For example, the long-term trend is toward decarbonization of economic activity and a decrease in energy use per unit of economic output. Fuel switching in electricity generation away from high-carbon fuels (for example, from coal to natural gas) and improvement in energy and pollution efficiency within the transportation sector are among the more important contributors to this trend. In the Asia and Pacific region, however, perverse incentives exist for the continued use of highly polluting coal and pollution-intensive, outdated modes of automobile and bus transportation.

In general, the rate of improvement in energy, materials, and pollution efficiency of technologies has been slow relative to the rate of economic growth in many Asian and Pacific economies (see Box 2-5). This pattern is reflected both in individual sectors of the economy, such as energy production, and in the economy as a whole (incorporating substitution effects across sectors). Industrial growth in Japan, for example, has more than offset the significant improvement in the efficiency of fuel, electricity,

In the region, perverse incentives exist for the continued use of highly polluting coal and pollution-intensive, outdated modes of automobile and bus transportation.

Box 2-5. High Cost of Inefficient Power Distribution

Technological inefficiencies are widespread within the region. Nowhere is this more apparent than in the generation, transmission, and distribution of electricity. Power plants in many developing countries consume up to 44 percent more fuel per kilowatt-hour of electricity generated than their counterparts in more industrialized countries. The transmission and distribution losses are up to 30 percent compared to less than 10 percent in the United States and Japan. In Bangladesh, Pakistan, and Thailand alone, these losses amount to 300 billion kilowatt-hours annually, equivalent to about \$30 billion in additional supply costs.

and water use in industry (Janicke and others 1997), and the generation of pollutants associated with industrial production (such as heavy metals) has grown substantially. The decline in the intensity of metals used in telecommunications and information technology products has been offset by the overall growth in these industries (Key and Schlabach 1986). Material and energy consumption will therefore continue to rise under a “business-as-usual” scenario.

The rate of adoption of green environmental technologies has been slow, despite numerous efforts to promote the use of efficient process technologies as well as end-of-pipe pollution controls. Widespread use of these technologies in the region is questionable under current policy frameworks and lacking the political will and incentives for clean production. Information clearing-houses and other efforts to correct for “market failures” in the provision of information on cleaner technology alternatives have generally not been successful in effecting substantial changes in investment and technology choices, especially among small and medium-sized firms.

The absolute gains from technology are also limited by market response to technology changes. Improvements in energy efficiency may be experienced as price reductions. This spurs an increase in demand for energy either directly through price elasticity effects or indirectly through released purchasing power redirected to energy-using goods and services (Saunders 1992). This “rebound effect” can be substantial.

Inappropriate use of and failure to maintain technologies as intended are also important drivers of environmental problems within the region. For example, technologies that depend on the availability of requisite monitoring equipment (e.g., equipment that monitors for leaks in material supply systems) or adequate systems of technical support risk causing major environmental disasters and resource inefficiency when inappropriately used or maintained, problems that are magnified by tendencies towards large-scale, capital-intensive projects in areas such as water and energy supply.

Many technologies also have unintended side effects (Tenner 1996). These effects are often displaced in time and space, making their presence and causes more difficult to detect. Therefore, there has been a systematic underestimation of the adverse effects of these types of technology

on the environment and systematic overestimation of their positive effects (Doeleman 1992).

GOVERNANCE

Countries within the Asia and Pacific region depend on a range of systems of governance to perform critical functions such as identifying societal goals, securing resources, and mobilizing participation of the public and private sector. Although broad assessment of governance systems is fraught with difficulty, several dimensions of governance have been identified as contributing to environmental problems within the region.

The experience of the 1997 and 1998 Asian financial crisis stressed the importance of transparency and accountability within government and the relation of government to the private sector and the public. Transparency and accountability are necessary to mitigate possible government corruption and mismanagement as well as the lack of requisite regulatory oversight over economic processes. Effective governance also depends on the availability of high-quality information concerning economic processes and related environmental effects.

Historically, central government organizations have been the cornerstone of institutions of governance within the region. Many countries are now recognizing the value of more inclusive processes of governance that provide greater scope for direct participation by the public and nongovernment organizations (NGO) (Seymour and Faraday 2001). Civil society, including environmentally-oriented NGOs of citizens groups and NGOs representing small businesses and trade associations, have increased in number and influence in the region. But the slow development of inclusive governance in the region has hampered efforts to reconcile competing societal goals.

An example of early successful environmental activism in Asia was the Chipko Movement in India in the mid-1970s, which successfully stimulated a 15-year ban on tree felling in Uttar Pradesh. Despite many such examples, many governments in the region, while welcoming civil society assistance and the provision of services, remain suspicious and hostile toward activist advocacy groups. The prolife-

Widespread use of [clean] technologies in the region is questionable under current policy frameworks and lacking the political will and incentives for clean production.

Inappropriate use of and failure to maintain technologies as intended are also important drivers of environmental problems within the region.

ration of NGOs has provided new opportunities for civil society participation in environmental governance, but the impact to date has not translated into improved environmental quality. There is also emerging concern that civil society organizations are not necessarily representative of or accountable to the constituencies that they serve or the citizens on whose behalf they advocate.

The global trend toward inclusive governance presents new challenges to regional governments. First, central governments have been slow to assign and devolve roles and responsibilities to civil societies (see Box 2-6), local communities, and the private sector. Second, it is important that responsibility be accompanied by delegating resources and authority (Agarwal and Ribot 1999). Third, most countries in the region have failed to establish and enforce a minimum national framework for development. This framework would ensure that local level departures from national goals and objectives are monitored and checked. Fourth, devolution from central government to local authorities and communities will not achieve much in the absence of good governance and transparency at both levels. Governance at the regional level also has implications on the international level (see Box 2-7).

One of the most important driving forces for change outside of the government is the private sector. However, when resources have been privatized without adequate safeguards, the results have often been disastrous for the environment, especially in the areas of mining and natural resource extraction. Through logging and mining concessions, companies have been granted the access and responsibilities to exploit vast areas and volumes of natural wealth. Many concessions have been granted by governments in areas where property rights are disputed. Many forest-dwelling or dependent communities have asserted ownership over the same forest resources assigned by governments to the private sector (Brunner and others 1998). Similarly, mining concessions have allowed operators to dispose of toxic mine wastes to land and water resources claimed by indigenous groups (Broad and Cavanagh 1993).

Awarding concessions over valuable natural resources to military affiliates and “cronies” of national leaders has led to the flouting of regulations designed to mitigate the environmental and social impacts of resource exploitation. Low rates of economic rent capture have resulted in significant profits for concession-holders that often allow them to enjoy disproportionate political influence and immunity from prosecution.

*Many concessions have
been granted by
governments in areas where
property rights are disputed.*

In addition, many resource extractive industries operate in remote areas, where government presence and services are minimal. As a result, private companies become the *de facto* providers of services to local communities despite questions about their capacity and accountability to the affected communities. As many concessionaires also finance their own security, there is justifiable concern over human rights violations, especially when environmental concerns have led to confrontation with indigenous groups.

In other areas, especially finance and management of infrastructure and service provision, progress has been hampered by a failure to draw upon the full resources of the private sector. Failure to price water and other resources relative to actual supply costs has distorted the market for critical resource inputs in both urban and rural areas. The

Box 2-6. Role of Civil Society

Six suggested broad roles that civil society organizations could play in environmental governance include the following: (i) intellectual leadership, (ii) specific issues advocacy, (iii) technical support providers for problem-solving, (iv) social services providers to marginalized groups, (v) government and corporate environmental performance monitors, and (vi) philanthropists.

Source: Zarsky and Tay 2000

Box 2-7. Regional and International Governance Trends

Many of the environmental problems of the region cut across national boundaries and can be mitigated by regional and international policy responses. Important examples of such problems and responses include regional transboundary air pollution and integrated river basin management. To date, effective regional institutions for environmental governance have been slow to develop and have lacked clear mandates and necessary authority.

Countries in the Asia and Pacific region need to be full and effective members of international initiatives to address global environmental concerns. Institutions of international governance, such as the World Trade Organization (WTO) and the Global Environment Fund (GEF), must be responsive to the developmental and environmental challenges facing the Asia and Pacific region. By the same token, the Asian and Pacific economies realistically cannot “opt out” of this important emerging trend toward regional and international governance.

increasing trend toward privatization of public services is likely to continue as governments become increasingly unable to meet the infrastructure demands of rapidly increasing urban populations.

INSTITUTIONS, POLICY, AND THE MARKET

ADB's *Emerging Asia: Changes and Challenges*, concludes that environmental degradation in the Asia and Pacific region was above all a failure of policy and of institutions (ADB 1997). Population growth, poverty and affluence, the pace and path of technological advancements, and other driving forces that influence environmental change evolve within the context of international, national, and regional institutions and policies. Markets, politics, the NGOs, and other institutions play key roles in the relationship between economic growth and the environment. Institutional failures discussed below include a lack of political will and commitment to environmental protection, limited financing for environmental improvement, continued dominance of sectoral approaches to policy making, market distortion, and poor compliance and weak enforcement.

Institutional and policy failures resulted from the presumption that developing countries can "grow now and clean up later." Governments acted as if the elimination of poverty through sustained economic growth and other socioeconomic goals were distinct from and independent of environmental goals. Investment in environmental protection was considered a secondary objective that could be dealt with after "real" problems were attended to. When environmental goals and environmental performance requirements were identified, they were rarely integrated into economic development or sectoral policies.

Protection of the environment was regarded as a policy goal to be pursued exclusively within ministries of environment. Few countries (the notable exception being Singapore) mobilized other line ministries (such as trade, finance, and industry) to the task of environmental improvement. Similarly, local and regional urban planning was rarely pursued as an integrated policy that also included environmental concerns.

Environmental agencies in the region are often marginalized, underfunded, and inadequately staffed, restricting their ability to design and implement effective environmental policies (see Box 2-8). Despite an impressive array of environmental regulations, environmental quality

in the region continues to decline. One reason is that the laws simply are not enforced, either through neglect, because government agencies lack the technical capacity, or because of corruption. Weak compliance and enforcement in the region can be attributed to the following:

- ◆ Lack of public support and participation in monitoring and detection and reporting violations
- ◆ Poor environmental monitoring
- ◆ Inadequate training of monitoring and inspection staff
- ◆ Lack of accountability for environmental mismanagement
- ◆ Ill-informed and nontransparent judiciary systems

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institutions.*

Poor environmental performance in the region can also be traced to the uncritical adoption of rigid command-and-control approaches to environmental regulation developed within the context of the mature industrial economies of the OECD. Command-and-control approaches were adopted without sufficient appreciation for the cost and complexity of implementation. Much of the basic institutional framework upon which command-and-control approaches were based — capacity to monitor compliance and to respond to cases of malfeasance — were absent from various countries within the region.

Informed and effective decision making requires a considerable amount of information on a wide range of environmental data and trends (see Box 2-9). However, even rudimentary environmental databases are lacking throughout the region. Systems of national accounts and other standard measures of economic performance and social well-being exclude the costs and benefits associated with the use of environmental services and present a misleading picture

Box 2-8. Environmental Expenditures by GDP

In the Asia and Pacific region, expenditure on environmental programs rarely exceeded 1 to 2 percent of the GDP compared to defense budgets, which range from 0.8 to 6 percent of the GDP. To meet the environmental program needs of the region, expenditures of at least 7 percent of the GDP will be required. There is little evidence that such increases in environmental expenditures are being considered by policy makers in the region.

Sources: UNDP 1999; ADB 1997

Box 2-9. Limited Environmental Disclosure

There remains limited disclosure of environmental performance information and of information on environmental quality within the region. Experiments with information disclosure, such as the Program for Performance Rating (PROPER) in Indonesia, suggest that simple, low-cost systems of disclosure can be an effective tool for harnessing and realizing public desires for improved environmental performance.

of the economy. There appears to be little prospect of environmental accounting becoming a mainstream component of development planning and national economic accounts.

Environmental degradation in many areas has resulted in part because of the absence of effective property rights over common pool resources, such as fisheries and forests. Environmental degradation has also resulted from subsidies on resource use and from the failure of resource pricing to reflect full environmental costs. Subsidies that distort market signals are rampant in the region. Subsidies can have adverse effects on people and the environment, even though they are often justified as helping the poor to obtain affordable fuel, food, and water. There is ample evidence that the rich take advantage of subsidies and that the poor are often excluded

from subsidized services such as piped-water supplies. Irrigation subsidies amount to \$11.4 billion per year in Asia (FAO 1994). Part of these subsidies assists farmers, but the balance leads to waterlogging and salinization and depletion of aquifers. Governments in the region also heavily subsidize fertilizers and agricultural chemicals that in most cases are overused and contaminate water supplies. Subsidies for export crops and for the establishment of tree plantations promote conversion of forests to other land uses.

TOWARD SUSTAINABLE DEVELOPMENT

Emerging trends pose a challenge to policy makers to construct systems of governance and policy frameworks that bring the powerful forces of globalization (above all, intensified international flows of capital, technology, information, and ideas) to bear on fostering environmental health and sustainable development in the Asia and Pacific region (see Box 2-10). As illustrated in this chapter, environmental outcomes depend on *how* the driving forces of change are harnessed to achieve various societal and environmental goals. Chapter 3 discusses opportunities (including regional successes) to direct these driving forces toward sustainable development.

Box 2-10. Emerging Trends

A number of trends are emerging in the Asia and Pacific region that will likely accelerate or intensify the impact of the driving forces discussed above. These trends, which are listed below, bring opportunities and pitfalls, depending on how and if policy makers in the region consider them during policy formulation.

- ◆ Deeper integration of regional and global economies; continued globalization of trade and investment; and increased public concern over the environmental, social, political, and economic consequences of this integration
- ◆ Increasing demand for inclusive and participatory governance, driven in part by increased access to information
- ◆ Emergence of ever-larger cities with populations of 10 to 20 million

Current patterns indicate economic globalization will intensify over the next two decades. International webs of trade, investment, and market connection will deepen and become more geographically extensive. Trade as a percentage of GDP among the East Asian newly industrializing countries (NIC) and the People's Republic of China (PRC) increased from 19 percent in 1970 to 58 percent in 1996. In 1997, East Asia and the PRC were the recipients of approximately half of worldwide foreign direct investments in developing economies. Despite concerns over economic globalization, international trade and market interconnection are likely to remain the development model of choice within the region. The role of large, multinational corporations will continue to grow, partly through a process of economic consolidation in which industries worldwide become dominated by a smaller number of multinational corporations. Harnessing economic globalization to address the goals of poverty reduction and reduced environmental degradation is likely to emerge as one of the greatest policy challenges facing the leaders of DMCs over the next decade.

Demands for inclusive and participatory democracy will continue to intensify within the region, driven in part by increased access to information on a global scale. The effects of information technology on the ability of social groups to mobilize on a local, regional, national, and international scale are emerging. It is critical that shifts in governance structures provide for effective management of difficult environmental problems. Of particular importance is the accuracy of information available, the technical capability of NGOs and other social groups, and other prerequisites for effective participation in governance structures.

Source: World Bank 1998



CHAPTER

3

**OPTIONS AND
OPPORTUNITIES**



OPTIONS AND OPPORTUNITIES



Investments in environmental improvement, especially those related to improved health, yield positive benefits in reducing poverty and economic vulnerability.

The challenges of shifting to a pathway of sustainable development are substantial. Indeed, it is fair to say that a transformational policy approach is required. Improvements in energy, materials, and pollution-reduction technologies will offset some of the problems associated with projected future growth in population, but increased industrial output and consumption will cause and exacerbate environmental problems well beyond what can be addressed by incremental gains in existing policy approaches. For at least some of the major environmental problems, especially increased materials and energy consumption, there are few policy alternatives or models of success currently available in the Asia and Pacific region or elsewhere in the world.

Two fundamental principles apply to the relationship between economic development and the environment in the Asia and Pacific region. First, environmental improvement and enhanced economic productivity can go hand-in-hand within the region. The false premise of “grow now and clean up later” is neither a necessary nor a desirable approach to managing the economy-environment relationship. Significant improvements in environmental performance can be achieved at low economic cost. Evidence suggests that strengthened environmental regulation is not associated with declining economic competitiveness (and may indeed enhance competitiveness through impacts on technological innovation). Investments in environmental improvement, especially those related to improved health, yield positive benefits in reducing poverty and economic vulnerability. Capturing these “win-win” opportunities is a first step toward improved environmental performance.

Second, much of the region’s environmental degradation and pollution occurs as a result of market failures, process inefficiency, lack of integrated planning, corruption and rent-seeking behavior not enforcing environmental laws, and lack of training and institutional capacity. The cost of correcting these failures can be relatively low, and such corrective actions can yield major environmental benefits. This raises the questions as to why the rate of adoption of new policy approaches has been slow and relatively uneven within the region and what can be done to address this problem.

For most environmental challenges facing the Asia and Pacific region, the outlines of an alternative policy approach are visible. Just as the current development trajectory and driving forces of change in the Asia and Pacific region present challenges, they also provide opportunities to shift to a different trajectory of sustainable development.

This chapter identifies six opportunities for intervention: (i) the widespread adoption of existing, proven policy approaches across a broad spectrum of activity, from population to water supply management; (ii) new urban-industrial investment opportunities;

The false premise of “grow now and clean up later” is neither a necessary nor a desirable approach to managing the economy-environment relationship.

(iii) development and widespread deployment of new technologies; (iv) advances in energy use and supply; (v) strengthening of the drivers of improved environmental performance through enhanced information availability and education, use of the courts, and resource pricing; and (vi) enhanced inclusive governance and institutional reform. The chapter ends with a look at opportunities for a better future.

ADOPTION OF PROVEN POLICY ALTERNATIVES

There are examples of successes in improving environmental quality through proven policy approaches in urban service provision, pollution charges, facility licensing, public-private collaboration, community-based resource management, and resource pricing (see Box 3-1). These examples show that communities and countries within the Asia and Pacific region can potentially implement policy innovations that reduce pressures on the natural environment in ways that support rather than undermine improvements in socioeconomic welfare. Perhaps the largest near-term opportunity for reduced environmental degradation is the more widespread adoption of the proven success stories, which should be modified as needed to fit local circumstances. Policy options exist if the political will for environmental improvement is forthcoming, something that in turn likely depends on a strengthening of societal drivers for environmental improvement.

It is fair to say that without a framework of policy integration, broad and sustained societal support for environmental improvement remains in doubt despite the severe environmental problems and the driving forces detailed in Chapters 1 and 2. Many of the opportunities for sustainable development discussed here are not restricted to environmental performance. For example, credit mechanisms that allow manufacturers to upgrade production technology often yield environmental benefits even though the primary motivation is to reduce costs or improve quality, the underlying premise of cleaner production. Privatization of capital-starved, state-owned facilities can lead to both improved economic competitiveness and improved environmental performance. Education programs that slow the rate of population growth indirectly reduce pressure on the natural environment.

DEVELOPMENT INVESTMENT OPPORTUNITIES

One of the key challenges facing the Asia and Pacific region is the volume of new urban-industrial investment anticipated over the next two decades. Paradoxically, this challenge also provides substantial opportunities. If new urban-industrial investment is based on technologies and economic practices that are less energy- and materials-intensive and old resource-intensive industries are replaced, the environmental effects of new economic growth will be substantially reduced. The question is how best to influence new investment choices.

The clearest example of opportunities provided by new investments lies in technology choices made by firms. It is typically far easier for firms to achieve a shift in technology

under new investment conditions than retrofitting an existing plant. Sunk costs in existing facilities are often a significant barrier to *in situ* technological change, especially for large capital projects. For example, existing power plants, even those based on economically and environmentally inefficient technologies, rarely are taken off-line until long after initial construction investments are recovered. Investments in ancillary equipment (such as distribution pipelines and building specifications) as well as worker training and management systems can present further obstacles to major process changes within an existing factory. The costs of switching to cleaner process technologies are typically lower under new investment

There are examples of successes in improving environmental quality through proven policy approaches in urban service provision, pollution charges, facility licensing, public-private collaboration, community-based resource management, and resource pricing.

conditions.

It is important to note that the opportunities associated with new investments are not limited to new production facilities. Expansion of existing facilities, shifts to new production lines, and changes in product mix all potentially involve new investments and provide opportunities to shift to less energy- and materials-intensive technologies.

New investment is not limited to large firms. Influencing the technology choices of small firms is a major opportunity for reducing energy and materials use and pollution. Another potential opportunity provided by anticipated future investment is the possibility of influencing the sector composition of economic activity, accelerating a shift away from resource- and pollution-intensive industries toward less polluting, knowledge-based industries and the service sector. A shift

Box 3-1. Proven Environmental Policies in the Region

- ◆ **Licensing New Facilities.** Singapore has demonstrated how facility licensing can be used as a point of effective policy intervention to improve the environmental performance of new industrial investments. From the late 1970s onwards, access to promotional privileges provided by the Economic Development Board (EDB) and to factory space and infrastructure services in industrial estates was predicated on the ability of investors to meet the Singapore's tough air and water emissions standards. Because of this, Singapore has been able to grow rapidly without experiencing significant declines in ambient air and water quality. Moreover, much of this happened during a time (1972 through 1990) when many were concerned that multinational corporations were relocating their production facilities from countries with tough emissions standards to those with weak or nonexistent standards.
- ◆ **Cleaner Production in Environmental Infrastructure.** An ADB loan was provided to the Government of Thailand in December 1995 to assist the Government in undertaking the Samut Prakarn Wastewater Management Project. The project adopted an integrated approach that tackles wastewater pollution both at the source and final treatment points, representing a significant attempt to proactively minimize wastewater pollution. First, the project is helping industries to adopt pollution prevention practices and improve on-site management. So far, over 300 industries have committed to participate in the Cleaner Production for Industrial Efficiency (CPIE) program aimed at reducing wastewater generation, energy use, and pollutant loads by 20 percent. Second, a polluter-pays principle has been adopted to provide industry with incentives to reduce pollution while sustaining a viable operation. Industry will bear 80 percent of the costs of treating wastewater; the remaining 20 percent will be split between commercial and residential beneficiaries. Third, the project provides support for revisions to environmental regulations to control industrial discharges. Taken together, these initiatives represent a significant attempt to proactively minimize wastewater pollution. Initial activities have focused on integrating cleaner production into normal business management (rather than simply proposing technical fixes) to ensure long-term impacts. Based on the results from first 83 industries in the CPIE, if they achieve their goals, annual reduction will be 840,000 cubic meters of water, 256,000 cubic meters of wastewater, and 44,600,000 kWh of electricity usage. The total annual cost savings from these reductions is approximately \$2.35 million. Benefits to Royal Thai Government include increased tax revenue, decreased reliance on international experts, improved relationship with industry, improved public image, and reduction in waterborne and airborne illness and deaths.
- ◆ **Community-Based Resource Management Strategies.** Community-based forest management has been adopted as the national strategy for the management and sustainable development of forest resources in the Philippines. To date, more than 500,000 ha of well-stocked, national forests have been turned over to communities, mostly of indigenous peoples. Community involvement in multisectoral forest committees has proven a potent weapon against large-scale illegal logging in the Philippines. Decentralized forest management systems are also being successfully adopted in Nepal and Papua New Guinea. Reforestation programs have had considerable success in reducing the loss of forest cover in Thailand and elsewhere and forest regeneration has been significant in Orissa and West Bengal. In several countries, there have also been significant experiments with community-based irrigation management programs.
- ◆ **Water Pricing.** To control inefficient water use among domestic users, water pricing has been an effective instrument. For example, in Bogor, Indonesia, a rise in the cost of water for domestic use from \$0.15 to \$0.42 per cubic meter encouraged a 30 percent reduction in consumption. Similarly, in Bangkok, introduction of a groundwater fee led to reduced use and a lowered groundwater pumping rate.

Sources: Douglas and Lee 1996; Brunner and others 1999; Lynch and Talbott 1995; Poffenberger and McGean 1998; Poffenberger 1999

in sector composition away from resource processing has occurred in many DMCs as a result of rising incomes.

New investment also provides the opportunity to influence the spatial distribution of economic activity in ways that reduce environmental impacts and poverty. On a small scale, this can involve ensuring that industrial activity is conducted at locations that provide requisite waste disposal and treatment systems, energy-efficient fuel supplies, and other required environmental infrastructure services (for example within industrial parks). Spatial planning at a

regional scale could direct industry away from critical environmental zones and take full advantage of the dilution capacity of natural ecosystems. This would ensure that industrial production does not create major health problems because of proximity to residential areas. Development of the eastern seaboard of Thailand, special economic zones in the Philippines and elsewhere, and managed industrial estates in Singapore point the way to careful spatial planning and management of industrial activity.

NEW URBAN-INDUSTRIAL INVESTMENT OPPORTUNITIES

These same principles also apply to urban development. It has proven extremely costly to retrofit poorly planned urban areas for environmental infrastructure. Even seemingly small features of existing urban areas, such as the width of streets, the design of houses, and the locations of places of residence and work, can become major obstacles to improving overall environmental efficiency within built-up urban areas. To the extent that new urban growth allows for effective planning for environmental infrastructure, the unit costs of investment are lower. Thus, it becomes especially important to exercise sensible planning control over rapid new urban growth.

It is obvious that an urgent requirement is to increase total investment in urban infrastructure (Panayotou 1997). This will require the identification of new sources of revenue (ADB 1999). At the “micro” level, the financial viability and sustainability of urban environmental services need to be significantly improved by implementing effective mechanisms for cost recovery. At the “macro” level, the overall financial security of agencies providing environmental infrastructure and services needs to be improved. One of the impacts of globalization has been increased access to a broader array of international funding sources. As events of recent years have demonstrated, it is important that such international capital flows be based on transparent investment criteria and effective monitoring and regulatory institutions.

New investment offers the opportunity for manufacturers to develop and sell products and services that are less energy- and materials-intensive. Perhaps the most urgent consumption concern is related to transportation. If the growing, increasingly affluent population of the Asia and Pacific region meets its mobility needs through polluting, energy-intensive automobiles and motorcycles, urban air pollution and energy usage are likely to escalate dramatically. Early adoption of alternative transportation technologies (such as fuel cells) and the accelerated retirement of the most polluting vehicles (such as two-stroke motorcycles) would reduce environmental impacts associated with the transportation demands of a growing urban population. Considerable progress is being made in PRC.

Opportunities associated with new investment remain latent and therefore will be potentially missed unless (i) effective approaches and policies are identified to influence the investment and purchasing decisions of firms and households and (ii) economically viable cleaner product and process technologies are available for widespread adoption and use.

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DEVELOPMENT AND DEPLOYMENT OF NEW TECHNOLOGIES

Research on technology change has demonstrated that the capacity of a country to adopt, use, and modify technologies is a critical determinant of the rate of overall technology upgrade. Taipei, China and a few other countries have demonstrated how investments in science and technology infrastructure and the development of public-private partnerships in research and technology can substantially accelerate the process of technology upgrade within industrial

economies and yield both environmental and economic benefits (Rock 1995) (see Box 3-2).

Box 3-2. Technology Change as Opportunity

To a large extent, technological change will be an enabler of rather than an obstacle to enhanced environmental performance and reduced environmental degradation in the Asia and Pacific region over the next two decades. Technologies already exist or are in early stages of commercialization that offer substantial improvements in energy and materials efficiency over those currently used in the region. The accelerated development, adoption, and effective use of energy- and materials-efficient technologies constitute a substantial opportunity for reducing environmental degradation.

Three broad categories of technology need to be assessed. First is the increased use of end-of-pipe pollution control equipment by industry, ranging from air-filters on smoke stacks to catalytic converters on cars. Even though the preference is pollution prevention, end-of-pipe pollution control equipment remains an economically feasible response to some air and water pollution concerns. Second is the development and use of so-called “environmental technologies” such as renewable energy systems and electric cars. These technologies were developed directly in response to

environmental goals such as reduced energy use and GHG emissions. Third are product and process improvements that yield environmental benefits from increased overall operations efficiency. Examples of such improvements include materials substitution, increased use of more sensitive monitoring technology, and substitution of communication for travel (Hawken, Lovins, and Lovins 1999). Other examples include super efficient cooling coils, switched-reluctance motors (that can continuously adjust their software for peak efficiency under all operating conditions), “smart” materials, sophisticated sensors, rapid prototyping and ultraprecise fabrication, improved power-switching semi-conductors, atomic-scale manipulation, microfluids, and micromachines.

In addition, it is recognized that pollution prevention and the use of clean technologies are cost-effective solutions to environmental protection and often more cost-effective than end-of-pipe waste treatment. This recognition has broadened the concept of what is now referred to as “cleaner production.” This more encompassing and more sustainable approach to environmental performance extends far upstream and downstream of the actual production process to include consideration of the environmental consequences of the design of the product; selection, extraction, and processing of production inputs; and distribution, use, and ultimate disposal of the product. The consideration of these concerns is referred to as “life-cycle analysis.” Cleaner production considers the sum of the life-cycle impacts of producing and using a product or service and engages a strategy and management approach to minimize aggregate environmental costs.

Perhaps the most significant cleaner production issue is the concept of “natural capitalism”. Natural capitalism assigns a monetary value for natural capital and human resources, in addition to traditional capital. Product production costs are accounted for in terms of natural resources and ecological services that are consumed or damaged per unit of production. As the first step toward a solution to environmental loss, it advocates resource productivity—doing more with less, wringing up to a hundred times as much benefit from each unit of energy or material consumed. Natural capitalism also redesigns industry on biological models that result in zero wastes (Hawken, Lovins, and Lovins 1999). Effectively applied, this approach can result in different design and production

process decisions by firms. Despite genuine concern of some firms, it is difficult for most firms to even guess the accumulated natural resource impacts of their actions. Therefore, governments can play a critical role by creating a framework within which such long-term assessments of environmental impact take place.

Clear public policies are still needed to influence which resources are consumed, to reinforce the trend toward greater efficiency and minimal environmental impact.

Some multinational corporations operating in developing countries have taken steps to require their local suppliers to also integrate principles of cleaner production (see Box 3-3) in their operations or otherwise demonstrate that they are environmentally responsible, sometimes called “greening the supply chain”. Some multinational corporations offer assistance to their suppliers to adopt cleaner production technologies. This trend offers great promise as a dissemination mechanism. New large enterprises will tend to be cleaner and use fewer resources if newer, more efficient technologies are used and multinational investment partners promote cleaner production. However, clear public policies are still needed to influence which resources are consumed, to reinforce the trend toward greater efficiency and minimal environmental impact.

For cleaner production to significantly impact environmental quality, a fundamental shift must occur in how governments and the stakeholders set policies, plan strategically, establish and enforce regulations, develop incentives and disincentives, implement these incentives and

Box 3-3. Cleaner Production Advantages

Reasons for firms to adopt the cleaner production include the following:

- ◆ Reduced operating costs and greater profitability through greater production efficiency
- ◆ Improved public image as an environmentally responsible firm
- ◆ Better access to certain types of financing
- ◆ Reduced business risks from accidents and regulatory enforcement
- ◆ Increasingly stronger and even preferential competitive position (especially in international trade).

Cleaner production also allows the government to incur fewer enforcement and monitoring costs. The ultimate winners, however, are the people and future generations who enjoy better health, a cleaner environment, and the preservation of natural capital.

disincentives, provide access to financing, build human resources, build partnerships between government and the private sector, disseminate information, and promote industrial growth.

ADVANCES IN ENERGY USE AND SUPPLY

Energy choices are fundamental to the environmental impacts of technology development. There are opportunities for managing both energy demand and energy supply. With regard to energy demand, environmentally friendly technologies available today can save about twice as much electricity as was feasible 5 years ago at only a third of the real cost. This rate of progress has been consistent for the past 15 to 20 years. Many continuing improvements in energy efficiency are due to ever-better technologies for wringing more output from each unit of energy and resources. Process innovations in manufacturing help cut time, materials, and costs and achieve better results using simpler and cheaper inputs. In practically every industry, improvements in energy efficiency are possible through the greater use of resource-efficient materials, techniques, and equipment.

Major advances in reducing environmental impact of energy supply can be achieved through shifts in fuel mix. One of the primary ways in which industrialized nations have increased output per unit of energy input is by switching to higher quality energy fuels, such as from wood, coal, and oil to gas, hydroelectric power, and nuclear power. Currently, approximately 80 percent of commercial energy use in the Asia and Pacific region is supplied by oil and coal.

Significant opportunities exist to increase the use of renewable sources of energy supply in the Asia and Pacific region (see Box 3-4). Photovoltaic systems are economically and environmentally efficient way of providing electric

power to areas not connected to electricity grids, especially in rural areas. Indonesia has launched a major initiative in solar energy use for homes with the goal of providing affordable clean solar energy to 35 million rural households. There are also opportunities for increased supply of wind and geothermal energy.

Biofuels are and will continue to be an important source of energy in DMCs, especially in rural communities. It is essential, therefore, that the management of more efficient biomass energy systems receives high priority in energy, forestry, and rural development planning. Particular attention will be needed to ensure that net energy gains result from technologies based on renewable energy sources as well as attention to social and environmental implications.

The energy business is poised to become a service industry that operates with flexibility in a decentralized milieu and responds to the diverse service needs of households and enterprises. It will be characterized by competition and entrepreneurial risk-taking. It will need governments to set up legal and regulatory environments where it can flourish. The governments must also ensure (i) that these environments have transparency and accountability built in to enhance true competition and (ii) access to the information required to make sound business decisions. The changes in energy use and supply are being enhanced by regulatory moves to (i) restructure electric power sectors, (ii) internalize at least some of the environmental costs of power generation, and (iii) introduce competition in energy supply. Competition springs from a wide variety of technological developments, such as renewable energy sources, fuel cells and micro-turbines, cogeneration, industrial and commercial self-generation and marketing, remote monitoring and control systems, and a large range of conventional generation techniques.

Encouraging participation of SMEs (public, private, and nonprofit) in the energy service business will facilitate new technological adaptations such as integration of telecommunications and electrical systems. Also likely is the creation of “virtual” utilities that provide household and institutional electricity on a fee-for-service basis but through dispersed provision of locally tailored power (for example, PV or hybrid PV) and demand-matching appliances (such as highly efficient direct-current lighting and electronics). Areas connected to a grid system should become more reliable and dramatically reduce technical and non-technical losses. A wide range of energy service companies and public-

It is essential, therefore, that the management of more efficient biomass energy systems receives high priority in energy, forestry, and rural development planning.

Box 3-4. Technology Advances Provide Opportunities

Technological advances offer opportunities to decouple the use of energy from the production of goods and services within economic, political, and social constraints. DMCs have a wide range of renewable energy sources and conservation energy technologies in various stages of development that potentially can reduce their reliance on fossil fuels. New institutional models are needed to channel market forces and specific policy instruments that foster the development of the appropriate mix of existing and renewable technologies in the coming decades.

private partnerships may develop on a customized basis, with the state providing information access, creative financial (and sometimes social) intermediation, and an enabling policy environment (see Box 3-5).

Box 3-5. Alternative Energy Requirements

If small-scale energy investments are to penetrate a market and be commercially viable, investors must have access to both equipment and technology, opportunities that open up new avenues for decentralized employment. Technical intermediation services must be available in both rural and urban markets. Equally necessary are financial intermediation services that provide accessible and appropriate medium- and long-term financing in both urban and rural markets.

Over the medium-term, technological changes offer perhaps the best prospect for driving down the energy and materials intensity of economic activity and of achieving the societal goals of poverty reduction and reduction in environmental degradation in the Asia and Pacific region. Economic globalization has a substantial role to play in this regard. Most capital equipment and machinery invested in the Asia and Pacific region will continue to be sourced internationally. Thus, effective international technology development and transfer techniques that can overcome market failure in information and in the transfer of knowledge will enhance rapid technological change.

STRENGTHENING THE SOCIETAL DRIVERS OF IMPROVED ENVIRONMENTAL PERFORMANCE

The opportunities of adopting proven policy alternatives, shaping the environmental footprint of new urban-industrial investment, and accelerating the adoption of less energy- and materials-intensive technologies are unlikely to be fully realized without a substantial strengthening of societal drivers needed to improve environmental performance. These drivers are discussed below.

CIVIL SOCIETY AND PUBLIC PRESSURE

Public pressure is a powerful driver of improved environmental performance, especially when local communities are mobilized to monitor and hold accountable potential polluters (see Box 3-6). Such public pressure is predicated in part on the availability of information on environmental

Box 3-6. Civil Society's Emerging Influence

The capacity of civil society to contribute to environmental governance has been significantly enhanced. "Civil society" is used here to mean organizations and associations above the level of the individual household that are outside the sphere of governments and private business. It thus includes independent research institutes, media, professional associations, labor unions, and religious groups as well as people's movements and NGOs. In recent years, civil society organizations in many Asian countries have increased both in number and in influence over environmental governance.

Source: Hopkinson 2001

performance and on the disclosure of this information in ways that are understandable within the communities. The ability to gather and publish information is key to educating and informing the public and mobilizing action. For example, the publication in 1985 by South Korea's first organized environmental group of results linking health problems in the community to cadmium contamination from the Onsan Industrial Complex alerted the public to the potential for pollution-related illnesses (Lee 1999).

Recent events within the region have highlighted the growing importance of NGOs acting as independent "watchdogs" that hold governments and corporations accountable for environmental performance. During the 1997 forest fires in Indonesia, for example, NGOs obtained and interpreted satellite imagery to demonstrate that most of the fires were started in corporate concession areas rather than by small farmers (Harwell 2000). In Cambodia, Global Witness exposed systematic illegal logging through the 1990s, and backed up their reports with detailed documentary and photographic evidence. In 2000, the Cambodian government acknowledged their expertise on logging issues by appointing them "as an independent monitor" to a newly established Forest Crimes Monitoring Unit.

The Internet and 24-hour news coverage by the media has also revolutionized civil society's capacity for communication on environmental issues, enabling instant access to information and providing an international forum for environmental concerns (see Box 3-7). Not only has this transformed communication, it has also opened up a new range of networking and coalition building oppor-

Public pressure is a powerful driver of improved environmental performance, especially when local communities are mobilized to monitor and hold accountable potential polluters.

Box 3-7. Information and Free Press

Free press is one of the most effective ways to expose environmental problems caused or linked to government policy. Environmental reporting has accompanied and assisted the growth of the environmental movement in the Asia and Pacific region, and there are now several umbrella organizations for environmental journalists, including the Asia Pacific Forum of Environmental Journalists and the Environmental Communication Asia Network (ECANET). Together, these organizations represent almost all areas of the Asia and Pacific region. Many of the journalists are dedicated environmentalists who use the media to organize environmental activities or campaigns.

tunities. There is also a growing phenomenon of “global public policy networks” that include NGOs, academic institutions, voluntary organizations, and media and government officials (Reinecke 1998). The knowledge revolution has enormous potential to empower people and communities, offering even remote communities a level of access to information and know-how previously unimaginable.

Effective environmental education is an essential building block to raising awareness, whether within the formal system of schools and educational institutions or more informal means. Incorporating environmental education into the formal school curriculum and providing adequate training for teachers should be an integral part of any national environmental policy. Knowledge is most effectively absorbed by a community when it is disseminated by groups whom local people trust. Community organizations and NGOs thus play a major role in supplementing the formal education system by providing educational materials and resources and channeling the community’s interest into action and behavioral changes (see Box 3-8).

Box 3-8. Community Mobilization

Success in mobilizing on one issue can create a virtuous cycle of actions. Community environmental coalitions formed in response to a particular environmental crisis often make the transition to becoming more permanent organizations. For example, the Project for Ecological Recovery, one of Thailand’s most successful, grassroots-oriented NGOs, grew out of an environmental coalition formed during protests over the proposed construction of a dam in the 1980s. Similarly, successful mobilization or tactics in one country can inspire action in another. Successful opposition to the Chico dam in the Philippines reportedly inspired similar movements in India and Thailand.

Source: So and Lee 1999

GLOBALIZATION AND ENVIRONMENT

Although economic globalization is bringing new pressures to bear on natural environments in the Asia and Pacific region, other aspects of globalization are strengthening countervailing forces. The internationalization of civil society networks is strengthening voices for environmental protection at the national level (Zarsky and Tay 2000). It is likely that these voices will increasingly use a common language of environmental governance principles such as those articulated during the Aarhus Convention, which will soon come into force in Europe (Petkova and Veit 2000).

Along with public pressure, significant opportunities are associated with strengthened market pressure. Globalization of trade and the elimination of trade barriers are placing unprecedented pressures on even domestic industries to achieve a competitive position through greater efficiency and responsible environmental management. The opening of markets and linking of trade and industrial policy to export incentives can provide a powerful incentive for industry to draw on its capacity for innovation to achieve greater resource efficiency with accompanying reduction of wastes.

As global and regional trade liberalization progresses, enterprises will increasingly be held accountable by consumers and shareholders for their environmental behavior. Asia and Pacific companies partnering with foreign firms will have opportunities to access new and clean technologies but will also find themselves bound by stricter international environmental standards. The challenge will be to shape environmental institutions to take advantage of the positive influences of globalization and to reduce or offset the negative consequences.

Market-based incentives are also at the heart of various certification schemes being extended to the Asia and Pacific region. Under such schemes, companies whose operations are independently certified as meeting certain social and environmental criteria are able to market their products at a premium to “green” consumers. For example, the SmartWood Program of the US-based Rainforest Alliance has a mission to “reduce the environmental damage caused by wood harvesting and to maximize the positive impacts of commercial forestry on local communities by awarding its seal of approval to responsible forest managers.” The SmartWood Program has so far granted that seal of approval to commercial forestry operations in six countries in Asia.

Although Business Councils for Sustainable Development were set up in several countries in the region in the wake of the 1992 United Nations Conference on Environment and Development (UNCED), there is still

considerable potential for voluntary initiatives in the region, particularly in natural resource sectors (see Box 3-9). In business environments where political concerns for environmental advocacy, enforcement of environmental regulations, and consumer awareness are all limited, opportunities for green enterprises may also be limited (Ganzi and others 1998). For example, the potential for voluntary timber certification programs to influence the forest products industry on a large scale depends on the development of credible and transparent monitoring capacity as well as

consumer demand for these products in the Asia and Pacific region.

The international community has increasingly celebrated the emergence of an independent civil society in the Asia and Pacific region and its role in environmental governance (see Box 3-10). Donor agencies, for example, have provided aid on the condition that civil society participate in various environmental decision making forums, ranging from environmental impact assessments (EIA) to consultation on new legislation affecting natural resource sectors (Seymour and Dubash 2000). Delegation of natural resource management roles from governments to NGOs or to community-level committees that are not elected or otherwise downwardly accountable cannot be assumed to automatically improve environmental governance.

Civil society organizations have acknowledged the issue of equality of access to information because many poor and developing countries are disadvantaged by the lack of telecommunication infrastructure. Some NGOs are now engaged in expanding access to knowledge and information technologies by helping people build and acquire essential tools and skills. Among these, the Global Knowledge Partnership, an informal partnership of public, private, and nonprofit organizations coordinated by a small secretariat at the World Bank Institute, helps people and communities acquire knowledge and communication tools such as telephones and computers.

Box 3-9. Emerging Certification of “Green” Products and Services

Product certification schemes are part of a broader international effort to promote voluntary corporate leadership in sustainable development. A growing body of experience highlights opportunities for businesses to simultaneously improve their environmental and financial performance. Businesses can protect their rights to operate by meeting societal expectations for environmental performance, reduce their costs and liabilities through cleaner and more efficient production, and enhance market position and revenues through provision of “green” products and services. Certification of management practices, such as ISO 14000, provide another means through which market pressure is brought to bear on the environmental performance of firms.

Source: Arnold and Day 1998

Box 3-10. Agenda 21 and Civil Society

UNCED’s Agenda 21 refers to civil society in terms of people’s organizations and points to women’s groups and NGOs as important sources of innovation and action at the local level. Agenda 21 further points out that such organizations have a strong interest and proven ability to promote sustainable livelihoods. Governments, in cooperation with appropriate international organizations and NGOs, should support a community-driven approach to sustainability, which would include the following:

- ◆ Empowering women through full participation in decision making
- ◆ Respecting the cultural integrity and the rights of indigenous people and their communities
- ◆ Promoting or establishing grass-roots mechanisms to allow for the sharing of experience and knowledge between communities
- ◆ Giving communities a large measure of participation in the sustainable management and protection of local natural resources in order to enhance their productive capacity

By establishing a network of community-based learning centers for capacity building and sustainable development, UNCED enhanced the role of civil society in environmental governance globally, especially the prominence and independence of NGOs. The Government of India was one of several countries that included NGO representation in its national delegation. Follow-up to the Rio Summit at the national level has also provided new opportunities for civil society participation in environmental governance. In 1996, the Philippine Council for Sustainable Development, for example, succeeded in institutionalizing a multistakeholder approach to national development planning and decision making.

Sources: Princen and Finger 1994; Maurer 1999; Isberto 1998

COURTS

Courts can play a central role by ensuring that the stated rights of review and redress of citizens under recent environmental legislation in many Asian countries are actually respected. For example, in 1996 in Malaysia, a court quashed a ministerial order exempting a hydroelectric project from conducting an EIA as required by law (Bruch and others 2000). Even when the legal framework governing environmental issues does not offer an explicit and comprehensive system of environmental guarantees, courts have derived them from general principles such as the right to life and freedom of expression contained in most national constitutions.

In a number of Asian countries, the courts have emerged as an important player in environmental and natural resource disputes. Since the late 1980s, India's Supreme Court has ruled on a number of cases arising from the construction of large dams. Although the Supreme Court has not consistently opposed such projects, it has generally proven more sensitive to the interests of the communities they threaten than have India's state and federal governments (Mehta 2000).

It should be noted, however, that a number of conditions must be satisfied if courts are to fulfill their promise in ensuring environmental justice for disempowered social groups. First, the administration of justice must be independent of political pressures and private influence. This is not the case in a number of countries in the region. In others, this may be the case in the higher courts more than in the lower courts. Second, national legislation, constitutions, and jurisprudence must adopt a sufficiently liberal interpretation of standing to sue to allow suit to be brought by third-party organizations (such as environmental law associations) because these organizations are generally best placed to represent ecological or social interests. The regions' record is more positive in this respect. A number of Asian countries have been at the forefront of the general worldwide movement toward such an expanded definition of standing to sue in public interest cases (E-Law 1998).

The opportunities for DMCs are to (i) strengthen the court system by enforcing laws, (ii) respect basic human

rights protected by most nations constitutions, (iii) rid court system of outside special interests, and (iv) empower disadvantaged social groups by providing standing to third-party lawsuits.

ENHANCED INCLUSIVE GOVERNANCE AND INSTITUTIONAL REFORM

Sustainable development in the Asia and Pacific region will require a major investment in strengthening institutions of environmental governance. Again, the beginnings of these changes are already visible in the region, which show that the exercise of authority over natural resources can be rendered transparent and accountable; decision making over environmental protection can be more representative and participatory; and authority and capacity for environmental governance can be placed at the appropriate level.

Implementing these changes as norms will require expanding natural resource management roles to include civil society and private business, decentralizing and devolving natural resource management functions, and developing the institutional capacities and accountabilities of new players at these new levels. The success of this reform agenda requires the explicit integration of environmental interests into mainstream governance mechanisms.

Enhanced governance begins with strong participating institutions, including governments, business, community organizations, and NGOs. There are important opportunities for strengthening the design and capability of all of these participants. At the same time, relations among these organizations and opportunities for full participation in policy-making are important dimensions of good environmental governance. Experience throughout the region has demonstrated the limitations of over-reliance on governments to provide environmental and natural resource management. With respect to environmental protection, government agencies charged with regulation and enforcement has often lacked accountability for meeting environmental objectives, especially when these have appeared to conflict with economic growth objectives. A more institutionally plural approach to environmental governance is characterized by a higher degree of collabo-

In a number of Asian countries, the courts have emerged as an important player in environmental and natural resource disputes.

With respect to environmental protection, inadequate capacity on the part of government agencies charged with regulation and enforcement has often been coupled with a lack of accountability for meeting environmental objectives, especially when they have appeared to conflict with economic growth objectives.

ration between the state, civil society, and the business sector to improve stakeholder participation in environmental decision making.

Perhaps the most difficult part of this transformation will be managing the existing institutions and vested interests constructed around current organizational arrangements. Top priority should be given to strengthening the capacity of line ministries so that they can understand and act on the most important environmental dimensions of their sector. Resource sectors dealing with renewable resources such as land, water, forests, coastal and marine, and protected areas especially need to supplement their traditional technical skills with management and social sciences skills. This range of skills will equip the sectors to work more effectively with local communities whose use rights and management systems have often been neglected but who remain reliant on the sustainable use of these resources for their livelihoods. Resource sectors dealing with non-renewable resources or involving infrastructure or industry such as mining, energy, transport, and urban development, need to think of improvements in environmental protection and management as representing untapped benefits rather than additional costs.

The allocation of authority between levels of government also will be important. In Indonesia, an effort is underway to empower local and municipal governments to raise their own funds and manage their own affairs, largely bypassing provincial governments. In Central Asia, more power is vested in the local government chiefs than in the intermediary *oblast* jurisdictions, but they enjoy this influence only through the grace of strong central governments. In the Philippines, “regions” (subnational groupings of provinces) have been empowered in recent years to act as strong intermediaries between central line ministries and rather independent local government units. In India, the states wield considerable power relative to the national government but effects to empower local governments have been inconsistent from state to state. In Sri Lanka, management of more than half of the sectors already has been formally devolved to provinces that still remain too weak to absorb many of their new responsibilities. As the Asia and Pacific region seeks new and more effective environmental institutions, reforms must be placed in this context of ongoing decentralization (see Box 3-11).

No successful system of environmental governance lacks central government regulatory agencies that have the mandate, resources, and capabilities to monitor environmental performance and sanction firms that violate agreed upon environmental standards. Many countries in the Asia and Pacific region lack such government institu-

Box 3-11. Government Decentralization Movement

Central governments need to let go of the notion that they should or even can “do it all.” Decentralization trends deserve encouragement, including devolution of authority and responsibility for provision of environmental services and the protection of environmental quality. Most local or city governments are eager to assume the widest possible mandates to manage their own affairs, though their staff and technical capacities need strengthening. As these capacities are developed, responsibilities should be devolved. New approaches for consultation in the planning stages and full participation in the implementation of policies and programs can serve as important intermediate steps. Even at the poorest sections of countries, a greater measure of self-rule and determination should improve the efficiency and targeting of central government programs.

tions. Opportunities do exist for national environmental institutions with legal mandate to take the lead advocacy role in environmental management and to guide decentralized institutions in dealing with environmental issues and problems as they emerge (see Box 3-12). Environmental management capacity appears to be a major constraint for such institutions to achieve their mandate. Investing in strong regulatory organizations at both the central government and regional scale offers significant opportunity for substantial improvement in environmental performance.

Box 3-12. Government and Community Partnerships

One important aspect of decentralization is community-based resource management. There is significant potential for the expansion of community-based management within the context of regional and national resource plans for land, forestry, fishery, water, and other resources throughout the Asia and Pacific region. For this potential to be realized, the property rights of resource users must be clarified and strengthened, local governments must develop the capacity to partner with communities, and regulatory frameworks must be sufficiently flexible to be responsive to diverse local situations.

Source: Ratner 2000

The role of firms in environmental governance is also changing in important ways within the region. Once viewed only as unwilling adversaries, many firms are now going “beyond compliance” in their environmental activities. Many leading transnational corporations are undergoing an unprecedented transformation in the understanding of their role in sustainable development, calling for changes in the whole industrial system as well as in their own strategic planning and actions.

The call for a new approach to environmental management and associated institutional reform comes at a time when regional trends are favoring restructuring of government bureaucracies and increased reliance on the private sector for development financing. Although unregulated financial markets have been blamed in part for the East Asian economic crisis, a strong movement continues toward greater reliance on market forces to shape the direction of economic development. New environmental institutions will need to be devised in this context to encourage the fullest possible integration of environment and development concerns.

REGIONAL AND INTERNATIONAL GOVERNANCE

In addition to strengthening environmental governance at the national and local scales, there are significant opportunities for enhanced international governance within the Asia and Pacific region and globally. Regional political and economic integration has increased the likelihood of direct and indirect transboundary environmental degradation (see Box 3-13). Transboundary environmental impacts on national development policies and projects indicate the need for regional environmental governance mechanisms to represent the interests of all relevant stakeholders (see Box 3-14). One potential model is the Aarhus Convention, which includes a provision allowing affected individuals and organizations to demand information, participation, and redress regardless of their country of citizenship (Petkova and Veit 2000).

Given the size of the regions' population and share of the world economy, emissions-intensive growth trajectories, and the global significance of its biodiversity, the region is vital as both the subject and object of global environmental

governance regimes. As the 1992 Rio Convention highlighted, over the last decade, developing countries have become more assertive regarding the need for such regimes to incorporate their aspirations for economic growth, and international environmental regime-making has become increasingly sensitive to these demands (Hassan 1995).

Box 3-14. Male' Declaration on Air Pollution's Transboundary Effects

ADB-SEI and UNEP sponsored senior government official meeting on February 22-23, 1998 to lay the groundwork for regional cooperation addressing the transboundary air pollution problems in South Asia. Subsequently on April 22, 1998, during the Seventh Meeting of Governing Council of South Asia Cooperative Environmental Programme at Male', The Republic of Maldives, ministers and high-level policy makers agreed to a *Declaration on the Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia*. The declaration was to combat regional issues of air pollution at the subregional level by developing programmes and plans that included local concerns. The result was that each country prepared a subregional action plans as a basis for further cooperation on the regional level to reduce air pollution.

Sources: ADB 1999; UNEP 1999

Many countries in Asia have acceded to major environmental agreements, including the 1973 Convention on International Trade in Endangered Species and the 1992 Convention on Biological Diversity (De Klemm and others 1995). However, partly because of weak enforcement provisions and the failure of industrialized countries to provide necessary financing, the degree of implementation of these agreements has been patchy. Myanmar, for example, has failed to comply even with basic provisions related to national-level reporting (Brunner and others 1998).

In the short-term, economic globalization and the participation of Asian countries in new global economic governance mechanisms will likely have a greater environmental impact than their participation in agreements specifically focused on the environment (see Box 3-15). Yet it is difficult to discern *a priori* whether the net impact will be positive or negative because for the most part, impacts will be unintentional. Globalization of finance has enabled governments in the Asia and Pacific region access to private capital for development investments free of the conditions of environmental development assistance (Ganzi and others 1998). For example, even though multilateral development banks declined financing the PRC's Three Gorges Dam Project, the government was able to access alternative financing from international bond markets.

Box 3-13. Transboundary Environmental Links Illustrated

Increasing opportunities for trade with the PRC have accelerated the exploitation of non-timber forest products in neighboring countries. The imposition of logging bans in Thailand has displaced timber demand to the forests of neighboring countries. Also, Thailand's appetite for natural gas from Myanmar has led to construction of the controversial Yadana pipeline. Construction of the Yahi dam on the Se San River to meet energy demands in Viet Nam has disrupted rural livelihood systems and ecosystem functions in neighboring Cambodia and large water releases from the Yali reservoir have reportedly led to the loss of life and destruction of property to high water levels.

Sources: Donovan 1998; Talbot and Brown 1998; Bryant 1998; Ratanakiri Province 2000

Box 3-15. Negotiated Reductions of Environmental Pollution

India and PRC are particularly significant players in global environmental governance issues largely because of their current and prospective contributions to total world GHGs. In the negotiations associated with the United Nations Framework Convention on Climate Change, the PRC has opposed emissions caps and actively resisted perceived compromises to national sovereignty. The government's continued participation in climate negotiations is based on the expectation that an arrangement will be made similar to the one crafted in the Montreal Protocol for reducing ozone emissions in which the compliance of developing countries is delayed and subsidized with funds from industrialized countries.

Source: Ross 1998

At the same time, new modes of global public policy making will increasingly influence norms of environmental governance at national and international levels. The World Commission on Dams, an independent, multistakeholder effort to determine criteria under which large dams contribute to environmentally and socially sustainable development, offers interesting possibilities. If the commission is successful in its objective of reaching a consensus on such criteria, public interest advocates in the Asia and Pacific region and elsewhere will have a new standard by which to hold governments, corporations, and international organizations accountable for their environmental performance.

One important emerging opportunity within the area of international environmental governance is that of carbon trading. Ample opportunities exist in the Asia and Pacific region for carbon sequestration using plantations. Although such enterprises have yet to develop fully in the Asia and Pacific region, there are many examples of the use of forest plantations for carbon sequestration by public utility companies in developed countries under the auspices of the voluntary framework referred to as "activities implemented jointly" established by the United Nations.

Private companies have already begun to engage in emissions trading. These private companies are proceeding with trades and initiatives regardless of the risk that some traded emissions may not be credited under currently emerging domestic, bilateral, and multilateral regimes. A large number of cases of carbon emissions trading either are already taking place or are in the process of being contracted (see Box 3-16). For example, Arizona Public Services (APS)

and Niagara Mohawk, two US utilities, traded CO₂ emissions reductions for sulfur dioxide emissions allowances in December 1996. Niagara Mohawk transferred 2.5 million tons of CO₂ reductions achieved through its emissions reduction activities to APS. These tons were "surplus" beyond what was needed to achieve a 1990 emissions level from its operations. In return, APS transferred sulfur dioxide allowances that it held in excess of what was required for compliance under US regulations. The value of the CO₂ reductions was estimated at \$2.7 per metric ton of carbon based on the market value of sulfur dioxide allowances. APS is also undertaking a project in Mexico to replace inefficient diesel generators with rural electrification based on solar and wind power. In May 1997, APS purchased 1,000 metric tons of carbon (equaling the average annual carbon emissions of 900 US cars) in the form of Certifiable Offsets (CTO) from the Government of Costa Rica. The CTOs are produced by the Protected Areas Project and are being independently certified by Société Générale de Surveillance.

One important emerging opportunity within the area of international environmental governance is that of carbon trading.

BUILDING OPPORTUNITIES FOR POLICY INTEGRATION

Opportunities are available to pursue economic development within an integrated policy framework in which ecosystem services are valued and protected. Under this scenario, the new and revitalized public institutions could play a significant role in

developing, implementing, and enforcing the policies and identify the ways in which contemporaneous development of economic and environmental policies support common objectives, particularly at local and regional levels and especially within urban centers (Smith and Jalal 2000). Chapter 4 continues to build on the opportunities and the need for policy integration.

Box 3-16. Carbon Trading Initiated

The carbon market and the specific determination of the Kyoto Protocol provisions are in a state of flux, but active carbon trading has already started. US carbon credits are worth as much as \$20 per ton, and the World Bank projects that such credits will be worth \$20 to \$70 per ton in the next decade. The estimates of GHG abatement cost and the supply of GHG abatements from developing countries (by means of the Clean Development Mechanism) would suggest an annual potential value of carbon trades as high as \$36.4 billion to \$47.3 billion if the market for carbon is competitive, with conservative estimates ranging from \$5 billion to \$21 billion annually and a "best estimate" of \$10 billion.

Sources: Haswell 2000; ADB 2000b



CHAPTER

4

**TOWARD POLICY
INTEGRATION**



TOWARD POLICY INTEGRATION



Adopting effective environmental policy is a prerequisite for achieving substantial progress in reducing environmental degradation.

Chapters 4 and 5 concentrate on national environmental policy integration as the most important aspect of policy redirection in Asia. This chapter discusses the mounting pressures for policy responses, the definition of policy integration, and entry points for policy integration including intrasectoral and intersectoral policy integration, trade and investment, governance, creation of an enabling environment, and a framework for policy integration. If the current driving forces of change in the Asia and Pacific region continue unabated without an effective policy response, environmental degradation will become an increasing constraint on economic growth and on efforts to eliminate severe poverty within the region.

A major consideration in policy integration is a concern that environmental improvements cannot be achieved without significant costs. This is certainly one of the reasons developing economies in the Asia and Pacific region have been slow to implement strong environmental regulation programs. Weaknesses of existing environmental regulatory approaches, such as inflexibility of traditional command-and-control regulations adopted from the west, have added to skepticism in the business community about the cost of environmental improvement. Even as the new alternatives to environmental policy are being successfully deployed as discussed in Chapter 3, the pace of change and of policy implementation remains desperately slow.

MOUNTING PRESSURE FOR POLICY RESPONSES

A "business-as-usual" scenario is not the most likely future for the Asia and Pacific region. Based on the experience of OECD economies and of higher income economies in the region, it is more likely that mounting environmental and social pressures will force a policy response (albeit delayed) that will bring the goals of environmental quality and economic growth into closer alignment. Over the next two decades, additional resources are likely to be committed to environmental protection and to resource management. Under conditions of economic growth, the more immediate environmental problems within the region will be partially addressed as public pressure for environmental improvement mounts and as the resources available for investment increase. In this context, the critical policy question is how to achieve such a transition at lower overall economic costs and in ways that will minimize the human toll that would accompany a delayed, uncoordinated, and partial policy response.

A major consideration in policy integration is a concern that environmental improvements cannot be achieved without significant costs.

For the twin goals of environmental improvement and poverty reduction to be met, greater proactive management of the economy-environment interface is needed than the case under existing policy approaches. The capacity to respond positively to new market and public pressures for environmental improvement cannot be presumed. There remain significant real obstacles to rapid and substantial change, including lack of information on technology alternatives, shortage of effective mechanisms for financing change and for amortizing costs, weak institutions, and inappropriate and inefficient policy tools.

POLICY INTEGRATION

It is important that policy integration be facilitative rather than proscriptive. For example, policies should not prescribe technologies to be used but ensure that information is available on a full range of technology choices, including both the economic and environmental efficiency of these technologies. Fundamentally, policy integration seeks to reduce the economic and social costs of organizational and technological changes driven by intensified pressure to improve environmental performance (see Box 4-1).

Box 4-1. Goal and Definition of Policy Integration

The pursuit of economic and environmental goals needs to be effectively coordinated and supported through policy integration to overcome information gaps, sunk costs, uncertainty, and other sources of market failure.

Policy integration is defined here as the creation of institutions, resources, and policy tools that allow economic actors to respond positively to pressures for enhanced environmental performance at lower economic and social costs.

The adoption of effective environmental policy is a prerequisite for achieving substantial progress in reducing environmental degradation within the Asia and Pacific region. Environmental policy begins with ambitious but achievable goals clearly stated and consistently pursued. It is also essential to note that environmental policy cannot be successful if it does not involve a strong national environmental regulatory agency with the authority to implement environmental standards. In addition, effective environmental policy requires the use of appropriate policy tools, including ambient environmental standards, market-based

instruments (MBI), and pollution charges as well as instruments of informal regulation, such as public disclosure of environmental performance information. Environmental regulatory institutions must have flexibility of response, coordination across levels, the capacity to learn and adapt to change, and broad stakeholder support. A first priority within many Asian and Pacific economies should be the strengthening of environmental protection institutions - both to enhance environmental protection and to improve the economic efficiency of environmental regulation.

Effectively pursued, policy integration lowers the marginal cost of driving down the intensity of energy, materials, pollution generation, and resource use associated with economic activity. In the absence of identifiable and realizable opportunities, increased pressure for change will raise costs rather than stimulate innovation.

Not all required changes will be favorable for the individual economic actors even though the net result supports enhanced economic and environmental improvement within the economy as a whole. For example, closure of outdated and inefficient factories will create economic dislocation for the workers involved. Decisions to limit use of over-taxed fisheries and forest areas will impact those whose livelihoods depend on these resources. It is therefore critical that mechanisms are in place to deal with such adjustments equitably and with the adequate participation of all actors in the decision making process. To the extent that individual economic actors assume the cost burden for greater public good, it is appropriate that society invest to offset these costs and return the benefits. This will no doubt be one of the most challenging aspects of the economy-environment integration.

The emphasis is on how a transition in the relationship of economic development and the environment can be managed to reduce overall economic and social costs. The focus is not so much on environmental policy as on methodology for integrating environmental and economic policy, thereby creating a framework of policy integration that facilitates the pursuit of environmental goals in ways that are consistent with other societal goals, especially reducing poverty and supporting economic growth (Angel and Rock 2001). The entry points for policy integration to improve environmental performance are discussed more fully in the following sections.

For the twin goals of environmental improvement and poverty reduction to be met, greater proactive management of the economy-environment interface is needed than in the case under existing policy approaches.

ENTRY POINTS FOR POLICY INTEGRATION

This section discusses five intersecting entry points for policy integration, including: (i) management of economic fundamentals; (ii) intrasectoral policy integration; (iii) intersectoral policy integration at the national level; (iv) international trade and investment; and (v) governance.

MANAGING ECONOMIC FUNDAMENTALS

The first entry point for policy integration is influencing the basic economic decisions of firms, farms, factories, and households. The challenge is to ensure that decisions about investment, purchasing, technology choice, and strategy are co-optimized with regard to both environmental performance (in terms of energy, materials, resources, and pollution efficiency) and economic performance (in terms of cost efficiency, growth potential, and competitiveness).

The policy response to this challenge has two main parts. The first is ensuring that the drivers of environmental performance (such as regulations, resource prices, and public pressure) are efficient in the sense that they secure environmental benefits at the lowest economic and social cost. The second is to ensure that economic actors are in a position to respond positively to these drivers of environmental performance by, for example, having access to more environmentally efficient product and process technologies. As efforts are made to strengthen the drivers of environmental performance, it is critical that the policy responses address both of these concerns.

ESTABLISHING A REGULATORY REGIME

The current state of environmental performance drivers varies widely within the region. A few countries, such as Japan and Singapore, have environmental regulatory infrastructure at par with that of the OECD economies. But other countries lack even the rudiments of an operational national environmental regulatory infrastructure. Basic environmental laws are unevenly enforced, and the main policy tools available are too blunt to accommodate the range of economic and environmental circumstances they need to address, from the concerns of multinational firms with substantial managerial capability to small enterprises that lack basic technical and financial resources for environmental protection. In general, weak and under-resourced institutions generate inefficient policy because the costs of achieving environmental goals are high. Whatever the level of a

country's environmental performance goals, when environmental policy is unevenly and inconsistently applied, unclear and uncertain messages concerning performance expectations result, causing higher levels of malfeasance and erosion of benefits for leading firms. An important first step to influencing basic economic decision making, therefore, is a national environmental regulatory system that provides clear performance expectations that are consistently enforced.

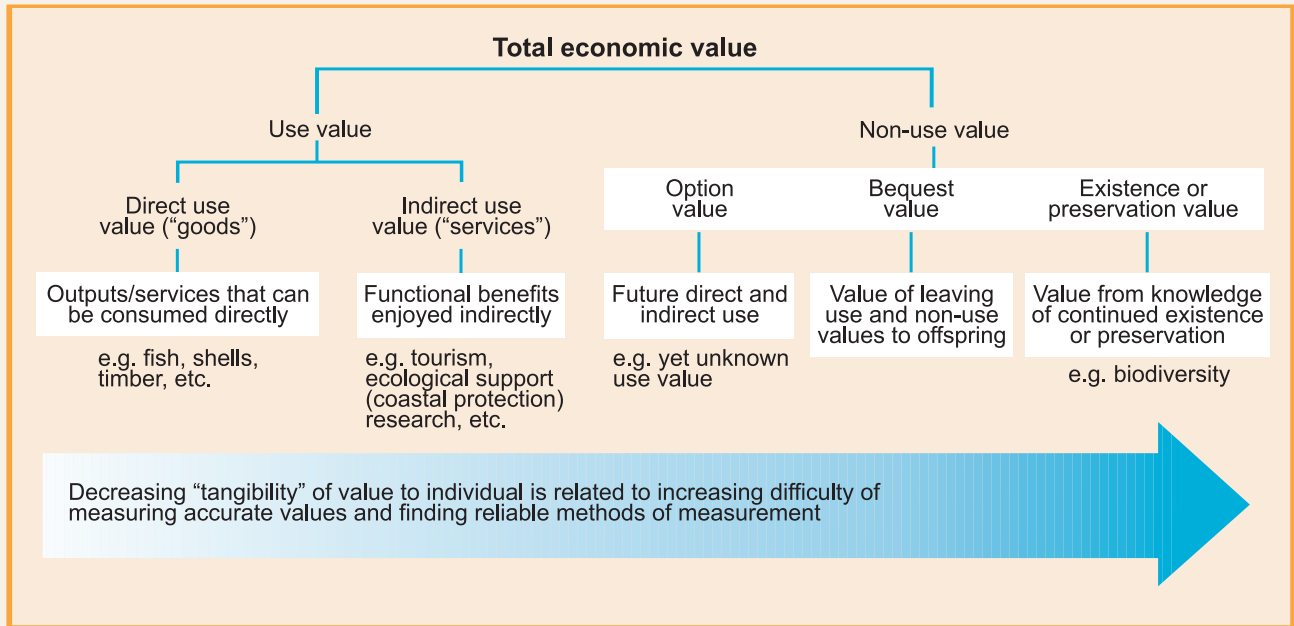
RESOURCE PRICING

Optimizing for both economic and environmental performance will not occur as long as resource prices fail to reflect environmental costs. Energy prices influence how efficiently a nation uses energy (Schipper 1997; Kaufmann 1992). When energy prices are low relative to the price of capital and labor, technologies are developed that are energy-intensive and labor-saving. Higher energy prices stimulate the development of more energy-efficient technologies and, when possible, the substitution of other inputs for energy. Just as stopping unaccounted water use (such as through leakage and theft) from urban water supply systems may be the best investment for water utilities, eliminating perverse subsidies may be the best investment for governments. Industries are accustomed to paying market prices for inputs, but if they are able to access inputs at no price, there is a strong incentive to substitute these inputs for those with a higher price. This is precisely what happens when ecosystem services, such as those provided by waste sinks (in the air, on land, and in the water), have no market. It is not that these services have no value; rather, the "owners" of these services (represented by the state) have not created a market and therefore a price for their use. The first step is to conduct a comprehensive government audit of all subsidies for energy and resource use and for pollution.

There are now good models in the Asia and Pacific region for integrating values and charges on resource use and pollution. An economic resource value model was developed in the Philippines to provide a value to coastal resources (see Figure 4-1). Other options exist for applying a broad-based pollution charge. For wastewater generators, the preferred approach is to charge for metered water consumption and to collect this charge in combination with a water tariff (see Figure 4-2). For example, in the PRC, all piped water supply consumers pay wastewater charges

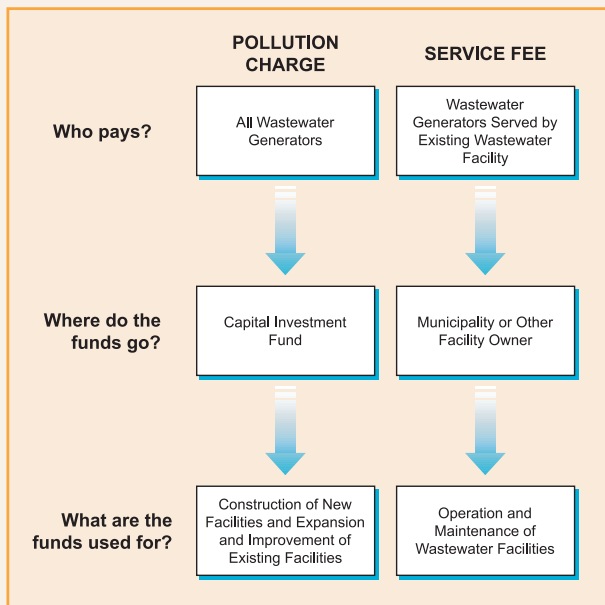
Optimizing for both economic and environmental performance will not occur as long as resource prices fail to reflect environmental costs.

Figure 4-1. Types of Resource Values



Source: White and Cruz-Trinidad 1998

Figure 4-2. Recommended Charging Structure



regardless of whether they are connected to the public sewer system. This approach links charges to wastewater generation and therefore provides an incentive for polluters to make economically and environmentally optimal decisions

regarding wastewater generation. This approach also provides a way to cross-subsidize low-income households in order to maintain affordability. In addition, because of the transparent link between water consumption and wastewater generation, a pollution charge based on metered water consumption is viewed as more acceptable than other types of charges.

In some cases, setting the pollution charge on the basis of metered water consumption is either impossible or undesirable. In some urban areas, the proportion of waste generators with piped water connections may be relatively low. In other areas, linking the pollution charge to water tariffs may be undesirable because of deficiencies in the application and collection of water tariffs. In these cases, it may be preferable to integrate the pollution charge with other existing charges or taxes such as property taxes.

However, because property tax application and collection methods are deficient in many DMCs, the implementation of a pollution charge may need to be coordinated with policy reforms in the property tax structure.

For industrial and some commercial waste generators, the water tariff structure can also incorporate differences in wastewater pollutant loading. Volume- and pollutant loading-based fee structures promote improved resource efficiency and are generally perceived as being more

equitable and therefore more accepted by waste generators. However, a highly complex pollutant loading fee structure, especially one requiring extensive monitoring and regulation, should not be used until the government can implement this structure efficiently. In the case of solid waste management, volume-based user fees can be more problematic, especially when governments are unable to adequately control illegal dumping. However, volume-based charges are generally viable in the case of nondomestic customers that generate large quantities of wastes or hazardous wastes.

USING MARKET-BASED INSTRUMENTS

The lack of effective MBIs in the Asia and Pacific region is conditioned by institutional and financial considerations and only rarely by technical constraints. Many agencies have been afraid to propose more sophisticated market-based instruments such as tradable permits in the belief that they are too complex to administer. Less complex instruments such as emission charges are often structured only to achieve regulatory levels, failing to provide incentives for the continual improvement that is at the core of cleaner production. Incentives such as tax and tariff waivers for implementation of cleaner production are opposed by financial agencies, who are loath to forego any source of revenue. Government policy should be to tackle these constraints in a systematic manner, progressing from simple to more complex MBIs as they gain greater experience.

In adopting policy instruments that seek to co-optimize environmental and economic goals, national governments will often wish to address other societal goals, such as a desire to increase access to electricity in rural areas and to ensure minimum service provision to low-income households. In the past, these goals have been used as a rationale for sweeping perverse incentives such as subsidized energy and water prices for all users, rich or poor, households or industrial. Policy integration requires the adoption of sharper policy tools that can achieve social welfare aims without distorting resource and pollution prices.

Co-optimizing economic and environmental priority decisions begins with ensuring that the tools of environmental policy offer the opportunity to achieve environmental goals at lowest possible social and economic costs. It is critically important that the capacity of firms, farms, and households to respond to these environmental policy tools not be presumed. Eliminating subsidies on resource use, for exam-

ple, will not generate anticipated optimizing behavior if economic actors lack the access, information, capacity, and financial resources needed to respond. Policy integration at the scale of individual firms, and households requires that attention be paid to overcoming information gaps and other sources of market failure.

REMOVING PRICING BARRIERS TO TECHNOLOGY ADOPTION

Import duties, tariffs, other market distortions, and high-purchase prices continue to form barriers to the adoption of clean technologies. Although new, eco-efficient technologies are being developed at an impressive pace, few are being adopted on a wide scale in DMCs. Policy integration requires that the whole set of policy incentives and disincentives be re-examined to isolate these barriers. Nowhere is this more important than with regard to decisions within a sector on whether or not to retrofit new production processes or environmental control technologies. Policy makers should promote a supportive environment for eco-efficient retrofitting through enhanced depreciation schedules, tax breaks, or environmental certification schemes. Dissemination of case studies showing the "win-win" nature of retrofits and the rapid payback periods that are possible will also help to convince reluctant firms in the same sector as well as uninformed financiers.

Policy makers should promote a supportive environment for eco-efficient retrofitting through enhanced depreciation schedules, tax breaks, or environmental certification schemes.

INTRASECTORAL POLICY INTEGRATION

Intrasectoral policy integration is defined as the internalization of environmental concerns within institutions of economic development. Rather than addressing environmental concerns only through a free-standing environmental agency, intrasectoral policy integration requires that organizations such as ministries of industry and agriculture also adopt environmental performance goals as well as strategies to enhance environmental performance at lower economic and social costs (see Box 4-2). Intrasectoral policy integration facilitates least-cost solutions to environmental problems and support for environmental improvement within institutions of economic development and the private sector.

The integration of environmental and economic performance will not be achieved without new initiatives to harness the power and policy leverage of a variety of line ministries in the region, including finance, industry, energy, education, science, and technology. As long as environmental priorities remain external to core economic planning, co-

Box 4-2. Intrasectoral Integration Illustrated**Ministries of Industry**

Market forces govern most aspects of technology transfer, although ministries of industry can take measures to promote the use of cleaner production technologies. These include information dissemination on the potential benefits in terms of increased productivity from the use of clean technologies. Regional industries still have a long way to go in understanding the potential benefits of pollution prevention and waste minimization. For example, encouraging industries to become certified under ISO 14000 standards will have a positive effect on both productivity and environmental behavior. Because of regional economic integration and globalization, the demands of shareholders and consumers from outside the Asia and Pacific region are exerting pro-environmental pressures on the regions' export industries. Closer to home, local communities are also demanding greater accountability for environmental practices and corporate citizenship from their industrial neighbors. Ministries of industry can take the lead in negotiating corporate environmental codes of conduct, complete with voluntary monitoring systems and agreed upon sanctions for violations.

At the same time, ministries of industry can take the lead in promoting new industrial sectors that are less resource- and pollution-intensive, reducing economic dependence on highly polluting industries while simultaneously creating new employment opportunities. The location of industries, preferably away from sensitive ecological zones and within estates that can efficiently handle wastes, can also have a profound effect on the sector's environmental behavior. For example, the PRC has pioneered the co-location of industries that can use each other's wastes. If waste streams become valuable inputs, there is less incentive to ignore fugitive leakages or to dump the wastes into the most convenient repository. Specific incentives can be offered to encourage industries to relocate to the same area. SMEs may be easier to relocate than larger factories.

Facility licensing provides a key opportunity to influence investment and locational decisions by firms. For example, Singapore's Economic Development Board (EDB) and the Jurong Town Corporation (JTC) have used the tools of promotional incentives and licensing procedures to ensure high environmental performance on the part of investors locating in Singapore. The EDB requires that new investors submit details of production technologies proposed along with an assessment of how the proposed facility would achieve compliance with Singapore's tough environmental standards prior to licensing approval. Access to promotional privileges is contingent on an acceptable plan for meeting the environmental standards. Sometimes the EDB will require location at an alternate site, or changes in abatement and pollution control equipment prior to approval. Through these procedures Singapore has managed to maintain ambient air and water quality while continuing to attract large flows of international investment capital.

Ministries of Science and Technology

Science and technology development is crucial in effectively reducing poverty and environmental degradation. Except for basic research, most research and development in the region is privately financed. One exception is Japan, where substantial resources are committed to basic research in and promotion of more energy- and resource-efficient technologies. Government ministries of science and technology can make important contributions in supporting applied research, facilitating technology transfer, and building the capacity of private firms for sustained innovation and technology upgrading. Much attention needs to be paid in this regard to the successes and failures of Asian and Pacific economies in building technological capabilities in science- and technology-intensive fields such as semiconductors and bioengineering. Debate still rages on the role that central governments played in the success of countries such as the Republic of Korea and Japan in achieving world-class technological capabilities in these industries. What is less controversial is the opportunity for public-private collaboration in technology development and adoption. In addition, Taipei, China has successfully pioneered a model of close collaboration among private industry, the ministry of industry and government-funded research institutes such as the Industrial Technology Research Institute (ITRI). Collaboration between the science and technology ministries and private and public institutions now extends to the areas of energy and environment (for example, through benchmarking of environmental performance in the semiconductor industry). ITRI also has a major research program underway in the area of clean technology.

Ministries of Agriculture

In many DMCs, a separate ministry of agriculture deals with food crop production, plantations, and grazing lands. Such organizations typically have a wide range of mandates, from food production to land conservation.

Box 4-2. Intrasectoral Integration Illustrated (Continued)

The opportunities for intrasectoral policy integration fall within five main categories. The first is that of integrated land use planning. Broader land-use planning that includes an agro-ecological perspective is often overlooked or serves as the basis for contentious debates among mission-based resource management departments. There is a need for much stronger land-use planning, and a ministry of agriculture can take the lead in resolving disparate interests. Increasingly, this authority will be vested in regional and local governments. Therefore, strong working relationships must be established between national, regional, and local authorities to strengthen land-use planning.

Second is a establishment of secure land tenure rights that can improve both economic and environmental incentives in the agricultural sector. The lack of secure, well-defined property rights in the Asia and Pacific region provides perverse incentives for appropriation of these rights by either the state or well-connected individuals. Traditional, customary, and commercial property rights must be acknowledged, registered, and strengthened. State ownership may be needed to protect critical ecosystems that provide unique ecological services to a large number of people or endangered species, such as large watersheds and old-growth forests. Assignment of private property rights may be the solution for other intensively used resources, such as issuing secure land titles to farmers with insecure ownership.

Third, the agriculture sector (especially irrigated agriculture) has historically been heavily impacted by subsidies on resource use. It is also a sector in which inefficiencies in resource use are pervasive. The large-scale irrigation schemes implemented during the Green Revolution are extremely inefficient, delivering as little as 40 percent of the water to crops. Subsidies exacerbate the problem by encouraging the expansion of inefficient supply systems and by discouraging demand-side behavior that would improve water delivery services. An important element of policy integration is an audit of all existing subsidies and resource pricing systems within the agricultural sector. As discussed further, addressing water use will typically also require a high degree of intersectoral policy integration (for example, to implement integrated river basin management).

A fourth key category is agricultural research. Feeding the growing population of the Asia and Pacific region will require substantial further advances in agricultural food productivity. It is critical that such advances be based on less resource-intensive production methods, and this is a key research priority for agricultural research institutions. Such research should include bioengineering of food products. Additional research and development is required to support sustainable agricultural systems that depend less on high usage of water, fertilizers, and pesticides and that place greater emphasis on resource management and soil and water conservation.

Finally, ministries of agriculture can take the lead in performing environmental impact analysis of agricultural production, focusing especially on the long-term health effects of chemical usage in food production, and in disseminating this information.

Ministries of Forestry

Forestry is a sector within many Asian and Pacific countries where the principles of intrasectoral policy integration are already well advanced. The major problems are implementation and enforcement. Plans for sustainable forestry abound even as illegal logging and unsustainable management practices continue. Many countries within the region have adopted national forest action programs with technical assistance from donors. Under these forest sector action programs, national ministries are responsible for maintaining accurate records of the national forest estate, and local forest use and access rights are the basis for allocating forest resources to their highest valued uses. This allocation would include benefits derived from all forms of marketed forest products as well as the ecological services provided by forests.

For policy integration to succeed in the forestry sector, it is generally agreed that greater decentralization of authority and management responsibility and greater dependence on community-based forest management practices are required. Centralized ministries lack the staff and resources to effectively manage forestry systems. Devolution of management responsibility could be encouraged to the maximum extent that is politically and institutionally feasible and in parallel with the devolution of resources and management capability at the local and regional levels. Forest management plans could be prepared with the participation of local communities and authorities and in compliance with national commitments to the Biodiversity Convention, the Convention on International Trade on Endangered Species of Wild Fauna and Flora, and possibly the United Nations Framework Convention on Climate Change if major carbon sequestration issues are involved. National ministries can also take the lead in promoting the adoption of voluntary or mandatory ecolabeling schemes for both harvesting and production, in the evaluation of conservation funds, in carbon trading and other financial tools, and in the evaluation of plans for carbon sequestration.

optimization of economic and environmental goals will be undermined.

Currently, several DMCs have established small environmental units in selected line ministries. However, these units typically lack resources and decision making authority and are not part of a clear mandate to integrate economic and environmental policy objectives. It may be more effective to work systematically within sector institutions, simultaneously strengthening environmental understanding within line departments and reaching out to their private sector constituents to demonstrate the positive relationship between environmental management and economic growth. Based on past experience, the magnitude of environmental problems faced, and the level of private investments required, there seem to be few alternatives to this strategy.

Although intrasectoral policy integration can have many approaches (see Box 4-3), there are several prerequisites for effective intrasectoral policy integration. First is clear mandates and effective leadership. Internalization of environmental goals will not occur without the highest level of leadership and the identification of internal champions within the sector. Success also depends on training and capacity building, but most sectors currently lack requisite technical in-house expertise to address environmental concerns. Finally, success requires information on environmental effects, costs, industry and international best practice standards, options, and opportunities.

Box 4-3. Approaches for Intrasectoral Policy Integration

Intrasectoral policy approaches may be (i) for a ministry of energy to take the lead in working with firms and other stakeholders to identify environmental performance goals for the energy sector (such as the percentage of energy obtained from renewable sources), (ii) focus on conditionality and environmental review where strategies and actions within line ministries (such as new loans and science and technology initiatives) would be subject to prior internal environmental review, and (iii) focus on integrated planning such as for fisheries, river basins, and regional economic development.

The suitability of these different approaches will likely vary by sector and across countries; they may also be used in combination. All the models share the common principle of internalizing environmental concerns within sector-based, economic decision making.

To yield both economic and environmental benefits, equally important is a focus on the development, adoption, and use of clean technologies within economic sectors.

The focus within sectors should be on ways to minimize waste and resource use that yield both economic and environmental benefits. The attention now being paid to waste minimization and pollution prevention by many manufacturing industries represents a major shift in thinking. This same concept can usefully be applied to all sectors of economic activity to serve as a fundamental basis for breaking down misperceptions regarding environmental protection costs. Water supply authorities and energy companies will find it cheaper to reduce distribution and transmission losses than to augment their supplies. Municipalities will find their solid waste collection costs reduced if they pay attention to waste reduction at the source. Forestry enterprises will produce less damage in harvesting if they pay attention to reducing logging wastes. The applications of this perspective are many and varied, and training is needed in all sectors to instill a better understanding of how economic efficiency gains and improved environmental performance can go hand-in-hand.

To yield both economic and environmental benefits, equally important is a focus on the development, adoption, and use of clean technologies within economic sectors. To date, most clean technologies and cleaner production techniques have been focused on manufacturing industries and certain resource processing sectors such as pulp and paper industries. Agriculture, fisheries, and service industries also offer significant opportunities for changes in technology that promote reduced energy and materials use and pollution reduction per unit of output. Line ministries can take the lead in identifying such opportunities and in financing best-practice examples of successful industry initiatives.

Within the energy sector, attention must be paid to both urban and rural areas. Traditional biomass conversion technologies are notoriously inefficient, with cooking stoves having conversion efficiencies of 10-20 percent (Kammen 1995). Promotion of renewable sources of energy is a key policy priority. Environmental and health benefits can be achieved by promoting widespread adoption of improved cooking stoves. More sophisticated biomass conversion technologies such as linking biogas digesters to fuel cells offer farm households the prospect of renewable, environmentally sound energy sources.

Some of the more significant opportunities for intrasectoral policy integration relate to improving overall economic efficiency within sectors. The finance and allied

ministries have a critical role to play in realizing these opportunities. The portfolio of credit and tax instruments available within DMCs needs to be reviewed with an eye to facilitating innovation, investment, and technology change within the economy. SMEs in particular are often constrained from investments that yield both economic and environmental benefits by credit shortages. Tax incentives and capital depreciation schedules need to be reviewed relative to their effects on technology change. Credit and lending practices have come under considerable scrutiny within the region as a result of the economic and financial crisis of the late 1990s. The resultant pressure toward greater transparency over credit practices and use of appropriate economic criteria in lending decisions provides an opportunity to build environmental assessment into credit and financial decision making within the region. Commercial lending agencies could usefully adopt environmental assessment practices from multilateral development banks. No investments require greater scrutiny than public infrastructure projects, from urban transportation systems to energy supply projects. It is critical that these projects are designed and implemented in ways that co-optimize economic and environmental goals.

Two broad areas that deserve particular attention are privatization and market deregulation. A look at the energy sector illustrates this point. Deregulation and privatization offers the potential for increased economic efficiency and greater capacity to respond positively to external drivers for improved environmental performance. Privatization also offers the prospect of new sources of financing for energy supply projects. Market forces should determine electricity prices in an unbundled environment that is supportive of private sector participation, with many sellers and a wide range of choices for consumers. Consumers who are willing to pay an environmental premium for energy from renewable resources or from distributed generating systems under community control should be able to make intelligent choices from a range of suppliers. Transmission and distribution services may re-main under the regulated control of a monopoly or also be privatized to introduce competition for service delivery. Separating generation, transmission, distribution, and supply should continue, as examples in Indonesia, Malaysia, Republic of Korea, Philippines, Singapore, and Thailand show.

Similarly, information technology deployment currently is heavily controlled by national policies that regulate telecommunication services within DMCs. Governments must look to liberalization and deregulation of information technology as an essential component in the redirection of unsustainable development trajectories. Policies that inhibit the development of information technology because of concerns over political opposition or globalization of cultures ensure that DMCs fall further behind in economic and environmental performance. Positive steps include the recent formation of an Association of Southeast Asian Nations (ASEAN) private sector task force to develop a comprehensive action plan for development of an ASEAN information infrastructure.

INTERSECTORAL POLICY INTEGRATION

Intersectoral policy integration is the creation of institutional arrangements that allow for comprehensive economic and environmental planning at the national and subnational scales. In most cases, the primary drivers of environmental change as well as the opportunities for policy intervention lie outside the jurisdiction of any single agency or organization. Intersectoral policy integration seeks to overcome the endemic fragmentation of policy response that undermines efforts to jointly improve economic and environmental performance within the region.

Inherently, economic development involves a range of economic and ecosystem services. For this reason, there are limits to what can be achieved through policy integration within individual sectors. Co-optimization of economic and environmental goals also requires intersectoral integration.

Efforts to improve ambient urban environmental quality require integrated management of all sources of pollution, including factories, power plants, households, and transportation. The costs of reducing emissions are likely to vary across sources. For example, fuel switching in electricity generation may be a more cost-effective approach to reducing particulate emissions than forcing closure of inefficient industrial factories. Relocating factories to peripheral industrial estates and away from residential areas and from areas that lack adequate waste management infrastructure may be more cost-effective than introducing higher waste charges. One approach to the need for integrated analysis

Governments must look to liberalization and deregulation of information technology as an essential component in the redirection of unsustainable development trajectories.

of multiple distinct sources is the creation of regional and urban integrated environmental management units.

In rural areas, similar pressures exist for cross-sector resource management, especially with respect to water usage. Competition among residential, industrial, urban, rural, upstream, and downstream users is taking on critical proportions in many DMCs. Competition for water is magnified by issues of declining water quality. Integrated river basin management can offer an effective institutional model for intersectoral policy integration. Many effective river basin management models are in operation around the world, providing the basis for integrated water resource management as part of national plans for water demand and supply.

Managing demand for resources and ecosystem services is perhaps the key imperative of intersectoral policy integration (see Box 4-4). In agriculture, this involves reducing the demand for water for irrigation. In both urban and rural areas, it involves controlling the rate of growth in demand for carbon-based sources of energy. In urban areas, it involves controlling the demand for waste disposal and other environmental infrastructure services, including transportation. Urban planning should be based on the premise that employment generators (factories, offices, utilities) should be optimally located in relation to their inputs and outputs. Industrial estates should consider co-location of industries that can use each others' waste outputs as inputs. Similarly, water pipes, utility pipes and cables, and telecommunications cables should be co-located in service trenches, thus avoiding the constant digging up of roads and footpaths as agencies decide to expand or repair networks.

Population and employment are two additional areas of considerable opportunity for intersectoral policy integration.

Box 4-4. Managing Ecosystem Demand

One general principle of intersectoral policy integration is that managing demands for ecosystem services over the long-term likely will result in lower total costs and lasting benefits than managing the "end-of-pipe" costs of pollution and of resource use (presuming that the price of energy and other resources include full environmental costs). With implicit subsidies for pollution and other ecosystem services, however, the motivation for demand management is reduced. The consequence throughout the Asia and Pacific region has been dramatic underinvestment in demand management for projects such as energy-efficient housing and public transit systems that would reduce the need for private automobile usage.

Managing demand for resources and ecosystem services is perhaps the key imperative of intersectoral policy integration.

Although the sheer scale of population growth in urban areas has produced severe environmental problems, it is fair to say that the greatest problems have resulted from the unplanned and unmanaged character of such urban growth. Social welfare goals may best be pursued through a shift toward an urban-based economy, but when rapid urban growth occurs with inadequate planning and control, there is little opportunity to address attendant environmental and economic concerns. Uncontrolled low-income residential areas (typically in urban slums) create major problems in terms of access to employment in the formal economy. The economic and environmental effects of uncontrolled rural

to urban migration require integrated rural and urban development strategies, including a strong focus on the creation of economically and environmentally sustainable livelihoods in rural areas.

INTERNATIONAL TRADE AND INVESTMENT

In much of the Asia and Pacific region, economic growth has occurred in parallel with increasing economic integration into the global economy through foreign trade and international investment. In East Asia, export-led industrialization was the leading edge of the region's development strategy, and this is now the development model of most DMCs. Private investment sourced internationally is the dominant basis of capital for such development. International initiatives on trade and investment within the context of the General Agreement on Tariffs and Trade (GATT) and the WTO focus on further liberalization of trade and investment regimes. A parallel set of initiatives for trade liberalization is also slowly taking root under the auspices of ASEAN and other regional organizations.

In this context of economic globalization, policy integration for trade and investment implies an open trade and investment regime, not necessarily an unregulated regime (see Box 4-5). Policies that encourage open trade and investment do not contradict policies that require all investors (foreign and domestic) to meet national environmental performance standards. Typically, this will involve developing in accordance with a "master" plan supported by EIA of all new investments. An approach of combining national environmental performance standards with support of open trade and investment will (in most cases) provide the best route to securing improvements in economic and environmental performance.

Box 4-5. International Treaties and Trade and Investment

In certain cases, trade and investment are directly regulated by international environmental treaty. One successful example of such regulation is the Montreal Protocol for phasing out ozone-depleting chemicals. This treaty in itself is an interesting case of policy integration in that it combines commitments to ending the use of certain ozone-depleting chemicals with a research program to identify cost-effective alternatives that are less destructive to the environment.

Approaches that use national environmental policy to regulate international trade and investment are often criticized for two reasons. First, in a competitive economic environment, developing countries may become pollution havens that seek to attract new investment by sacrificing environmental protection as a way of reducing costs for foreign investors. But most research suggests that such pollution haven effects, if present at all, are very weak and secondary to other investment concerns (such as adequacy of infrastructure) (Zarsky 1999). Of greater concern is the transfer of outdated, polluting technologies and equipment to DMCs. Such concerns are more effectively addressed through national environmental regulations rather than by efforts to directly regulate the import and export of particular kinds of technology. This regulatory approach is often both impractical and highly inefficient as a strategy for co-optimizing environmental and economic performance.

Second, some argue that environment, health, and safety regulation is a "shadow" form of protectionism. Countries could use a laborious and time-consuming regulatory process that is unevenly applied to international investors as a means of controlling access to domestic markets. This charge has been made on a number of occasions with respect to trade in food products, for example, from North America to Asia. There is a counter-demanding concern that national environmental regulatory concerns will be overridden in the name of open trade. The solution to such concerns is transparency in the operation of regulatory regimes, including opportunities to submit suspected use tactics for international review and arbitration by the WTO and other international bodies.

If such reviews are to take place, however, it is critical that the decisions of international organizations and their operational criteria be developed within an open and participatory environment. The recent WTO finding that

regulations requiring turtle excluders on fishing nets are an unjustifiable restraint on trade created a storm of protest from environmental groups and others, making clear that there is currently little consensus on how such rulings are to be made. There is also a need for greater capacity building around environmental concerns within international organizations. Trade and investment organizations must also practice policy integration. These are serious concerns both for the environment and for economic welfare. Without successful initiatives to secure broader consensus over the operation of WTO and other international organizations, it is likely that the current backlash against the effects of economic globalization will only intensify.

Environmental regulation is also pursued on a bilateral basis in the form of environmental riders on free-trade initiatives (such as the North American Free Trade Agreement). More generally, the Kyoto Protocol of the Framework Convention on Climate Change seeks to create an international regime that will impact investment and trade on a global scale through international commitments to reductions in the rate of growth of GHG emissions. Balancing economic and environmental concerns has been one of the largest stumbling blocks to the successful

It is critical that the decisions of international organizations and their operational criteria be developed in an open and participatory environment.

implementation of the Kyoto Protocol. The challenge of achieving policy integration by treaty has proven extraordinarily difficult as countries disagree over accounting systems for cost and benefits, ranging from credits for carbon sequestration to mechanisms for technology transfer. These difficulties notwithstanding, some level of international regulation is likely to be required to address global environmental problems such as climate change.

In principle, open international trade and foreign investment regimes improve access to capital and technology on a global scale. Rather than being limited to domestically available capital and technology options, economic actors can draw on a global stock of opportunities. Manufacturers in Bangladesh can contract with suppliers in Germany for low-pollution industrial technology. Households in Indonesia have access to energy-efficient appliances from around the world. In practice, such capital and technology transfer is often subject to market failure because of limited access to information, credit, and other necessary enabling factors. For the full economic and environmental benefits of open trade and investment to be achieved, these sources of market failure need to be addressed. One particular source of concern in this regard is how to ensure equitable transfer

of energy- and materials-efficient technologies, without the extraction of monopoly economic rents.

In agriculture and other sectors, the definition of intellectual property rights is also a source of concern (see Box 4-6), especially as a result of increased use of biotechnology in food production and the increased "prospecting" for genetic varieties in developing economies. New policies of access and reciprocal benefits are needed, but policymakers in the region are likely to act only after the damage is done. Only after terms are agreed and conditions strictly controlled should DMCs invite foreign firms to form joint ventures with local groups to explore the chemical and genetic cornucopia of a region's biodiversity.

Box 4-6. Intellectual Property Rights Responses

Policy makers should respond to intellectual property rights problems by (i) conducting inventories of indigenous knowledge regarding medicinal and other uses of plants and animals, (ii) establishing patents and plant variety rights over all promising species, and (iii) entering into partnerships with traditional knowledge holders to allow bioprospecting.

Increasing international trade and investment also results in tighter connection between suppliers, manufacturers, customers, and producers around the world. This provides further opportunities for policy integration. Among the tools available are supply chain management, various forms of product and firm certification (such as ISO 14000), and socially responsible investment. Ethical investment funds would direct foreign investment funding into firms or sectors that are certified as environmentally sound and sustainable.

Regional and global economic and social integration will almost certainly continue apace, bringing with it access to new and environmentally sensitive markets but also pressure to convert natural areas into export-oriented businesses. As global and regional trade liberalization move forward, enterprises will increasingly be held accountable by international consumers and shareholders for their environmental behavior. Asian and Pacific companies partnering with foreign firms will have access to new and clean technologies, although they also will find themselves bound by stricter international environmental standards. The challenge will be to shape environmental institutions to take advantage of the positive influences of globalization and to reduce or offset the

negative consequences. Some of these institutions will be formed at the national level. Others will necessarily be developed at the regional or global levels to deal with the rules of trade, investment, and knowledge exchange.

Finally, it is important to reiterate the significant role of the donor community in influencing international investment. Although typically small as a share of total investment, donor investment is a critical point of leverage and can be a major source of funding for infrastructure projects. Donor agencies need to hold their lending practices to the highest level of environmental review within the policy integration framework of co-optimization of environmental and economic performance.

GOVERNANCE

The preceding sections of this chapter lay out a framework for co-optimizing economic and environmental performance within the Asia and Pacific region. It is obvious that the scale and scope of changes required is large. Such changes will not occur without a broad-based constituency for reform and unless effective and durable institutions are created. Thus, good governance is the bedrock of policy integration.

It is critical for the institutions of governance in the Asia and Pacific region to actualize the principles of transparent, participatory, and inclusive decision making. Policy integration will require a multitude of important and sometimes controversial decisions to be made, such as raising resource prices, closing a highly polluting factory, ending farming in a degraded area, and acceding to international jurisdiction on issues of trade regulation. Support for such decision making will only be sustained to the extent that the criteria upon which the decisions were made are well understood and identified through a participatory process and to the extent that actions are made equitably and consistently in line with these criteria. This requires strong participatory institutions of governance at all scales — local, regional, and international.

Good governance begins with strong and effective institutions, including both government agencies and institutions of civil society. Governments will remain central in developing and implementing environmental policy for the foreseeable future. Many Asian and Pacific countries have a long way to go in terms of putting effective administrative institutions into place. Institutions are often

As global and regional trade liberalization move forward, enterprises will increasingly be held accountable by international consumers and shareholders for their environmental behavior.

poorly resourced and lack a strong tradition of rule-based behavior and systematic implementation of policies. Capacity building remains a critical priority, especially at the local level.

Over the past 10 years, there has been considerable investment in building the capacity of environmental institutions in Asia and not as much on the regional or local governments. These investments have centered on establishing national capacity to implement the EIA requirements of donor-funded projects as well as domestic investments covered by EIA legislation. Oversight capacity for these assessments has been established in national environmental agencies and in some special units established within line ministries. Significant investments have also been made to develop expertise in pollution control, natural resource management, and regional and global issues.

Except for the preparation and passage of national environmental laws, the legislative branch of Asian and Pacific governments has yet to play any significant role in environmental management. Many national legislatures have committees that are expected to deal with environmental issues, but legislators tend to be ill-informed and rarely have qualified staff to deal with these matters (university experts partially fill these gaps in some countries). The problem is even more pronounced at the subnational and local levels, where legislative and consultative institutions remain weak and environmental issues are seldom given high priority.

In addition to the improvements for the executive branch of government in order to strengthen environmental management, changes also can be expected in judicial, legislative, and civil society institutions. The varied histories of Asian and Pacific countries have resulted in a diversity of institutional arrangements in the judicial branch of government. Authority for the prosecution of both criminal and civil violations of environmental statutes is commonly vested in national police forces and courts. Prosecution staff and judges generally remain ill-informed with regard to environmental matters, and coordination between police and environmental agencies is very weak. Despite continuing weaknesses, India's Supreme Court is an outstanding example of constructive engagement on environmental questions. In some cases, environmental agencies or line ministries maintain inspectors and guard forces that complement and sometimes overlap the work of the judiciary. Corruption

remains a significant problem in the enforcement of environmental statutes by the judicial branch of government.

No single initiative is of greater importance than that of strengthening the participation of civil society in environmental governance. The role of civil society in forcing environmental issues onto national policy agendas,

changing societal behavior, and engendering a new environmental consciousness in Asia is multifarious and far-reaching. Certainly, the nature of the environmental crisis facing the Asia and Pacific region demands an extraordinary response beyond the normal incremental changes associated with a "business-as-usual" attitude. It is in the interest of all governments to capitalize on the collective intelligence, ingenuity, and expertise of the community. To do this,

governments need to understand the roles that civil society can play, overcome their fear of losing control, and understand the consequences of failing to include civil society in the decision making process.

Civil society can play an increasing role in overcoming a number of obstacles faced by government in pursuing a framework of policy integration, including the lack of political will, fiscal constraints, pervasive corruption and cronyism, lack of technical and regulatory capacity, and competitive pressures of globalization (see Box 4-7). Civil society should be empowered to participate in planning decisions, either through involvement in environmental clearances required prior to decisions being made (such as through the EIA process) or subsequently through a planning appeals process.

No single initiative is of greater importance than that of strengthening the participation of civil society in environmental governance.

Box 4-7. Amendments in Law Required

To enhance the role of civil society in influencing decisions taken at the enterprise level, policy integration requires several coordinated amendments in laws and regulations related to environment, industry, consumer protection, and planning.

Regulations on information disclosure need to be extended so that civil society can be knowledgeable participants in decision making (see Box 4-8). Institutionalizing public participation affords governments a wider range of views to consider and may be crucial for building community consensus on controversial decisions. Environmental groups can assist the government in design-

Box 4-8. How to Enhance the Role of Civil Society

At the level of environmental governance, policy makers can enhance the role of environmental and other civil society groups by empowering them to become involved in (i) corruption monitoring; (ii) community facilitation; (iii) service delivery; (iv) legal challenges; and (v) capacity building.

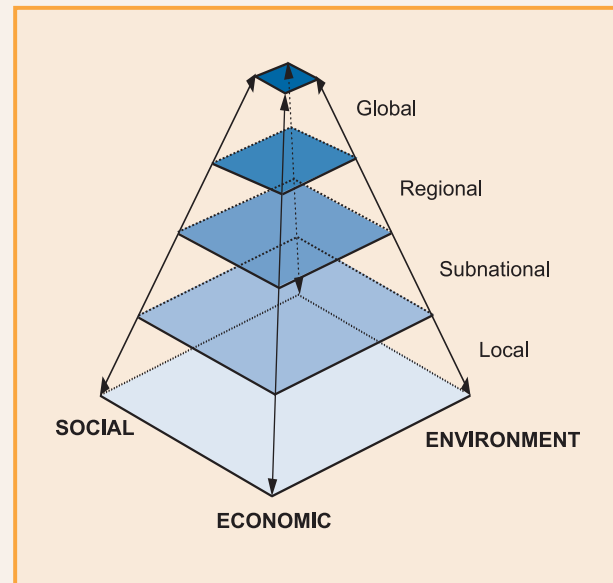
ning and implementing participatory processes that facilitate policy integration between and within various sectors.

An important rationale for adjustments in the region's environmental institutions derives from rising demands for greater transparency and accountability in governance systems. Rising demand in the region for governance improvements should bode well for the creation of better underlying conditions to support sound environmental management. Recent cross-country comparisons show a strong relationship between environmental quality, national income levels, security of property rights, and the development and implementation of sound legal and regulatory systems. Findings also highlight the importance of strong national institutions in achieving higher levels of environmental quality. A country's degree of private property protection, the effectiveness of its legal and judicial systems, and the efficiency of its public administration systems all have been shown to be important in explaining good national environmental performance.

A related development across the region is the clear trend toward the decentralization of government functions. In a growing number of countries, central government authorities are transferring responsibilities to provincial, state, local, and city governments. Because most urban environmental challenges can only be effectively addressed by local authorities, decentralization should help transfer responsibility for management closer to those who stand to directly benefit. Decentralization should also encourage the empowerment and re-establishment of community-based resource management institutions. Such traditional institutions often have shown themselves better capable of sustainably managing local resources than externally advocated or imposed practices.

A FRAMEWORK FOR POLICY INTEGRATION

An overarching deficiency in integration of economic and environmental management in the region is in its piecemeal approach. A nested vertical hierarchy of integrated economic and environmental plans should be established to cover global, regional, national, subnational, and local levels (see Figure 4-3).

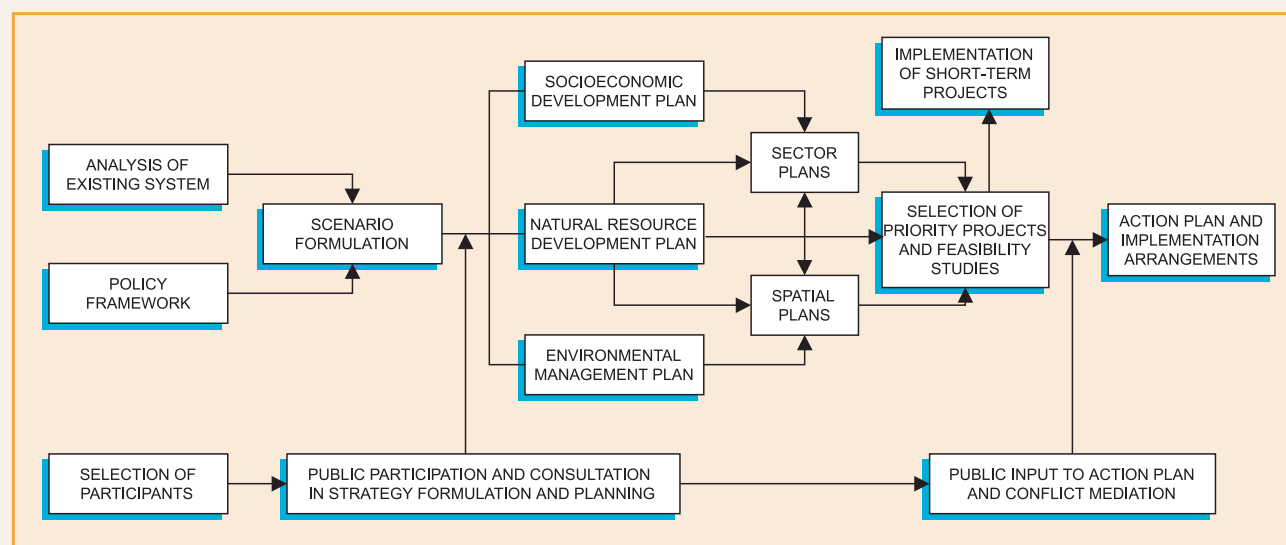
Figure 4-3. Integrated Economic and Environmental Planning

Source: King 1999

Integrated economic and environmental plans should be based on bioregions (such as river basins, islands, or specific ecosystems) across administrative boundaries, including national borders. These plans should be developed using participatory approaches and be endorsed at the appropriate political level. Whenever possible, they should carry sufficient legal status so that breaches and deviations from the plan can be challenged by affected parties. The integrated plans should identify priority economic development, environmental management, and social support strategies leading to specific projects to achieve short- and medium-term goals. Strategic environmental assessments should also be conducted to examine cumulative impacts of policies, programs, and projects and to systematically document the likely environmental outcomes of such integrated plans.

Based on careful review of a wide range of integrated environmental and economic plans, global, regional, and national plans rarely contain sufficient detail for direct implementation. At the other end of the spectrum, project and local plans are often disconnected from national, regional, and global goals. A particular gap in the hierarchy of plans in the Asia and Pacific region is at the subnational level (see Figure 4-4). Some subnational plans have been developed for river basins, integrated area development regions, provinces, islands, and biosphere reserves. Planning guidelines developed by ADB have been applied in a small number of integrated plans in Indonesia, Malaysia,

Figure 4-4. Subnational Prototype Planning Model



Philippines, PRC, and Thailand (ADB 1998). An important lesson learned from these is to vertically link economic-cum-environmental plans at all levels to ensure that they are consistent and compatible. Also, these plans should consider

how the driving forces of change can influence, and be influenced by the five entry points for policy integration (see Table 4-1).

Table 4-1. Entry Points for Policy Integration by Driving Forces

Driving Forces	ENTRY POINTS				
	Economic Fundamentals	Intrasectoral Policies	Intersectoral Policies	International Trade and Investment	Governance
Population <ul style="list-style-type: none"> • Growth rates • Demographic shifts • Migration • Density 	Education, training, capacity building, and access to information	Rural employment opportunities and integrated urban and rural economic planning	Balance of winners and losers and compensation for economic cost of environmental policy	Migration policy and access to appropriate health and medical technologies	Public participation in decision making on establishing protected areas, and controls on resource use, and enforcement of clear property rights
Industrialization and Urbanization <ul style="list-style-type: none"> • Unplanned growth • Materials and energy intensity • Industrial wastes and sinks • Sectoral shifts 	Access to information on technologies, capacity building for SMEs, financing mechanisms, and supply-chain management	Environmental regulation, factory location and licensing, competition policy, performance, metrics, certification, pollution charges, and full environmental cost pricing	Integrated river basin and forest ecosystem management, urban infrastructure planning and financing, elimination of energy and resource price subsidies, and sector-based environmental goals	Access to international finance, foreign direct investment, and trade policies; international certification; international institutions (such as GATT and WTO); transboundary transfers of hazardous materials; and compliance with international treaties and protocols	Regulatory enforcement and training; enhanced public participation; education and capacity building at local, regional, and national levels; strengthened judiciary; and hazardous waste legislation

Table 4-1. Entry Points for Policy Integration by Driving Forces (continuation)

Driving Forces	ENTRY POINTS				
	Economic Fundamentals	Intrasectoral Policies	Intersectoral Policies	International Trade and Investment	Governance
Income Growth and Inequality <ul style="list-style-type: none"> • Consumption • Globalization • Poverty 	Education, training, and capacity building, and financing for entrepreneurs and new business enterprises	Pro-poor tax, investment, and economic policy, design for reuse and recycling, charges for use of ecosystem services, and privatization of firms and industry	Charges for water use and waste disposal, balanced rural and urban development strategies, and investment in sanitation and health services	Occupational health and safety standards for foreign investment, tax incentives for employment generating new investment, and development assistance and debt policies	Participatory governance, increased involvement by local governments and the public in decision making, and transparency in planning and governance procedures
Technological Changes <ul style="list-style-type: none"> • Efficiency • Transfer and use • Development • Rebound effect • Unintended consequences 	Enhanced access to information and financing of technology alternatives, life-cycle analysis, and other research on environmental impacts	Information clearing-house, training for SMEs, clean production programs, environmental audits, and tax incentives for technology upgrades	Development of science and technology infrastructure and financing for clean technology development and next-generation technologies	Investment in technology "scanning" for best available technologies, international technology cooperation, and collaborative technology transfer	Protection of intellectual property rights on technology, clarification of legal risks and responsibilities, and preservation of traditional knowledge and plant variety rights
Governance <ul style="list-style-type: none"> • Empowerment • Advocacy • Watchdogs • Direct action 	Pressure groups, monitoring of performance, and solution brokers	Industry watchdogs, information analysis, resource providers, and comparative analysis	Education and public participation in planning	International NGO networks and capacity building, and participation in international governance	Strengthening of institutions of governance through advocacy, enlistment, and participation
Institutions, Policy, and Markets <ul style="list-style-type: none"> • Environmental governance • Command-and-control approaches • MBIs • Informal regulation 	Internalization of externalities, "polluter pays principle", and compliance and enforcement	Environmental standards, performance standards and benchmarking, and certification and ecolabeling	Removal of subsidies and new markets for ecosystem services	Global trade flows, ethical investment funds, and carbon trading and offsets	Design of effective institutions, access to information, right of review, sanction of illegal behavior, and matching to societal goals and values

TOWARD AN ACTION AGENDA

Chapters 1 and 2 stated that efforts to assist the process of environmental degradation need to be directed at the underlying driving forces of change. Chapters 3 and 4 present options and opportunities for change, but fundamental (or

incremental) change requires action. Chapter 5 discusses a vision for the future and challenges decision makers to undertake change and presents a list of broad-based actions.



CHAPTER

5

**CALL TO
ACTION**



CALL TO ACTION



Opportunities are available to institutionalize sustainable development in the Asia and Pacific region – the type of development that is economically sustainable, environmentally sound, socially equitable, and responsive to a shared vision among the community of nations.

The call to action is directed at the Asia and Pacific region decision makers, whose input to this report represents a consensus view on priority actions that need to be taken. This consensus on actions has been achieved through discussion and assessment by a diverse group of DMC government officials, staff from ADB and other international assistance agencies, representatives of NGOs and research institutions, and the private sector. The consensus-reaching process included a series of workshops in eight DMCs. At these workshops, sectoral policy agendas were developed and reviewed by national experts to identify root causes that are inhibiting environmental progress in some countries. Workshops and participants are listed in the appendix of this report. Common themes emerged across the region, especially the need for policy integration, development by design, and a political and social will for pro-environmental actions. The need for new approaches is particularly relevant because past actions in the region have demonstrably constrained development sustainability. The AEO Series is a work in progress. As such, general and specific policy recommendations and actions proposed here in the AEO 2001 report are generic and evolving. The call to action is a baseline against which future progress will be measured in subsequent AEO reports, and implemented in the region with the assistance of the development partners, including ADB.

As illustrated in this report, opportunities are available to institutionalize sustainable development in the Asia and Pacific region – the type of development that is economically sustainable, environmentally sound, socially equitable, and responsive to a shared vision among the community of nations. If catalyzed by strong political will and a reflection of social preferences, the vision for the future would encompass policies that integrate environment into development with the aim of achieving an appropriate level of environmental compliance, protecting the poor against environmental mismanagement, and commitment of budgets and human resources commensurate with environmental management requirements (see Box 5-1).

REGIONAL POLICY RECOMMENDATIONS

Three pillars support the shift from environmental decline to environmental vigor. First, the concept of **policy integration** is fundamental to successfully moving forward with policy reforms. This translates to infusing national environmental objectives into national economic development plans and processes and achieving environmental goals

The need for new approaches is particularly relevant because past actions in the region have demonstrably constrained development sustainability.

Box 5-1. Vision for the Future

ADB's long-term strategic framework for 2001 through 2015 draws attention to the following realities:

"The Asia and Pacific region is still home to two-thirds of the world's poor despite the significant progress in the past three decades. A lesson learned from the 1997 Asian crisis is that even gains made in poverty reduction through long years of rapid and sustained growth can be quickly reversed. The challenge of reducing poverty in the region remains more daunting than ever and requires new approaches and commitments."

The three core areas of intervention, consonant with the poverty reduction strategy:

- ◆ Sustainable economic growth, which covers broad-based growth-promoting activities, including investments in both physical and social infrastructure, and an environment program that promotes environmentally sound development;
- ◆ Inclusive social development, which includes investments in social support programs and a policy and reform agenda that will promote equity and empowerment, especially for women and disadvantaged groups; and
- ◆ Governance for effective policies and institutions, which includes support for public sector management at all levels; legal and judicial reform; and improving public accountability. Governance must also promote processes and procedures for more effective participation in decision making to promote equitable and inclusive growth, especially by civil society.

The three core areas will be complemented by three crosscutting themes that will both broaden and deepen the impact of the core areas of intervention:

- ◆ Promoting the role of the private sector in development builds on the private sector development strategy, recognizes the central role of the private sector and of markets in the development process, and responds to the challenges of mobilizing private sector resources to address the region's increasingly complex development agenda;
- ◆ Supporting regional cooperation and integration for development reflects the need to support the development of DMCs through cooperation, to provide wider development options through greater access to resources and markets, to address shared problems that stretch across borders, and to take advantage of opportunities for sharing knowledge and information; and
- ◆ Addressing environmental sustainability includes putting environmental considerations in the forefront of all development decision making and planning in the DMCs and in all ADB initiatives, and not only stopping but reversing the enormous and costly degradation and damage to the environment that have already occurred.

through the actions of corresponding public sector development authorities and private sector interests instead of depending on national environmental (enforcement) agencies.

Second, **development by design** must be emphasized as the guiding instrument for development. National, subnational, urban, and industrial development, as well as infrastructure projects, need guidance and monitoring in accordance with integrated environmental and economic development plans.

Third, **an abiding political will** is essential to translate national environmental rhetoric into actions if (i) an appropriate level of environmental compliance is to be achieved, (ii) budgets and human resources commensurate with the job at hand are to be provided, and (iii) subsidies

that lead to resource degradation are to be eliminated. The implicit message is that *access to information is critical*.

Ensuring sustainable economic growth, which implies environmental soundness, is one of the core areas of intervention in ADB's long term strategic framework (LTSF) 2001-2015. The other two core areas include (i) inclusive social development which will include investments in social support programs and a policy reform agenda that will promote equity and empowerment; and (ii) improve governance for effective policies and institutions which will include support for public sector management at all levels, legal and judicial reform, and improving public accountability, processes, and procedures for more effective participation in decision making, including by civil society, particularly to promote equitable and inclusive growth.

Understanding the meaning and scope of policy integration is a fundamental prerequisite to ensure environmentally sustainable development. The entry points where such integration can be initiated (discussed in Chapter 4) and the options and opportunities for sustainable development (discussed in Chapter 3) are highlighted below under three broad cross-cutting areas of reform: economic actions, institutional actions, and governance actions. Further details on how these concepts can be translated and implemented in the region will be published through the AEO series of documents (see Box 5-2 at end of chapter).

ECONOMIC REFORM ACTIONS

- ◆ **Integrate economic and environmental decision making to provide a value to ecosystem services.** Simultaneously pursue economic and environmental goals and overcome information gaps, sunk costs, uncertainty, and other sources of market failure. Governments can make environmental priorities internal to core economic planning if clear performance goals are identified and applied consistently. For example, DMC governments that apply performance based budgeting can include environmental performance as a decision making criterion. In support of business sector efforts at integrating economic and environment goals, policy makers must promote a supportive environment for eco-efficient retrofitting through enhanced depreciation schedules, tax breaks, or environmental certification schemes.
- ◆ **Establish resource pricing and eliminate all policies that create perverse incentives.** This approach may be the best short-term investment for governments. Abandoning subsidies that disproportionately benefit the rich may be politically difficult because vested interests have structured whole sectors on the expectation that these subsidies will continue. However, the normal excuse that elimination of subsidies will harm the poor can nearly in every case be shown to be false. The first step for governments is to conduct comprehensive environmental audits of all subsidies, opening such inquiries to public debate and

Policy integration can be initiated in three broad cross-cutting areas of reform: economic actions, institutional actions, and governance actions.

Substantial new investment expected to flow into Asian DMCs over the next two decades can be used by firms as an opportunity to shift to technologies that are less energy- and materials-intensive.

participation in the often difficult deliberations. A second priority is to reform energy markets and remove distorted pricing regimes. Phase out of subsidies that distort the production and consumption of energy or that propagate inefficient systems is a responsible approach. However, subsidies can continue to be used to meet the government's responsibility for providing access to electricity and commercial energy to disadvantaged people in remote, rural areas, bearing in mind that access to electricity may be one of the key indirect factors for promoting slower population growth rates. Establish charges for water to reflect environmental and social costs, including both the cost of providing water and the disposal costs of wastewater. Again, transparent cross-subsidies for basic domestic water use can be provided for the poor. Urban areas can consider a polluter-pays approach to water supply that combines a broad-based pollution charge to all wastewater generators and a service fee to those connected to the wastewater system. In addition, the experience of many countries, both inside and outside of the Asia and Pacific region demonstrates the MBIs can be used effectively for environmental protection (see Table 5-1).

- ◆ **Capitalize on positive economic forces for change to reduce or offset negative consequences of the driving forces of change in the region.** Use the substantial new investment that is expected to flow into Asian DMCs over the next two decades as an opportunity for firms to shift to technologies that are less energy- and materials-intensive. Environmental improvement through new investments can also come from expansion of existing facilities, shifts to new production lines, and changes in product mix. Policy makers can assist by ensuring that loans and funds for technology upgrades are available and by ensuring that an economic safety net is in place for those displaced by economic change. Credit and tax instruments can facilitate innovation, investment, and technology change particularly for companies with very limited capital such as SMEs. Also, education is critical in solving environmental problems. Governments must train the thousands of professionals in the environmental

Table 5-1. Examples of Market-based Instruments for Environmental Protection

TYPE OF MBI	EXPLANATION
Air (Intraboundary) Fees	Air pollution prevention fees (PRC and Taipei, China) and emissions charges above a threshold (Republic of Korea)
Air (Transboundary) Fees	Greenhouse taxes on carbon, sulfur, and volatile organic compounds (Sweden and United States)
Water Charges	Charges for discharge above specified levels (Malaysia and PRC)
Solid Waste Charges	Charges on disposal of household wastes (OECD countries and United States)
User Charges	Water effluent treatment charges (OECD countries and Thailand) and solid waste disposal (Hong Kong, China; PRC; and parts of Thailand)
Product Charges	Charges for products such as lubricants, mineral oil and mineral oil-containing products, batteries, and agricultural chemicals
Input Taxes	Taxes on the sulfur content of coal (PRC)
Emissions Trading Permits	Permits for particulates (Chile), auctionable permits for the import and use of ozone-depleting substances (Singapore), and acid rain trading program for electric utilities (United States)
Performance (Guarantee) Bonds and Noncompliance Fees	Fees for cleanup of mining wastes (Australia and Malaysia) and littering along tourist trails (Nepal)
Tax Differentiation	Taxes for leaded versus unleaded petrol use (Thailand) and gasoline versus diesel fuel use (OECD countries)
Resource Pricing	Marginal cost pricing of water supply and sewage collection (Chile), energy pricing (PRC), and auctioning of certificates of vehicle entitlement (Singapore)

Sources: Modified from Panayotou 1996; ADB 1994

sciences and encourage participation in professional organizations. Governments can foster such associations by paying membership fees for their officials and by providing time off to attend training courses and conferences.

- ◆ **Use environmental improvements as an important part of the effort to eradicate severe poverty within the region and critical to efforts to secure sustainable livelihood.** Apply operational principles that govern the ADB's long-term strategic framework. Operational principles include the following: (i) a country focus to ensure ownership of ADB's development interventions and actions; (ii) selectivity and focus of work in areas where a commitment to change exists and to ensure closer cooperation between development partners; (iii) quality and excellence through strengthening of economic and sector work; improvement in business processes, project administration, and analysis and evaluation; and strengthening of knowledge management; (iv) building of enduring relationships with stakeholders; and (v) greater

transparency and external feedback, strengthening of corporate governance, and intensification of anticorruption activities. Experience demonstrates that regional authorities that systematically and routinely share information are more responsive, more effective, and achieve long-lasting, superior outcomes.

INSTITUTIONAL REFORM ACTIONS

- ◆ **Mainstream environmental concerns in sectoral agencies.** Establish or strengthen national environmental authority, including establishing broad-based national environmental and natural resource management strategies and policies, organizing national participation in and compliance with international environmental conventions and agreements; and setting minimum national environmental standards for certain types of behavior or pollutants and overseeing the implementation of such regulations. The consistent enforcement and imposition of penalties for unacceptable, environmentally damaging behavior (by firms or citizens) is an essential underpinning of

environmental policy, whether based on regulatory restrictions, MBIs, or public accountability. Mainstream the environment within the private sector to focus on changing values and lifestyles so that there is a positive change toward less energy- and materials-intensive consumption patterns at the individual, community, and societal levels.

- ◆ **Set realistic and appropriate environmental standards and improve enforcement.** Effective environmental policy requires clear environmental performance standards that are consistently enforced. The process of monitoring compliance should be designed with consideration to local context. The failures experienced within the region in implement environmental policy are often traceable less to the policy tools themselves (such as ambient air quality standards) than to a tendency to adopt these tools in rigid fashion. Each government is expected to continue to build, strengthen, and maintain a sound national regulatory foundation for its environmental compliance and enforcement programs. DMC governments can increase the level of compliance by developing permits that are flexible, streamlined, and enforceable. The EIA process needs to be linked to the permitting process. Permits ensure that undertakings provided by implementation of EIAs will be adhered to and that the consequences of failure to meet those commitments are clearly documented. Governments will also need to build litigation processes into environmental laws to fully realize their environmental compliance and enforcement objectives. Enforcement programs will normally involve a combination of informal and formal regulatory mechanisms. Informal mechanisms include site visits, warning letters, and offers of technical assistance. The formal legal process may cover administrative, judicial, or criminal sanctions. Other enforcement mechanisms include environmental liability provisions, litigation, stakeholder responsibility, publicizing violations, compliance assistance, and enforcement communication. The true measure of success of an environmental compliance and enforcement program depends on the willingness of the

The consistent enforcement and imposition of penalties for unacceptable, environmentally damaging behavior (by firms or citizens) is an essential underpinning of environmental policy.

DMC governments can increase the level of compliance by developing permits that are flexible, streamlined, and enforceable.

regulated community to voluntarily comply with environmental requirements and standards.

- ◆ **Build the capacity of a new generation of institutions.** Governments in the region are responsible for leading the reform of existing institutions to respond to environmental problems more quickly, more effectively, and more equitably. A new generation of environmental institutions will (i) integrate environmental concerns into national and sectoral planning; (ii) devolve authority over environmental management where appropriate; (iii) increase the transparency and accountability of government; and (iv) invest and otherwise encourage capacity building in the environmental arena. Strengthen the capacity of line ministries so that they can understand and act on the most important environmental dimensions of their sector. Decentralization should also be encouraged, including devolution of authority and responsibility for provision of environmental services and the protection of environmental quality. DMCs should also consider creating the office of environmental ombudsman, a public official to whom the citizens can report violations of environmental law. Governments need to spearhead efforts to collect, standardize, and make available data and information at the national and local levels prioritized according to the most pressing needs and not focus on the data and information easiest to collect. To assure financing for environmental programs, earmarking of revenues raised from environmental charges is needed. Proceeds from appropriate MBIs in the regulation of conventional power energy systems, for example, could finance and support “green energy” development. Pollution fees and fines can be designated as revenues for investment in environmental improvement.
- ◆ **Use subregional planning approaches to address common problems or similarities of interests.** Form or strengthen subregional planning organizations to adequately address concerns related to globalization. Economic globalization, trade agreements, and the participation of countries in the region in new global economic governance mechanisms will likely have a greater environmental impact than their participation in agreements specifically focused on the environment.

The future of the global environment will depend increasingly on compliance with international agreements or customary law by private agents within states operating in national and global markets. Presently, counterpart domestic legislation mediates between international law. Accordingly, private agents are regulated by domestic and not international mechanisms (Ghosh 1999). Various intermediate possibilities between the extremes of strictly national enforcement (as currently) and full-scale multilateral enforcement may need to be devised. Greater effort is needed to promote inter-regional cooperation and adopt subregional groupings of countries to improve the quality of transboundary analysis. The unique situation of Pacific DMCs, for example, has to be recognized. There is an opportunity to identify and analyze common environmental and natural resource management issues among groups of countries and promote development and dissemination of common solutions, particularly related to compensation for transboundary environmental damage.

GOVERNANCE REFORM ACTIONS

- ◆ **Foster strong political will in the DMCs.** Strong political will at the national, regional, and global levels is needed to break the barriers to governance. Barriers include indifference or active resistance by parties that seek private gain from the *status quo* and the prevalence of patron-client relations as a driver of decision making in some DMCs. The bedrock of good governance, environmental or otherwise, is capable, credible, fair, accountable, and efficient government. Fostering stronger political will depends on strong systems of democratic participatory governance and a system of performance-based rewards within government. Policy makers will generally have a natural tendency to make only minimal changes when political will is weak.
- ◆ **Empower civil society to make decisions and pursue implementation of environmentally sustainable development.** Sustainability depends on citizen support, without which good leaders cannot

Fostering stronger political will depends on strong systems of democratic participatory governance and a system of performance-based rewards within government.

Governments at the national and local levels assuming new roles as “enablers” and “convenors” can strategically interact with civil society and business groups in the pursuit of environmental goals.

assume positions of authority. Governments need to engage civil society in the decision making process and allow them more and specific responsibilities for environmental management. Civil society can be given the capacity and mandate to undertake environmental monitoring and hold concerned public and private sector institutions accountable for the environment and compliance with environmental quality standards. Governments can then balance their enlistment of the special skills and perspective of civil society groups with their own responsibility to see the “big picture” and to balance the needs of all stakeholders. Governments at the national and local levels assuming new roles as “enablers” and “convenors” can strategically interact with civil society and business groups in the pursuit of environmental goals. An important adjunct to effective civil society participation is the development of an information access policy that provides needed information in a timely manner.

- ◆ **Promote public disclosure of information about environmental performance.** Governments should collect and make available information on the costs of environmental degradation (such as EIAs and life-cycle analyses) to both policy makers and the public. Effective policy implementation could come about through industry benchmarking, an important tool for identifying leaders and laggards in environmental performance and a firm, farm, or fishery operations that lag behind industry standards. In the region, industry benchmarks need to be developed by industry associations, separately or jointly with government for the use of energy, materials, resource, and intensity of pollution. To fully harness the potential of rapidly advancing information technology, governments need to shift from national policies that excessively regulate this technology toward liberalization and deregulation of such technology. In the DMCs, the issues of an ever-widening digital divide and the need for mechanisms to bridge this divide within and between countries are of utmost concern. Promoting a free press is one of the most effective ways to expose environmental problems caused by or linked to government policy. The Internet could also be used to set up “global public policy

networks” and mechanisms for encouraging environmental dialogue at the national, regional, and global levels. An inter-regional technology network can also be organized.

- ◆ **Establish multistakeholder partnerships.** Partnerships are important because environmental issues are so extensive and complex that the government cannot succeed acting alone. Partnerships become a critical mechanism for policy integration. The prospects for establishing such partnerships for sustainable development in the region are very good and will be realized sooner if strongly supported by international collaboration. A key to building partnerships is reordering government priorities and a true commitment to sustainable development that places the human and physical environment high on the agenda of all branches of government, not just on the agenda of those traditionally involved with environmental regulation. Institutional confidence, which is characterized by technical and financial capacity; a clear and comprehensive framework for action; and absence of a “turf” orientation are necessary if agencies are to establish partnerships with other government agencies, the private sector, and civil society. External funding agencies can help encourage partnerships by providing opportunities for participation of both parties in project or program design. Dialogues and other forms of exchange will create linkages between the government’s development agenda and the NGO’s agenda. In the industry sector, the promotion of clean development in the Asia and Pacific region will require a new type of development platform based on shared interests and goals and involving a broad and deeply rooted partnership among business, government, NGOs, development institutions, and the research and policy community.

SECTOR-SPECIFIC ACTIONS

Recommendations for actions in the land and forest, water, industry, energy, and urban sectors are discussed below. Since air pollution is a prevalent problem in densely populated urban areas, it is presented in the section on urban sector. The recommendations are not intended to be compre-

hensive but rather are illustrative of how the principles and opportunities discussed earlier can be put into practice.

LAND AND FOREST SECTOR

- ◆ Target vulnerable sites and sectors (not in high-potential areas only) in agriculture and natural resources management, promote equity in the selection of sites and projects, and give priority to protecting and reclaiming degraded lands specifically for poverty reduction.
- ◆ Rationalize national protected area systems by preparing or updating and implementing national protected area system plans. The plans should, at a minimum, address national inventories of biological resources; assess current protected area systems; evaluate financial, institutional, and capacity constraints; conform with international criteria and classification; and address community involvement. Coordinated bioregional coverage will foster transboundary management coordination.
- ◆ Consider the rights and concerns of indigenous peoples and local communities in making decisions and performing activities related to protected area delineation and management.
- ◆ Facilitate the flow of benefits to local communities from useful traditional knowledge.
- ◆ Consider a global agreement that extends the Convention on Biological Diversity and that would lead to the establishment of a global park management agency funded by public-private partnerships. This agency could offer support to national park management agencies in high-priority national parks of global significance and transfer advanced park management techniques.

WATER SECTOR

- ◆ Adopt river basin development planning at the national, regional, and local levels, and integrate economic and social sectors with the sustainable development and conservation of water and other biological resources. Prepare a national river basin resource profile and inventory, followed by preparation of a national policy to provide the framework for basin and sub-basin development plans. Establish national and basin-level

Institutional confidence, which is characterized by technical and financial capacity; a clear and comprehensive framework for action; and absence of a “turf” orientation are necessary if agencies are to establish partnerships with other government agencies, the private sector, and civil society.

institutional mechanisms to achieve integrated development of major river basins, including the capability to allocate water among users, demand-side water management, flood control, and socio-economic development and environmental protection. Institute computerized, real-time monitoring of water use in heavily regulated rivers.

- ◆ Adjust water pricing to reflect total impacts consistent with efforts to improve the efficiency of water systems. Correcting prices may require a complex set of incentives or disincentives. Key issues regarding political problems associated with necessary cost and cross-subsidies will also need to be addressed. All users should pay for the true cost of water resources, including the environmental and social costs. Costs would cover both the cost of providing the water and the cost of wastewater disposal. Cross-subsidies for basic domestic water use may need to be instituted for the poor.
- ◆ Privatization of water supply and wastewater management services in major urban centers and industrial zones may be encouraged, but only after proper pricing reforms are in place. Public-private partnership can be a source of financing.
- ◆ Transfer legal rights over shallow subsurface water to communities and users. Keep government rights to deep aquifers (which are often not renewable). Integrate groundwater policy with general water resource policy, and undertake institutional reforms in accordance with such policies. Charge groundwater users the same amount as surface water users and avoid subsidizing energy use for extraction.
- ◆ Require downstream beneficiaries (such as irrigation farmers, flood plain residents, estuarine fishermen, and aquaculture farms) to compensate upstream watershed managers, who undertake legally binding watershed protection activities and forego more profitable but damaging activities. The transfer payment, based on locally appropriate mechanisms, could include land tax premiums, increased water tariffs, or direct contractual arrangements.
- ◆ Adopt integrated coastal zone management to achieve sustainable development in coastal areas. Delegate

Adjust water pricing to reflect total impacts consistent with efforts to improve the efficiency of water systems.

Transfer legal rights over shallow subsurface water to communities and users. Keep government rights to deep aquifers (which are often not renewable).

planning and management of coastal areas to the local level. Integrated coastal management involves resource inventory and monitoring, macro- and local-level resource use zoning, preparation of local management plans congruent with national policies and guidelines, and creation of local planning and management institutions under the local government.

- ◆ Promote regional cooperation for contingency planning and control of episodic oil spills (this is also applicable to environmental emergencies). Provide technical knowledge and equipment to deal with hazardous wastes and other dangerous pollutants.

URBAN SECTOR

- ◆ Identify new sources for urban infrastructure revenue. At the “micro” level, significantly improve the financial viability and sustainability of urban environmental services by implementing effective mechanisms of cost recovery. Adopt waste minimization efforts to minimize capital investments required for wastewater and solid waste conveyance and treatment. At the “macro” level, improve the overall financial security of agencies providing environmental infrastructure and services. Use a broader array of international funding sources brought about by globalization by providing transparent investment criteria and effective monitoring and regulatory institutions.
- ◆ Consider infrastructure financing innovations for urban environment such as municipal, tax-free bonds, pollution charges or “green” taxes, and empowerment of local authorities to raise financial resources. More specifically, finance urban environmental improvement through targeted taxes and surcharges.
- ◆ Link urban planning with private investment plans.
- ◆ Shift from outdated automobile and bus or jeepney transport by removing perverse incentives that support such use.
- ◆ Prepare integrated, 20-year urban and industrial development plans based on national guidelines that include recognition and anticipation of slum growth. Incorporate networking principles in utilities provision in coordination with industrial development as well as

improvements in municipal management and finance. A possible target is for such plans to be prepared by municipal authorities for all urban areas expected to have a population of over 500,000 by 2020.

INDUSTRY SECTOR

- ◆ Prevent pollution transfer by transnational corporations, such as the movement of highly polluting technologies, into DMCs. Encourage industries to become certified under ISO 14000 or other forms of certification. Develop ecolabeling, ISO 14000, and environmental management system certification regimes and incorporate requirements of these certification practices into DMC procurement guidelines. Widen industrial efforts through approaches such as “greening the supply chain” under which local suppliers are also required to integrate cleaner production principles in their operations. Other approaches may be used to demonstrate that they are environmentally responsible.
- ◆ SMEs, which produce the most pollution but have the least capacity for shifting to clean production, must be reached, motivated, and assisted differently than large enterprises. There is a particular need for governments to enable SMEs to engage in the policy making process and to demonstrate how environmental protection contributes to the “bottom line.” Governments can facilitate this process by coordinating information exchange among firms and industry sectors at the local, national, and international levels.
- ◆ Strengthen public and private sector collaboration in enforcement, pollution control inspection services, and monitoring (with community-based monitoring). Place inspection and monitoring under different service contracts. Designate private sector providers of such services that are accountable to NGOs, concerned citizens, and government auditing offices.
- ◆ Encourage relocation and co-location of industries that can use each others wastes as inputs. Use new investments as an opportunity to influence the spatial distribution of economic activity in ways that reduce environmental impact. On a “micro” scale, this can involve ensuring that industrial activity takes place at locations that provide requisite waste disposal and treatment systems, energy-efficient fuel supplies, and

Widen industrial efforts through approaches such as “greening the supply chain” under which local suppliers are also required to integrate cleaner production principles in their operations.

other environmental infrastructure requirements and that do not endanger residential areas. More generally, this involves spatial planning at a regional scale to direct industry away from critical environmental zones and to take full advantage of the dilution capacities of natural ecosystems.

- ◆ Integrate environmentally sound practices (such as the use of best available technologies, cleaner production techniques, and demand-side management) into industrial development policy. A ministry of industry or board of investment can take the lead, with a ministry of finance monitoring competitiveness of the industrial policy and the ministry of environment monitoring pollution and environmental quality improvement.

ENERGY SECTOR

- ◆ Adopt the following specific goals:
 - **Pro-Poor Focus:** Improve access to and broaden energy choices for households and rural communities, including promoting the use of higher quality fuels to the fullest extent possible.
 - **Renewable Energy:** Use decentralized renewable energy technologies.
 - **Rational Trade in Energy:** Remove tariff and nontariff trade barriers to increase international competition and market access.
- ◆ Encourage participation of SMEs (public, private, and nonprofit) in the energy service business to facilitate technological adaptations. Provide technical and financial intermediation services for both urban and rural markets.
- ◆ Remove perverse incentives that continue the use of highly polluting coal. Adjust prices to reflect total impacts consistent with efforts to improve the efficiency of energy systems.
- ◆ Promote renewable sources of energy, such as the adoption of improved cooking stoves or more sophisticated biomass conversion technologies (for example, linking biogas digesters to fuel cells). Look for alternatives to fossil fuels in the provision of commercial energy and to wood fuels for home energy requirements.
- ◆ Increase efficiency in the generation, transmission, and distribution of electricity.

- ◆ Improve energy efficiency through greater use of resource-efficient materials, techniques, and equipment.

CONCLUSIONS

Based on exploration of the environmental symptoms plaguing the Asia and Pacific region, environmental trends are alarming and previous institutional and policy approaches appear to have had limited success. But trends can be changed! The region still has the opportunity to follow a different economic-environmental pathway, one that builds a clean urban-industrial economy from the bottom up and avoids much of the costly, inefficient, and embattled institutional and technological experience of industrialized countries. In much of the developing countries of the Asia and Pacific region, affordable options are still available to prevent long-term or permanent damage to most natural resources and the urban environment. Abundant opportunities exist for redirecting the underlying driving forces of change, create new and effective institutions, establish markets for ecosystem services where none exist

Political will, policy integration, and development by design will become meaningless slogans unless all stakeholders act in concert to ensure long-term sustainable development in the region.

today, and integrate environmental policies into mainstream economic planning and management. Only then a sustainable future for the Asia and Pacific region can be realized.

The AEO series identifies a future focused on policies that integrate environmental concerns with economic development to reduce poverty, improve environmental quality, and support sustainable livelihoods for all people in the region. In this context, an abiding political will is essential to translate rhetoric into action. Political will, policy integration, and development by design will become meaningless slogans unless all stakeholders act in concert to ensure long-term sustainable development in the region. The potential result is development that conforms with the principles of natural capitalism, exhibits concern for the long-term stability of the environment, and leads to meaningful social development. ADB anticipates that AEO 2001 and future AEO Series reports (see Box 5-2) will be able to document the positive changes occurring in the Asia and Pacific region, thereby making a real difference. Nothing less than our collective future depends on it.

Box 5-2. Upcoming AEO Series

The following documents will be published and posted on ADB's website at <http://www.adb.org/environment/aeo>. Abstracts of the AEO Background Papers are included in the appendix of this report:

Economic

- ◆ Policy Integration – Environment and Development in Asia
- ◆ Natural Resources Management and the Environment
- ◆ Urbanization
- ◆ Energy and the Environment
- ◆ Market-Based Instruments for Environmental Management in Asia

Institutional

- ◆ The Future of Environmental Institutions in Asia
- ◆ Cleaner Production in Asia: Obstacles to Change and a Regional Strategy for Rapid Adoption

Governance

- ◆ From Bystanders to Collaborators: New Roles for Civil Society in Urban-Industrial Environmental Governance in Asia
- ◆ Public Awareness, Education, and Mobilization for the Environment
- ◆ Emerging Environmental Governance

Country Environmental Policy Integration Study (CEPIS) reports:

- | | |
|-------------|---------------|
| ◆ India | ◆ Philippines |
| ◆ Indonesia | ◆ Sri Lanka |
| ◆ Pakistan | ◆ Thailand |
| ◆ PRC | ◆ Viet Nam |



AEO 2001

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 - ADB's Emerging Asia: Changes and Challenges (ADB 1997) and <<http://www.adb.org>>
 - World Resources Institute <<http://www.wri.org>>

FRESHWATER AVAILABILITY

- Worldwatch Institute 2000 <<http://www.worldwatch.org>>

GLOBAL CLIMATE CHANGE

- International Institute for Applied Systems Analysis' (IIASA) RAINS-Asia Model <<http://www.iiasa.ac.at>>
- Intergovernmental Panel on Climate Change (IPCC), World Meteorological Organization (WMO), and the UNEP <<http://www.ipcc.ch>>

POPULATION

- UNDP's Human Development Report 1999 <<http://www.undp.org/hdro>>

CLEANER PRODUCTION

- UNEP's Cleaner Production Activities <<http://www.unep.org/cp2/home.html>>

ENVIRONMENTAL MONITORING

- Global Witness <<http://www.oneworld.org/globalwitness>>

ENVIRONMENTAL REPORTING

- Asia Pacific Forum of Environmental Journalists <<http://www.oneworld.org/slejf>>
- Environmental Communication Asia Network (ECANET) <<http://www.ecanet.net>>

INDEPENDENT CERTIFICATION

- SmartWood Program <<http://www.smartwood.org>>
- Commercial Trading Schemes <<http://www.ieta.org/etinit.htm>>

CIVIL SOCIETY

- UNCED's Agenda 21 <<http://www.igc.org/habitat/agenda21>>

WEB SOURCES

GENERAL ENVIRONMENTAL CONDITIONS IN THE ASIA AND PACIFIC REGION

- ADB's Asian Environment Outlook <<http://www.adb.org/environment/aeo>>
- United Nations Environment Programme's (UNEP) Global Environment Outlook (UNEP 1999 and <<http://www.unep.org/geo2000>>)
- United Nations Economic and Social Commission for Asia and the Pacific's (UN-ESCAP) State of the

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EDUCATION

- The Global Knowledge Partnership
<<http://www.globalknowledge.org>>

EMISSIONS TRADING

- Commercial Trading Schemes <<http://www.ieta.org>>

COMPREHENSIVE ACTION PLAN FOR DEVELOPMENT OF ASEAN INFORMATION INFRASTRUCTURE

- Association of Southeast Asian Nations
<<http://www.aseansec.org>>



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APPENDIXES



ABSTRACTS OF BACKGROUND PAPERS

ECONOMIC

TITLE: *POLICY INTEGRATION – ENVIRONMENT AND DEVELOPMENT IN ASIA**

AUTHORS: DAVID P. ANGEL AND MICHAEL T. ROCK

For the twin goals of environmental improvement and poverty reduction to be met within developing Asia there is a need for greater pro-active management of the economy-environment interface than occurs under existing policy approaches. Many observers are now calling for policy integration – for the internalization of environmental concerns within core economic development strategies and policies. Significant obstacles to the adoption and implementation of effective systems of environmental protection within developing Asia exist, including weak and under resourced institutions of environmental regulation, and a shortage of political will to implement necessary reforms. Policy integration appears to offer a way forward to overcome these obstacles. In this paper, policy integration is examined as a way of enhancing environmental protection by more closely aligning efforts to improve environmental quality and economic performance in developing Asian economies. Experience of East Asian newly industrializing economies are drawn upon to provide practical examples of policy integration in action. The implications of the East Asian experience are used for other developing countries in the region to explore ways in which organizations of environmental protection and economic development can work together without compromising their individual autonomy.

* Paper co-published with US-Asian Environmental Partnership (US-AEP)

TITLE: *NATURAL RESOURCES MANAGEMENT AND THE ENVIRONMENT*

AUTHOR: S. TAHIR QADRI

CONTRIBUTORS: DELFIN GANAPIN, JR., JAVED HUSSAIN, JOSE PADILLA, AND DARIUS TETER

Sustainable development requires continuous economic growth with minimal stress to the environment. It is therefore necessary to overcome problems related to growing populations, depletion of natural resources, and the growing economic gap between industrialized and the developing countries. This paper discusses the need for a clear understanding of the concept of ecological resilience, its linkage to the sustainability of natural resources, and constraints in the application and adoption of these concepts in order to overcome such problems.

The Asia and Pacific region is one of the most vigorous and dynamic regions in the world in terms of natural resources. Because of demographic pressure, inequality and poverty, inappropriate policies, development biases, and exploitative approaches, these natural resources are not being sustainably managed.

The continuing degradation and pollution of natural resources has far reaching implications on the poor. Solutions must be localized but undertaken under national policy, and institutional arrangements must be developed through participatory processes. Water resources must be sustainably used through proper national water programs, functional river basin organizations, and the use of cost recovery practices. Fisheries and coastal and marine resources likewise need better and more effective management through holistic national coastal policies, wider use of coastal resource economic values, development of information and knowledge networks, institutionalization of coastal management at the local government level, and mainstreaming of coastal management in the national social agenda.

ADB's natural resources sector attempts to make investments that operationalize a landscape ecology concept, resulting in integrated ecosystem and area-based natural resource conservation and development. The purpose of this approach is to link the sector with overall economic strategic goals and make ecological and ecosystem spatial scales compatible (or whenever possible, congruent) with administrative, developmental planning, local use, and management scales. This approach ensures that benefits from such management are felt beyond specific localities. An ecosystem approach also will more closely reflect mainstream development planning methods.

TITLE: *URBANIZATION*
AUTHOR: J. WARREN EVANS

The most striking difference between the Asia and Pacific region today and 25 years ago is the shift of people and economic activity from rural agrarian communities to urban and industrial centers. This change has been most dramatic in low- and middle-income nations in East Asia and the Pacific regions. From 1970 to 1997, the agriculture share of the gross domestic product (GDP) in the region from agriculture dropped from 35 percent to 18 percent, while urban populations grew from 19 percent to 33 percent. The economic growth resulting from this transition had major impacts on poverty. In 1975, almost 60 percent of Asians and Pacific islanders lived in poverty. By 1995, poverty declined to 33 percent. Despite explosive population growth, the absolute number of poor declined by 28 percent, from 1,149 million in 1975 to 824 million in 1995.

With these improvements notwithstanding, urbanization and industrialization have created a host of social, economic, and environmental problems, or have exacerbated existing ones. This paper discusses such problems and possible solutions in the context of responsive approaches to urban planning, development, and management. Problems in major cities include: a proliferation of slum areas; traffic congestion; uncontrolled industrial growth; unprecedented degradation of air quality; encroachment on natural systems; and public health degradation from water pollution, poor drainage, and solid waste disposal practices. This paper presents strategies to overcome these challenges.

TITLE: *ENERGY AND THE ENVIRONMENT*
AUTHOR: CUTLER CLEVELAND
CONTRIBUTORS: ALI AZIMI, PRODIPTO GHOSH, AND AMINUL HUQ

Energy plays a crucial role in the economies of the Asia and Pacific region. Rapid expansion of commercial energy use has increased reliance on energy imports, particularly crude oil; and electrification of the region has increased at an average of 16 percent annually. Commercial energy use in developing member countries (DMC) is increasing at an average of 7 percent per year, and energy providers rely heavily on nonrenewable fuels. Biofuels also play an important role in DMCs, accounting for 40 percent of total energy use.

Increased energy use, especially fossil fuel and tradition biofuel use, is contributing to environmental degradation at local, regional, and global levels. Fuel extraction disrupts terrestrial and aquatic ecosystems, and conversion and combustion is the principal source of greenhouse gases (GHG) and other air pollutants in the region. To mitigate these impacts, increased attention must be paid to energy efficiency and alternative forms of energy — the topic of this paper.

This paper discusses energy-related policy issues and presents a case that in the Asia and Pacific region, energy use is not only rising because of increased demand but also because of inefficiencies in energy supply and use. Energy efficiency remains very low throughout the region as a result of institutional, technological, and policy problems. The key is to delink the use of energy from the production of goods and services within economic, technological, political, and social constraints. This paper recommends approaches to promote a shift to policies that encourage more effective and equitable use to meet human needs through a pro-poor focus, a strengthened private sector, full-cost pricing, increased use of renewable energy, and rational trade in energy.

TITLE: *MARKET-BASED INSTRUMENTS FOR ENVIRONMENTAL MANAGEMENT IN ASIA*
AUTHORS: P. ABEYGUNAWARDENA, NESSIM J. AHMAD AND T. PANAYOTOU

Today, in many countries, use of incentive-based approaches for environmental management is an important component of overall environmental policies. Yet their use cannot be discussed in isolation of the existing regulatory and administrative arrangements, or without due regard to the institutional readiness. In other words, there are many factors that affect environmental outcomes, and it is impossible to single out one of them as being the real reason for environmental success or failure.

This paper investigates the economic instruments for environmental management to include (i) review of the existing institutional framework for environmental management; (ii) discussion of the role of different policy tools; (iii) assessment of the experience of using incentive-based policy tools on a sector specific manner; and (iv) problems with administrative, legislative and other institutional aspects of the policy tools. It describes and compares current and recent uses of market-based instruments for environmental management in several Asian countries.

INSTITUTIONAL

TITLE: *THE FUTURE OF ENVIRONMENTAL INSTITUTIONS IN ASIA*
AUTHOR: DAVID MCCAULEY

Considerable investment has been made in establishing and strengthening national environmental management institutions in the Asia and Pacific region over the past two decades. This has resulted in the creation of cabinet-level environmental bodies in most of countries in the region. Particular attention has been given to assessing and mitigating the environmental impacts of government-sponsored development projects and industrial production. During this same period, there has been an increase in public awareness of the environmental dimensions of economic development.

The focus on strengthening national environmental management agencies has resulted in relatively less attention being given to other important institutions with a stake in promoting sustainable development. These include planning authorities, sectoral development agencies, transnational and subnational environmental and development bodies, legislative and judicial authorities, the media, private sector associations, nongovernment organizations, the scientific community, and other elements of civil society.

This paper discusses the establishment of robust, honest, and effective environmental management institutions in the Asia and Pacific region. To achieve this objective, better capacity and fuller engagement of a much wider range of agencies than just national environmental authorities are required. An important element is integration of environmental considerations into the work of agencies responsible for urban and regional planning as well as those promoting key development sectors, such as industry, mining, water, and transportation sectors. Government entities cannot possibly be successful in promoting sustainable development without the full engagement of all elements of civil society and the transparency and accountability that such collaboration necessitates. This paper presents approaches to strengthen the interphase between environmental management and economic development at institutional levels.

TITLE: *CLEANER PRODUCTION IN ASIA: OBSTACLES TO CHANGE A REGIONAL STRATEGY FOR RAPID ADOPTION*
AUTHORS: J. WARREN EVANS AND RICHARD STEVENSON

Industry has adversely impacted human health and the natural environment for almost two centuries. From the beginning, the impact has been concentrated in urban areas, where the combination of industrial pollution and

urban wastes pose immediate threats to human health and welfare. If recent trends prevail, the growing congestion and pollution in the vast urban centers of the Asia and Pacific region will overwhelm urban infrastructure and may lead to strong resistance to industrial expansion, particularly in the urban areas. This resistance would have serious implications on the economic growth of the region. Some view pollution as a cost of economic development, but an increasing number see an alternative future path in which industry is both more productive and less polluting through better technology and management; new roles for the marketplace; and partnerships among industry, government, and communities.

Concepts of cleaner production, including the use of cleaner technology, are now widely recognized as effective in increasing the efficiency of industry and reducing environmentally damaging pollutants, the consumption of natural resources, costs, and risks while leveraging the global economy. And yet, despite the enormous resources expended in both donor and nationally funded programs in the last decade to promote the use of cleaner production, the rate of adoption has been disappointingly slow, particularly among small and medium enterprises (SME).

Most cleaner production programs have used same capacity-building and technology diffusion techniques, including in-plant demonstrations, training, and information dissemination, together with limited efforts toward public transparency and financial incentive. This paper discusses barriers to change, including limited awareness, absence of effective information networks, distorted pricing of natural resources, insufficient number of trained personnel, poor compliance monitoring, and environmental regulatory regimes that promote end-of-pipe solutions. The most serious obstacle, however, is a lack of strong public policy that is mainstreamed into all aspects of the economy. This paper presents the necessary policy and economic tools to motivate change in the behavior of industry decision makers in their own perceived best interests.

GOVERNANCE

TITLE: *FROM BYSTANDERS TO COLLABORATORS: NEW ROLES FOR CIVIL SOCIETY IN URBAN-INDUSTRIAL ENVIRONMENTAL GOVERNANCE IN ASIA*
AUTHOR: LYUBA ZARSKY

The Asia and Pacific region is in the midst of an industrial and agrarian revolution. Over the next two decades, people in the region will undergo massive changes in where and how they live as well as how they make their livelihoods. Asian “megacities” will become centers of economic, social, and political life, and will enormously impact the region’s ecosystems and resources. Within these urban-industrial agglomerations, growing middle and lower classes will increasingly demand political voice.

The key to the Asia and Pacific region’s environmental future lies in the evolution of governance. The key to good environmental governance depends largely on how effectively an increasingly organized and vocal civil society is able to demand social and environmental accountability from the government and industries. In the past, citizen and community groups have largely been bystanders in environmental policy making and policy implementation in the region.

This paper explores an emerging approach to environmental governance characterized by the institutionalized and strategic engagement of civil society groups. It focuses particularly on the roles of civil society in improving environmental performance in an urban-industrial setting by monitoring, prodding, encouraging, and partnering with government and private sector institutions. Part I of the paper outlines current urban-industrial and civil society growth in the Asia and Pacific region and argues that the critical variable in terms of environmental impact is the evolution of governance. Part II outlines six functional roles for civil society groups and considers new roles for government in a “multiple agent” model, including helping communities monitor industry environmental performance. Part III presents three designs for collaborative governance: community partnership, constructive engagement, and stakeholder consultation. Part IV examines the influence of international nongovernment organizations (NGO) on the region’s civil society and environmental norms, including “social

responsibility” norms for business. Part V concludes that a shift of civil society groups from bystanders to collaborators in environmental governance could result in significant benefits to society as a whole.

TITLE: *PUBLIC AWARENESS, EDUCATION, AND MOBILIZATION FOR THE ENVIRONMENT*
AUTHOR: LISA HOPKINSON

Civil society has responded to environmental change by forcing environmental issues onto national policy agendas, changing its behavior, and creating a new environmental social consciousness in the Asia and Pacific region. This paper discusses the roles that civil society can play in promoting better environmental governance.

Although governments continue to play the central role in developing and implementing environmental policy, civil society can play an increasing role in overcoming obstacles faced by governments. In the Asia and Pacific region, these obstacles are often related to the lack of political will, fiscal constraints, lack of regulatory capacity, and competitive pressures from globalization. Civil society groups in the region can promote better environmental governance through a variety of roles (often multiple). Failure to enlist or encourage civil society in protection of the environment can lead to exacerbation of environmental problems, loss of international funding, and deterioration of environmental quality and security.

Mobilizing civil society on environmental issues requires awareness of environmental problems, motivation, and action. Awareness is facilitated by access to information, effective environmental education, a free and informed media and increasingly, access to the Internet. Civil society is typically motivated by impacts on livelihood or health, and popular figures, cultural characteristics, and religious beliefs also play an important part in motivating civil society. The capacity of communities to cooperate and organize environmental issues closely correlates with political and civil rights.

The relative importance of these factors is illustrated in the case studies presented in this paper. For example, India, which has one of the oldest and most diverse environmental movements in the Asia and Pacific region is in stark contrast to the People’s Republic of China, where an emerging civil society has been effective in educational and awareness-building activities but where it has a more limited advocacy or “watchdog” role.

Perhaps the most important roles of civil society are to promote social change and provide a political mandate for action on environmental issues. To properly integrate environmental issues into development programs and policies requires changing the mind-set of key decision makers and society by raising awareness, engaging citizenry in the political and development process, and institutionalizing public participation in the decision making process. A strong environmental movement will strengthen the accountability of government and business on environmental matters, thereby ultimately benefiting the environment and people in the region.

TITLE: *EMERGING ENVIRONMENTAL GOVERNANCE*
AUTHORS: FRANCES SEYMOUR AND GEORGE FARADAY

Good environmental governance is increasingly recognized as central to sustainable development and natural resources management. Although countries in the Asia and Pacific region are diverse, their political systems share common elements—this concentration of power in centralized bureaucracies and a disjuncture between formal structures of authority and customary social institutions. Natural resources management regimes in the region share the characteristics. This mode of environmental governance has frequently proven unsatisfactory from social, ecological, and economic standpoints and today faces intensified challenges from general trends in globalization and democratization. This paper highlights the ways in which institutions are changing to satisfy the demand for improved natural resources management in the Asia and Pacific region.

The paper focuses on institutional change at many levels, with an emphasis on the transfer of authority to newly empowered institutions such as local governments, national legislatures, and the judiciary. The paper also discusses the changing roles of business and civil society organizations in environmental governance. The paper considers the development of transboundary institutions and the need for international cooperation in global

APPENDIX I: ABSTRACTS OF BACKGROUND PAPERS

environmental policy making. Seymour and Faraday argue that the state will continue to have an important role in providing the infrastructure required for good environmental governance and the mechanisms for enhanced stakeholder engagement. As such, the state will need to develop new modes of collaboration with non-state actors, a process that will require recognition of the explicitly political character of natural resource issues. Finally, leaders within the region will need to constructively channel the pressures towards transparency, participation, and accountability in environmental decision making in the context of Asian and Pacific conditions.

TITLE: *NATIONAL SUSTAINABLE DEVELOPMENT PLANNING*
AUTHOR: PETER KING

Successive global conferences on sustainable development, such as the 1992 Earth Summit, have called for environment and economic dimensions to be planned at the same time and in the same institutions, without elucidating how this should be done. Over the past decade, ADB has been developing a conceptual framework for organizing the various approaches for integrated economic and environmental planning, and their supporting tools and techniques. This paper presents an analysis of the past efforts and recommends a conceptual framework for vertical linkages and integrated planning. The conceptual framework derived from this analysis illustrates the importance of vertical linkages between planning levels and highlights the paucity of integrated economic and environmental plans at the subnational level in Asia. Both of these weaknesses need to be addressed by ADB and its member countries if a nested hierarchy of integrated economic and environmental plans is expected to contribute to the achievement of sustainable development.

AEO WORKSHOP PARTICIPANTS



THAILAND WORKSHOP, JANUARY 17-19, 1999 BANGKOK, THAILAND

Boriboon, Sirithan - Pollution Control Department
Bunyangidj, Chaiyod - Thailand Environment Institute
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Snidvongs, Kasem - Thailand Environment Institute

INDIA WORKSHOP, OCTOBER 28-29, 1999 TATA ENERGY RESEARCH INSTITUTE (TERI), NEW DELHI

Ackerman, Richard - The World Bank
Alam, M. - Asian Development Bank
Bose, Ranjan Kuamr - TERI
Dhawan, Vibha - TERI
Evans, J. Warren - Asian Development Bank
Gupta, Sujata - TERI
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Jorgensen, Alex - Asian Development Bank
Mathur, Ajay - TERI
Narang, R.K. - Distinguished Fellow, TERI
Pachauri, R.K. - TERI
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Samiullah, Yusaf - British High Commission
Sen, Ardhendu - Visiting Fellow, TERI
Sethi, Pia - TERI
Singh, D.P. - Municipal Corporation of Delhi
Srivastava, Leena - TERI
Suvarthan, P.I. - Ministry of Power
Talwar, Rajeev - Government of NCT Delhi
Verma, Sunil - New Delhi Municipal Council

VIET NAM WORKSHOP, NOVEMBER 5, 1999 VENUE

Dang Huy Huyen - Biodiversity
Le Quy An
Le Thac Can
Luu Bich Ho - MPI
Nguyen Ngoc Sinh - NEA
Pham Xuan Su - MARD
Phan Thu Huong - DSEE-MPI
Truong Manh Tien - NEA
Vo Tong Xuan - Can Tho University
Vo Tri Chung - FIPI-MARD

PHILIPPINE WORKSHOP, NOVEMBER 23-24, 1999 OECD CONFERENCE ROOM 7134E, ADB

Abracosa, Ramon - Industrial Initiatives for a Sustainable Environment
Acosta, Nereus - House of Representatives
Andres, Flordeliza - Department of Energy
Arellanor, Francisco - Manila Water and Sewerage System
Cruda, Helen - Asian Development Bank
Del Castillo, Olivia - Philippine Business for the Environment
David, Marissa - Tetra Tech EM Inc.
Esguerra, Jason Jorge - Department of Transportation & Communications
Evans, Warren - Asian Development Bank
Fuentes, Rodrigo - Tetra Tech EM Inc.
Ganapin, Delfin Jr. - Philippine Federation for Environmental Concerns
Gorospe, Amihan - PRIME, Board of Investments
Idanan, Annie - Asian Development Bank
Jacinto, Gil - Marine Science Institute
Lirag, Rufino - Department of Science & Technology
Mercado, Elmer - Coastal Resource Management Project
Oposa, Antonio - Oposa and Associates
Paloma, Roselita - House of Representatives
Penalba, Moreno - Landbank of the Philippines

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PRC WORKSHOP, NOVEMBER 27-28, 1999

MIYUN COUNTY, BEIJING

Cao Yanjin - Ministry of Construction
Ding Yuanzhu - Institute of Social Development, SPDC
Jin Jiaman - Chinese Research Academy of Environmental
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Li Junfeng - Renewable Energy Development, SPDC
Li Xinmin - State Environment Protection Administration
Ma Zhong - Beijing Environment & Development Institute,
Renmin University
Rong Peikang - State Administration of Building Material
Industry
Shi Quichi - Ministry of Water Resources
Tan Weiping - China Development Center for Poverty
Alleviation
Wang Guanghui - Department of Electricity
Yang Jienan - Tianjin EPB
Yang Jinlin - Ministry of Finance
Ye Huihai - Ministry of Communication
Zhao Wei - Peking Royalstone, Ltd.
Zhang Jianyu - Beijing Environment & Development
Institute, Renmin University

INDONESIA WORKSHOP, JANUARY 24-25, 2000

JAKARTA HILTON

Abimanyu, Anggito - University of Gadjadara
Aboejoewono - DKI Jakarta
Adiwibowo, Soeryo - PPLH-IPB
Coutrier, P.L. - Indonesian Mining Association
Dahuri, Rokhmin - Coasts and Small Islands
Habir, Ahmad - Indonesian Institute for Management
Development
Hadad, Ismid - Indonesian Biodiversity Conservation Insti-
tute
Haeruman, Herman - Deputi Bidang Regional dan
Sumberdaya Alam
Hafild, Emmy - WALHI Indonesian Forum for the Environ-
ment
Hardjasoemantri, Koenadi

Iskanadar, Untung - Bureau of Foreign Cooperation and
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Lumbantobing, Sharon - Tetra Tech EM Inc.
Makarim, Nabel - Ministry of Trade and Industry
Murdiono, Bambang - Bureau of Foreign Cooperation and
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Nirwanda, Saptia - State Administrative Reform
Purnomo, Agus - WWF
Qadri, S. Tahir - Asian Development Bank
Rooyani, Firouz - Tetra Tech EM Inc.
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SRI LANKA WORKSHOP, FEBRUARY 29 - MARCH 1, 2000

TRANS-ASIA HOTEL, COLOMBO

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McCauley, David - International Resources Group
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Nanayakkara, V.K. - Ministry of Housing and Urban
Development
Pallewatta, Nirmalie - IUCN Sri Lanka
Peiris, Dinal - Ceylon Chamber of Commerce
Pilapitiya, Sumith - The World Bank
Ranasinghe, Malik - University of Moratuwa
Samarakoon, Jayampathy - Central Environment Authority
Samaranayake, S.W.K.J. - Institute of Participatory Interac-
tion in Development
Utami, Dewi - Asian Development Bank
Wijesekera, Sohan - University of Moratuwa
Yasaratne, Shirahnee - IUCN Colombo

ASPEN WORKSHOP, SEPTEMBER 13-15, 2000
ASPEN MOUNTAIN LOUNGE, COLORADO

Ackermann, Richard - The World Bank
 Angel, David P. - Clark University
 Bell, Ruth Greenspan - Resources for the Future
 Cleveland, Cutler - Environmental Studies and Dept.
 Geography, Boston University
 Cylke, Owen - US-Asia Environmental Partnership
 De Sherbinin, Alex - Center for International Earth Science
 & Information Network, Columbia University
 Evans, Warren J. - Asian Development Bank
 Hansen, Stein - Nordic Consulting Group A.S.
 Hassan, Parvez - Hassan and Hassan
 Hausker, Karl - Hagler Bailly
 Hecht, Alan - US Environmental Protection Agency
 Heede, Rick - Rocky Mountain Institute
 Hopkinson, Lisa - Civic Exchange, Hong Kong
 Juniper, Christopher - Rocky Mountain Institute
 Kauffman, Joanne - Massachusetts Institute of Technology
 Kimm, Peter - US-Asia Environmental Partnership
 Kimm, Victor - University of Southern California
 King, Peter - Asian Development Bank
 Lock Lee, Eng - Supersymmetry Services Pte.,Ltd.
 Lovins, L. Hunter - Rocky Mountain Institute
 McCauley, David - International Resources Group
 Mc Nerney, Mike - ODUSD (Environmental Security)/Force
 Protection
 Qadri, Tahir - Asian Development Bank
 Rabago, Karl - Rocky Mountain Institute
 Rock, Mike - Hood College
 Rooyani, Firouz - Tetra Tech EM Inc.
 Saksena, Sumeet - Tata Energy Research Institute
 Scola, Lisa - Tetra Tech EM Inc.
 Seymour, Frances - World Resources Institute
 Stevenson, Richard - Mantaray Management LLC
 Talbott, Kirk - Conservation International
 Wilkinson, Robert - Rocky Mountain Institute
 Wise, John - US Environmental Protection Agency
 Zarsky, Lyuba - Nautilus Institute for Security and
 Sustainable Development

JAPAN WORKSHOP, SEPTEMBER 20-21, 2000
TOKYO, JAPAN

Hoshino, Kazuaki - Global Environment Department,
 Environment Agency
 Isozaki - Iwate University
 Katsumoto, Shuzo - IGES
 Matsumoto - Satoru Mekong Watch
 Matsushita, Kazuo - IGES
 Mizuno, Yuji - Nomura Research Institute
 Mori, Hideki - Environment Division, JBIC
 Okuma, Maiko - Conservation International
 Otsuka, Takashi - IGES
 Qadri, Tahir - Asian Development Bank
 Sugiyama, Rie - IGES
 Takahashi, Kazuo - International Development Research
 Institute (IDRI), Foundation for Advanced Studies on
 International Development (FASID)
 Tanaka, Tsutomu - Chuo University
 Tsuji, Masami - Asian Development Bank
 Yamada - Pacific Consultants

SAMOA WORKSHOP, SEPTEMBER 25-26, 2000
SPREP HEADQUARTER, APIA, SAMOA

Barker, Deborah - Marshall Islands
 Brotoisworo, Edy - Asian Development Bank
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 Dropsy, Audrey - SPREP
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 Fiti, Laupa'a - APIA, Samoa
 Ioane, Petelo - SPREP
 Liu, Sailimalo Pati - APIA, Samoa
 Malua, Laavasa - APIA, Samoa
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