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FOREWORD

The outcome of the Earth Summit 1992, in particular, Agenda 21, highlighted the critical importance of reshaping the decision-making structure and process for the promotion of sustainable development. This was reaffirmed in the millennium development goals, as contained in the United Nations Millennium Declaration, adopted by the General Assembly in September 2000. Considerable progress has been made in the Asian and Pacific region over the last decade in terms of development of environmental institutions and legislation. Despite these positive initiatives, however, the state of natural resources and the environment continues to deteriorate. While unsustainable resource exploitation and elements external to economies of the region have been identified as contributing factors, the inability to combat environmental degradation has been attributed primarily to the failure of environmental governance - weak institutions, reliance on inappropriate policy tools, lack of effective enforcement and lack of participatory planning and implementation. This underscores the importance of revamping environmental governance.

This realization has led ESCAP and UNDP to undertake this study, which discusses the major challenges to environmental governance in the region, highlights the main elements that need attention and outlines key instruments that need to be put in place. The main message of the study is that policies and institutional reforms by Governments will form the critical components of sustainable development, including long-term economic growth, social well-being and environmental viability. Attaining effective environmental governance, calls for a shared vision, the establishment of well-articulated goals and targets to realize that vision, a mechanism for policy coordination, the use of efficient and equitable policy measures, the adoption of appropriate approaches to involvement and the empowerment of stakeholders as well as the enforcement of policies and the monitoring of their implementation.

This study is the result of close collaboration between ESCAP and UNDP. It has also involved numerous institutions and experts throughout its development, including Governments, civil society and scientific and academic bodies. The study was initiated at the Asia-Pacific Forum on Environmental Governance and Sustainable Development, held at Tokyo on 10 and 11 May 2001. It was further developed at a brainstorming session held at

Bangkok on 20 July 2001. Given the commitment and dedication of the Governments to policy reforms and institutional restructuring, it is hoped that this study will provide useful guidelines to decision makers in the region for the formulation and implementation of improved policies for sustainable development.

We wish to express our sincere thanks to member Governments, United Nations agencies, international organizations and various experts who provided extremely useful comments, suggestions and inputs to the study.

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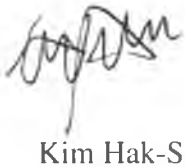

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Executive summary

Sustainable development became a widely accepted goal after the Rio summit in 1992. However, as Nobel Laureate Kofi Annan (2001) puts it: "Our biggest challenge in this new century is to take an idea that seems abstract – sustainable development – and turn it, too, into a daily reality for all the world's people."

Sustainable development rests on three pillars: economic growth, social development and environmental quality. Economic growth provides resources for consumption, social services and improving the environment, and is a prerequisite for improving human development and alleviating poverty. Growth by itself, however, is not sufficient. It needs to be pro-poor in that while increasing income entitlement and capability, it also reduces inequity and deprivation. This, in turn, requires the promotion of the second element, social development and well-being, through the provision of health services, access to education and skills formation, provision of public goods, and the establishment of safety nets that empower the poor by giving them options. Without an equitable social framework, development cannot be sustainable. The third pillar is maintenance of environmental quality. Environmental services are critical for many production processes and for human well-being, without which long-term development cannot be sustained.

Much is known and has been written about linkages of economic growth and human development. Many countries in the Asian and Pacific region have made significant progress in terms of economic growth and human development. However, the situation has not been as positive with regard to maintaining environmental resources and quality, which have continued to deteriorate over the years. The failure of environmental policies and institutions has been identified as a major contributing factor. Therefore, the focus of this document is on environmental governance.

Environmental resources, air and water quality, land productivity, diversity of plant and animal life and their abundance, all become degraded as a result of externalities. Actions by an individual or an establishment, or even a group of individuals or establishments, are generally unable to ensure the quality of these resources. Sound environmental governance demands action by all sections of society including governments, the private sector, major groups and civil society in general. Governments would need to improve policies as well as mechanisms for the enforcement and implementation of those policies. At the same time, the private sector would have to play a more positive role through innovation and incorporation of environmental consideration into its operations. A crucial role would also need to be played by civil society as an agent of change through participation, advocacy, partnership, communication and awareness raising.

A. Sustainable development trends in Asia and the Pacific

By and large countries of the Asian and Pacific region have followed sound macroeconomic policies. Most of them have experienced relatively high economic growth and savings rates. They have emphasized openness in international trade and followed an outward oriented strategy. This has forced domestic producers to become internationally competitive and efficient. They have also had low inflation rates and good fiscal management with relatively modest deficit levels. Poverty reduction or improvement in human development, however, has not taken place

through redistribution of income. It has primarily resulted from trickle-down effect and the implementation of specific policies for human development.

Countries of the region have demonstrated a steady improvement in the Human Development Index (HDI). Yet, they still have to go a long way to go before they attain the level of HDI achieved by developed countries such as the United States of America. Only four countries/areas – Brunei Darussalam; Hong Kong, China; the Republic of Korea; and Singapore – have achieved HDI levels comparable to the United States. Bangladesh, Bhutan, the Lao People's Democratic Republic and Nepal are among those countries with the lowest HDI levels.

The progress in HDI has, in most cases, been neutralized by population growth rates (annex table 3), which are still quite high in some countries of the Asian and Pacific region. Curtailment of population growth could certainly improve HDI. Life expectancy at birth and infant mortality rates have seen substantial improvements, although they could be improved in many countries of the region.

A general look at the socio-economic trends indicates overall progress. Indicators such as gross domestic product (GDP), the incidence of poverty, infant mortality, traditional diseases, nutrition and child undernourishment clearly indicate movement in the right direction. The only trends marring that progress are prevalence of slums and squatters, growth in the incidence of modern diseases and losses due to natural disasters.

Unlike their economic and social counterparts, however, the environmental trends are all adverse. The pressure on natural resources and the environment is almost overwhelming. For each unit output of GDP, land, water, energy and other resources have been exploited at an increasing pace. Losses due to land degradation are over US$ 10 billion annually. About two thirds of the Asian wildlife habitats have disappeared placing the biodiversity of the region under serious threat. Food production is unable to keep pace with population growth. As a result, the net food import of the region continues to increase at around 9 per cent annually.

The picture is even worse in terms of waste loads and pollution. The total amount of municipal solid waste generated per year is about 700 million metric tons. The output of industrial waste is more than double that amount. Much of the waste goes untreated, contaminating groundwater and contributing to various health risks. Urban air pollution is also on the increase and, in most of the Asian mega cities, suspended particulate matter exceeds the WHO limit by a factor of two or three. Many of the rivers in Asia contain three times as many bacteria from human waste as the world average, and more than 10 times as the levels given in the Organization for Economic Cooperation and Development (OECD) guidelines.

While most of the environmental trends are negative, several positive changes can be discerned in the area of policy response. Significant progress has been made in areas of public authorities' action, business sector response, environmental monitoring and research, environmental education and awareness, activities of major groups, participation in international conventions and subregional cooperation. Why is it that even when environmental policies and actions are increasing, the levels of environmental resources and pollution are worsening? How can such policies be made more effective? What types of policies are effective? What types of policies will be easier to implement? What types of institutions are needed? In short, what type of environmental governance is required?

B. Environmental governance in Asia and the Pacific

Environmental governance consists of many elements: setting a broad objective, planning for specific targets, framing policies to attain those targets, selecting specific policy instruments, establishing institutional mechanisms to implement them, adopting appropriate approaches for involvement and empowerment of stakeholders, prescribing rights and responsibilities of stakeholders etc.

A widely accepted vision document is the first requirement of successful environmental governance. Most countries in the region already have vision documents. Many countries have formulated vision documents outlining their national environmental objectives and strategies through widespread consultations with the involvement of civil society. However, the continuation of that involvement in implementation remains a problem in many countries of the region. Since environmental problems pervade all types of geographically dispersed economic activities, public cooperation and involvement is vital for monitoring, feedback and ensuring compliance with environmental laws.

A major cause of ineffective policy response has been the failure to translate the policy objectives into specific goals and targets. There has been a general lack of coordination among different ministries and departments as well as across sectoral policies of governments. The lack of horizontal and vertical coordination of policies is a major problem. Policies for sustainable development not only cover environmental aspects; their scope is much wider. It extends through a wide range of macro- and microeconomic policies, including taxation and trade, as well sectoral aspects such as industry, agriculture, transport and urban development. Thus, coordination between environmental and economic policies needs to be much more pervasive and widespread An institutional mechanism within a planning body or a Planning Commission might be appropriate to the promotion of such coordination and the resolution of conflicts and trade-offs.

Almost all the countries of the region have enacted resource conservation and pollution control Acts. Yet, deforestation, biodiversity loss, soil degradation, and air and water pollution are on the increase in most countries, primarily because of the lack of compliance and enforcement. There is thus a need to examine and bridge the gaps. It is important to put effective monitoring and enforcement mechanisms in place. Further, it is important to search for options such as incentive-based measures that are easier to implement.

The inability to enforce environmental laws may have resulted from one or a combination of several factors. The laws may be flawed and impossible to enforce. The enforcing authority may lack the power needed to enforce the laws or it may not have the required skills, manpower or equipment for monitoring, collecting and analysing data needed to make a judicially convincing case. Violators may have more resources, financial power, political clout or inadequate incentive to comply. Gaps in skills, capacities and information are widely felt in efforts to make environmental governance effective.

C. Challenges and approaches to environmental governance

The challenge of environmental governance lies in the ability to meet the needs of a continuously expanding population without destroying the environment and the resource base on which the process of development depends. The key issues are the promotion not only of economic growth but also the quality of that growth and ensuring that such growth is equitable and environmentally friendly. This requires giving a new direction to development strategies wherein environmental concerns become an integral part of the investment, incentives, tax and other facets of economic policy.

1. Reorientation of national strategies and action plans

The vision documents, including national strategies and plans on environment of most countries of the region, only identify broad objectives. However, these objectives need to be translated into goals and specific time-bound targets. It is here that the complexities and trade-offs come into play. The environmental targets have to be consistent with economic targets. Often, the tradeoffs may be more apparent than real. If the depreciation of environmental resources is properly taken into account, or if the economic consequences for a society are valued and accounted for, then the net return on a project would be the correct measure for evaluating it both from the economic and environmental perspectives. To do this, an environmental impact assessment (EIA) that uses the tools of environmental economics, and which values environmental consequences in economic terms is required. Furthermore, GDP only indicates gross income. It does not indicate loss of resources. For example, if forests or mineral resources are exploited to enhance income, GDP will only show growth. It does not take into account the forest or mineral resources lost. It will therefore be necessary to prepare integrated environmental and economic accounts (IEEA), which will help in monitoring and assessing the strategy for further development of macro-policies from a holistic perspective.

2. Partnership with stakeholders, and their participation

It is not possible to successfully implement any plan or strategy until the needs and priorities of the stakeholders have been taken into consideration. Their involvement in implementation reduces the costs, and ensures compliance with and enforcement of measures for environmental control. It is therefore important that all major stakeholders have ownership of national strategies and plans, and that the process of their implementation closely involves those stakeholders.

3. Need for policy intervention

The theorem of 1960 Nobel Laureate Ronald Coase argues that there is no reason on the grounds of efficiency for a government to intervene except to enforce property rights. If citizens have a right to clean air, then a polluting firm will have to buy this right from the consumers. On the other hand, if a firm has a right to pollute, the victims will pay the firm to pollute less. The Coasian argument contends that the outcome would be efficient without government intervention. There thus appears to be no need for special environmental policies, provided property rights are allocated appropriately. The theorem, however, presupposes efficient markets without transaction costs. This is unlikely to be the case in many developing countries. In Mumbai, or for that matter in any mega city of the region, where there are millions of citizens (a large proportion of whom live in

congested slums), millions of motorized vehicles and tens of thousands of small and medium manufacturing units contributing to pollution, one cannot easily imagine a functioning market for pollution. Government intervention is therefore essential as it can improve efficiency.

4. Principles of policy selection

The proposed policies should induce change, particularly in the behavior of different economic actors, in order to reduce resource inputs and polluting outputs.

In selecting a particular set of policies from among alternatives, cost effectiveness (social benefits exceeding costs), efficiency (maximized benefit/cost ratio), distributive impact (greater benefits and lower costs for the poor), ease of enforceability at reasonable cost and public acceptance (should be seen as fair and just) should be the basic criteria.

5. Instruments of environmental policy

Instruments adopted under environmental policies can be classified into two broad groups: command and control (CAC) and incentive-based measures.

6. Command and control measures

By adopting command and control measures, regulators prescribe ambient quality, emission levels, and process and product standards with which polluters must comply or face the imposition of penalties, usually fines or closure. Under such measures, quantitative restrictions are imposed on emissions from various activities. For example, firms may be asked to limit their effluents to within prescribed limits. The limits are set keeping in mind the best available technology. It is most unlikely, therefore, that the regulators, with only partial information, can set efficient standards across industries in the sense that the cost of abatement is minimized. The problem becomes even more acute when future targets for achievable standards are to be set.

Yet another problem with CAC policies is that even when every firm meets the standard, the ambient quality of air in a city may continue to deteriorate. This can happen if the number of firms increases. Together with emission limits, the restriction of permits for industrial location will also be required if an ambient quality standard is to be met. This may be difficult if the two decisions fall under the jurisdiction of two different ministries or departments. In fact, controlling the entry of new establishments in the developing countries of the Asian and Pacific region, where there are a large number of informal, household, and small and medium-sized enterprises (SMEs), would be very difficult if not impossible. Where there is SME domination, it is extremely difficult to implement CAC measures.

The use of CAC measures becomes imperative in certain instances. This is particularly so in cases where products are considered too damaging to human health, such as certain types of pesticides. The marketing and use of some pesticides such as DDT are already banned. CAC instruments could also be used to protect fragile ecosystems where the uncertainty of market-based policies may be considered too risky. Furthermore, CAC measures can be very effective in setting environmental performance standards for new equipment in the developing countries of the region where capital stock is accumulating at a rapid rate.

7. Incentive-based measures

Among the incentive-based measures are taxes/subsidies, tradable permits/quotas, insurance, bonds and liability laws. The basic objective, as pointed out above, is to internalize the environmental costs in the corporate decision-making process. The idea is to induce entrepreneurs to take decisions in an environmentally friendly manner,

particularly when considering, how and by how much to abate, how to abate, and when to invest etc.

8. Taxes, subsidies and pricing

When a tax is imposed on a market that is functioning well, it creates a distortion and a loss of efficiency. A measure of this is the deadweight loss, which is the difference between the loss in consumer and producer surplus and the tax revenue collected. However, an environmental tax internalizes an externality and thus removes a distortion and increases efficiency. Its use promotes a "win-win" policy as it improves both environmental and economic efficiency.

Similar instruments include: (a) depletion charges to regulate overuse of exhaustible resources; (b) appropriate pricing to reduce waste and promote conservation; and (c) tax write-offs or investment allowances to encourage abatement measures as well as investment in energy saving, the promotion of renewable energy and the acceleration of research and development. Many countries in the Asian and Pacific region recognize the role of cleaner technology and provide incentives to promote it through tax write-offs and an accelerated depreciation allowance.

9. Tradable permits

Tradable permits allow trading of natural resources use or emissions to maintain a balance in the environmental carrying capacity. The price at which quotas are traded serves the purpose of an emission tax, and the tax rate is determined by the market at a level that restricts total emissions to the desired level. Such quotas can be traded within prescribed limits. For a local air pollutant, trade may be permitted only within the jurisdiction of a local authority, whereas for a global pollutant, such as CO_2, trade may be permitted internationally.

10. Growing use of incentive-based policies in the region

Countries in the region now increasingly rely on incentive-based measures. Promotion of energy conservation through demand side management and material recycling deposit refunds, and waste sorting through volume-based collection charges have been used. Scarce public resources have also been augmented through a pricing policy such as that of Singapore (i.e., road charges or through tradable permits such as auctioned car ownership permits). Some countries have sought to mobilize consumers who, in certain cases, have proved a powerful force in altering the behavior of industries. Ecological labeling is one such mechanism under which the "Ecomark" is promoted in India, "Environmental Choice" in New Zealand and "Green Labeling" in Singapore. The promotion of ISO 14000 is also helping in these efforts as more and more firms are seeking certification in order to present their green image. The region is thus moving ahead and experimenting with a variety of instruments to promote environmental governance. However, the challenges posed by implementation, monitoring and enforcement have yet to be satisfactorily met as can be seen from the generally poor environmental indicators for the region.

11. Monitoring and enforcement

Monitoring and enforcement are essential tools for promoting compliance with the requirements of environmental policies. To be effective, this demands the establishment of an appropriate institutional mechanism, the enhancement of public participation, access to information as well as the right to public interest litigation.

(a) Institutional mechanism

In terms of institutional mechanisms, the need is for an environmental protection agency or a

pollution control board (PCB) to be established with sufficient authority, and technical and human resources to monitor compliance and initiate action against violators.

Since environmental resources and potential damages are geographically widely distributed, a single central agency is likely to find it difficult to monitor and enforce compliance. Therefore, in addition to the establishment of decentralized offices of the agency, it will also be important to promote the participation of public and civil society organizations (CSOs) in prosecuting violators.

(b) Right to information

If citizens are given the right to all information on who pollutes and how much, they could generate pressure on polluting establishments/industries to clean up their act. This could also make enforcement agency more accountable and spur it to action.

(c) Liability laws

A strict liability law can be an effective policy instrument for ensuring that polluters take every possible measure to avoid environmental accidents. The concept of strict liability holds polluters liable for any environmental accident regardless of whether their actions were negligent. The advantage is that the regulator does not have to know the costs of abatement nor the probability of accidents or failures. The polluters make their own estimates of expected liability and the cost of abatement, and take appropriate measures accordingly.

(d) Legal system

In order for strict liability to function, a strong and independent judiciary is required to ensure that due process is upheld so that even if a firm goes bankrupt compensation is paid to the sufferers. This would encourage firms to take effective measures to avoid rare but highly damaging accidents, as required by the legal doctrine of strict liability.

(e) Insurance and bonds

Environmental decisions have to be taken under uncertainty and often there is a reluctance to take abatement measures. Firms that make polluting packages should be responsible for collecting and cleaning up. Similarly, if a mine disfigures the land, the company must restore the landscape. Compliance for such responsibilities can be ensured through bonds.

(f) Stakeholder participation

For environmental resources such as common property resources, cooperative action of citizens is needed to preserve or restore the resource. The need for participation is obvious. Approaches where the stakeholders are empowered through appropriate ownership of user rights, and where the rules of resource use are formulated in a participatory, consultative and democratic manner, are likely to succeed.

D. Environmental governance: sectoral issues

Most ministries and government departments in the countries of Asia and the Pacific are arranged along sectoral lines. Ministerial and departmental terms of reference, policies and objectives can conflict with each other when it comes to sharing the exploitation of common environmental resources. Indeed, the expansion of certain sectors has previously often gone ahead without concern for the environmental consequences of such actions on other sectors. Such operations have created increasing sources of conflicts and inefficiencies in the various uses of resources. Alignment of sectoral policies is therefore of critical importance when dealing with environmental problems such as those related to land, forest, biodiversity, marine environment, freshwater, air quality etc.

1. Land-use change

The land-use issue is a very good example that cuts across sectors and shows that environmental governance goes beyond environmental policies. Land is one of the most important resources for the developing countries of Asia and the Pacific. Land productivity is critical to the well-being of farmers and poor consumers who spend a large part of their income on food. The main reason for the expansion of cultivated land is to meet increased demand for agricultural products due to population growth and increasing incomes. In addition, urban expansion is often at the cost of agricultural land. To compensate for lost cropland, forests are cleared and cultivated. In land-scarce countries of Asia, the price of expanding the area of cropland is deforestation.

Various policies and actions are needed to deal with the problems. Policies on population, education, increasing agricultural production, macroeconomics and fuel, the promotion of efficient technology, the removal of subsidies on timber, innovative actions to control commercial logging, the promotion of social forestry and the protection of forests through stakeholder participation as well as through CAC mechanisms all have a role to play here.

The first policy that needs to be implemented is that dealing with the curtailment of population growth, which works in the long term. For that, the provision of family planning services, female literacy, gender equity, female empowerment and economic growth are needed. Poor class attendance is often due to poor quality of schools. Rapid strides can be made with a decentralized approach that empowers local communities to run schools. This is underscored by the experience of the Education Guarantee Scheme of Madhya Pradesh State in India.

Apart from population and education policies, a macroeconomic policy that leads to rapid economic growth and the creation of jobs in non-agricultural sector can attract small cultivators to leave agriculture. This will lower the proportion of the population that is dependent on agriculture as well as reduce the pressure for land-use change.

2. Prevention of land degradation

When land is privately held, the owner is unlikely to degrade it willfully or knowingly. Such land may still become degraded through ignorance of the consequences of an individual's actions. However, there is some evidence that when farmers are aware of the consequences, they will take measures to maintain the productivity of the land resources that belong to them. Thus, creating awareness through extension and the mass media as well as capacity-building, particularly at the local level, are

important elements of environmental governance.

The more difficult problem is that of degradation of privately owned resources through the actions of others. Collective action and a social contract may offer possible solutions for redressing such problems. Actions by people in distant locations are difficult to control. Horizontal and vertical policy coordination across departments is needed to prevent the problem. If EIAs are carried out before initiating development programmes such adverse consequences may be avoided. Appropriate pricing can encourage sensible use of inputs such as water, fertilizers and pesticides. Eliminating improper subsidies could raise revenue, provide more resources for investing in the expansion of services to poor farmers and benefit the environment.

Degraded land can be reclaimed through appropriate action and its fertility restored. Such programmes have the potential to enhance agricultural production, reverse soil degradation and alleviate poverty. Experience with previous projects suggests that they succeed when there is flexibility in design, strong government commitment, non-governmental organization (NGO) participation, stakeholder involvement, a holistic approach and links between stakeholders and line departments and credit institutions. Such participatory regeneration shows that environmental governance can also serve as an effective tool for ensuring a sustainable livelihood.

3. Common property or publicly-held resources

Common property resources (CPRs) face a threat of overexploitation as each individual is tempted to extract a little more. Societies usually evolve social norms of behavior, which ensure sustainable use. In some countries, the poor obtain nearly 25 per cent of their consumption from common property resources. Since the poor have a higher stake in the quality of environmental resources, particularly common property resources, many programmes have mobilized them as agents of environmental regeneration. Such regeneration is truly a "win-win" solution in that it improves the environment, and provides additional income and livelihood opportunities to the poor. The critical elements in such cooperation are democratic decision-making, which ensures a fair share for all stakeholders, and an operating arrangement that minimizes private incentives to overexploit the resource. An example of the latter is the collection of fuelwood and fodder from common woods, which is sold to all members of the community at the market prices less the value of labor involved in collecting it.

Furthermore, effective monitoring of vast expanses of forests by a government agency is, to say the least, difficult. A possible way could be to involve communities through shared management of forests. Many countries have accumulated extensive experience in successfully involving local people, who depend on forest products for their livelihood, in joint forest management and afforestation efforts. The key to stakeholder participation is to empower them with rights to forestry products in a well-defined way that creates incentives for their sustainable use.

4. Biodiversity

Biodiversity loss occurs because of the loss or degradation of habitats. To preserve biodiversity, protected areas and biosphere reserves have been set up in countries of the region. CAC policies that exclude communities from such reserves sometimes disrupt the lifestyles of indigenous people who live in those areas. It is now generally recognized that

effective protection of these reserves requires the participation of such people as well as the recognition of their rights to live in harmony with nature.

An important element in biodiversity conservation is public awareness. Various wildlife programmes on television, such as the Discovery and National Geographic channels, have created a large global constituency for conservation. Yet, just a handful of poachers can ruin a reserve. This is where ethical commitment and participation of local communities, which can provide many watchful eyes, takes on great importance.

Eco-tourism, when properly organized, can create a vested interest among a local population in the preservation of biodiversity. Significant economic benefits can be derived both by the governments and local populations. It is often possible to design governance strategies through appropriate research that are "win-win" for all stakeholders. It helps to bring about an understanding of the ecological-cum-economic dynamics of sanctuaries.

Experience in northern Pakistan has shown that empowering local populations to manage biodiversity facilitates conservation. Maldives has also developed its tourism industry around its unique marine life biodiversity including coral reefs. This underscores the need for coordination between ministries and departments concerned with economic development, tourism and the environment.

5. Marine and coastal environment

To control coastal water pollution, the dumping of untreated effluent in the sea by municipalities and industries should be controlled. Pollution due to shipping, washing of oil tankers and oil spills requires the enforcement of regulations.

The problem of loss and damage to mangroves due to aquaculture requires policy intervention. Although aquaculture is profitable to private entrepreneurs, its economic cost to communities can be far higher. There is a need to raise the awareness of the communities to the environmental and long-term economic consequences of aquaculture and empower them to protect mangrove areas. The communities can then levy an appropriate tax on aquaculture or insist on sustainable practices that do not damage the mangrove areas. Positive experience in Indonesia in this regard is a case in point.

The degradation of fisheries due to overfishing and destructive fishing methods is a serious threat to the livelihood of fishermen. As far as deep-sea fishing is concerned, trawlers from other countries often fish in the waters of many developing countries. They get away with it as the latter lack policing capacity. The cost of depleted fisheries is borne by local fishermen in developing countries. A global system of monitoring via satellites and global positioning system could be introduced to control clandestine fishing. Moreover, community management of local fisheries, like other CPRs, can promote sustainable fishing.

6. Water pollution

Water bodies become polluted by untreated municipal sewage and industrial effluent, inadequate sanitation facilities, fertilizer and pesticide run-off from farms, and acid rain. The policies needed include: (a) appropriate pricing of chemical fertilizers; (b) common effluent treatment plants for small and medium-sized industries (SMIs); (c) the enforcement of effluent standards; (d) technological upgrading of new capital goods through the setting of standards; and (e) the treatment of municipal sewage and the construction of sanitation facilities, particularly toilets and septic tanks for poor households. Institutions may also have to be set up to provide financial credit to households, firms and municipalities.

CSOs need to be mobilized to monitor and promote enforcement and compliance with laws through public pressure.

SMIs should be located in industrial estates, in which common effluent treatment plants could be set up. To enable municipalities to treat sewage, imposing adequate service charges on households and industries could raise needed resources. Extension services should be provided to farmers on more effective and economic use of chemicals to reduce water pollution from fertilizer and pesticide residues

7. Air pollution

The major cause of air pollution is vehicular and industrial emissions. The use of a large number of vehicles with two-stroke engines, traffic congestion that slows down vehicles and a lack of vehicle inspection contributes a great deal to increases in air pollution. Likewise, weak enforcement of regulations intended to check industrial emissions is another major factor that leads to air pollution. Pedestrians in urban areas are subjected to severe exposure to exhaust gases from usually poorly maintained vehicles. Policies could include:

(a) Better traffic management;

(b) Monitoring of vehicle emissions and the phasing out of polluting vehicles through strict inspections in urban areas;

(c) The introduction of catalytic converters;

(d) The use of clean fuels;

(e) The implementation of stricter emission standards for new vehicles;

(f) The introduction of four-stroke engines to replace two- and three-wheelers (for fuel efficiency and lower emission levels); and, most importantly,

(g) The improvement of public transport systems and the provision of rapid mass transit systems for urban areas.

A mix of CAC measures and incentive-based measures could help in the control of industrial pollution. There is a need to promote cleaner production as well as industrial relocation, particularly for SMIs, in industrial estates away from densely populated areas. To promote enforcement, a very good option would be to motivate public pressure through the publication of information on polluting establishments. Such establishments would not want to be classified by the public as dirty and irresponsible firms. Such strategies have worked very well in Indonesia and Thailand. In the long term, industries themselves realize that they benefit considerably from clean-up action. For example, recycling and increasing energy efficiency often increase profits. What appears to be an unnecessary burden turns out to be a "win-win" option.

8. Indoor air pollution

Particular mention must be made of air quality inside houses, which often affects women and children to a greater extent. Domestic pollution due particularly to the use of biofuels for cooking in poorly ventilated kitchens is a major area of concern. Indoor pollution is a major cause of acute respiratory infection (ARI), the second largest killer of children in the Asian and Pacific region. It is estimated that in India alone indoor air pollution causes 400,000 to 500,000 premature deaths every year and 2.4 million to 3 million person/years of illness. Mass awareness of this issue needs to be mobilized. Moreover, promotion of smokeless stoves at subsidized rates and the provision of cleaner fuels such as kerosene or gas could help a great deal in improving the situation.

9. Solid waste

The countries in the Asian and the Pacific region face many waste management challenges that require clear and effective policies and strategies. Although the role of local government is most important in waste management, in view of the magnitude of the problem all levels of government should promote the hierarchy of waste management, that is, the reduction, reuse, recycling, recovery and encouragement of waste separation, in order to maximize flexibility in disposal. Local governments are usually in the best position to assume key responsibility for municipal solid waste collection and disposal. However, in view of the increasing load, sustainable financing and service provision still needs to be defined by a broad set of stakeholders. Therefore, all levels of governments, including multinational agencies, and the private sector must bear some responsibility, taking into consideration such long-term developments as extended product life, lifecycle analysis and waste exchanges.

Waste collection and disposal fees should be based on waste generation rates. Direct user charges and waste fee collection should begin with the business community. Major efforts by local governments should focus on residential waste collection, especially from poor and densely populated areas. At the same time, in order to cut costs, they should empower the private sector to pick up waste from non-residential sources. Commercial, institutional, and industrial waste collection should be promoted on a self-financing basis by issuing licenses to private haulers/contractors who can generate revenue from it. Moreover, governments should view solid waste as a resource rather than a local problem, and local bodies should promote good partnerships aimed at developing progressive programmes such as community-based operations, micro-enterprise development, waste separation for increased recycling and composting, and reduced collection frequency.

E. Environmental governance: spatial issues

Environmental concerns vary spatially. At the local level, a pollutant such as mercury released from an industrial or mining establishment into a water body such as a lake or local river, or lead released from automobiles into the air, pose serious problems for human health. At the national level, land degradation, soil erosion, deforestation, loss of biodiversity, industrial pollution, water shortages and solid waste management can be of serious concern. To these problems can be added those of transboundary pollution such as acid rain and the haze caused by the Indonesian forest fires, as well as the global problems of climate change and ozone depletion.

The Rio Declaration stresses that authority should be vested at a level of decision-making suitable to the scale of the environmental issue. National governments are the primary level for most environmental decision-making. However, the allocation of authority recognizes that environmental decision-making power can be devolved and decentralized at different levels (for example, subnational, local and sectoral) of decision-making together with certain rights and responsibilities. In the case of transboundary environmental problems, the delegation of authority to regional or international institutions is based on the realization that no single nation can adequately address such problems on its own.

1. Local versus national issues

Local and municipal administrations have the closest interface with environmental problems such as land degradation, urban waste, and air and water pollution. The importance of strengthening institutional arrangements at such levels has been increasingly realized in many countries of the region. Consequently, environmental bodies have been set up at the state or provincial levels as well as in many large and medium-sized cities.

The involvement of subnational and local governments in environmental management, formulation and implementation of plans and policies, and monitoring of environmental laws has increased during the post-Rio years. Many countries in the region have devolved powers and delegated responsibilities to provincial governments, local bodies and municipalities to enable them to undertake environmental protection measures within the national conservation strategies or national environmental action plans.

As the evidence suggests, the devolution of authority and responsibilities to subnational, local and municipal bodies has not followed a uniform pattern across the region. The lack of resources, both technical and financial, have been a constraint to effective decentralization.

2. Transboundary issues and environmental governance

Transboundary issues such as acid rain, haze and environmental pollution, desertification, climate change, ozone depletion, migratory species, species trading, the management of large eco-regional landscapes and the equitable use of shared natural resources pose a unique set of challenges to environmental governance. They highlight the need for decision-making processes that go beyond national borders and illustrate the necessity for creating mechanisms at the subregional, regional and international levels in order to

promote ecologically sustainable and socially acceptable development.

(a) Subregional mechanisms and initiatives

A number of intergovernmental institutions have been established in Asia and the Pacific on a subregional basis for cooperation in environmental matters. These include:

- The ASEAN Senior Official on Environment (ASOEN) for South-East Asia with rotating headquarters.
- The South Asia Cooperative Environment Programme (SACEP) with its headquarters at Colombo.
- The South Pacific Regional Environment Programme (SPREP) with its headquarters at Samoa.
- The Interstate Commission for Sustainable Development in Central Asia (ICSD) with rotating headquarters.
- The North-East Asia Programme on Environmental Cooperation with ESCAP as its headquarters.

The participating countries develop joint projects and programmes. In some cases, the cooperation is quite robust such as in ASOEN and SPREP, where it has led to the development of subregional environmental agreements. ASEAN has two such agreements: the ASEAN Agreement on Transboundary Haze Pollution, 2002, and the ASEAN Agreement on the Conservation of Nature and Natural Resources, 1985. SPREP has one such agreement in the form the Convention on Conservation of Nature in the South Pacific. However, even these cooperative mechanisms still leave much to be desired, particularly in terms of conducting transboundary EIAs of projects and the promotion of channels for direct communication among the full range of stakeholders.

In addition to the above, there are a number of other forms of cooperation for specific purposes. Examples include the management of shared resources of international rivers, such as the Mekong River Commission, or regional seas such as the South Asian Seas Action Plan, the North-West Pacific Action Plan, the Action Plan for a Coordinating Body of Seas in South-East Asia (COBSEA). Such cooperation is also a good omen for future protection of shared resources. Hopefully, the best practices from these forms of cooperation will serve as good examples for promoting similar activities elsewhere in the region.

(b) Regional mechanisms and initiatives

At the regional level, countries of the Asian and the Pacific region have been providing coordinated responses to global initiatives through the five-yearly Ministerial Conferences and the ESCAP Committee on Environment and Natural Resources as well as ad hoc intergovernmental meetings. For example, a High-level Regional Meeting for the World Summit for Sustainable Development (WSSD) was organized in Phnom Penh to provide Asian and Pacific inputs to the World Summit.

These mechanisms need to be strengthened and given a broader base, particularly for monitoring and implementation of programmes and initiatives. So far, they have enabled regional inputs to be provided to global conferences such as the United Nations Conference on Environment and Development (UNCED) and WSSD, and also helped in the development of Regional Action Programmes for implementing the outcome of those conferences at the regional level. For example, the Ministerial Conference on Environment and Development in Asia and the Pacific 2000, organized at Kitakyushu, Japan, in September 2001, adopted the Regional Action Programme on Environmentally Sound and Sustainable Development 2001-2005 and the Kitakyushu Initiative for Clean

Environment in Asia and the Pacific. Under the Kitakyushu Initiative, a network of cities and other relevant organizations has been established to promote the exchange of information and replication of best practices.

The High-level Regional Meeting for WSSD, which was organized by ESCAP, the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP) and the Asian Development Bank (ADB) also identified seven initiatives for follow-up action including:

- Capacity-building for sustainable development
- Poverty reduction for sustainable development
- Cleaner production and sustainable energy supply
- Land management and biodiversity conservation
- Protection and management of and access to freshwater resources
- Oceans, coastal and marine resources and sustainable development of small island States
- Action on atmosphere and climate change.

Consensus on the identification of these priority initiatives in a highly diverse region points to very good prospects. Hopefully, the cooperation demonstrated in identifying these initiatives will continue and flourish into a more robust coordination of efforts in their implementation.

(c) Global initiatives

The final two decades of the twentieth century witnessed the outpouring of tremendous energy in the creation of international partnerships and the development of an international legal regime to protect the global environment. The Earth Summit, and the Conventions that it brought forth, is an outstanding example of this burst of international creativity in meeting the environmental challenges of our common future. However, these plans of action, particularly Agenda 21, and MEAs cannot be successfully implemented unless the global commitments made at UNCED are fulfilled.

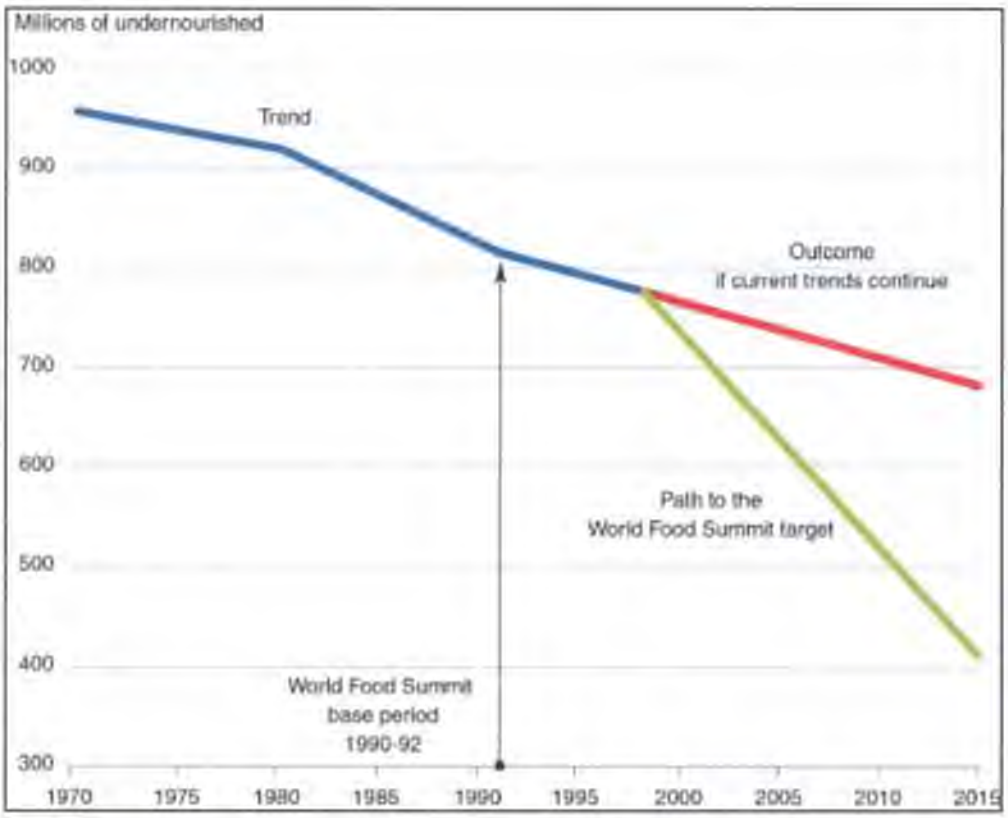
Existing multilateral agreements and related institutions should be better utilized in order to assist countries to meet their obligations efficiently. The developed countries should make their best efforts to increase their level of official development assistance (ODA) and take measures to enhance their capacity for effective debt management. This approach should be accompanied by good governance at the national level as well as by open, equitable, transparent and non-discriminatory multilateral systems.

Introduction

SUSTAINABLE DEVELOPMENT AND ENVIROMENTAL GOVERNANCE

Sustainable development emerged on the global agenda shortly before the Earth Summit of 1992 and the concept subsequently gained wide acceptance with the adoption of Agenda 21, the "blueprint" for sustainable development.

The 1987 report of the Bruntland Commission, which was created by the United Nations General Assembly in 1983, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Then, at the Earth Summit in Rio, 178 nations accepted that "human beings are at the centre of concerns for sustainable development."



Source: Food and Agriculture Organization of the United Nations, 2001.

Figure 1. Total undernourished in the world: Target and performance

The call to move to sustainable development implies a paradigm shift that should focus on economic growth and social development with fairness and opportunity for all people, men and women, not just a privileged few, without degradation of the world's finite natural resources and carrying capacity. The need for environmental governance is thus embedded in the very definition of sustainable development.

Attaining sustainable development is the biggest challenge. As United Nations Secretary General Kofi Annan stated in 2001: "Our biggest challenge in this new century is to take an idea that seems abstract – sustainable development – and turn it, too, into a daily reality for all the world's people."

There are three pillars of sustainable development: economic growth, social development and environmental quality. Economic growth is needed to improve human development. It provides resources for consumption, enhances social services and protects the environment. Growth by itself, however, is not sufficient. It has to be pro-poor growth, growth that increases the income, entitlement and capability of the poor. For this to occur, social development is necessary. This involves provision of health services, access to education and skills formation, the provision of public goods, and the establishment of safety nets that empower the poor by giving them options. Without equitable social development, economic development cannot be sustainable. The third pillar is maintenance of environmental quality. Environmental services are critical for many production processes and human well-being. Thus, without an environment of appropriate quality, development cannot be sustained.

There is a legitimate need for economic development to improve conditions for the majority of the world's population, but it has become increasingly clear that this economic development cannot take place at the cost of the environment and the natural resource base on which it is closely dependent. An activity looks economically attractive if the value addition that it creates is high compared with the resources used. If the activity degrades environment, it is understandable that this would be perceived as a conflict between economic growth and environmental concerns. This, however, is a false conflict, a misleading trade-off. It may represent a conflict between different types of economic growth and environment, but it is not a conflict between development and environment. Economic growth represents an increase in the total value-added in goods and services produced, while development represents change in human well-being, which depends on quantum as well as quality of growth including changes in quality of life and natural assets. The income generated by an activity, less the value of environmental degradation and the costs it imposes on other members of the society, is the appropriate measure of its contribution to development. When so assessed, the conflict disappears. The challenge is to redesign the economic system in such a way that it will not destroy the environmental support systems and thus enable economic progress to continue. For this, we need to design mechanisms and policies that induce economic agents, consumers and, producers to act in a way that accounts for environmental costs and benefits.

Much is known and has been written about policies for economic growth and the promotion of human development. Many countries of the Asian and Pacific region have made significant progress in terms of economic growth and human development. Their performance in maintaining environmental resources and quality, however, has not shown comparable growth. Therefore, the focus

of this paper is on environmental governance.

Environmental resources, air and water quality, land productivity, diversity of plant and animal life and their abundance degrade because of externalities. Individuals, by their own actions, are generally unable to ensure the quality of these resources. Often, the cost of degradation is not borne by those who cause it. A concerted effort by many is needed to maintain or improve environmental quality. It may require efforts of a community, or a group of communities, a nation or a group of nations. One's own environment can degrade because of actions and policies of faraway people and communities, factories or countries. Thus, public policy or governance at the local, regional, national and global levels has a very important role in managing the environment. Environmental governance consists of many elements, such as:

- Setting a broad objective
- Planning for specific targets
- Framing policies to attain the specific targets
- Selecting specific policy instruments
- Establishing institutional mechanisms to implement the policies
- Adopting appropriate mechanisms of involvement and empowerment of stakeholders
- Prescribing the rights and responsibilities of stakeholders.

The broad objective of environmental governance for sustainable development can be to manage environmental resources at levels that are consistent with sustainable development. There can, however, be many levels at which environmental resources can be sustainable. A simple example can illustrate this point. The stock of fish in a fishery can be maintained at the starting level by adjusting the rate of catch to the rate of regeneration. The catch remains constant and so does the stock. However, many different combinations of fish catches and stock would be sustainable. So a society needs to set specific goals and targets.

To attain the broad objective of environmental governance, a whole range of policy instruments, enforcement and monitoring mechanisms, and institutional arrangements are needed. First, the development agenda of a country must be socially, economically and environmentally sustainable. It requires the coordination of objectives and policies in all three areas. An institutional mechanism, such as a Planning Commission, is needed to ensure consistency of the plans and actions of different ministries. It involves institutional and policy reforms, effective legal and regulatory frameworks, macroeconomic policy reforms that respond to market signals while protecting the environment, effective partnerships and the engagement of civil society. These are all essential ingredients in bringing about effective environmental governance.

The purpose of this paper is to review the issues related to environmental governance in the Asian and Pacific region. After briefly reviewing sustainable development trends, it highlights the need for environmental governance. Various aspects of environmental governance in the region are then critically examined, followed by a discussion of the policy options for dealing with major issues of environmental governance. It then covers the sectoral and spatial aspects of environmental governance in the light of experience in the region in order to analyse what constitutes effective environmental governance in the context of the key environmental concerns in the region.

I. *Sustainable development trends*

A brief review of economic, social and environmental trends is undertaken in this section in order to provide an insight into the sustainability of the development process.

A. Economic growth trends

Figure 2 shows the growth rates of per capita consumption over the past 15 years. It can be seen that, by and large, the countries of the region have shown reasonable progress. Of the 15 countries of the region for which data are available, 12 show growth rates of 2 per cent or more. Only one, Papua New Guinea, shows a falling consumption level. The Philippines and the Islamic Republic of Iran show growth rates below 1 per cent. In terms of GDP growth, Asia and the Pacific is one of the fastest growing regions in the world. Per capita income in Malaysia, India and Sri Lanka is growing at around 3 per cent, while in Indonesia, Singapore, Thailand and Hong Kong, China it is around 5 per cent. The growth is even higher in the Republic of Korea and China at 6 per cent and 7 per cent, respectively.

By and large, the countries of the region have followed sound macroeconomic policies. Table 1 shows some indicators of macro economic performance. Most of the countries have had a relatively high savings rates and have followed an outward oriented strategy. There has been sustained growth in international trade and openness. This has forced domestic producers to be internationally competitive and efficient. They have also recorded low inflation rates and sound fiscal management with relatively modest levels of fiscal deficit.

The region offers some of the best success stories of economic growth in the post-war period beginning with Japan, followed by the miracle economies of East Asia, the so-called "tigers". These countries have shown remarkable resilience in withstanding and recovering from shocks such as oil price hikes and financial crises.

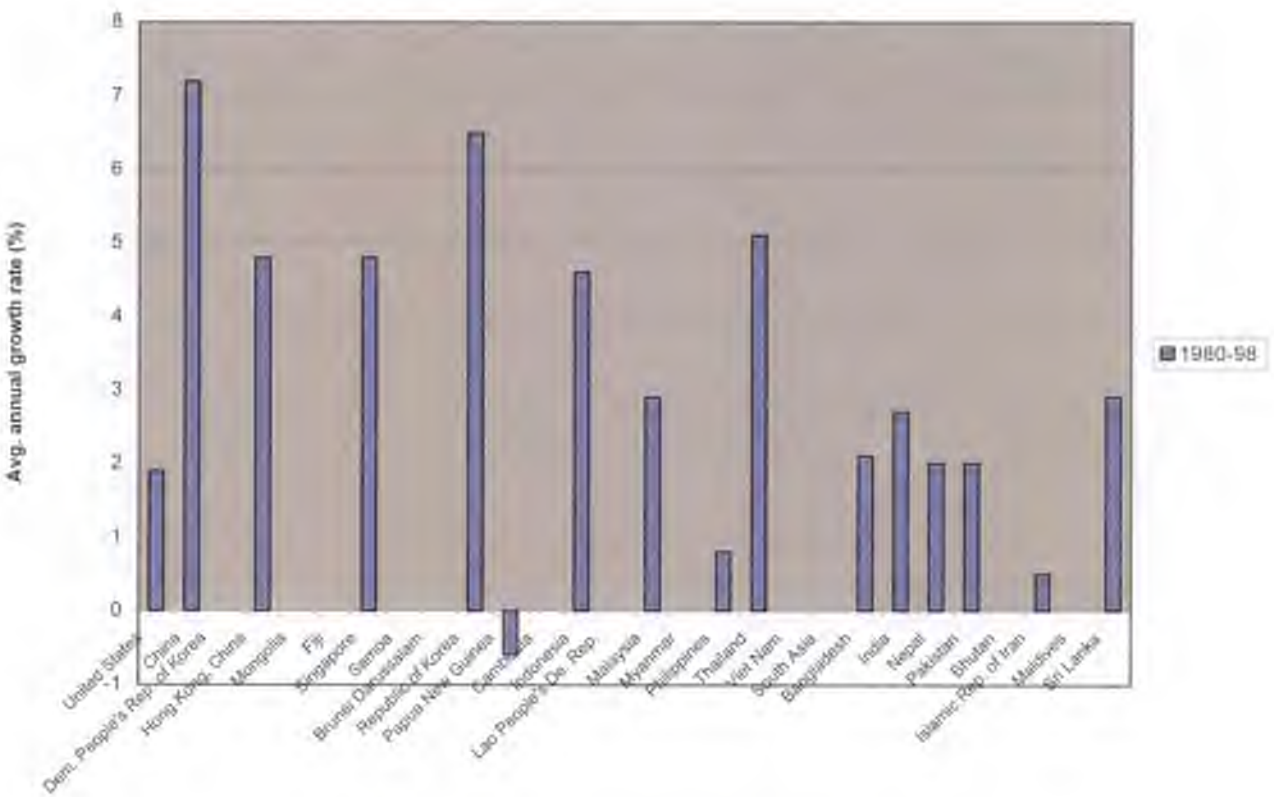


Figure 2: Per capita growth of private consumption

Table 1. Indicators of macroeconomic performance and policies

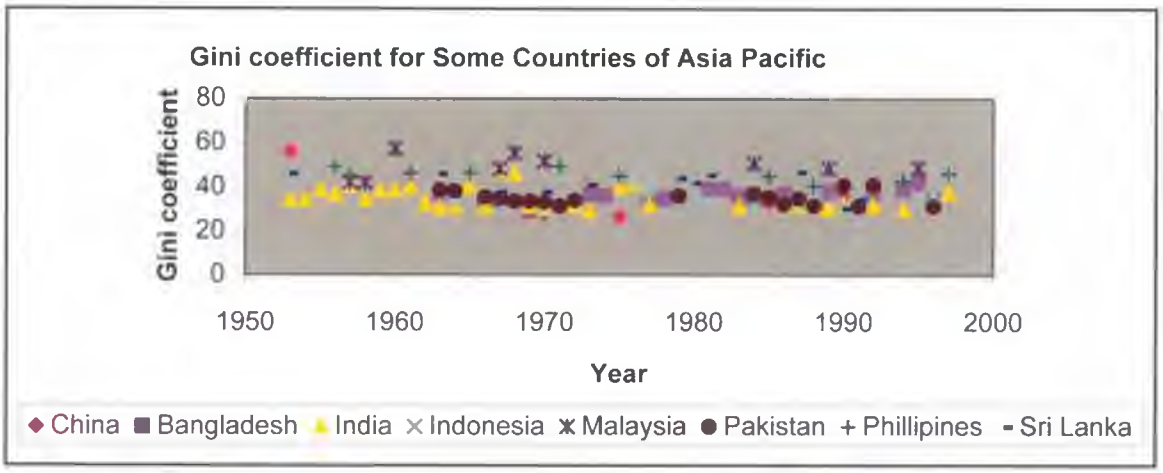
Country	Annual average growth rate				As a percentage of GDP							
	Gr. rate of GDP		Gr.rate of exports		Gr dom Inv		Gr dom sav		Exp (openness)		Overall sur/def	
	1980-90	1990-98	1980-90	1990-98	1980	1998	1980	1998	1980	1998	1980	1997
United States	3	2.9	4.7	8.1	20	18	19	16	10	12	.	.
China	10.2	11.1	11.5	14.9	35	39	35	43	6	22	...	-1.6
Hong Kong, China	6.9	4.4	14.4	9.5	35	30	34	30	90	125	. .	. .
Mongolia	5.4	0.1	...	...	63	23	27	24	21	68	. .	-6
Singapore	6.6	8	10.8	13.3	46	37	38	51	215	—	2.1	11.6
Rep. of Korea	9.4	6.2	12	15.7	32	35	24	34	34	38	-2.2	-1.4
Papua New Guinea	1.9	5.7	3.3	10.6	25	37	15	33	43	56	-1.9	...
Cambodia	...	5.5	—	—	—	16	...	4	...	30	...	...
Indonesia	6.1	5.8	2.9	8.6	24	31	38	31	34	28	-2.3	1.2
Lao People's Dem. Rep.	...	6.7	...	...	...	29	...	11	...	24	. .	. .
Malaysia	5.3	7.7	10.9	13.2	30	32	33	47	58	118	-6	3
Myanmar	0.6	6.3	1.9	8.8	21	13	18	12	9	1	1.2	-3.2
Philippines	1	3.3	3.5	11	29	25	24	15	24	56	-1.4	0.1
Thailand	7.6	7.4	14.1	11.1	29	35	23	36	24	47	-4.9	-0.9
Viet Nam	4.6	8.6	—	27.7	—	29	—	21	...	46	...	...
Bangladesh	4.3	4.8	7.7	13.7	22	21	13	15	4	14	1.8	...
India	5.8	6.1	5.9	12.4	20	23	17	18	6	12	-6	-4.9
Nepal	4.6	4.8	3.9	16.8	18	21	11	9	12	23	-3	-4.1
Pakistan	6.3	4.1	8.4	3.2	18	17	7	13	12	16	-5.7	-7.9
Islamic Rep. of Iran	1.7	4	6.9	2.4	30	.	26	.	13	...	-13.8	1.4
Sri Lanka	4	5.3	4.9	9	34	24	11	17	32	36	-18.3	-4.5

The question is what has been the quality of growth? How equitable has this growth been in per capita income? Figure 3 shows the Gini coefficient data, which measure inequity in expenditure/income distribution, for selected countries of the region. The Gini coefficient takes the value zero when there is extreme inequality in a case where all income accrues to one person and 1.0 for perfect equality where everyone has the same income. It can be seen that economic growth has not raised inequity in most of the countries nor has there been any significant reduction in inequity in most countries. However, poverty reduction or improvement in human development has taken place not through redistribution but through the trickle-down effect and specific policies for human development. Economic growth thus appears to be important for poverty reduction and human development.

B. Social development trends

Annex tables 1 and 2 give data on measures of well-being in the countries of the Asian and Pacific region. The data cover the Human Development Index (HDI), Gender Adjusted Development Index (GDI), Gender Empowerment Measure (GEM), and some of the constituents of these indices (GDP, poverty, infant mortality, life expectancy at birth, adult literacy, youth literacy and primary education completion rate).

Figure 4, which is based on data from UNDP, shows HDI progress that has taken place in countries of Asia and the Pacific. Steady improvement is shown for all countries. Yet, a significant gap exists compared with the HDI for the United States, which is also given in figure 4 for comparative purposes.



Source: Data from the United Nations University-WIDER web site of the World Income Inequality database.

Figure 3: Inequity in selected countries

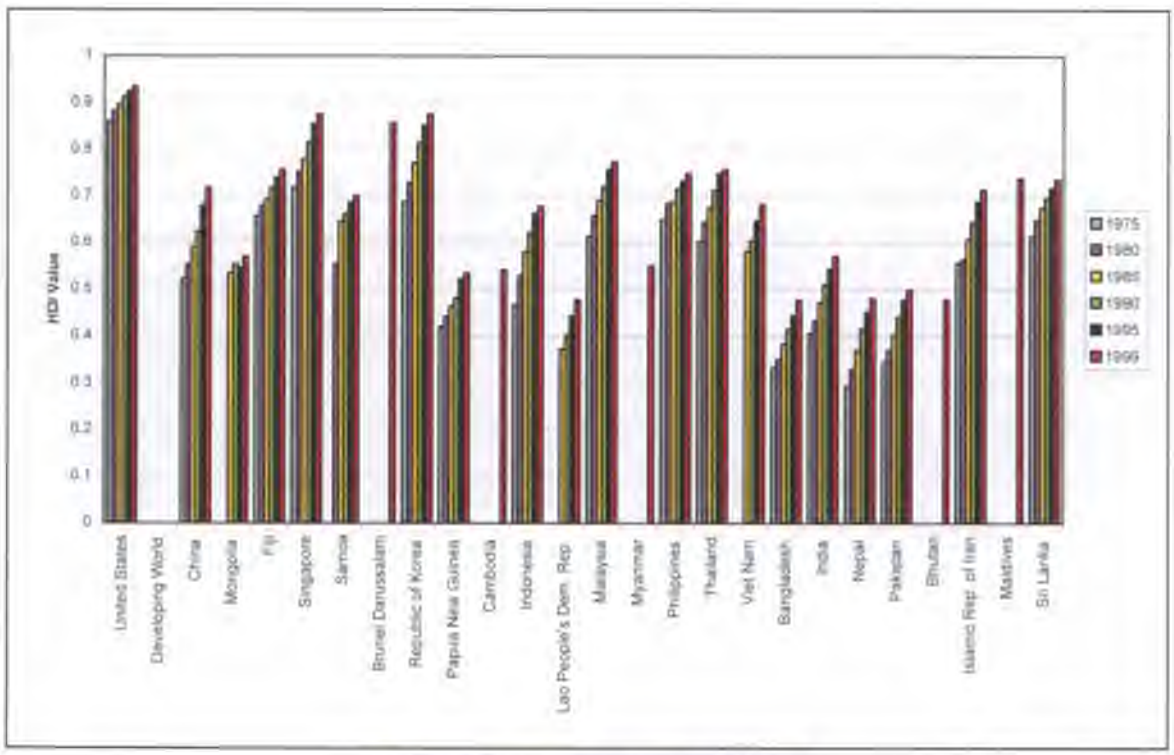


Figure 4. HDI trends, 1975-1999

In only four cases (Brunei Darussalam; Hong Kong, China, the Republic of Korea and Singapore) are the HDI levels comparable to the United States. Bangladesh, Bhutan, the Lao People's Democratic Republic and Nepal show some of the lowest HDIs. Although progress is visible for all countries, some still have far to go. The somewhat inadequate progress in HDI is partly the outcome of population growth, which is still quite high in some of the countries. Rapid progress in reducing it could accelerate improvement in HDI.

To compare GDI with HDI, they have been plotted together with GEM in figure 5. The HDI and GDI comparison (annex table 1) is not very significant. The difference between the two is very small

(to the third decimal place) for most countries. It is to the second decimal place for only four countries, the Lao People's Democratic Republic, India, Nepal and Pakistan, while just two countries, Thailand and the Islamic Republic of Iran, show a difference in the first decimal place. Only one country, Malaysia, shows GDI to be higher than HDI. Malaysia also has the highest GEM among the regional countries for which GEM is calculated.

It is also important to examine the outlook in other elements of human development. Beginning with the data on undernourishment plotted in figure 6, it can be seen that the level of undernourishment is quite high in many Asian countries. Mongolia and the Democratic People's Republic of Korea show high levels of 42 and 40 per cent respectively, followed by Cambodia with 37 per cent and Bangladesh with 33 per cent. India, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand and Viet Nam have around 20 per cent of their population undernourished. When compared with the proportion below the international poverty line of US$ 1 1993 purchasing power parity (ppp) per day, the undernourished numbers are surprising. For example, Mongolia with 42 per cent undernourished has only 13.9 per cent poor. Similarly, Thailand with less than 2 per cent poor has 21 per cent undernourished. In contrast, India with only 23 per cent undernourished has as many as 44 per cent of its population below the poverty line. In a sense, this indicates problems with applying international norms of nutrition as well as the purchasing power parity adjustment and use of an international poverty line.

Data on life expectancy at birth and infant mortality (figures 7 and 8) indicate some other aspects of human development. The progress in improving life expectancy is significant in almost all countries. Considerable reduction has also taken place in infant mortality rates. Clearly, the status of health has improved in the region. But despite this progress, the levels attained in many countries, when compared with developed countries such as the United States, show large gaps.

Figure 9 shows data on literacy. Most countries of East Asia except Cambodia, the Lao People's Democratic Republic and Mongolia show high levels of adult literacy and still higher levels of youth literacy. On the other hand, most countries of South Asia, except Maldives and Sri Lanka, show low levels of adult literacy. The youth literacy rate is somewhat better but the adult literacy situation is highly unsatisfactory. The status of overall literacy is quite unsatisfactory in the Lao People's Democratic Republic, Pakistan, Bangladesh and Nepal, which also show adult literacy (age 15+) rates of less than 50 per cent. India is only a little better with a literacy rate of 56.5 per cent.

Taking all indicators into account, it can be concluded that there has been progress in human development, particularly in increasing literacy and life expectancy at birth and in poverty reduction.

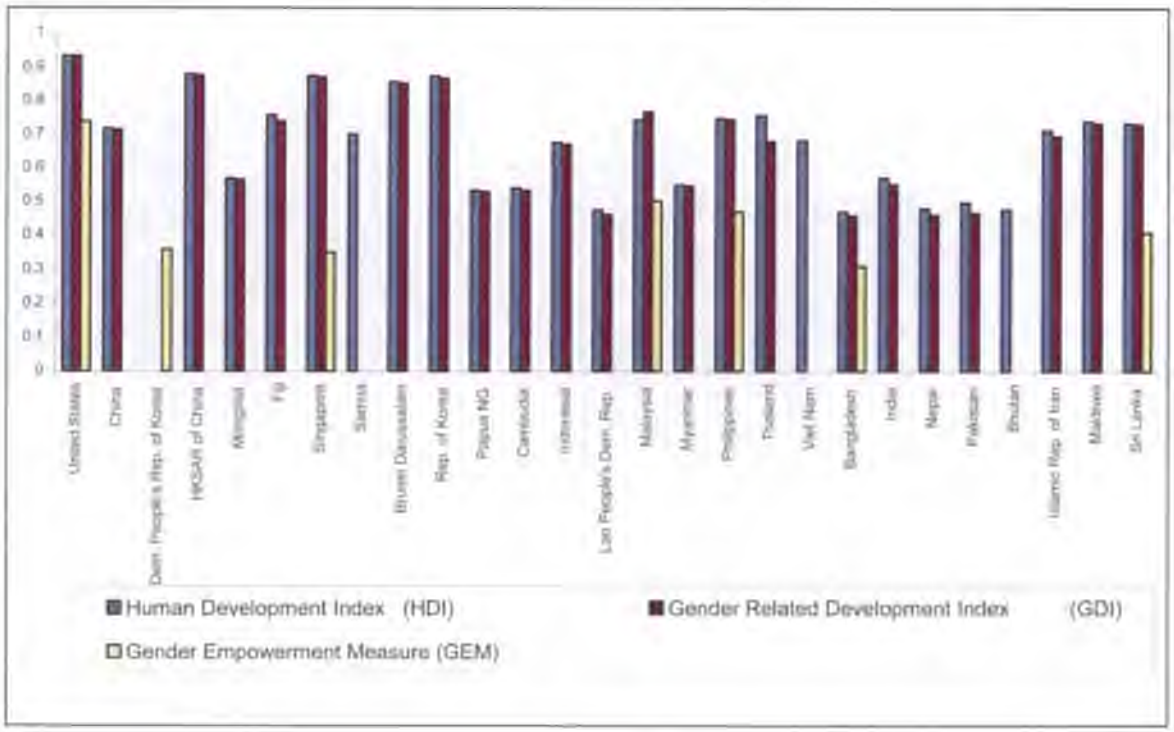


Figure 5. HDI, GDI and GEM, 1999

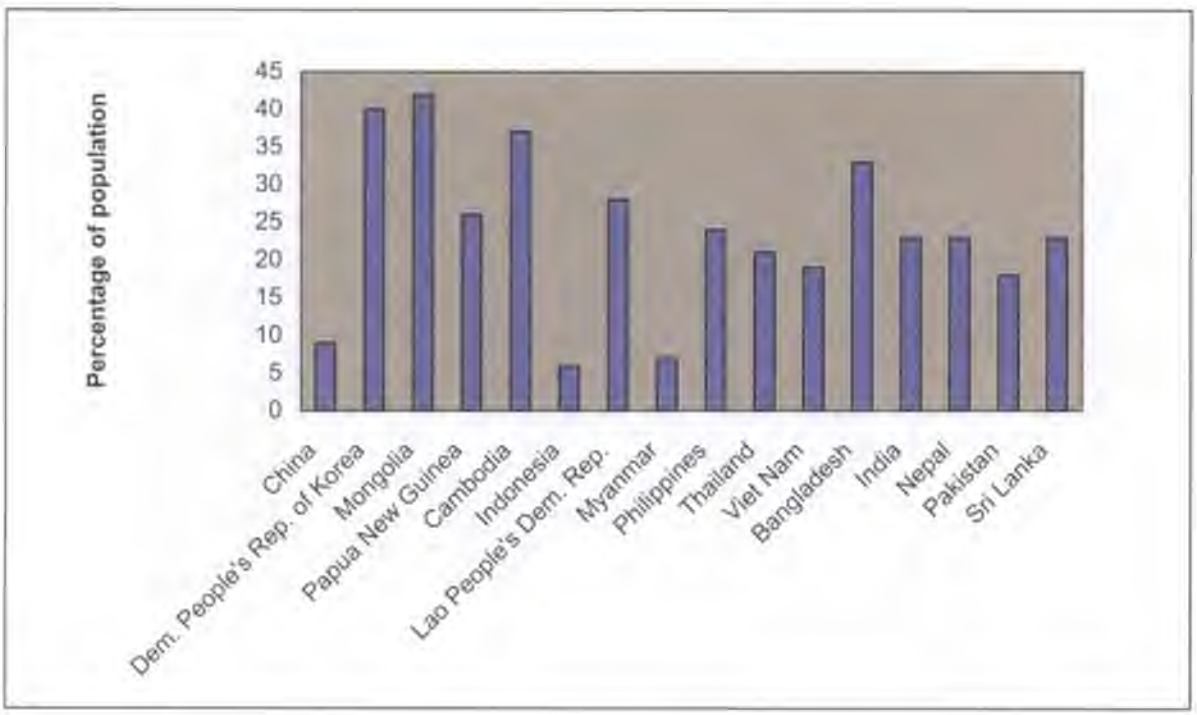


Figure 6. Undernourished proportion of populations in Asia and Pacific countries

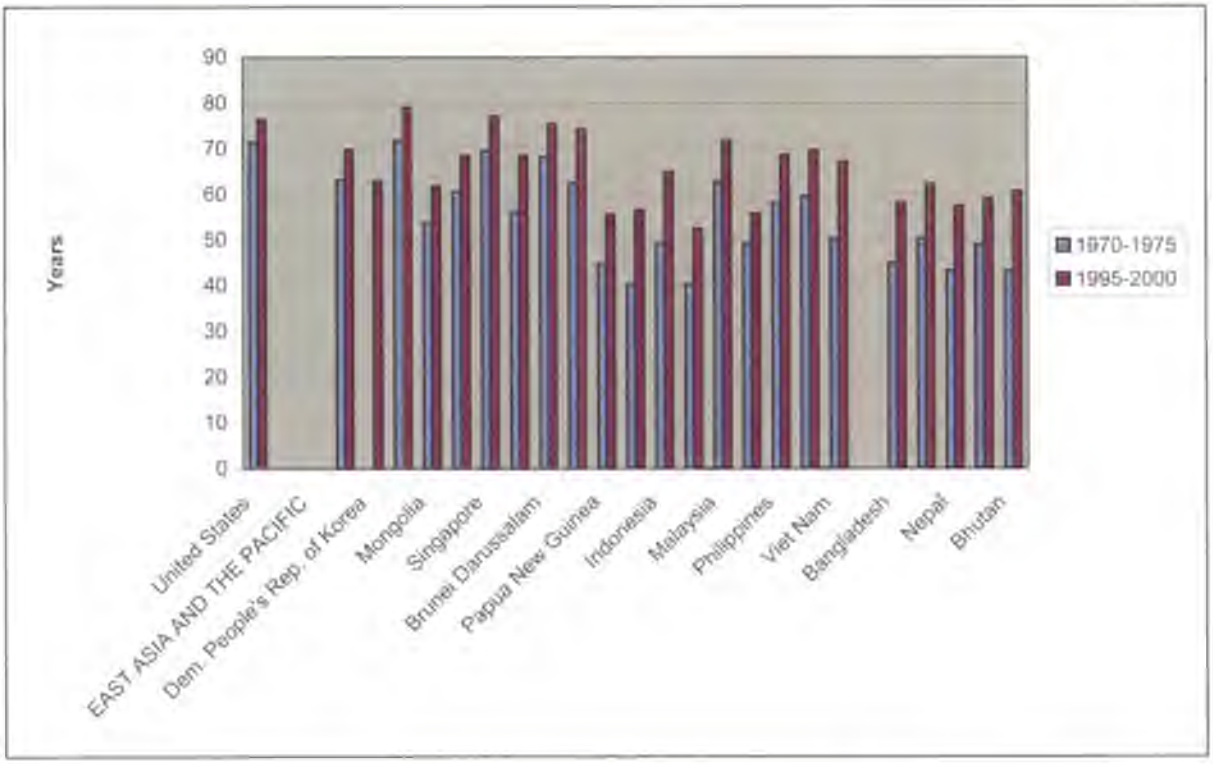


Figure 7. Life expectancy at birth

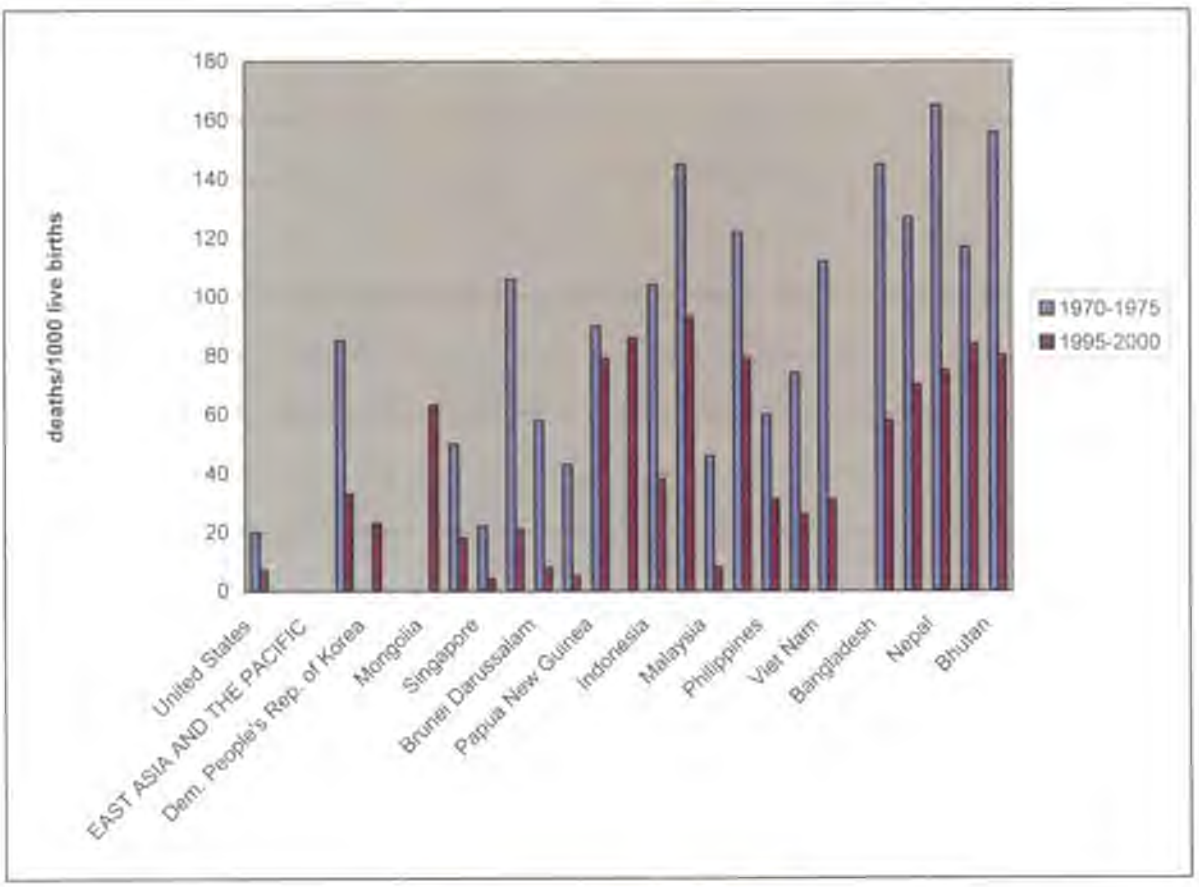


Figure 8. Infant mortality

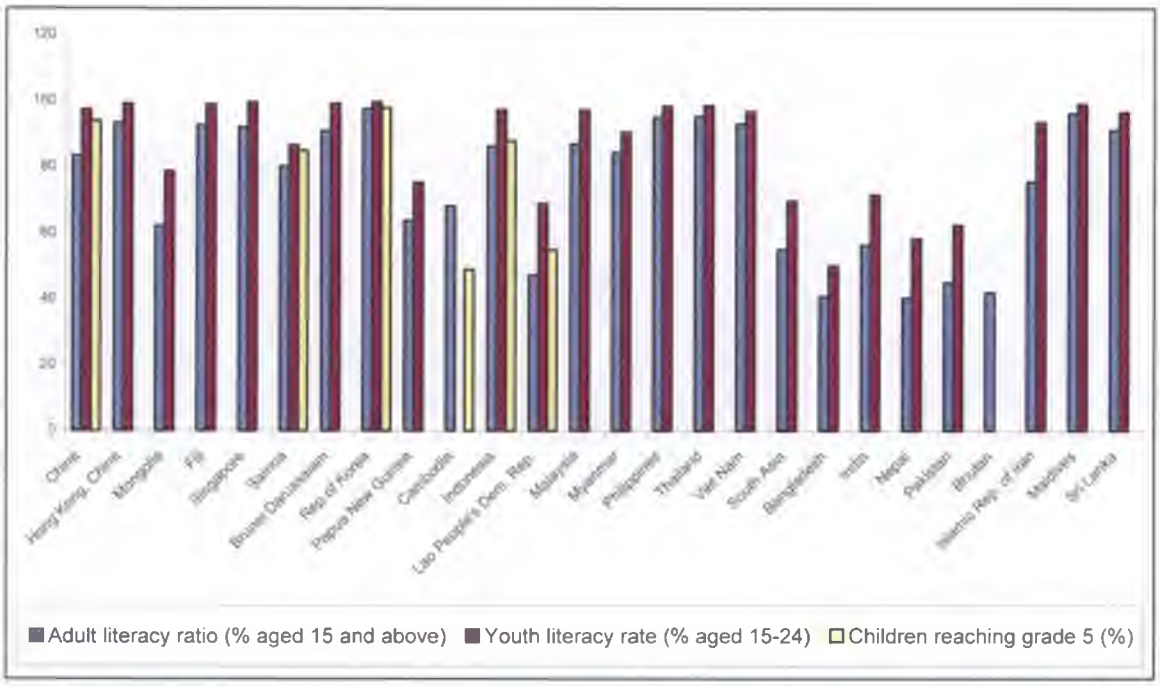


Figure 9. Adult literacy, youth literacy and grade five completion rates, 1999

C. Environmental trends

A detailed review of environmental trends is available in the ADB/ESCAP publication, *The State of the Environment Report in the Asia and the Pacific: 2000.* Based on that report, the key environmental concerns of the countries of the region are summarized in Table 2. It can seen that some concerns are common to many countries such as land degradation, soil erosion, deforestation, loss of biodiversity, air pollution, industrial pollution, water pollution and water shortages. Solid waste management and natural disasters each concern eight or more countries out of 39.

The countries of the region have responded with various policies when dealing with these concerns. Tables 3 and 4 show that most countries of the region have laws and regulations to protect the environment. Many have also published vision documents for environmental protection.

It can be seen that since the Rio summit, considerable progress has taken place in legislative development. Many countries (table 3) enacted framework laws such as Environment Protection Acts in the 1990s. Only India, Malaysia and the Philippines had laws that predated 1990.

It can also be seen that in many countries an EIA requirement is built into the framework laws while others have enacted special Acts for the purpose.

Table 4 shows that in the post-Rio period, most countries have articulated their environmental protection vision in the form of conservation strategies, vision statements, Agenda 21 plans, national environmental action plans or national environmental management strategies.

The analysis of economic, social and environmental trends in these tables show that although there has been notable progress in the economic and social spheres, the environmental trends are worsening.

Table 2. Key environmental concerns of the countries of the Asian and Pacific region

	Afghanistan	Bangladesh	Bhutan	India	Islamic Rep. of Iran	Maldives	Nepal	Pakistan	Sri Lanka			Brunei Darussalam	Cambodia	Indonesia	Lao People's Dem. Rep.	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam		Australia	New Zealand	Solomon Islands	Vanuatu	Papua New Guinea	Fiji	Tonga	Samosa		Azerbaijan	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan		China	Japan	Russian Federation	Rep. of Korea	Dem. People's Rep. of Korea	Mongolia
Soil pollution							*																								*	*			*	*				*			
Soil degradation	*	*					*							*						*	*																						
Soil erosion			*	*			*	*	*				*		*		*	*		*			*	*	*		*		*							*		*				*
Rising soil salinity																							*												*	*							
Overgrazing	*			*	*																																						*
Desertification	*			*	*			*															*															*					*
Deforestation	*	*		*	*		*	*	*				*	*	*	*	*	*		*	*						*		*				*		*	*		*					*
Loss of biodiversity	*	*		*			*	*	*				*	*	*	*	*	*		*	*		*	*					*									*	*				*
Seasonal smoke												*		*		*			*																								
Air pollution				*	*	*								*		*	*	*		*												*							*	*	*	*	*
Industrial pollution		*																	*		*		*				*					*	*		*		*			*			*
Oil pollution					*																																						
Radioactive and toxic chemicals																																	*										
Pesticides																																*	*		*	*	*						
Sedimentation													*																														
Water pollution		*		*			*	*	*				*	*		*				*	*										*		*	*	*							
Water shortage		*	*	*	*	*		*							*				*	*	*		*			*										*					*	*
Water borne diseases		*															*					*																					
Capsian Sea pollution																																*	*			*							
Coastal degradation									*									*																									
Beach erosion							*																																			

	Food security risks	Poor farming practices	Landless	Overpopulation	Problem of SWM	Climate change	Natural disasters
Mongolia							
Dem. People's Rep. of Korea	*						*
Rep. of Korea							
Russian Federation					*		
Japan					*		
China							*
Uzbekistan							
Turkmenistan							
Tajikistan					*		
Kyrgyzstan							
Kazakhstan							
Azerbaijan							
Samosa							
Tonga							
Fiji							
Papua New Guinea							*
Vanuatu							
Solomon Islands							
New Zealand							
Australia		*					
Viet Nam							*
Thailand					*		*
Singapore					*		
Philippines							*
Myanmar					*		
Malaysia							
Lao People's Dem. Rep.							
Indonesia							
Cambodia					*		
Brunei Darussalam							
Sri Lanka					*		
Pakistan							*
Nepal	*						*
Maldives						*	
Islamic Rep. of Iran	*						*
India				*			*
Bhutan							
Bangladesh	*		*	*			*
Afghanistan	*						*

Sources: ESCAP and Asian Development Bank.

Table 3. Some framework laws, EIA laws and regulations for environmental management in selected countries of Asia and the Pacific

Country	Framework laws	EIA laws and regulations
Bangladesh	Environmental Protection Act, 1995	(FW)
Cambodia	Environmental Protection and Natural Resources Management Law, 1996	Sub-decree on Environmental Impact Assessment (X)
People's Republic of China	Environmental Protection Law of People's Republic of China, 1979	(FW)
Democratic People's Republic of Korea	Law on Environment Protection and Land Administration, 1986	
India	Environmental Protection Act, 1986	Environmental Impact Assessment Notification, 1994 (X)
Indonesia	Environmental Management Act, 1997	Environmental Impact Assessment Regulation, 1999 (*)
Islamic Republic of Iran	Environmental Protection and Enhancement Act	Environmental Impact Assessment Regulation, 1998 (FW)
Kazakhstan	Law on Protection of the Natural Environment, 1991	Provisional Instructions on Procedure for the Conduct of Environmental Impact Assessment on Designated Economic Activity, 1993 (X*)
Kiribati	Environment Act, 2000	
Kyrgyzstan	Environment Act, 1994	(FW)
Lao People's Democratic Rep.	Law on Environmental Protection, 1999	
Malaysia	Environmental Quality Act, 1974	Environmental Impact Assessment Order, 1987 (X*)
Maldives	Environment Act, 1993	(FW)
Mongolia	Environmental Law of Mongolia, 1994	Environmental Impact Assessment Law, 1997 (*)
Nepal	Environmental Protection Act, 1996	Environmental Protection Regulations, 1997 (X)
Pakistan	Pakistan Environmental Protection Act, 1997	(FW)
Philippines	Philippine Environment Code, Presidential Decree No. 1152, 1977	Pres. Decree 1987; Rules and Regulations, 1979; Proclamation, 1989 (X)
Republic of Korea	Basic Environmental Act 1990 (incorporating amendments); Enforcement Decree, 1991	Act for Environmental, Traffic and Disasters Impact Assessments 1999 EIA Act, 1993
Sri Lanka	National Environmental Act, 1980 (incorporating 1988 amendments)	(FW)
Tajikistan	Law on the Protection of Nature, 1993	(FW)
Thailand	Enhancement and Conservation of National Environmental Quality Act, 1992	Environmental Impact Assessment Notification 1992 (X*)
Turkey	Environmental Law, 1983; new draft Bill is before the Parliament Regulation, 1993 (X**)	Environmental Impact Assessment
Uzbekistan	Law on the Protection of Nature, 1992	(FW)
Viet Nam	Law on Environment Protection, 1994	(FW)

Sources: Asian Development Bank; ESCAP; United Nations Environment Programme, 1995, *New Way Forward: Environmental Law and Sustainable Development*; and inputs from country experts.
FW: EIA legislation contained in framework laws
X: Separate EIA legislation
*: Separate EIA legislation with some reference to framework laws.

Table 4. Governmental environment protection vision in Asia and the Pacific

Northeast Asia	
China	China Agenda 21
Democratic People's Republic of Korea	National Environment Plan for Implementing Agenda 21, 1995-2005
Japan	Basic Environment Plan; Japan Agenda 21
Mongolia	Mongolia Agenda 21
Republic of Korea	Green Vision 21
Southeast Asia	
Indonesia	Indonesia Agenda 21; National Environment Action Plan 1998
Malaysia	Vision 2020
Myanmar	Myanmar Agenda 21
Philippines	Philippine Strategy for Sustainable Development; Philippine Agenda 21
Singapore	Singapore Green Plan
Thailand	Policy and Perspectives for Enhanced Conservation
Viet Nam	Environment Vision 2020; Environmental Protection Strategy, 2001-2010; National Environment Action Plan, 2001-2005
South Asia	
Bangladesh	National Environmental Management Action Plan
Bhutan	National Environment Strategy (Middle Path)
India	National Conservation Strategy; Policy Statement on Environment and Development
Islamic Republic of Iran	National Environment Action Plan
Maldives	National Environment Action Plan, 1999-2005
Nepal	National Environment Policy and Action Plan I and II
Pakistan	National Conservation Strategy
Sri Lanka	National Environment Action Plan, 1998-2002
Central Asia	
Azerbaijan	National Environment Action Plan, 1998
Kazakhstan	National Environment Action Plan
Kyrgyzstan	National Environment Action Plan ,1996
Turkmenistan	National Environment Action Plan
Uzbekistan	National Environment Policy
Pacific	
Australia	National Strategy for Ecologically Sustainable Development
Cook Islands	National Environment Management Strategy, 1993
Fiji	Sustainable Development Bill
Kiribati	Environment Act, 2000
Marshall Islands	National Environment Management Strategy, 1993
Micronesia	National Environment Management Strategy
New Zealand	Government Energy Efficiencies Leadership Programme; Sustainable Land Management Strategy; Coastal Policy Statement
Niue	National Environment Management Strategy, 1994
Nauru	National Environment Management Strategy ,1999
Samoa	National Environment and Development Strategy, 1993
Solomon Islands	National Environment Management Strategy, 1993
Tonga	National Environment Management Strategy, 1993
Tuvalu	National Environment Management Strategy, 1993
Vanuatu	National Environment Management Strategy

Sources: ESCAP and Asian Development Bank.

Table 5. Environment and development in Asia and the Pacific, 1995-2000

	South Asia		North-East Asia		South-East Asia		Pacific		Central Asia	
	1995-2000	2000-2005	1995-2000	2000-2005	1995-2000	2000-2005	1995-2000	2000-2005	1995-2000	2000-2005
Socio-economic trends										
GDP growth	⬆	⬆	⬆	⬆	⬆	⬆	⇧	⇧	⇩	⇧
Population growth rate	⇩	⇩	⬇	⬇	⇩	⇩	⇩	⇩	⇩	⇩
Incidence of poverty	⇩	⇩	⬇	⬇	↓↑	⬇	⇩	⇩	⇩	⇩
Urban growth	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Slums and squatters	⬆	⬆	⇧	⇧	⬆	⬆	⇧	⇧	⇧	⇧
Life expectancy	⇧	⇧	⬆	⬆	⬆	⬆	⇧	⇧	⇧	⇧
Infant mortality	⇩	⇩	⬇	⬇	⬇	⬇	⬇	⬇	⇩	⇩
Traditional diseases	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	↓↑	⇩
Modern diseases	⬆	⬆	⇧	⇧	⇧	⇧	⬆	⬆	⇧	⇧
Child undernourishment	⇩	⇩	⬇	⬇	⬇	⬇	⇩	⇩	↓↑	↓↑
Nutrition	⇧	⇧	⇩	⇧	⇧	⇧	⇧	⇧	⇧	⇧
Natural disaster losses	⬆	⬆	⬆	⬆	⇧	⇧	⬆	⬆	⇧	⇧
Environmental trends										
Arable land per capita	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
Land degradation	⬆	⬆	⬆	⬆	⬆	⬆	⇧	⇧	⬆	⬆
Desertification	⬆	⬆	⬆	⬆	⬆	⬆	⇧	⇧	⬆	⬆
Deforestation	⬆	⬆	⬆	⇧	⬆	⬆	⇧	⬆	⬆	⬆
Tree plantation	⇧	⬆	⬆	⬆	⬆	⬆	⇧	⇧	⇧	⇧
Los of habitat and species	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Water consumption	⬆	⬆	⬆	⬆	⬆	⬆	⇧	⇧	⬆	⬆
Marine resources loss	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆		
Commercial use of energy	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Food security	⬇	⬇	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⬇
Resource use by industry	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Environmental degradation by tourism	⬆	⬆	⇧	⇧	⬆	⬆	⬆	⬆	⇧	⇧
Freshwater pollution	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Coastal pollution	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆		
Air pollution	⬆	⬆	⬆	⇧	⬆	⬆	⇧	⇧	⇧	⬆
Greenhouse gases	⬆	⬆	⬆	⬆	⬆	⬆	⇧	⇧	⬆	⬆
Solid waste generation	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Agro-chemical use	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Pollution by energy generation	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Vehicular pollution	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Industrial pollution	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Environmental policies/actions										
Public authorities action	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	↓↑	⇧
Business sector's response	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	↓↑	⇧
Environmental monitoring and research	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	↓↑	⇧
Environmental education and awareness	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Activities of major groups	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⇧	⇧
International Conventions (participation)	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆
Subregional cooperation	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⬆	⇧	⇧

Sources: Asian Development Bank and ESCAP.

Note: ⬆ Increase ⬇ Decrease ⇧ Slight increase ⇩ Slight decrease ↓↑ No change

Red color shows deteriorating trend; Green color shows improving trend;

GDP and urban growth have not been indicated by red or green color because their impact can be good or bad

D. Conclusions

Socio-economic trends show improvement in most subregions of Asia and the Pacific. For indicators such as GDP growth, incidence of poverty, infant mortality, traditional diseases, nutrition and child undernourishment, the movements are in the right direction. Only the prevalence of slums and squatters, modern diseases and losses due to natural disasters show adverse trends.

The environmental trends concerning arable land, land degradation, deforestation, desertification, habitat and species loss, water consumption, marine resources, commercial energy use, food security, resource use intensity and environmental damage due to tourism are all adverse. Only tree plantation shows a positive trend

The picture is even worse for pollution. All indicators (freshwater and coastal pollution, air pollution, pollution by energy use, industrial pollution, vehicular pollution, green house gases, solid waste generation and agro-chemical use) show strong negative movement for South Asia, North-East Asia and South-East Asia. The trends are also negative for Pacific and Central Asia and most are strongly so.

There are, however, positive movements in the area of environmental policies and actions. Except for Central Asia, in all the subregions significant progress can be seen in the areas of action by public authorities, business sector response, environmental monitoring and research, environmental education and awareness, activities of major groups, participation in international Conventions and subregional cooperation.

These findings raise some important questions. Why is it that even when countries show good economic growth, reasonable progress in social development and progress in environmental policies and actions, the environmental resources and pollution levels are still moving in adverse directions? Do they suggest a lack of coordination among these policies? Do they indicate a failure of policy implementation? Do they indicate an inadequacy in institutions of environmental governance? How has environmental governance been faring in the region? How can these policies be made more effective? What types of policies are effective? What policies are easier to implement? What types of institutions are needed? In short, what type of environmental governance is required? These aspects are addressed in the following chapters.

II. *Environmental Governance in Asia and the Pacific*

Globally, considerable progress has been made since the United Nations Conference on Human Environment in Stockholm in 1972. That conference was attended by only two prime ministers, from Sweden and India. Twenty years later at UNCED in Rio de Janeiro in 1992, more than 150 heads of state were present.

The ESCAP-ADB publication, *The State of the Environment in the Asia and the Pacific: 2000*, noted that "more than 178 governments participated in UNCED and adopted Agenda 21, a comprehensive blueprint for action to achieve sustainable development. In June 1997, a Special Session of the United Nations General Assembly reviewed the implementation of Agenda 21, and identified priorities for future action.

Parallel developments have taken place at the regional level in Asia and the Pacific, particularly in terms of institutional and legislative developments after the 1992 Rio Summit. Since the adoption of Agenda 21, significant progress has been made which includes the updating of environmental laws and the introduction of new ones, the establishment of new institutions for environmental governance, the formulation of national environmental strategies including national Agenda 21. Most countries in the region now have agencies entrusted with the task of environmental management.

Environmental concerns have been incorporated in overall development policies and projects. The National Economic Development Authority in the Philippines, the Planning Commission in India, the National Environmental Board in Thailand and the National Planning Commission in Nepal are all high-level government bodies with cross-sectoral, decision-making authority, which generate an integrated approach to environmental protection and economic policy."

Despite these developments, as discussed in the previous chapter, the environmental trends are continuing to deteriorate. This is not for want of awareness or the lack of desire to do something, but as a corollary to past shortcomings in environmental governance as detailed below.

A. Lack of ownership of plans

The broad objectives of environmental governance in most countries are to relieve environmental stress, reduce emissions and effluents, arrest degradation of resources, improve quality of resources, promote the moderate use of exhaustible resources, and preserve the environment and habitat for the present and future generations.

What is important here is that such objectives are accepted by the people. They should reflect not just the goals of the policy makers but also of the citizens. This can happen if the vision document is formulated through extensive public debate and participation so that citizens accept the ownership of the vision document.

Most countries in the region already have vision documents (tables 1 and 2) However, only a few had extensive participation of CSOs in their formulation.

Widespread and extended participation of stakeholders has helped some countries in the region to deal amicably with the complex task of preference of such documents. Notable among these countries are Bangladesh, Mongolia, the Philippines and Pakistan.

In the Philippines, the Agenda 21 (PA 21) plan was developed by the Philippine Council for Sustainable Development (PCSD), which was set up by the Government on 5 September 1992, barely three months after the Earth Summit at Rio. It gave strong

representation to non-governmental or people's organizations.

Later in September 1996 despite initial opposition by representatives of non-governmental organizations (NGOs), PCSD was expanded to include business and labor representatives. After 14 months of consultations with various sectors all over the country, the National Agenda for Sustainable Development for the Twenty-first Century (PA 21) was issued. PCSD can claim many successes. Some critics, however, argue that it has not made a significant dent in government policy. Some suggest that even with PA 21 local sustainable development councils need to be organized. To cook rice cake, the heat has to be applied from both top and bottom.

Mongolia provides another example of participatory preparation of a national environmental strategy. Mongolia actively participated in the 1992 Rio Earth Summit and became one of the first countries to adopt Agenda 21. In the mid-1990s, the National Development Board (a government body responsible for national development strategy and planning as well as coordination between ministries) and the Ministry of Nature and Environment jointly formulated a project document, the Mongolian Action Programme for the Twenty-first Century (MAP 21), that then became the plan for a national Agenda 21.

The MAP 21 process also included unprecedented involvement of local communities. Six months after the initiation of the MAP 21 process, *Aimag* Sustainable Development Advisors were selected. After two weeks of training at the Programme Implementation Unit, the *Aimag* Advisors coordinated the preparation of *Aimag* Action Programmes (AAPs), or local Agendas 21, in their respective provinces. The *Aimag* Advisors ASDAs also facilitated the creation of economic, social and environmental committees within each province to support the implementation of AAPs. The committees, established by local Parliament resolution, and comprising members of local government, local parliament, local and national NGOs and business representatives, are headed by provincial governors. Each of the committees is subdivided into three or four working groups that correspond to the four main pillars of Agenda 21: economic growth, social equity, environmental protection and civil society participation.

Bangladesh shows what civil society initiatives can accomplish. While Bangladesh still has no National Council for Sustainable Development, multi-stakeholder processes are well advanced, driven by a vibrant civil society movement. The National Environment Management Plan is a good example of participation in action. The successful, cost-effective process of ensuring people's participation in national planning was a joint initiative by the Ministry of Environment and Forest, the NGO community led by the Association for Development Agencies of Bangladesh, and various other bodies.

The National Environment Management Plan was a massive countrywide national consultation of all sectors of society with special emphasis on grassroots participation by the population. The process was participatory, transparent, involved all stakeholders and was individually documented. In each consultation, people were asked to give their definition of environment, identify and list environmental problems in order of priority and suggest solutions. An awareness campaign was launched using radio, television and the print media. Over 20,000 people, mostly non-literate, were surveyed and a huge database was compiled. This information was analysed and a people's priority plan was formulated, endorsed by stakeholders and is now being implemented.

These examples show that participatory processes are important for ownership and consensus on a national vision. Ownership can lead to cooperation. Since environmental problems pervade all kinds of geographically dispersed economic activities, public cooperation is vital for monitoring, feedback and compliance with environmental laws. Without ownership environmental governance is unlikely to be effective. Ownership on its own, however, is not sufficient to ensure good governance, as can be seen from persisting environmental problems even in countries with wide participation of CSOs in the preparation of vision documents and plans. It cannot solve the problems of coordination of policies. Moreover, it is not only important to involve citizens in the formulation of plans but also in their implementation, an aspect that has often been ignored.

B. Lack of policy coordination

Economic policy targets have to be consistent with environmental policy targets. This means that separate Ministries of Environment and Economic Affairs or Finance cannot formulate these policies independently. They have to be coordinated. Policy coordination is required among many ministries, for which governments have established varying mechanisms for such coordination. However, these need to be strengthened in order to resolve conflicts and trade-offs. The coordination between environmental and economic policies needs to be much more pervasive and widespread.

The lack of horizontal and vertical coordination of environmental policies is a major problem. Policies for sustainable development are not just environmental policies; they affect all other policies such as those concerned with industry, agriculture, transport and urbanization. Macro-policies such as those dealing with tax and trade also have an impact on environmental resources.

However, the Ministries of Environment in most countries do not have the legal or political power to affect the policies of other ministries. In fact, the latter look at the Ministry of Environment as a nuisance, an obstruction to be overcome or pushed aside. Thus, the Ministry of Tourism may be upset that the Ministry of Environment does not permit the construction of hotels near the sea, or the Ministry of Energy cannot understand why it cannot build a transmission line through a reserved forest and so on. Such conflicts are frequent and many. The resolution is often based on the relative political power of the ministers concerned.

An important issue here is that environmental and finance/planning issues are often dealt with and polarized separately. For example, national conservation strategies and national environmental action plans are being developed by Ministries of Environment, whereas the national development plans (five-year development plans, long-term perspective plans etc.) are being developed by the Ministries of Planning/Finance. The two streams of plans are not being coordinated effectively; as a result, the promotion of sustainable development through the integration of economic, social and environmental dimensions still remains an elusive goal.

Some countries have tried to overcome this polarization through coordination by a Planning Commission. Thus, for example, in India the Five-Year Plans have an explicit chapter on environmental planning and provide financial resources for implementation. However, the Plans do not deal with the problems of harmonizing the policies of different ministries.

In the absence of a coordinating agency, or even when one is available,

coordination in a decentralized manner is sought through EIA. Most countries of the region, (table 2) have EIA laws or regulations, sometimes contained in their framework laws. In some countries, EIAs have not been effective as they are not carried out by independent agencies and examined by a regulatory body independent of both the consultant who carried out the EIA and the project sponsors. With a paucity of technically trained, skilled persons, the scope for "capture of regulators" by the consultant or the corporate sponsors is high. Capacity-building for EIA is a major perceived need.

Some countries have also used economic valuation at the national economy level to help in coordinating broad strategic policies. The Philippines has initiated expanded national income accounts to take care of changes in the value of environmental resources. The framework for preparing IEEAs is developed by the United Nations Statistical Office. A simpler treatment and case studies for the region are given by Parikh and Parikh in *Accounting for Valuation and Environment* (volumes I and II). Regular preparation of IEEAs can help monitor and assess the strategy of development and macro-policies from a holistic perspective. Such integrated national accounts are not available for most countries of the region. Thus, effective policy coordination through this mechanism is missing in the countries of the region.

C. Institutional weakness and lack of enforcement of environmental laws

In many countries, concern over the environment has evolved through vanishing wildlife, deforestation, local air and water pollution, the degradation of natural resources to threats of climate change, but not necessarily in this same order in all countries. The institutions of environmental governance have also evolved in steps.

Many countries in the region have established pollution control boards and forest protection Acts. Many have also passed appropriate legislation and set up emission and effluent standards. Yet, the qualities of air and water have continued to deteriorate. For example, in Nepal, the Forest Protection Act was passed in 1967 and the National Parks and Wildlife Conservation Act in 1973. The National Forestry Plan was formulated in 1976. A Master Plan for the Forestry Sector (1989-2010) was also formulated in the late 1980s. Yet the State of Environment Report for Nepal, 2001 notes that continuing deforestation is a major problem.

Similarly, in Sri Lanka, despite several initiatives, soil degradation is continuing as a result of the growing population pressure. The Sri Lanka State of Environment Report, 2001 calls for appropriate macro-policy and alternative employment opportunities to arrest soil degradation. It also calls for the establishment of data banks to assess, monitor and control degradation.

Laws alone cannot ensure a reversal of deteriorating trends. They need to be enforced in order to be effective. Enforcement depends on the kind of policy instrument used. If it creates economic incentives for compliance, it may be more effective. Moreover, appropriate institutions are needed for effective enforcement. The use of economic instruments has been limited in the region. While enforcement institutions have been created in many countries, they lack resources and authority to be effective.

D. Gaps in capacity, skills, information and resources

The lack of enforcement of environmental laws is due to a number of factors. A law may be poorly formulated

and impossible to enforce. The implementing authority may lack the authority needed to enforce the law. The required skills or manpower needed to collect and analyse data, or the resources or equipment needed for gathering data, may not be available. A violator may have more resources, financial power and political influence. For example, in India, the state pollution control boards have filed tens of thousands of cases in the past 20 years but have only been able to obtain a handful of convictions. The gaps in capacity, skills and information have been well documented in the State of Environment Reports in Asia and the Pacific.

E. Conclusions

The review of the existing situation of environmental governance shows that in recent years, a great deal of consideration has been given to environmental issues. A number of institutions have been established and many legislative measures have been introduced in countries of the region. In addition, strategies and plans have been formulated. However, many of these actions have been carried out on a piecemeal basis from a limited perspective, with very little coordination and integration and with much less effort put into monitoring and evaluation.

Even countries that have formulated their national environmental vision documents and strategies through widespread consultations are often not promoting public participation in implementation. Moreover, the objectives and goals of these strategies and plans have yet to be translated into specific targets, which seriously undermines the monitoring and evaluation of their implementation. It will also be necessary to decentralize the authority for execution and implementation functions to line agencies, so that the Ministries of Environment can concentrate on policy integration, coordination, facilitation and legislation.

There is a need to reexamine policy options that are easier to implement as well as monitoring and enforcement mechanisms that are more effective. Incentive-based policies could play better roles. A major effort is needed to narrow the gaps in skills and capacities. Furthermore, no mechanism yet exists to enable interaction with the private sector, represent its interests or elicit private sector cooperation in environmentally related decision-making.

In terms of legislation, most countries have comprehensive legislation in the form of an Environmental Protection Act or Environmental Framework Law. However, to enable immediate and effective implementation there is a need for equally comprehensive rules and regulations that specify in clear terms the authority, responsibility and jurisdiction of the various government agencies, local bodies, the private sector and NGOs. In addition, the vast number of existing laws, regulations and notifications (outside the Environmental Framework Law) should be reviewed, amended and consolidated, and even be annulled if they have become redundant in the present situation.

III. *Challenges and approaches to environmental governance*

The main challenge to environmental governance stems from the need to meet the demand of a continuously expanding population without destroying the environment and natural resource base on which the very process of development depends. This requires giving a new direction to development strategies wherein environmental concerns become an integral part of the investment, incentives, tax and other facets of economic policy-making.

Moreover, it calls for rethinking of how the development process should be approached. Awareness among policy makers and practitioners needs to be raised to levels that would integrate environmental concerns into the decision-making process. Environment and natural resources should be reviewed not only as a productive resource but even more so as a resource that provides ecological services. Policy makers and practitioners should be able to perceive the environmental consequences of specific economic activities, so that measures can be taken to avoid any resultant damage that could prove irreparable. That approach requires the availability of adequate information and data for bringing about integration. Likewise, it is important to build technical capabilities for the design and use of appropriate policy instruments that facilitate integration.

As stated in the previous chapter, despite previous efforts, the current state of policy-making in the countries of the region leaves much to be desired in terms of incorporating environmental concerns into the decision-making process. Existing structures and mechanisms for integration are either not fully equipped in terms of capabilities and/or policy tools, or they lack the teeth and the mandate to implement their recommendations. In most cases, policy decisions go through a number of consultations in various bodies where the members do not necessarily have either a full grasp or even an appreciation of the environmental implications of specific policy actions. Moreover, those bodies also have priorities that, when taken into consideration, relegate any environmental issue to a lower level of priority, thus preventing such issues from being considered in the decision-making process. This chapter therefore concentrates on some of the needed steps that should be taken to strengthen environmental governance in the region.

A. Environmental policies

Intervention through environmental policies is absolutely essential in promoting sustainable development. For example, if a polluting firm does not wish to bear the cost of damage its pollution imposes on others, because it does not want that cost to enter its profit and loss accounts, it has no incentive to do anything about it. If one could internalize the environmental costs (that is, make the firm pay for the damage), then it would have an incentive. A Pigouvian tax (so-called as it was first proposed by the English economist, Pigou, in 1929) on pollution, equal to the marginal social cost that the pollution imposes on society, would provide the polluting firm with the incentive to take abatement steps until the marginal abatement cost equals the tax rate.

However, Nobel Laureate Ronald Coase argued in 1960 that for the sake of efficiency, a government should not intervene except where it needs to enforce property rights. If citizens have a right to clean air, then a polluting firm would have to buy this right from the consumers. On the other hand, if the firm has a right to pollute, the victims will pay the firm to pollute less.

For this to be the case, the transaction costs (that is, the costs of negotiating and collecting charges) must

be zero. In developing countries, where millions of polluters confront millions of citizens who are often poor and without knowledge of their rights or the resources to demand them, transaction costs cannot be assumed to be zero. In Mumbai, for example, more than 10 million citizens, almost half of whom live in congested slums, 1 million motorized vehicles and tens of thousands of small and large manufacturing units contributing to pollution. In such a situation, it is difficult to imagine a functioning market for pollution. Government intervention is therefore essential as it can improve efficiency.

1. Principles of environmental policy choice

Policies induce change in the behavior of different economic actors and, consequently, changes in the levels of output (pollutants) and/or input (resources). Environmental policies are directed at altering behavior that has resulted in, or is likely to lead to, environmental stress. It may benefit some while hurting others. In selecting a particular set of policies from alternatives, it may be necessary to evaluate trade-offs, using certain principles for policy formulation such as cost effectiveness, distributive impact, efficiency, enforceability and public acceptance.

(a) Benefit/cost

A good policy should provide more social benefit than the social cost it imposes. If emissions are to be reduced and firms are asked to incur costs in order to do so, their products would become more expensive. On the other hand, the improved quality of the environment, air and/or water, will benefit many people, including perhaps some of the consumers of the product. The social valuation of their gains should exceed the social valuation of the cost to the consumers if the policy is to be acceptable (that is, it must show a benefit/cost ratio exceeding one). It should be noted that costs are not always borne by the consumers. It is conceivable that emission or effluent charges may make the firm non-viable or uncompetitive and it may have to close down. Then the employees who lose jobs bear part of the cost of the policy. Dynamic efficiency also requires that the policy provide appropriate incentives for the exit and entry of firms. Of course, this presumes that such an entry or exit is not prevented by other policies such as industrial licensing that restrict entry, or labor laws that prevent closure. It should also be noted that not all policies involve trade-offs. There may be "win-win" options. For example, technological options of conservation and energy-use efficiency and improvement are available, which reduce both costs and emissions.

(b) Efficiency

It is not enough for the policy to be merely acceptable. It should be efficient (that is, it should show highest benefit/cost ratio or should attain the desired goals at least in terms of social cost). For example, in the case of a coal-fired power plant, particulates emissions can be reduced either by installing an electrostatic precipitator or by washing the coal at the mine site. The latter method will also lower transportation costs and reduce the problem of waste disposal. The costs of the various options will be different and it would be necessary to assess their relative efficiencies. The notion of efficiency should be extended to include dynamic efficiency (that is, what type of incentives does the policy provide for innovations, adaptations and development that, over time, will lead to more efficiency).

(c) Who gains and who loses?

Even when the social benefit/cost ratio is high, it is necessary to assess who gains and who loses. The gains may be diffused among a large number of persons

and the losses concentrated among a few. If the losses are borne by those not responsible for the problem in the first place, they ought to be compensated for their losses.

(d) Effective enforcement at reasonable cost

Good policy instruments are those that can be enforced. However, an ideal policy instrument may have to be given up if it cannot be enforced at a reasonable cost. For example, in restricting exhaust emissions from automobiles, the ideal approach is to impose a tax on each car depending on its emission of say sulphur oxides (SO_x). However, emissions vary from car to car, depending on how well a vehicle is maintained, and it would be too expensive to periodically measure emissions from each car. Thus, a second-best solution of imposing a flat tax on each car may have to be accepted, depending on the rated mileage of each model. Such a tax would encourage people to switch to less polluting cars. Although this method would not promote better maintenance of each specific vehicle, it would be far easier to enforce.

Enforceability also depends on the legal framework, liability laws and the political economy of a particular society. If consumers are empowered with liability laws and the right to information, and if they are well organized, they may succeed in getting consumer protection boards established. The extent to which polluters are held liable to the damage they inflict on others would affect their abatement behavior. Of course, if the legal system does not provide redress or if it takes a great deal of money and time to obtain justice, enforceability of such liability, even if it is recognized by law, will be minimal. Thus, the enforceability of alternative policy measures has to be considered within the context of the particular political-economic system.

(e) Public acceptance

Environmental policies affect everyone. Without widespread public acceptance and support, such policies may not succeed. Therefore, such policies should be just and perceived as such. The burden of the policy should fall on those who are responsible for causing the problem in the first place, through mechanisms such as the polluter pays principle.

B. Instruments of environmental policy

Instruments of environmental policy can be classified into two broad groups: (a) CAC; and (b) incentive-based policies. The following sections discuss the principles of various instruments and examine their relevance to the countries of the Asian and Pacific region, keeping in mind their suitability and limitations for specific situations.

1. Command and control measures

Under CAC measures, regulators prescribe ambient quality, emission, process and product standards with which polluters must comply. Failure to comply may incur a penalty, usually a fine or closure. This involves imposing quantitative restrictions on various activities. For example, firms may be asked to limit their effluents within prescribed limits, which are set keeping in mind the best available technology. Companies may also be required to meet certain efficiency standards for their products by given dates. These targets must be attainable.

A number of features of CAC policy can be illustrated with reference to air pollution control. First, the controllers must prescribe emission limits. In assessing feasibility, the concept of best available technology is often used to prescribe limits. Such technologies can differ from industry to industry and,

conceivably, from process to process. The regulators would need a vast amount of information, which the regulated firms would have every incentive not to reveal. It is most unlikely, therefore, that the regulators, with only partial information, would be able to set standards across industries that are efficient in the sense that the cost of abatement is minimized.

Another shortcoming of CAC policies is that even when compliance with standards is achieved, the ambient quality of the air in a city may continue to deteriorate. This can happen when the number of polluting firms increases. Therefore, together with emission limits, permits for industrial locations would have to be restricted if an ambient quality standard is to be met. This may be difficult as the two decisions may fall under the jurisdiction of two different ministries.

The distributional consequences of CAC policies, when the incidence of the policy is restricted to large units, are not obvious. Marginal units may fake smallness and evade control. A large unit may be producing goods for consumption by the poorer classes while a small unit may be manufacturing luxury goods. SMEs may lose their relative competitiveness when small units are not exempted and if there are economies of scale in abatement technology that may favor larger units.

In certain instances, however, CAC policies may be considered appropriate. When products are considered too damaging, either too health or property, their use may be banned. CAC restrictions may also be used to protect fragile ecosystems where the uncertainty of market-based policies could be considered too risky. In addition, market-based policies may lead to very unequal results when income distribution is uneven.

2. Promoting technology for clean development through command and control instruments

An important aspect of CAC instruments in developing countries is the promotion of clean technologies. Among these are measures that generate public pressure through labeling, ISO standards, the creation and maintenance of public databases on clean technologies, research and development for cleaner technologies, and the provision of finance for adoption. Industry is becoming increasingly sensitive to environmental concerns. Waste minimization, energy efficiency, waste recycling and substitute chlorofluorocarbon (CFC) programmes are among the many initiatives now being undertaken. While environmental auditing is not yet common, the following examples show that some countries have pioneered its practice:

- Major equipment manufacturers in Japan produced a package of environmental control and audit standards to prevent pollution as early as the 1970s; and
- In India, the Ministry of Environment and Forests issued a notification in 1992 requiring every industry to audit stocks and consumption of raw materials, output, wastes, methods of waste disposal and the environmental impact of the industry on its surroundings.

Other examples are documented in the *GEO 2000* report by UNEP.

Recognition of the importance of clean technology is reflected in the regional interest in ISO 14000 standards for manufacturing. National organizations to certify these standards have been established in Malaysia, Singapore and Thailand. The Government of the Philippines is adopting ISO 14000 standards as part of its national standards. Industries in the Republic of Korea are

preparing to adopt the ISO 14000 environmental management system and some companies have already introduced an internal environmental audit. Japanese companies have watched the ISO developments closely and many of them are planning to obtain the ISO 14001 registration, which they see as essential to succeeding in international markets.

Environmental labeling is being promoted in a number of countries to encourage cleaner production as well as to raise awareness among consumers of the environmental implications of consumption patterns. In Indonesia, for example, timber certification and eco-labeling are used as instruments to attain sustainable forest management. In Singapore, some 26 product categories are listed under the Green Labeling Scheme while the Government of India has prepared Ecomark criteria for 14 product categories: soap and detergents, paper, paints, plastics, lubricating oil, aerosols, food items, packaging materials, wood substitutes, textiles, cosmetics, electrical and electronic goods, food additives and batteries. In New Zealand, the national eco-label, Environmental Choice, was launched in 1991, but six years later only three companies had earned the label.

Partnerships are emerging between governments and the private sector for providing environmental services and infrastructure. In Pakistan, the Federation of the Pakistan Chambers of Commerce and Industries has been working with the Government to combat pollution. In India, the National Environmental Engineering Research Institute is developing a wide range of environmental technologies to improve pollutant monitoring, recycling and management of urban and industrial solid wastes, EIA analyses, water treatment and environmental support for rural development programmes. The Government of Indonesia, acting through the Environmental Impact Management Agency, is providing assistance to factories in the development of cleaner and less polluting technology. In Thailand, the textile, pulp and paper, electroplating, chemical and food industries are all involved in promoting cleaner production initiatives. Reports by the Federation of Thai Industries and Thailand Environment Institute indicate that cleaner production is having a significant impact in terms of minimizing waste and pollution as well as promoting cooperation between Government and industries, and among the industries themselves. Other countries in the same subregion are expected to follow this trend.

Japan has been a pioneer in pursuing policies to encourage cleaner production as well as the development of the required new technologies. The private sector finances some 60 per cent of all research and development into environmental technology, and contributes heavily to a number of government research agencies. Japanese industry is particularly strong in certain clean energy fields such as photovoltaic cells and fuel cells, and in "end-of-pipe" technology and clean motor vehicle technology. The country enforces the world's most stringent standards for automobile exhaust emissions as well as strict standards to control smoke emissions from factories and other facilities. As a result, Japan has been successful in reducing atmospheric SO_2 and CO emission levels. Nine of Japan's largest steel makers are involved in a project to increase the use of scrap metal in steel manufacture, and the Japan Automobile Manufacturers Association has set standards for making vehicle parts in plastic for easy recycling. Consumer cooperatives have become a powerful force in popularizing "green" products in Japan while local governments have progressively provided technological and financial support to SMEs. In the Republic of Korea, an Act for Promoting Environmentally Friendly Production

Systems and the Environmentally Friendly Plant Certification System were passed in 1994.

In China, an elimination system in the chemical, metallurgical, machine tool, power generation and construction industries is getting rid of factories with high pollution costs and those based on old smokestack technology. By June 1997, some 64,000 enterprises with heavy pollutant emissions had either been closed for refurbishment or had ceased production. Heavy metal pollution from industrial workshops, which used to constitute a major water contamination problem, has been particularly targeted. For example, as part of the Three Rivers and Three Lakes water control project, covering the Huai He, Hai He and Liao He rivers and Tai Hu, Dian Chi and Chao Hu lakes, an Interim Regulation for Controlling Water Pollution along the Huai He River was formulated. This was one of the seven largest water basin programmes in China. By 1997, when the programme ended, several thousand small enterprises that had been discharging heavy pollutants had closed down, upgraded their technology or transferred production to clean products, and the water quality of the river had improved substantially.

Policies are being pursued to decrease atmospheric pollution, particularly from smoke and dust, and to expand smoke control areas. These policies include the introduction of clean-burning technology. The main obstacles are the lack of adequate capital and technology necessary for changing the present energy structure.

In Australia, the draft National Strategy for Cleaner Production examines activities to date in encouraging the implementation of cleaner production. It recommends further measures, drawing on national and overseas examples. The National Pollutant Inventory, established under the 1996 National Environment Protection Act, will produce a public database detailing the types and amounts of certain toxic chemicals entering different areas of the Australian environment.

Cleaner production is also being fostered in New Zealand by government agencies such as the Energy Efficiency and Conservation Authority and the Ministry of the Environment.

The Clean Development Mechanism of the Kyoto Protocol, together with other features of the continuing negotiations in the context of the UNFCCC, are potentially important to all countries in the region. They open significant new prospects for the Pacific island nations in particular, since (a) the small scale of their economic activity has not previously created scope for the transfer of clean technology outside a limited number of aid projects, and (b) because there is a need to build local capacity in applying the new technologies that are now available in, for example, the management of solid waste and hazardous substances. This could have a crucial and beneficial impact on many Pacific island communities whose remote situation invites the application of such technologies as solar photovoltaic cells and wind power.

3. Incentive-based policies

Among the preferred incentive based policies for environmental management are: (a) internalization through taxes/subsidies, pricing, depletion charges, tax write-offs, insurance, bonds and liability laws; (b) the allocation of property rights; and (c) the creation of markets through tradable permits/quotas. The basic objective, as already noted, is to change decision-making process of companies and individuals.

(a) Taxes/subsidies

When a tax is imposed on a market that is functioning well, it may create distortion and efficiency loss. A measure of this is the deadweight loss, which is the difference between the loss in consumer and producer surplus and the tax revenue collected. The distortions introduced by taxes imposed to raise revenue can be immense. In the case of the United States, these costs have been estimated to range from US$ 0.17 to US$ 0.56 for every US dollar of tax collected, and it could be much higher in developing countries. However, as an environmental tax internalizes an externality, thus removing a distortion, it should therefore increase efficiency.

It is, however, important to recognize that ill-conceived taxes and price policy (which is also a form of tax policy) often lead to environmental degradation. For example, Binswanger documented how Brazilian tax policy promoted deforestation in the Amazon. Similarly, Panayotou reported on how a misconceived logging ban had accelerated deforestation in Thailand. Routinely subsidized irrigation water in South Africa contributes to land degradation in many countries. In India, irrigation charges from public systems do not cover operating costs let alone capital charges. Electricity for tube wells is highly subsidized and often not measured. Farmers use both electricity and water wastefully and contribute to water loss and land and air pollution. Repetto reported that in Indonesia, the Republic of Korea, Nepal, the Philippines and Thailand, irrigation costs amounted to between 440 per cent and 1,800 per cent of irrigation revenue.

Policies such as these that contribute to environmental degradation may be difficult to change, given the economic benefit they provide to farmers. However, extension and raising awareness could help. Furthermore, one strategy for effecting a policy shift would be to frame the change as an improvement in efficiency (that is, make it a "win-win" policy). The extent of such an improvement will depend on the level of tax compared to the existing distortion. Taxes can be used for a variety of environmental purposes, such as containing undesirable effluents and emissions, conserving goods and exhaustible resources, and combating externalities.

Some specific economic instruments that may be more effective in controlling effluents and emissions are detailed below.

(i) Emission charges

Imposing a tax on the quantum of emission will give a profit-maximizing business the incentive to reduce it. Enforceability of emission taxes requires the measurement of emissions from each firm. It may be noted that CAC measures will also require similar measurements. Therefore, techniques may need to be developed for apportioning emissions to sources from ambient measurements at a few places.

(ii) Input taxes

Sometimes, in order to reduce emissions, it is easier to levy a tax on the use of inputs, rather than on the actual emissions. Consider, for example, residues in groundwater resulting from the use of chemicals. A tax on chemicals (particularly toxic chemicals) would promote their less wasteful use and also reduce groundwater pollution.

(iii) Subsidies and tax write-offs

In many instances, alternative environmentally sound techniques exist and incentives can be introduced to promote them. For example, manual weeding may be preferable to the use of herbicides.

Integrated pest management may be more environmentally friendly than chemical pesticides. However, these environmentally preferred methods may be more expensive or less effective from the farmer's point of view. In such instances, a subsidy or tax write-off may be given to those who use these techniques. The subsidy level has to be such that it makes it profitable for the farmer while, at the same time, the social value of the benefits have to exceed the cost of the subsidy.

(iv) Subsidies for the use of abatement equipment

Subsidies may also be given to encourage the installation of abatement equipment. Here also such subsidies make installation attractive to firms while, at the same time, social benefits accrued should be larger than the cost of subsidies.

(b) Depletion charges, tax write-offs and pricing

(i) Depletion charges

Establishing a particular rate of use for an exhaustible or non-renewable resource through a tax on the extracted resource (depletion charge) is another option. This could reduce the demand due to the price increase while also promoting the development of substitutes.

(ii) Tax write-offs for promoting conservation, re-cycling and substitution

Another way to reduce demand for non-renewable resources is to promote conservation, re-cycling and substitutes. For example, a tax write-off or an investment allowance may be given for energy-saving investments. Recycling could be promoted by giving excise rebates on recycled products. Research and development for substitutes could be encouraged through tax incentives. All these measures could reduce demand, both in the short term and long term.

(iii) Appropriate pricing for resources: removing subsidies

Sometimes, pricing of resources does not consider the cost of the environmental consequences while, in some cases, it is set so low that it encourages wastage of resources. A typical example is irrigation water. For example, in India, the price charged for water supplied from public irrigation systems does not even cover the cost of operating those systems, let alone pay for the cost of the capital investment. Also, the irrigation charge is a flat fee and not related to the volume of water used. This leads to massive overuse of water, distortion in cropping patterns, unequal distribution and water logging. A price based on the volume of water used would significantly reduce these undesirable consequences.

(c) Allocation of property rights

Common property resources can be managed sustainability if some form of property rights is allocated to users. Panayotou observed that "contrary to conventional wisdom, economic instruments are neither foreign nor new to developing countries. Traditional societies, especially, have a wealth of customary use rights, communal management systems, and customs that provide incentives for efficient use and management of natural resources". These range from water rights in India, to communal forests and land rights in Papua New Guinea and customary fishing rights in Sri Lanka.

These systems, far from being outdated, contain valuable lessons and elements for the design of effective modern systems for managing natural resources in developing countries. Customary communal rights over resources could form a dynamic balance between the economies of collective

management and the gains from the internalization of externalities. However, rigid applications of many of these traditional systems have not withstood the test of time, while others are undergoing intense pressure from population growth, new markets and modern technologies. Nevertheless, they act as prototypes of management systems that are attuned to the local cultures and provide insights into the design of modern systems of natural resource management in non-Western societies.

The developing country experience is not limited to customary use of rights for communal resources. For example, private water rights in India provide incentives for efficient management of increasingly scarce water resources. As early as the mid-1970s, Malaysia introduced a system of effluent charges for its palm oil and rubber industries, while Singapore instituted marginal cost pricing of access to the city centre in order to combat traffic congestion. More recently, China introduced industrial discharge permits and emission charges, which double or triple when the allowable discharge standard is exceeded. Traditional fishing communities in Sri Lanka have solved the problem of overfishing through a combination of customary territorial rights and economic incentives as well as internally imposed quantitative controls sanctioned by the community's social organization.

(d) Tradable permits

Tradable permits for the use of natural resources or emissions based on environmental carrying capacity offer another option. For example, with regard to the control of emissions of SO_x in the air, imposing CAC standards or even a pollution tax does not ensure an ambient air quality at the desired level. Under the tradable permits scheme, quotas amounting to emissions that will ensure the desired air quality are auctioned off or allocated to different firms. They are, however, free to trade these permits. Thus, the assumption is that ambient air quality will remain at the desired level as no firm will release emissions beyond its quota. Also, since permits can be traded, this approach will be realized at minimum cost. For example, firms, when taxed, emit only up to where their marginal cost of remission equals the tax rate. Different total emission levels occur in accordance with different tax rates. The price at which quotas are traded serves the purpose of an emission tax, with the rate being determined by the market at a level that restricts total emissions to the desired concentration.

The distributional effects of such a system depend on the initial allocation of the quotas. It can be argued that quotas should be allocated equally to all citizens of the region or the globe, in which case, equity would be served. The difficulties of implementing such quotas are not much greater than imposing an emission tax. Both require monitoring and measurement. With today's computer technology, the additional task of matching quota ownerships with emissions should not be a problem. Of course, a mechanism to punish those who exceed a quota is needed, but so is a mechanism to punish those who do not pay emission tax.

Tradable quotas can promote dynamic efficiency, if a futures market system is introduced. If quotas are tradable for the next 10-20 years, firms can take decisions with lesser uncertainty. In addition, quota prices will encourage researchers to work on abatement and substitute technologies. They will also help determine the value of new technologies.

However, under certain types of uncertainty a price policy may be preferable, such as a situation in which the

marginal pollution control cost curve is very steep but the marginal social benefit curve is very flat. In that case, there is uncertainty about the cost curve with the regulatory authority. If the total quantity of tradable permit released by the authority is too small, it could impose very large abatement costs without corresponding benefits to society. In such a situation, a tax policy may give a better result in terms of social benefits. A combined policy may yield an even better outcome where the quota is set at the level that equates expected marginal benefit with expected marginal cost, together with an adjustment mechanism under which the polluters are provided with a subsidy for reductions below the quota and a tax for emissions above the quota. This mechanism, in effect, lessens the steepness of the marginal pollution control cost curve.

4. Economic instruments for sustainable development in the Asian and Pacific region

Many countries in the region are beginning to make use of economic instruments although often still in combination with CAC regulations. In China, for example, economic instruments such as pollution charges, pricing policy, favorable terms of investment for environmental technology, market creation and ecological compensation fees are being introduced. In the coming decade, China aims to incorporate natural resource and environmental values into the accounting system for its national economy as well as establish a pricing system that reflects environmental costs. Mongolia, in trying to move from a top-down CAC approach to one with increased public participation, is relying on traditional patterns of resource use, enhanced by economic incentives and user-pay principles. Thailand has subsidized capital investment in the treatment of hazardous wastes and toxic chemicals, implemented a service charge on community wastewater treatment, and introduced a price differentiation between leaded and unleaded gasoline. The Government of Thailand is also considering granting community rights to conserve forest areas.

Economic incentives and disincentives are being employed to promote environmental conservation and efficient resource use. Incentives include preferential tax credits and accelerated depreciation allowances on pollution abatement and control equipment. For example, tax deductions stimulated the installation of industrial anti-pollution equipment in the Philippines and the Republic of Korea, while in India an investment allowance of 35 per cent, compared with the general rate of 25 per cent, is provided towards the cost of new machinery and plant for pollution control or environment protection. Another success story is the Demand-side Management Programme in the power sector of Thailand (box 1), partly funded by the Global Environmental Facility.

A number of deposit-refund schemes have been promoted to encourage recycling and reuse of products, especially packaging materials. For example, manufacturers and importers of various goods in the Republic of Korea are required to deposit funds with the Government to cover the cost of waste recovery and treatment.

In order to effectively use the polluter pays principle, pollution fines are invoked. For example, in the Philippines fines are used to complement the enforcement of emission standards. They are based on the duration of the violation, the environmental conditions prevailing at the time, the quantity of effluent discharged and the average deviation from the effluent or emission standards. Among the East Asian countries, Japan and the Republic of Korea have both adopted the

polluter pays principle, although in Japan it has yet to be applied comprehensively to pollution control because of existing systems of financial subsidies and tax credits. In Malaysia, discharge fees have been in use since 1978 to complement a regulatory approach towards solving water pollution from palm oil mills. With the gradual imposition of more stringent standards and higher discharge fees, biological oxygen demand in public water bodies dropped steadily from 222 metric tons per day in 1978 to 58 metric tons in 1980 and 5 metric tons in 1984.

Box 1: Demand side management in the power sector in Thailand

Recognizing the severe impacts of accelerated energy demand, the Government of Thailand has adopted a comprehensive Demand-side Management (DSM) Plan for the power sector. A five-year (1993-1997) DSM Master Plan was formulated and implemented with a total budget of US$ 189 million. By the end of October 1997, the DSM programmes were saving 295 MW of peak demand and 1,564 GWh per year of electrical energy. The reduction in CO_2 emissions through the DSM programmes was estimated at more than 1 million metric tons per year while the investment required in power generation was reduced by US$ 295 million. The programmes also resulted in consumer savings of US$ 100 million per year in terms of electricity bills. The DSM programmes include: (a) switching lamp production from fat tubes (40 W and 20 W) to slim tubes (36 W and 18 W) and promotion by the Electricity Generating Authority of Thailand (EGAT) of compact fluorescent lamps instead of incandescent lamps through price differentials; and (b) the Green Building Programme, through which commercial buildings can obtain CFLs at a subsidized price. For existing buildings, EGAT carries out an energy audit, and the design and retrofitting of electrical systems to comply with the energy efficiency requirements set by the Government.

EGAT also provides: (a) interest-free loans to building owners for energy-saving modifications; (b) a programme to replace fluorescent lamps for rural street lighting with subsidized high-pressure sodium vapor lamps; (c) a campaign to test refrigerators and air conditioners for efficiency; (c) interest-free loans to purchase efficient air conditioners; (d) a programme under which EGAT encourages manufacturers and importers of electric motors to produce or import high-efficiency motors, and industrial entrepreneurs to utilize high-efficiency motors by providing interest-free loans to meet the additional costs.

A DSM study for India similarly showed that a large potential existed for energy saving. The study looked at 12 specific technologies and considered only those applications that had a payback period of two years or less. Even then, the estimated saving potential for India over a 15-year period was 15,000 MW of peak demand.

Sources: EGAT, 1997, for Thailand; J. Parikh and others, 1994, for India.

Singapore introduced road pricing in the early 1970s to reduce road congestion. Highly effective area licensing schemes were adopted that, by charging drivers to use the roads in the city centre during peak hours, reduced congestion significantly. This system is to be further improved by an automated electronic road pricing system. In 1990, to control the growth of private vehicles even further, Singapore introduced a vehicle quota system under which anybody wishing to own a car had to bid for a Certificate of Entitlement.

South Asia and most of the Mekong Basin countries still rely more on regulatory mechanisms for achieving environmental policy objectives than on market forces or economic instruments. However, awareness is growing of the importance of pricing resources, such as water, to reflect their real economic value and social cost. There have been some successful examples of price mechanisms influencing the more efficient use of water by the industrial sector. In India, property rights, especially for water and forests, remain ill-defined and insecure. This is despite efforts to decentralize decision-making to the local level. In these sectors, there is a need to consider the interests of the poor and introduce measures to prevent commercial interests from taking over.

In the Pacific Islands, few economic instruments have so far been introduced as tools for environmental management. A lack of experience with such mechanisms, the important role of the informal economy and the traditional role of "custom" in resource management at the local level all weigh against market-based instruments. Nevertheless, the possibility of increased impacts stemming from globalization will make it essential for countries to consider the role that such mechanisms may need to play in future.

While economic and fiscal instruments are being promoted for many environmental uses in Australia, the opposite seems to be occurring in New Zealand, where the only fully-developed example of an economic instrument at present is a transferable quota system used to manage the major fisheries. The best-known economic instruments are the deposit-refund schemes that operate for soft drink, beer and milk bottles.

Table 6. Applications of economic instruments in developing countries of Asia and the Pacific

Country	Type	Period	Direct instruments	Indirect instruments
Land and soils				
Indonesia	C/RS	1985-	Removal of pesticide subsidies	
Thailand	PropR	na	Community rights to conserve forests	
Water resources				
Malaysia	C/RS	1978-	Effluent charges (with stiffening standards)	
India	C/RS	na	Mix of water tariffs, pollution charges and fiscal incentives in Jamshedpur	
India	TP	na		Groundwater markets in Punjab, Uttar Pradesh and Haryana
China	C/RS	1985-		Irrigation service fees. Decentralization of authority to local water management agencies
Thailand	C/RS	na	Charge on wastewater treatment	
Congestion and air pollution				
China	TP	1985-	Pollution discharge permit system, Beijing	
China	C/RS	1985-	Emission fee and fine collection system, Beijing	
Thailand	C/RS	na		Higher price for leaded gasoline
Republic of Korea	EI	na		Investment allowance for anti-pollution equipment
Philippines	EI	na		Investment allowance for anti-pollution equipment
India	EI	na		Investment allowance for anti-pollution equipment
Thailand	EI	na		Demand side management to reduce electricity needs
India	EI	na		Demand side management to reduce electricity needs
Human settlements				
India	DRS	na	Deposit refund on glass, carbonated beverage containers	
Republic of Korea	EI	1991		Manufacturers required to deposit funds for waste generated by product
Republic of Korea	C/RS	1995	Volume-based charges for municipal wastes	
Singapore	C/RS	1970-	Road pricing	
Singapore	TP	1990-	Auctioning of ownership permits to limit cars	
Toxic chemicals and hazardous waste				
Thailand				Posting of performance bonds based on projected levels of hazardous wastes
Thailand	EI	na		Subsidy for capital investment

Source: T. Panayotou, 1996, with certain additions.
Note: C/RS = Charge or removed subsidy; TP = Tradable permit; DR = Deposit-refund system; SB = Subsidy; EI = Enforcement incentive; PropR = Property rights.

C. Implementation, monitoring and enforcement

To implement environmental policies, special institutional mechanisms are needed. Whether CAC policies or incentive-based policies are used, monitoring is required to ensure compliance. For example, when an effluent quality standard is prescribed or an effluent tax is imposed, in either case it is necessary to monitor the quality of effluents. Some examples of institutional arrangements are detailed below.

1. Special government agency

A PCB can be established with sufficient authority and technical and human resources to monitor compliance and initiate action against violators. Agencies are also required for assessing EIA studies of new projects, prescribing corrective measures and ensuring that the measures are implemented. Many countries have established environmental agencies with accompanying legislation.

2. Civil society organizations and public participation for promoting compliance

An informed and aware citizenry can greatly facilitate environmental compliance if appropriate mechanisms are set up. Citizen pressure can be effective in modifying the behavior of large corporations and even SMEs. For example, it has helped in reducing effluent discharges into the Chao Phraya River of Bangkok by establishments located along its banks. The process can be strengthened by facilitating public action through the right to information, effective liability laws, and a judicial system that dispenses justice quickly and inexpensively.

3. Right to information

Citizens should have a right to access information on who pollutes and how much. This could generate pressure on industries to clean up their act. It could also make an enforcement agency more accountable and spur it to take action.

4. Liability laws

A strict liability law can be an effective policy instrument for ensuring that polluters take every possible measure to avoid environmental accidents. The concept of strict liability holds polluters liable for any environmental accident, regardless of whether their actions were negligent. The advantage is that the regulator does not have to know the costs of abatement nor the probability of accidents or failures. The polluters make their own estimates of expected liability and abatement costs, and take appropriate measures.

5. Legal system

For strict liability to function, a strong and independent judiciary in required to ensure that due process is upheld, so that even if a firm goes bankrupt, compensation is paid to the sufferers. This would encourage firms to take effective measures to avoid rare but highly damaging accidents, as required by the legal doctrine of strict liability.

6. Economic valuation in EIA and IEEA

The preparation of EIAs with economic valuation and regular preparation of IEEAs can be of much value in monitoring sustainability of policy. As pointed out in the previous chapter, independent consultants will be needed to carry out EIAs and an independent regulatory body will be required for assessing, accepting or rejecting it. To maintain the independence of the process, public hearings where stakeholders can participate become important.

While the EIA process can ensure that individual projects are environmentally sound, the IEEA role could be to indicate whether or not the macro-policies will lead to sustainability

of the development process. For example, it is only through the adjustment of the economic accounts, by subtracting the loss of various natural and environmental resources from GDP, can a measure of net growth be obtained. Regular publication of such accounts would provide citizens with a measure against which the economic and environmental performance of the government can be judged.

D. Conclusions

A number of options are available to the governments in the region for converting environmental policies into tangible actions. The selection of an option or a combination of options should depend on the particular circumstances of the country and the type of problems it faces. In selecting specific policy instruments, however, the benefit-to-cost ratio, efficiency, who gains and who loses, public acceptance and the possibility of enforcement at reasonable costs must be considered.

The countries in the Asian and Pacific region have used both CAC policies and incentive-based policies. With sizeable production from SMEs, policies of effluent/emission standards and fines are difficult to enforce. A CAC policy of setting environmental performance standards for new equipment can be very effective in developing countries where capital stock is accumulating at a rapid rate. However, the use of CAC measures are by far the most predominant in the countries of the Asian and Pacific region. Applying CAC measures to the environment have included:

- Enacting and enforcing environmental laws and regulations;
- Establishing and maintaining government agencies responsible for the environment;
- Creating reserves and park areas;
- Adoption of ISO standards.

However, experiences with CAC in many countries have shown limited success in dealing with the protection of the environment.

Under the present conditions of the lack of resources and weak monitoring capacities, governments need to implement a system that could use a combination of limited CAC and more incentive-based measures. This should be supported by a comprehensive educational and public awareness programme. However, an integrated government policy on incentives for implementation will require the participation of a wide range of government agencies, many with very different disciplinary backgrounds. A set of incentives aimed at influencing development investment will require the involvement of economic planners, development financiers, conservation management agencies and the public at large. National efforts, therefore, would also be needed in human resources development and capacity-building.

Self-regulation, through incentive-based measures, implies less inspectors, fewer court cases and less bureaucratic delays. The goal should be to increase the acceptance of government environmental policy by the private sector. Involving the private sector in the means to achieve environmental goals is expected to result in more realistic and economic ways of achievement while also preventing unfair competition. Given the current limitations created by poor monitoring, database and administration, setting or enforcing complicated and stringent norms and standards will not be feasible. Until a reasonably adequate and reliable database can be established, simple standards offer a better chance of achieving compliance and enforcement.

IV. *Environmental governance: sectoral issues*

At the national level, a daunting challenge for environmental governance is not only the guidance of the overall environment and development process on a sustainable path. It also includes: (a) the promotion of vertical coordination between the various tiers of the government at the national, provincial and local levels; and (b) the horizontal coordination between the key sectors of the economy. The process of plan formulation should involve intensive deliberations on those aspects of sustainable development that are most relevant to national priorities as well as extensive participation by the public in giving their views and suggestions on the adoption of appropriate means for accomplishing sustainability.

Most ministries in the countries of Asia and the Pacific are arranged along sectoral lines. Ministerial and departmental terms of reference, policies and objectives can conflict with each other when it comes to sharing the exploitation of common environmental resources. Indeed, in the past, the expansion of certain sectors has often gone ahead without concern for the environmental impacts of such actions on other sectors. Such operations have created widening sources of conflicts and inefficiencies in the different use of resources. Examples of where that has occurred are highlighted in this chapter. At the root of the problem is the inadequate and sectorally-oriented legislation as well as the lack of a formal mechanism for communication and coordination of activities between different institutions responsible for environmental resources.

This chapter concentrates on the sectoral dimension of environmental governance. Taking into account the most widely recognized and key environmental concerns in the region, it highlights some sectoral inputs that could contribute to the mitigation of these problems.

A. Land-use change and deforestation

For the developing countries of the Asian and Pacific region, land is one of the most important resources. Its productivity is critical for the well-being of farmers and poor consumers who spend a large part of their income on food. As shown in table 2, deforestation is a key concern for 28 out of 39 countries of the region.

1. Driving force

Despite rapid urbanization in many developing countries, population densities in rural areas are continuing to increase. Unchecked growth of rural populations can lead to environmental problems when the demands of the rural population exceed the carrying capacity of the land.

It is obvious that the demand for biomass rising as population and incomes increase. Biomass in the form of food or feed, pulp and paper, furniture and construction materials are demanded in increasing amounts as incomes rise. The only biomass use that goes down with a rise in income is the use of firewood and dung as fuel.

With limited cultivable land in many Asian countries, the increasing demand for biomass can only be met through more intensive cultivation. Such cultivation however, often involves the use of chemical inputs, which cause their own problems with effluents in run-off and groundwater resources.

In countries where land is available, cultivation is expanded to new areas, often at the cost of forests. In addition, urban expansion is often at the cost of agricultural land. To compensate for lost cropland, forests are cleared and the land cultivated. In land-scarce countries of Asia, the price of cropland expansion is deforestation. The expansion of agriculture through deforestation decreases the area under natural ecosystems. In addition to

soil erosion and associated consequences of deforestation, the loss of variety and biodiversity makes the system more fragile.

Thus, a growing demand for biomass increases the fragility of the ecosystem when intensive or extensive use of land takes place. It must be remembered that a fragile ecosystem is unable to return to its initial state after even a modest shock.

The propensity for biomass demand to exceed the productive capacity of land is much higher when the population of rural poor increases. They depend on limited common property resources for their fuel and forage requirements. Once the biomass demand exceeds the natural regeneration rate, common property resources degenerate rapidly and turn into wasteland. Therefore, it is necessary to limit biomass extraction from such common property resources and involve people in the management of those resources. While voluntary and cooperative efforts have occasionally succeeded in achieving this objective, a more effective policy is to absorb the rural poor in gainful employment outside agriculture. Economic development is essential to the creation of needed employment opportunities.

2. Policies

Integrated sectoral policies and actions are needed for dealing with the problems. Population policy, education policy, increasing agricultural production, macroeconomic policy, fuel policy, the promotion of efficient technology, the removal of subsidies on timber, innovative actions for controlling commercial logging, the promotion of social forestry and the protection of forests through stakeholder participation as well as CAC mechanisms all have a clear role to play.

The first set of obvious policies covers those for curtailing population growth, which works in the long term. For that, the provision of family planning services, female literacy, gender equity, female empowerment and economic growth are needed. It should, however, be noted that while female literacy is important for reducing fertility, it is not the magic bullet. In addition, the provision of family planning services, health care and female empowerment is necessary. Literacy, however, is important in itself for human well-being.

The performance of South Asian countries in promoting literacy, particularly female literacy, is far from satisfactory. The low rate of class attendance is often due to the poor quality of schools. School infrastructure and teacher accountability are serious problems. However, rapid strides can be made with a decentralized approach that empowers local communities to run schools. This is shown by the experience of the Education Guarantee Scheme (EGS) of the State of Madhya Pradesh in India (box 2) and the UNDP-assisted COPE project in Nepal.

Apart from population and education policies, macro policies that lead to rapid economic growth and the creation of jobs in non-agricultural sectors can attract small cultivators to leave agriculture. This lowers the proportion of the population dependent on agriculture. Of course, those who remain will increase the size of their holdings. Yet, the overall pressure on cropland could decrease as larger cultivators may practice more intensive cultivation. However, with economic growth often comes urbanization and increased demand for agricultural products and timber. This may lead to the expansion of cropland and deforestation. An increase in agricultural productivity can reduce deforestation. Laws to preserve natural forests, mechanisms to enforce those laws and encouragement for commercial forestry can also help to curtail deforestation.

The felling of trees by the poor for fuelwood, subsequently leading to deforestation is a theory that is no longer believed. Empirical evidence in India and other countries shows that the poor do not cut down trees. They are aware of the need to keep the trees growing. Much of the firewood gathered by the poor comprises twigs, lops and tops. Also, much of the fuelwood burnt in India comes from privately-owned land and social forestry. Nonetheless, reducing the need for fuelwood would improve the quality of forests. This can be done if the poor are provided with alternate fuels or encouraged to use wood-burning stoves with improved fuel efficiency.

3. Institutional challenges

Another issue is how to control commercial loggers whose economic incentives to cut natural forests are very high. Commercial loggers may find it more profitable to cut existing forests than to invest in planting trees and waiting for them to grow. The traditional approach of having a government own all the forests and letting the Forestry Department issue permits to loggers for a prescribed amount has not worked very effectively. First, the stumpage fee charged is often too low and does not account for the full value of the tree, let alone the forest. Thus, there is a distorting subsidy, the removal of which will increase efficiency. Second, there is often collusion between loggers and Forestry Department officials and extensive clandestine logging takes place. Thus, raising stumpage fees may only lead to more clandestine logging. However, raising stumpage fees would increase the price of timber and reduce its demand. So some benefit would be gained. The fee should be raised to cover full long-term marginal costs.

Box 2. Education guarantee scheme of Madhya Pradesh State, India

In 1997, the State Government of Madhya Pradesh made a radical break and promoted the Education Guarantee Scheme (EGS) with the objective of reaching primary school facilities for every child in the State. Under EGS, the Government guarantees the provision of a primary schooling facility to the children in a community where there is no such facility within 1 kilometre. The guarantee is that the facility will be provided within 90 days of receiving a demand by the local community. EGS operates on a decentralized basis through collaboration between the State Government, the local *panchayat* and the community.

The community submits its demand, identifies a local resident to be *guruji* (teacher) and provides start-up space for the school. The *panchayat* appoints a teacher and oversees the functioning of the school. The State Government supports the school through a grant for the teacher's salary, arranges training for the teacher, provides teaching-learning materials and academic supervision, and provides all inputs for ensuring quality. Thus, EGS gives children a school on demand. The accomplishments of EGS so far include:

- Reaching the unreached in the quickest possible time.
- The opening of 40 primary schools every day in 1997, which demonstrated the demand that existed.
- Madhya Pradesh achieved a facility in every community by August 1998.
- The elimination of the historical backlog in 18 months at one third the cost of conventional schools.
- Successfully assisting the target group that consists mainly of scheduled tribes and girl children.

Some critics have questioned the quality of the education provided in such schools. However, a comparison should be made with the generally poor quality of public schools. The quality problem is not particular to the EGS schools. For those without any school facility, an EGS school is a great improvement.

Source: Based on information at www.fundaschool.org/html/whatsit.htm

Neither of the above mechanisms - permits nor pricing - will work without effective monitoring. Such monitoring of vast expanses of forests by a government agency is, to say the least, difficult. A possible way could be to utilize financial markets to do the job (box 3).

Many countries have accumulated extensive experience of the successful involvement of local people in forest management and afforestation who depend on forest products for their livelihood. The key to stakeholder participation is to empower them with rights to the products of the forests in a well-defined way that creates incentives for sustainable use.

One way to reduce forest degradation is to improve the productivity of newly-planted forests. Such efforts have gained a new significance with the increasing demands for timber and fuelwood and the rapid decline of natural forests. Improving the productivity of forest trees can make an important contribution to increasing incomes and asset values, especially among the poor, and to protecting the environment. Such efforts are eminently suitable for an intercountry and regional approach, largely in view of the many commonalties of tree species across national frontiers and the major gains to be obtained through knowledge, technology transfer and field experiences in relation to the range of tree species that are being planted (box 4).

C. Land degradation, restoration and afforestation

Land degradation is a key concern of 24 countries of the region (table 2). The following account examines separately the issues related to the degradation of privately- and publicly-held land as they are different from one another.

1. Privately-held land

(a) Driving forces

When land is privately held, the owner is unlikely to willfully and knowingly degrade it. However, ignorance of the consequences of the owner's actions could damage it. For example, overuse of water can lead to water logging. Excessive use of fertilizers and pesticides may damage the land. Improper shrimp farming/aquaculture may also damage land. However, there is some evidence that when farmers are aware of the consequences, they take care to maintain the productivity of their resources.

Box 3. Using financial markets for sustainable forestry

Financial markets can play an allocative role in the sustainable exploitation of forests. Today, forest contractors have no incentives to nurture the forests assigned to them and they would like to clear-fell such areas. Forestry Departments are forced to micro-manage the actions of contractors, but the forestry officials are only human. Thus, while the areas under the responsibility of the Forestry Departments grow, the actual forest areas decline.

The problem arises from the fact that ownership of the forests is not with the contractors. However, if forests were privatized, there would be no guarantee that they would be maintained as forests. Even if the land contained trees, private owners might prefer to operate commercial plantations with inferior biodiversity.

One possibility is to lease out forests on a long-term basis of, say for 30 years, to private firms with the stipulation that a forest of the same quality (as defined by certain objective metrics concerning biomass, biodiversity etc.) will be returned at the end of the lease period. The failure to do so would evoke substantial penalties. However, how can it be ensured that the terminal conditions generate altered behavior today? One way is to stipulate that the leases are only given to joint stock companies with shares that are meaningfully traded on the stock market.

The stock market would be aware that a large penalty awaited any company that failed to maintain a forest through adherence to certain minimal standards. Security analysts today visit the plants of companies that they cover; it is not unreasonable to think that they could also visit the forests, which are comparable productive assets. The stock market would carry out this monitoring in a more efficient and corruption-free fashion compared to any bureaucratic organization. Satellite images and even aerial photos from low-flying aircraft could be regularly provided to the public by the Forestry Department.

Similarly, it is feasible for voluntary environmental groups to visit a given forest once every 15 years and verify the correct calculation of penalties. In contrast, it is not feasible for them to ensure the honest day-to-day, micro-management by a Forest Department, which is required to ensure good behavior on the part of forest contractors.

Source: K. Parikh, 1995, "Sustainable development and the role of tax policy", *Asian Development Review*, vol. 13, No. 1, pp. 127-166

Box 4. Improving the productivity of man-made forests in the Asian and Pacific region

A five-year UNDP project was directed to improve the productivity of man-made forests in the Asian and Pacific region through the application of technological advances in tree breeding and propagation.

Major opportunities were evident for collaboration with other donor activities, especially with those of the Australian Tree Seed Centre, and the project established close linkages and co-financing arrangements with them. A total of US$5 million was allocated to the project by UNDP. Denmark and the Netherlands made contributions in kind to the project.

The primary aim of the project was to train foresters and forestry researchers in the region through technical cooperation. An independent review carried out at the completion of the project found that "many important contributions can be attributed to the project. It has acted as a regional forum on tree breeding and propagation issues and has been of value to other national and intercountry activities of donor agencies. It provided a high profile to a subject, which was growing in significance. It has been a catalyst in transferring technology and stimulating the exchange of seeds and planting materials. Through the training of around 500 officials and over 80 high-quality publications, it has made important technical contributions. The networking arrangements organized within the framework of species improvement network constitute important opportunities for, and innovative approaches to, regional cooperation. The project encouraged technical cooperation at the regional level, drawing on regional technical resources, and has pointed to new potential directions for extensive inter-institutional cooperation across the region, predicated on the growing technical capacities to be found in these institutions."

The review also observed that the contribution of the project could have been improved if, instead of confining itself to a sophisticated constituency of forestry researchers and tree-breeders, it had been placed in the broader context of forestry policy and the social economic imperatives of sustainable development. A focus on the poor would have given the project greater relevance.

The review further recommended that "there is an enormous potential for expanding regional cooperation in improving the productivity of new forest plantings. There is also evident interest by many donor agencies in this sector. The project has pointed to the potential for further productive activities, although it has not so far exploited these opportunities. It is vital that the investment made so far should be made to obtain maximum yields. A further small injection of around US$ 250,000 for the next nine months should be made by UNDP to enable the project to undertake a few specific tasks, which can generate the next round of regional cooperation in this field, largely in collaboration with region-based institutions and a cluster of interested donors, with UNDP and FAO playing a modest facilitating role."

Source: K. Parikh, 1998.

The more difficult problem is degradation of privately-owned resources through the actions of others. For example, a farmer's land could be damaged by excessive use of chemicals or water logging as a result of excessive irrigation by neighbors. This problem is particularly important in land-scarce Asia where farm plots are tiny.

(b) Policies

Awareness creation through education, extension work, involvement of the mass media and capacity-building are important elements of environmental governance for the prevention of land degradation resulting from excessive use of inputs such as water and fertilizers or pesticides through ignorance.

If it is the actions of members of a person's own community that affects him/her, collective action and a social contract may be possible for redressing the problem. Actions by people far away are difficult to control. A person's land may be eroded because of deforestation that causes more intense run-off or flooding. Construction of reservoirs or the diversion of water from a river may reduce the supply of water downstream and may result in land degradation, as has occurred in the Aral Sea area. Saline intrusion may also take place when the flow in a river falls below a critical level. Similarly, excessive withdrawal of groundwater by many farmers can lower the water table, reduce water availability and cause salinity. Government policies can ensure that such degradation does not occur. These policies can restrain groundwater use in order to restrict the lowering of the water table as well as encourage the appropriate use of fertilizers and chemicals, appropriate planning and monitoring of large projects to minimize adverse environmental consequences, and prevent deforestation in order to contain erosion. This underlines the need for policy coordination across ministries and departments. If an EIA is done before initiating development programmes, such adverse consequences may be avoided.

Appropriate use of inputs such as water, fertilizer and pesticides can be encouraged by appropriate pricing. In many countries, unfortunately, these inputs are subsidized. For example, in India, chemical fertilizers are subsidized, as is electricity for irrigation and water from surface irrigation schemes. Thus, there is excessive use of these inputs. The prices charged do not even cover direct costs whereas, ideally, the prices should reflect capital charges as well as environmental costs imposed on others. Eliminating such adverse subsidies would raise revenue, provide more resources to invest in expanding services and benefit the environment.

Degraded land can be reclaimed through appropriate action and its fertility restored. Such programmes have the potential to enhance agricultural production, reverse soil degradation and alleviate poverty. This was demonstrated by the sodic lands reclamation project in the State of Uttar Pradesh in India (box 5). The project succeeded mainly due to the flexibility in its design, strong government commitment, NGO participation, stakeholder involvement, a holistic approach and links between the stakeholders and line departments and credit institutions.

Another example is provided by the horti-forestry project in Karnataka, India (box 6). Environmental governance can thus be a tool for sustainable livelihood. This aspect of environmental governance may provide an opportunity to design "win-win" strategies.

Box 5. Sodic lands reclamation in Uttar Pradesh: Enhancing agricultural production, reversing soil degradation and alleviating poverty

Uttar Pradesh covers half the Indo-Gangetic plain, which is India's agricultural heartland and one of the country's most fertile areas. Uttar Pradesh has nearly 17 million hectares under cultivation, and accounts for 10 per cent of India's net sown area and 25 percent of the total irrigated area. It produces nearly 20 per cent of India's food grain requirements. Despite its existing and potential wealth, Uttar Pradesh is the third poorest State in India. More than 80 per cent of its people are rural and 75 per cent are dependent on agriculture for their livelihood. Of the total operational holdings of 19 million in Uttar Pradesh, about 16.8 million are classed as small (one to two hectares) or marginal (less than one hectare).

The Uttar Pradesh Sodic Lands Reclamation Projects began in 1993, but sustained support through the International Development Association has seen a remarkably successful series of interventions in reversing this major type of land degradation in South Asia. The development objectives were to: (a) develop concomitant models for environmental protection and improved agricultural production through large-scale reclamation of sodic lands; (b) strengthen local institutions, thus enabling effective management of such programmes with strong beneficiary participation and NGO support; and (c) contribute towards poverty alleviation for families managing sodic lands.

Uttar Pradesh Sodic Lands II has advanced the solid progress made since 1993 in important directions through sustainable reclamation of sodic lands and the prevention of further increases in sodicity in selected districts with the highest concentration of sodic areas. As well as scaling up the earlier thrusts, farm to market roads have been upgraded, with additional and increased community participation and ownership, and further reduction of waterlogged and sodic land areas. One of the components is adaptive research, both in participatory and competitive modes.

The success of this International Development Association project is due mainly to: (a) flexibility in project design; (b) strong government commitment to succeed; (c) effective use of NGOs in motivating beneficiaries to organize themselves to design, implement and monitor the program; and (d) a systematic approach through a "full" reclamation package. The sustainability of achievements was addressed through linking beneficiaries with line departments and credit institutions.

Source: http://www.un.org/esa/sustdev/success.htm

Box 6. Horti-forestry for sustainable livelihood in Karnataka, India

Most of the families in the Karnataka region are landless poor, and have to depend on non-agricultural occupations for their livelihood. Some of the poor had illegally settled 15-20 years earlier on 1,500 hectares of deforested land at B. R. Kaval Hamlet, which has been transferred to them for cultivation purposes. However, due to the infertile land and harsh climate, the crop yields had been very low, and since most of the families only owned one to two hectares, they were only able to earn a mere Rs. 2,000-3,000 annually. This was the common problem of the poor throughout the State. Bharatiya Agro Industries Federation (BAIF), an Indian NGO, carried out an agro-forestry project from 1991 to 1999, funded by the Danish International Development Agency (DANIDA), through the Council for Advancement of People's Action and Rural Technology (CAPART).

The beneficiaries of the projects were 100 families in B. R. Kaval, who each owned less than 2 hectares of land. BAIF, which was responsible for implementing the project, formed three groups with the participating families. Under the guidance of a BIAF staff member, the groups met at least once a week to review the work carried out by the members in their respective fields and to plan farming activities to be completed during the following 1-2 weeks. After transplanting mangoes and cashews, the participants raised food crops such as sorghum and finger millet in the interspaces. They collected all the crop residues and branches pruned from the trees to prepare compost by using improved techniques such as vermicomposting. All members of the participating families were involved in the development of their orchards. They raised many vegetables during the monsoon season. Tuber crops were grown under the shade of the trees. Trees planted on boundaries attained a height of 12-15 metres in five years. The families who were earlier dependent on forests for fuelwood were now able to harvest the branches from their trees for fuel. With plenty of forage and grasses available from the fields and the breeding services provided by BAIF, the productivity of their livestock improved.

During the past five years, this agro-forestry programme has made a substantial change in the lives of the 100 participating families who had previously been eking out a living on government-owned degraded land for nearly 15 years. Prosperity and happiness has come to B.R. Kaval and few visitors can believe the rapid pace at which this village has developed.

The Alfred family is just one example. They have worked hard to maintain their orchard. Their farm, which comprises 120 cashew trees, 110 mango trees, 30 papaya trees and more than 2,000 multipurpose trees, has brought them good returns. During 1998-1999, they sold fruit and food grains, which earned an income of Rs. 25,350.

Source: http://www.un.org/esa/sustdev/success.htm

(c) Institutional arrangements

Degradation of private land as the result of overuse of groundwater poses a problem of rational usage similar to that of other common property resources. This is dealt with later in this document.

Most countries now require an EIA at the planning stage of large projects, including land use and irrigation projects. The effectiveness of EIAs depends on an independent, open and transparent review process in which CSOs and stakeholders can fully participate. When this is done at the planning stage, marginal modifications at low cost can often avoid causing hardship to others as well as long drawn-out controversies over the project.

2. Common property or publicly-held resources

Apart from cultivable land, open access commons that provide fodder and fuel are also of great value to the poor. Sustaining their productivity has also to be given a high priority. While institutional innovations can promote sustainable use practices for village commons where access is restricted to the villagers, in other situations preventing degradation may require special policies.

(a) Driving forces

Commonly owned resources face a threat of overexploitation as each individual is tempted to extract a little more. Societies usually evolve social norms of behavior that ensure sustainable use. However, when demand rises rapidly for a product from the resource, due to population growth, increases in income or opening up of other markets, societies may not have time to evolve new norms. The tragedy of commons can occur. Desertification, often an outcome of natural processes, can also be accelerated by human action such as deforestation, overgrazing and poorly planned use of water.

Since the poor have such a large stake in the quality of environmental resources, particularly common property resources (box 7), many programmes have mobilized them as agents of environmental regeneration.

(b) Institutional mechanism

Degradation of a common property resource can be arrested or even reversed. However, it will require concerted action on a large scale. Yet, a large-scale effort cannot succeed unless it is done through many local-level projects of afforestation. Once again, recognition is required of the importance of public policy, effective community participation, and the role of NGOs and CSOs. It should be noted that regeneration is not possible without the participation of the stakeholders. Such regeneration is truly a "win-win" solution in that it improves the environment and provides additional income and livelihood opportunities to the poor. Many examples exist in the countries of the region where proper cooperative action has regenerated degraded land or rejuvenated depleted fisheries. The critical elements in such cooperation are democratic decision-making, which ensures a fair share for all stakeholders, and an operating arrangement that minimizes private incentives to overexploit the resource. An example of the latter is the selling of fuelwood and fodder from common woods to all members at market prices less the value of labor in collecting them. Only those with surplus labor will have any incentive to collect. There is now wide recognition of the success of joint forest management programmes for preserving forests in many countries with the help of local inhabitants who are given the rights to sustainably extract forest produce is now widely recognized.

D. Biodiversity

Loss of biodiversity is a key concern in 22 of the 39 countries of the region (table 2). Biodiversity constitutes the most important component of a natural system. It helps maintain ecological processes, creates soil, recycles nutrients, has a moderating affect on climate and degrades wastes. It also provides a wide

range of useful products including food, medicines and raw materials for a number of industrial and other economic activities as well as construction material and fuel for hundreds of millions of poor persons. The rich biodiversity of the region, however, is under serious threat from a number of human-induced factors in the region.

1. Driving forces

Biodiversity loss occurs because of the loss or degradation of habitats. It can also occur when humans overexploit a particular species through hunting. For example, the American wild buffalo, the Indian cheetah and tigers in many areas of the world were hunted to extinction or near extinction even when their habitats still existed. Similarly, when wild plants are collected for commercial purposes, they can disappear. Nature's balance becomes disturbed and biodiversity is threatened.

Box 7. How important are common property resources for the poor?

Systematic data from large sample surveys on how much of the consumption by the poor is obtained from CPRs are not available for many countries. However, some evidence is available from small surveys. A 1991 survey of 82 villages in India showed that the poor obtained 66-84 per cent of fodder from CPRs in some States. Moreover, CPRs provided between 137 and 196 days of employment per household and 14-23 per cent of the income of the poor. The survey also found that the average area of common land declined by 31-55 per cent between 1950 and 1985. The table below summarizes date from many micro studies in India.

Common property resources and the poor

Study	State	CPR type	As percentage of household income
Jodha, 1991	Andhra Pradesh	Land	17
	Gujarat	Land	18
	Karnataka	Land	20
	Madhya Pradesh	Land	22
	Maharashtra	Land	14
	Rajasthan	Land	23
	Tamil Nadu	Land	22
Sarabhai and others, 1991	Four villages in Rajpipla District in Gujarat	Forest	38.5 to 46.3 of village income from forest produce
Nadkarni, 1997	Four villages in Karnataka	Land and water bodies	24.3 for poor farmers 18.1 for non-poor farmers
Beck, 1994	Three villages in West Bengal	Land and water bodies	19 to 29

Source: J. Parikh and K. Parikh, 2000, "Environment economics and development", *Environmental Governance Brief #5*, UNDP Capacity 21 Project of India, Indira Gandhi Institute of Development Research, Mumbai.

A large systematic survey carried out in Bangladesh in 1989-1990 provided estimates of annual savings in expenditure for rural Bangladesh. These are detailed in the table below.

Annual savings on expenditure due to ecological resources

	Average annual household income	Annual saving (% of market income)			
Category	Tk 1,000	Fuel	House building materials	Fruit and vegetables	Total
Landless	19.2	1.6	3.5	9.4	24.5
Functionally landless	26.0	9.2	2.5	10.6	22.3
Marginal landowner	31.7	6.6	2.1	19.2	27.9
Small landowner	39.1	10.5	1.7	13.0	25.2
Middle landowner	56.6	6.7	1.1	6.1	13.9
Large landowner	117.4	1.3	0.8	1.7	3.8

The table shows that for the poor who are in the bottom four groups, the worth of implicit income derived from ecological resources is 22-28 per cent of the income from market sources. What is even more striking is that this does not include the value of fish obtained from common access waters, which is very significant in Bangladesh.

2. Policies

To preserve biodiversity, natural reserves need to be established, as has been done already by many governments of the Asian and Pacific region. Such a CAC policy, which excludes all users from such reserves, sometimes disrupts the lifestyle of indigenous people who live in the reserve areas. It is now generally recognized that effective protection of these reserves requires the participation of such people and the recognition of their rights to live in harmony with nature as they have done for generations.

An important element in biodiversity conservation is the stimulation of public awareness and a passion for preserving it. Various wildlife programmes on television such as the Discovery and National Geographic channels have created a large global constituency for conservation. Yet, it only takes a handful of poachers to ruin a reserve. This is where the importance of ethical commitment and participation by local communities, who can provide many watchful eyes, comes into play. The approach by Bhutan is worth noting (box 8).

3. Institutional arrangements

It is often possible to design "win-win" governance strategies for all stakeholders. An example of such a multi-stakeholder, multidisciplinary dialogue in India is given in box 9. Results of research

into the understanding of the ecological dynamics of the sanctuary, economic studies to assess the economic value and willingness of visitors to pay for the sanctuary, interactions with villagers in and around park in order to appreciate their stake, and consultations with park management about their problems were brought together in a workshop to devise a "win-win" strategy. Other examples include the management of wetlands, air pollution, water resources and land regeneration developed under the UNDP Capacity 21 programme for India.

In addition to a "win-win" governance strategy, empowerment of the local population is important. It also helps in the conservation of natural resources as the results of a project under implementation in northern Pakistan have shown (box 10).

Box 8. Commitment by Bhutan to the preservation of biodiversity

Bhutan has made the following commitments to ensuring biodiversity preservation:

- A trust fund has been set up for environmental conservation.
- Adequate laws to protect wildlife, biodiversity and the people have been formulated.
- The 73rd session of the National Assembly in 1995 ruled that the country must maintain not less than 60 per cent of its area under forest cover. Bhutan currently has 72.5 per cent of the country under forest cover.
- To set aside 26 per cent of the kingdom as protected areas. There are nine national parks and wildlife sanctuaries that harbor some of the rarest and most significant animals in the world such as rhinoceroses, tigers, snow leopards, takin, blue sheep and golden langurs. For many of these animals, protecting them in national parks represents their last hope for survival.
- To undertake controlled farming and agricultural activities in areas close to forest and wildlife sanctuaries.
- To draw up management plans for protected areas and forest management.
- To conduct biodiversity inventories and socio-economic studies in order to establish a comprehensive natural resource database in the kingdom.

What is equally important is the ethical dimension. The relatively small population of 600,000 in Bhutan enjoys a sustainable lifestyle which has been inherited from their forefathers. Buddhism, prevalent in the country since the seventh century, respects all forms of life and considers them sacred. The natural elements of the earth (wind, water, rocks, trees, lakes and mountains) are seen as the abode of gods, goddesses, spirits and demons, who are believed to punish, with death and disease, those who disturb and pollute their domain.

Box 9. Evolving a "win-win" management strategy for a bird sanctuary in India

Under the Capacity 21 project of UNDP, the Indira Gandhi Institute of Development Research (IGIDR), Mumbai led a multi-stakeholder, multi-institution, multidisciplinary project to develop a strategy for managing wetlands. The Keoladeo National Park was selected as a case study.

The Keoladeo National Park, an artificial wetland built as a hunting reserve for the local maharaja in the 1901, is an integral part of the life and economy of the adjoining town of Bharatpur, Rajasthan. Ever since it was established, the local population has grazed their cattle in the park, obtained fish, and collected fuelwood and grasses of economic value. This however, stopped once the area was declared a national park. Soon it was realized that removal of grass encouraged the growth of tubers and roots on which important bird species depend. Use by local people was then built into the management strategy of the park through a system of permits for fodder grass extraction.

Ecosystems are complex systems of relationships between biodiversity, physical attributes and culture, and other areas of significance, which makes evaluation difficult. However, evaluation is extremely useful to ecosystem managers as it helps them take stock of their resources and monitor them regularly. At a policy level, evaluation can facilitate rational development choices.

The Bombay Natural History Society identified the valuable resources, attributes and functions of the Keoladeo National Park. Based on that case study as well as studies by IGIDR, a series of social, economic and ecological indicators have been drawn up to enable decision-makers to evaluate which wetlands are worth conserving and for what reasons.

Researchers at the Delhi-based Institute of Economic Growth assigned an economic value on the numerous benefits provided by the park. They identified the stakeholders who had an interest in the park and valued the park holistically. The park is visited by thousands of tourists each year and, as a consequence, tourism-related economic activity is booming in Bharatpur. Researchers and conservationists have a stake in the continuing existence of the park, as does the Forest Department, which is mandated to protect and manage the park. As a national park, Keoladeo has an inherent value so that others in the country, but who may not be in contact with the park, have a stake in it.

Although the park generates considerable revenue (Rs. 2,452,000 in 1995-96), it is still subsidized by the Government. In 1995-96, the Government spent some Rs. 3,707,400 on maintaining the park. Other stakeholders also earn an income from the park. Transporters and park guides, for example, earned almost Rs. 3 million in 1992, while hoteliers and others also earned substantial income.

At a two-day interaction of ecologists, economists, villagers, managers, NGOs and tourism operators at the park, a strategy was evolved that could make the park self-sufficient, protect the interests of the villagers, encourage tourism and create all-round incentives for preserving the unique biodiversity of the park.

Source: Parikh Jyoti and Parikh Kirit, 2000, "Sustainable wetlands", *Environmental Governance Brief #2*, UNDP Capacity 21 Project of India, Indira Gandhi Institute of Development Research, Mumbai.

One growing threat to biodiversity is from tourism. Eco-tourism, when properly organized, can create a vested interest among the local population in the preservation of biodiversity. The economic benefits can be significant and should be made attractive for local people. They must be able to share in the economic gains. Maldives has developed its tourism industry around its unique biodiversity of marine life and colorful coral reefs. By careful planning and the restriction of tourism activities in specific islands, Maldives has developed sustainable eco-tourism, which has helped the country to provide a livelihood to local people and general resources for investing in human development. This underscores the need for, and benefits of, coordination among economic development, tourism and environment ministries.

Box 10. Biodiversity conservation in Pakistan through empowerment.

The landscape of the western Himalayan, Karakoram and Hindu Kush mountains of northern Pakistan is dominated by some of the world's highest peaks, separated by narrow river valleys. As a result, the biodiversity of this area is incredibly varied, with 45 mammals, 222 birds, 32 reptiles, 6 amphibians, and some 1,000 vascular plant species having been recorded. About 80 per cent of the 300 or so known endemic species of plants are found in these mountains. The vegetation varies from xeric types to alpine meadows and heaths, stands of oaks and birch, and conifer forests. Although, historically, low human populations have had limited impacts on this biodiversity, threats are accelerating, spurred by demographic, economic and technological change. These include the degradation of rangelands by domestic livestock, the hunting of wild ungulates and carnivores, and unsustainable harvesting of fuelwood, trees for construction, fodder for livestock, and medicinal plants and other commercially valuable flora.

The goal of the biodiversity conservation project being implemented in the area is to protect the rich ecological landscapes and biodiversity of the Karakoram, Hindu Kush, and Western Himalayan mountain ranges of northern Pakistan. The project comprises a package of interventions aimed at addressing the underlying causes of biodiversity loss in the region, using a landscape approach. The principal focus of the project is on empowering local communities to manage biodiversity and making them accountable for the quality of their resource stewardship. Four wildlife conservancies will be established, representing the bio-geographic zones of the high mountains. Within the conservancies, activities will facilitate the in situ conservation of habitats and species, and promote sustainable uses of components of biodiversity.

Newly-formed conservation committees in local villages are giving local people a say in how their natural resources are managed. Revenues from controlled hunting are being directed to village conservation funds. In one case, these funds have already been tapped to bring clean drinking water to a village from a nearby glacier. The project has also supported the training of local wildlife guides while increasing awareness of conservation and wildlife management at the village level, particularly among schoolchildren.

Source: http://www.un.org/esa/sustdev/success.htm

E. Marine and coastal environments

Coastal water pollution control needs some of the actions described below for dealing with freshwater pollution. Pollution due to shipping, washing of oil tankers and oil spills requires the enforcement of CAC regulations and good practices.

1. Mangroves

The problem of damage to mangroves due to activities such as aquaculture can result in high environmental and economic costs (box 11) and policy intervention is therefore required. Carrying out EIAs of aquaculture projects can help to focus the externalities of private decisions on society. The results can be used to generate social pressure or public policy action. EIAs can also help to educate the community about the economic consequences of aquaculture and subsequently to empower the community to protect mangroves. The community can then levy an appropriate tax on aquaculture or insist on sustainable practices that do not damage the mangroves. This is possible, as demonstrated by experience in Indonesia (box 12). This is yet another example of how the participation and empowerment of a community can work to protect environmental resources.

2. Fisheries

The degradation of fisheries due to overfishing is a serious threat to the livelihood of fishermen. As far as deep-sea fishing is concerned, trawlers from other countries often fish in the waters of many developing countries. They get away with it as the latter lack policing capacity. The cost of depleted fisheries has to be borne by local fishermen.

A global system of monitoring via satellites and a global positioning system could be introduced to control clandestine fishing. Industrialized nations should voluntarily restrain their trawlers.

For local fisheries, the problems of sustainable fishing are the same as for other common property resources. Communities should be empowered to require the use of sustainable practices. Community-based management of fisheries through a systematic scientific approach can lead to sustainable fishery operations. This is demonstrated by the experience of Thailand (box 13).

Box 11. Costing aquacultural and mangrove losses in Thailand

The destruction of mangrove forests for commercial gain is one of the most pressing environmental problems facing South-East Asia. But a recent study by the Centre for Ecological Economics at Chulalongkorn University, Bangkok, has shown that it makes better economic sense to conserve this vital resource than to destroy it.

The study looked at Surat Thani province of southern Thailand, where substantial areas of mangrove have been cleared for shrimp farming. It compared the financial returns from this commercial exploitation with the economic benefits of sustainable use of the remaining mangrove areas. It concluded that while mangrove clearance for shrimp farming was lucrative for individual entrepreneurs it economically disadvantaged local communities. Furthermore, the study found that local people had the capability to undertake the sustainable management of the mangrove resources themselves, thus conserving the environment together with their livelihoods.

The study looked at Tha Po village, on the coast of Surat Thani province, where about 130 households depend almost entirely on fishing for their livelihood. The area around Tha Po used to be extensively covered by more than 1,100 ha. of mangrove swamps. In the past decade, over half that area has been cleared for commercial shrimp farms. As elsewhere along the Thai coast, this clearance has been partly encouraged by government policy. Thailand's exports of frozen shrimp now produce about US$ 1.2 billion in annual export revenue.

When the situation was viewed from the perspective of an individual entrepreneur who could discount many of the indirect benefits provided by mangroves, it was clear that farming shrimp was much more lucrative than trying to make a living from the mangrove area itself. The net present value per rai (6.25 rai = 1 hectare) for a commercial shrimp farm was estimated to be as high as US$ 2,734.80. The highest net present value per rai for the mangrove forests was put at US$ 666.42.

However, when the situation was analysed from the local community's point of view, the scenario was much different. It was found that while an entrepreneur usually pulled out of a shrimp project after five years when profits started to diminish, the community had to live with the abandoned shrimp ponds, which could take up to 15 years to become re-established as a mangrove forest. When this longer time scale and other external costs, such as pollution from the shrimp ponds, were taken into consideration, the value of the mangrove was in the range of US$ 5,771 to US$ 4,227 per rai.

The survey therefore concluded that, while the conversion of mangroves into shrimp fisheries was privately profitable, it was not economically viable from the point of view of society. It also showed that the "gainers" from conversion were mainly outsiders who could afford the high initial investment. Indeed, only 11 households in the Tha Po village were engaged in shrimp farming. The remaining farms were owned by outsiders, most of whom were businessmen from Bangkok and other cities.

Source: Suthawan Sathirathai, *Economic Valuation of Mangroves and the Roles of Local Communities in the Conservation of Natural Resources: Case Study of Surat Thani, South of Thailand*, Centre for Ecological Economics, Chulalongkorn University, Bangkok 100330, Thailand; suthawan@lox2.loxinfo.co.th

Box 12. Integrated environment and business planning: The case of two shrimp farms in Indonesia

The intricate relationship between environmental and economic sustainability have formed the basis of much research at the global, national and regional levels. Recent case studies of two comparable shrimp farms in Indonesia, however, offer an interesting example of how financial injections and poor business management, in the absence of local buy-in (ownership), can lead to unsustainable development at the project level.

At one time, Lampung in southern Sumatra, with an area of 80,000 hectares, was reputed to be the largest shrimp farm in the world, and produced around 50,000 metric tons of shrimp per annum. At the beginning of the 1990s, a combination of bilateral and international financing was channelled through a financier to provide loans to 7,750 farmers taking part in the scheme, amounting to some US$ 65 000 each. The loans were used by the farmers to purchase shares in a plot, the majority of which remained under the ownership of the financier. Loans were undertaken on the expectation of full repayment and personal profits within eight years.

The scale of the establishment provided work for an additional 30,000 labourers. Feed, fry, power and other necessities were all provided by the financier, and paid for by the farmers out of their returns. However, farmers were forced to take out further loans, or to default on payments of their original loan, when harvests fell short. They were also unable to recover their losses when harvests improved, since repayments had also increased during those periods. This led to growing tensions between farmers, farm management and the banks, the tripling of farmers' debts, and the repossession of many of the farms. Consequently, some 18 000 ponds have fallen into disrepair or disuse to the extent that many are now potential hazards to the environment.

Just north of the farm, in Wachyuni Mandira, a similar establishment was also developed and began operating about five years later. The deal offered to the Wachyuni Mandira shrimp farmers, however, facilitated "total ownership". As a result of careful financial and business planning, and the use of the many years of experience of local fishermen and elders, conditions on the farm have remained stable. Environmental sensitivities have been carefully observed and increasingly higher yields have been supported. While rising profit margins have also led to some management-worker tensions at times, local buy-in has again been advanced and the operation continues to expand, demonstrating the "win-win" benefits that accrue to such a business and the environment when careful and cautious business planning is observed.

Source: *Far Eastern Economic Review*, 30 May 2000, and *Jakarta Post*, 30 March 2000.

Box 13. Community-based fisheries management in Phang-Nga Bay, Thailand

The main problem facing fisheries in Phang Nga Bay is the overexploitation of pelagic and demersal stocks, resulting in (a) reduced catches and incomes, and fears of drastic dwindling of the stocks, (b) the degradation of fishery habitats caused by waste discharge from industry and tourism and (c) difficulties in enforcement measures. Before the project was initiated just over three years ago, better management awareness was urgently needed on the part of all stakeholders in the fishing villages of Phang Nga Bay. Also needed was the systematic implementation of management measures with the full co-operation of the community. In other words, a people-centred, ecosystem-based fisheries management programme to conserve and replenish the fisheries resource.

The project supported a Workshop on Community-Based Fisheries Management that was held in February 1996. The Workshop included in-depth discussions of management issues and possible solutions. Representatives of many of the 114 Phang-Nga Bay villages covered by the project meet for regular monthly meetings to discuss, initiate and monitor management activities.

The strategy that emerged consisted of: (a) the promotion of cage culture of finfish; (b) the culture of oysters and mussels; (c) open water stocking of finfish and shellfish seeds; (d) a ban on the use of trawls and motorized push nets within 3 km of the shoreline, and within a radius of 400 meters from any stationary gear; (e) the installation of over 40 artificial reefs at the entrance to Phang-Nga Bay; (f) keeping trawlers and push netters out of the 3 km inshore zone; (g) a programme of mangrove reforestation; and (h) an aggressive education campaign to discourage the harvesting of gravid female blue crabs.

Source: http://www.un.org/esa/sustdev/success.htm

F. Water pollution

Water and air quality are also of great concern in terms of the well-being of the population, particularly the poor. In many countries of the region, water pollution is a key concern. Poor water quality affects health. While the rich may be able to protect themselves by boiling, filtering, purifying water or by buying bottled water, the poor cannot afford to do so. They pay with their health. Waterborne diseases are a major source of under-five mortality in many poor countries of the region. In fact, diarrhea transmitted through contaminated water is the biggest killer of children in the Asian and Pacific region.

1. Driving forces

Water quality has deteriorated due to a number of reasons. Industries, large and small, do not adequately treat their effluents in order to save costs and they thus pollute water bodies. Untreated or partially treated domestic effluents from cities and towns that have inadequate sewage treatment facilities is also dumped into rivers and seas. In rural areas of many countries in the region, adequate sanitation facilities are not available to households. Defaecation in open areas as well as fertilizer and pesticide residue also pollute rivers and lakes through run-off. Finally, acid rain can contribute to water quality deterioration.

2. Policies and institutions

The solution should be to prevent pollution in the first place. Many countries have adequate laws for requiring industries to treat their effluents. Often, there are CAC laws that stipulate effluent standards and penalties for violation. The laws, however, are not enforced in many countries. For example, as already pointed out, in a number of States in India, thousands of actions have been initiated against erring industries by various State Pollution Control Boards (SPCBs) over the past 20 years, but only a handful of convictions have been obtained so far. SPCBs are poorly staffed, and they lack the technical support and resources needed to get convictions in court. The Indian legal system does not help much as it lends itself to interminable delays. Augmenting the capacity of SPCBs, both in terms of human skills and technical equipment, is needed.

CAC policy can work if an enforceable system of monitoring industrial effluent quality is put in place. This can be done through public pressure. Effluent quality should be periodically sampled and the results made available to the public, naming the firms. With Internet and television, it should be possible to bring to bear a great deal of public pressure on large industries to get them to behave.

The problem of many small and medium-sized industries (SMIs) or township and village enterprises is much harder to deal with. Those engaged in polluting activities may be located in industrial estates and common effluent treatment plants could be set up. However, in villages where there are not many such units, such treatment plants may not be viable. Shutting them down may be one option to prevent pollution. This, however, is a difficult choice. A possible alternative is to improve their technology. If the equipment used by them can be made more efficient, effluents can be reduced. While this may be difficult to do for existing units, with new units it may be more feasible. A CAC policy of stipulating standards for a usually small number of capital equipment manufacturers may be easier to enforce. In growing economies of the Asian and Pacific region, capital stock grows rapidly and perhaps doubles in 10 to 12 years, so this policy can be quite effective within a reasonable period of time.

To control water pollution from human waste, town and cities must treat their sewage. However, the municipalities need resources that can be raised by imposing an adequate service charge on households and industries. Technological choices involving varying costs and land requirements are available for sewage treatment (box 14).

To contain rural pollution, households need to be encouraged to install latrines and septic tanks. The costs can be large but so can be the benefits. Financial mechanisms may be devised to enable households to build proper toilets. The required resources can be large. For example, the investment cost for providing toilets to 115 million rural households in India will be an estimated US$ 10 billion. The savings in the relief from the burden of waterborne diseases, however, would be much more, thus justifying the costs.

To reduce water pollution from fertilizer and pesticide residues, efficiency in their application has to be improved through extension and the removal of subsidies. Educating farmers on more effective and economic use of agro-chemicals and encouraging them to use integrated pest management should also be pursued.

Thus, the required policies include:

- Appropriate pricing of chemical fertilizers
- Common effluent treatment plants for SMIs
- The enforcement of effluent standards on large industries
- The technological upgrading of new capital goods through standards setting
- The treatment of municipal sewage and construction of toilets and septic tanks for households.

Institutions may also have to be set up to provide financial credit to households, firms and municipalities. CSOs need to be mobilized to monitor and enforce compliance with laws through public pressure.

Box 14. Technology choices: costs of treating sewage in India

An IGIDR study revealed that a combined initial capital investment of between Rs. 61.3 billion and Rs. 73.5 billion and about 12,255 acres of land would be required to treat wastewater, using activated sludge treatment plant technology, from 3,696 cities/towns in India. Oxidation pond technology, on the other hand, would be a cheaper option at a capital investment of only Rs. 18.4 billion, but the land requirement would be 61,280 acres, much of which would have to be urban/town land.

Technology	Land required (hectares/mld)	Capital costs (Rs. 100,000/mld)	Operation and maintenance costs (Rs. 100,000/mld/year)
Activated sludge treatment plant	0.4	35-40	3.00
Oxidation ponds	1.0	12015	0.50
Aerated lagoons	0.6	15-20	2.75
Upward anaerobic sludge blanket	0.2	23-28	1.50
Duckweed and fish culture technology	0.7-1.0	10-12	0.50-1.00
Karnal technology	1.0-1.5	0.6-0.8	0.25-0.30
Trickling filter	0.4	35-40	3.00

Source: Parikh Jyoti and Parikh Kirit (2000), "*Sustainable wetlands*", *Environmental Governance Series #2*, UNDP Capacity 21 Project of India, Indira Gandhi Institute of Development Research, Mumbai.

G. Air pollution

Air quality, which is often very bad in large metropolitan areas of developing countries, affects both the rich and the poor. It is a key concern for 17 countries in the region. Air pollution control in developing countries poses particularly difficult problems.

1. Driving forces

Many SMEs are still using dirty fuels and old equipment, thus contributing

substantially to such pollution. Few of them are likely to have the profit margin needed to incur these additional expenses. Also, while large point sources can be easily monitored, many small sources require an expensive monitoring effort. In fact, what would be considered as point source pollution in developed countries, almost appears to be non-point source pollution in the presence of hundreds of thousands of small and medium-sized establishments in the developing countries. This makes policy design much more difficult.

Pollution by vehicles in Asian cities also poses special problems. The use of very old vehicles, the mix of different types of vehicles, the large number of two-stroke engines and traffic congestion that slows down vehicles all increase pollution. Pedestrians in urban areas are subjected to severe exposure to exhaust gases from usually poorly maintained vehicles. Policies are required to address these problems.

2. Policies

(a) Industrial emissions

The same type of policies as those discussed for industrial effluents are applicable here. A mix of a CAC policy on emission standards and economic incentives such as emission charges, tradable permits etc. can be effective, provided that enforcement institutions and capacity exist.

Enforcement through a few public servants is difficult without the active involvement of the public. Once again, the best option for enforcement should be the public's right to information. If regular measurements by independent groups can be made and published, large firms would behave. They would not want to be classified by the public as dirty, irresponsible firms.

For SMIs and township and village enterprises, however, a different approach is needed. Cleaner production techniques and the use of cleaner fuels need to be promoted.

When forced to clean up their act, industries often find that conservation actually pays. Reducing waste, and recycling and increasing energy efficiency often increase profits. What appears an unnecessary burden turns out to be a "win-win" option.

(b) Vehicular air pollution

A variety of measures are available. In urban areas, the enforcement of many of the measures should also not be too difficult. Special attention needs to be paid to dealing with the large number of two-wheeler scooters and motorbikes and the various forms of three-wheeler auto rickshaws, Thai *tuk-tuks*, baby taxies etc. running on the same type of engine that is common in the region. A number of short- and long-term measures can be employed.

(i) Short- term measures

- Phasing out of old vehicles from urban areas.
- Introduction of catalytic converters for vehicles.
- Introduction of clean fuels including unleaded petrol in urban areas.
- Effective monitoring of vehicle emissions
- Taxing of vehicles based on the pollution generated.

(ii) Long-term measures

- Implementation of stricter emission standards for new vehicles.
- Introduction of four stroke engines (for fuel efficiency and lower emissions) for two and three wheelers.

- Improvement of fuel quality: the reduction of sulphur content in diesel and petrol to reduce particulate emissions, and the reduction of the benzene content in unleaded petrol.
- The improvement of public transport systems and provision of rapid mass transit systems for urban areas.
- Improvement of road quality for smoother flow of traffic.

The use of cleaner fuels is often an option that is employed to get quick results. The costs of alternatives should be carefully accounted for. For example, in Delhi, under the directives of the Supreme Court, many cars, taxis, three-wheelers and buses have been converted to run on compressed natural gas (CNG). The current pricing policy makes CNG an attractive fuel compared to petroleum. As a result, many vehicles have been converted. Unfortunately, there is not enough CNG available in the city. In September 2001, taxis had to wait for 8-10 hours in queues to get CNG. However, in Bangladesh with its abundant natural gas, the changeover to natural gas promises to be successful (box 15).

The policy mix thus involves CAC policies of standards, technology policy of better fuels and vehicles, tax and pricing policy for appropriate pricing of alternative fuels, and a substitution and conservation policy on mass transport and better roads.

Box 15. Baby taxis mean clean air in Bangladesh

UNDP in partnership with Rupantarita Prakritik Gas Company Ltd. is bringing hope for cleaner air to the inhabitants of Dhaka, by promoting the use of CNG as an alternative transportation fuel.

According to UNDP Dhaka, the project will demonstrate the benefits of CNG as an energy source for auto-rickshaws or baby taxis as they are known in the capital of Bangladesh, since they are cheaper and a cleaner form of technology that will benefit the drivers financially and make it easier to breathe in Dhaka.

The US$ 1.2 million project is geared towards strengthening the skills of the gas company in reducing air and noise pollution, which has reached critical proportions in the city. Smoke emission, in particular, from the 60,000 baby taxis that ply the streets of Dhaka has become a serious problem.

Recent studies show that motor vehicles such as the baby taxis with two-stroke engines, and diesel-driven trucks and buses, are responsible for most of the air and noise pollution in Dhaka. The baby taxis alone emit 25 per cent of the particulate matter and 60 per cent of the toxic and smog-forming hydrocarbons that result from all motor vehicles in the city. This level of pollution is a serious health hazard, particularly for the very young and the elderly.

This initiative also supports the national policy of making Bangladesh more energy self-reliant. Bangladesh has large reserves of natural gas, and compressed natural gas can be made available to domestic consumers at prices significantly lower than imported oil. At the same time, the use of domestic resources will contribute to reducing the heavy dependence of the country on imported fuel.

Source: http://surf.undp.or.th/Knowledge_Bases/Project_Stories/project_stories.html

3. Indoor air pollution

Particular mention must be made of air quality inside kitchens, which affects women and children more. Domestic pollution due to use of biofuels is a major area of concern, as it causes several types of diseases. Since most of the cooking is done by women, they, together with their young home-based children, are in close proximity to such sources and have high exposure levels to pollution from these fuels. Acute respiratory infection (ARI) is the second biggest killer of children in the region.

Use of biofuels, fuelwood, crop residues, and animal dung for cooking and heating is widely prevalent in many countries of the region. These fuels are often collected free of cost and are used by the poor. But due to non-availability of cleaner fuels such as kerosene or liquefied petroleum gas (LPG), they are also used by others who can afford to pay for cleaner fuels. These fuels, particularly when used in poorly ventilated kitchens, cause enormous health damage. It has been estimated that in India indoor air pollution causes 400,000 to 500,000 premature deaths annually and 2.4 million to 3 million person/years of illness in the population.

To reduce the undesirable impact of indoor air pollution the following can be done:

- Provide better ventilation in kitchens. This does not necessarily require exhaust fans. Merely providing holes in the wall below the roof can substantially reduce pollution levels and exposure.
- Use smokeless stoves. This can reduce fuel use and also give a cleaner kitchen (box 16).
- Provide cleaner fuels such as kerosene or gas, at least to those who can afford it.

H. Solid waste

Waste is an unavoidable by-product of most human activity. There has been a sharp increase in solid waste generation in the region and generation rates are expected to double in the next 25 years.

1. Driving force

However, in many countries of the region, waste management (in particular waste disposal) projects are not considered a national priority. Inadequate funding, legislation and enforcement by local authorities, and a low degree of coordination among different sectors and levels of government and agencies concerned, have constrained waste management programmes. Even in countries where enabling legislation is sometimes in place, compliance is seldom monitored or enforced.

The lack of public support is also a major obstacle in solving waste problems. This is due to a lack of public awareness and insufficient attention being given to community participation in waste management. The key to successful waste management may not lie in funding alone, but also in community energy and resources.

2. Policies

The essential elements of an integrated solid waste management strategy have been outlined in box 17. Source reduction, reuse and recycling of wastes, and low or non-waste technologies are important components of any waste management strategy. Recycling, resource recovery and waste minimization not only slow the consumption of natural resources and limit pollution loadings, they also markedly reduce the costs to society of proper waste management.

Box 16. Improved cooking stoves make a difference

Dipa Chaudhari, daughter-in-law of a Tharu resident of Chharahi village, Kota Tulsipur Village Development Committee (VDC) of Kailali district, Nepal, is happy to cook meals on her improved cooking stove that produces less smoke. Originally from a neighbouring village, she is just 16 years old and married. She speaks fluent Nepali, which is not common in this tiny village of 32 Tharu ethnic group households.

"It is easy to keep the kitchen clean," says Dipa, "there is not much smoke, not much ash! Although it is a little time-consuming to prepare a meal, it is comfortable to my eyes. Also, it does not require the large amount of fuelwood that was very difficult to collect in the past." Dipa added that she would be able to continue her schooling because she required less time to collect fuelwood. "I also have to clean my clothes but from now onwards, I don't need much time to do that as a result of the smokeless stove".

The GEF-Small Grants Programme operates in three VDCs including Kota Tulsipur in close collaboration with the Sustainable Community Development Programme (SCDP) in Kailali. The Small Grants Programme has extended support to various environmental management activities that contribute to sustainable development. Sustainable Development Facility (SDF), a local NGO, is supporting the implementation of the programme. Alternative energy promotion is among the activities under which improved cooking stoves and biogas have been introduced. As a result, there are two model villages in one VDC: Chharahi, the model ICS village, which has ICS in all 32 houses, and Prithvipur, the model biogas villages with biogas plants in all 16 houses. The improved cooking stoves in the Kailali Programme VDCs total 1,175 and a further 2,515 stoves have been installed in four SCDP-implemented districts of the Mid and Far Western Development Region.

Source: http://surf.undp.or.th/Knowledge_Bases/Project_Stories/project_stories.html

Recycling is not often used due to the costs involved. One way of reducing recycling costs is to sort out, at the household level, the waste that can be recycled, where it requires only small marginal effort. Citizen participation and sorting at the household level needs to be encouraged. The experience of the Republic of Korea provides a useful example of how this can work (box 18). Disposal also offers some options. If organic and inorganic wastes are sorted at home, community level composting or vermiculture pits become possible. These have been tried successfully by NGOs in India.

Many countries have opted to engage private companies to undertake waste collection, treatment and disposal services. The benefits of private sector involvement include efficiency and consistency in waste collection, improved quality of services and cost savings. It is important to remember, however, that the responsibility for ensuring waste management meets acceptable standards must always rest with the public sector, with the private sector being used to carry out operational functions. Thus, there is likely to be a continuing and expanding role for regulation, monitoring, enforcement and revenue collection by the public sector.

The strengthening of manpower and technical capabilities is also of critical importance. Although some countries have developed waste management master plans at the national or local levels, there is often a lack of trained personnel at the local level to implement such programmes.

Box 17. Integrated solid waste management: key strategic considerations

There is a striking degree of similarity in the solid waste management needs and constraints within the Asian and Pacific region. Policy makers, municipal managers and practitioners could be assisted in the resolution of those needs and constraints through the adoption of one or more of the following key strategic considerations:

- Developing waste disposal facilities such as landfills and incinerators often generates tremendous concern, both warranted and reactionary. However, it is possible to reduce opposition to new facilities by involving the community, following a technically sound and transparent site selection process and, wherever possible, using local conditions to ameliorate potential environmental impacts and costs (for example, locating landfills in geotechnically superior locations). Waste disposal facilities, which often have a useful life in excess of 25 years, need to be well integrated within a sound master plan that reflects regional requirements, standard operating procedures and financing mechanisms.

- Local governments should minimize the frequency of residential waste collection to a maximum of twice per week, which is adequate from a public health perspective, but requires social acceptance. Citizens should be encouraged to place their waste in containers that enhance collection efficiency.

- Local governments should focus primarily on residential waste collection, especially from poor and densely populated areas, and empower the private sector to pick up waste from non-residential sources. Commercial, institutional and industrial waste collection can usually be self-financing.

- Waste collection and disposal fees should be based on waste generation rates. Direct user charges and waste fee collecting should begin with the business community.

- An integrated approach towards solid waste management needs to be followed. Municipal waste managers should opt for the least technically complex and most cost-effective solution.

- All levels of government, must play a role in long-term programme development

- Local governments must carefully gauge the public's willingness and ability to participate in the design and implementation of waste management programmes. These programmes include community-based operations, micro-enterprise development, waste separation for increased recycling, and reduced collection frequency.

- Although waste collection, treatment and disposal costs often place a heavy burden on local government finances, improper disposal is far more expensive in the long term, with costs accruing over many years.

- Local governments are usually in the best position to assume key responsibility for municipal solid waste collection and disposal. However, sustainable financing and sustainable service provision still need to be defined by a broader set of stakeholders. Local authorities need the assistance of all levels of government to provide efficient waste management services. Regional approaches to waste disposal, for example, shared landfills, are especially important.

Source: World Bank, 2000, *World Development Report, 2000-2001*.

Box 18: Volume-based fee system for municipal waste collection in the Republic of Korea

The volume-based collection fee system for municipal wastes was introduced in the Republic of Korea to minimize the generation of waste and encourage households to separate their wastes for recycling. The system was put into effect nationwide on 1 January 1995. Until that time, waste collection fees had been calculated for each residence based on the level of property taxes imposed on houses or apartments, or the size of buildings regardless of the actual volume of wastes that the residents generated. The volume-based collection fee system, however, strongly adheres to the polluter pays principle.

Under the system, household waste has to be discarded in officially designated plastic trash bags, which are manufactured and sold by the city, county, and district government authorities. These regulations, however, do not apply to the discharge of burned coal briquettes and recyclable wastes including paper, waste iron, metallic cans, bottles and plastics, which are collected at no charge if discarded properly at locations designated by local government. Local government also has the authority to set collection fees for discarded furniture and major home appliances. Waste collected during street cleaning and park cleaning is discarded in trash bags provided for public purposes free of charge. The prices of official trash bags are determined by ordinance of the local municipal and county governments after consideration of waste treatment costs and the financial state of the local government in question.

Performance of the volume-based collection fee system

	Reduction in waste generation (%)	Increase in recyclable wastes (%)	Per-capita waste generation (kg/day)
National average	>29.4	28.5	1.01
Six major cities	>24.9	33.2	1.10
Provinces	>35.6	22.6	0.90

The results of a two-year study on the performance of the system in 15 cities and provinces revealed that after the system was introduced, the volume of discarded waste had decreased by 29.4 per cent from 49,191 metric tons to 34,726 metric tons per day. The availability of recyclable goods increased by 28.5 per cent from 8,927 metric tons to 11,468 metric tons per day after the introduction of the system. By region, the rate of reduction in waste generation was most pronounced in small and medium-sized cities and rural areas than in large cities. Per capita waste generation dropped to 1.01 kg a day.

Residents of large housing units such as apartment complexes were found to be more conscientious about separating wastes before disposal than were residents in individual houses. Wastes such as paper, waste metals, cans, and bottles, which are discarded separately for recycling purposes, are thoroughly treated by private sector recycling agencies. These agencies account for 30-50 per cent of the volume of recycled goods. Only 13 per cent of plastics are collected, however, due to the lack of plastic recycling facilities. Recyclable plastics are therefore stocked at collection sites of local governments and the Resource Recovery and Reutilization Corporation.

The implementation of the volume-based collection fee system served as an opportunity to heighten the general public's awareness of the environment in addition to producing visible benefits such as a meaningful reduction in the volume of wastes generated,

an increase in recycling and an improvement in waste administration services. The entire process of production, distribution and consumption of goods was shifted to a more environmentally friendly paradigm. That is, when consumers buy goods at retail establishments, they have come to prefer goods that entail less waste generation in their production, distribution and consumption and also goods in refillable containers. Enterprises, for their part, have shifted to more efficient production processes in order to reduce the volumes of waste generated.

Consumers cannot be expected to bring packaging materials such as Styrofoam to retail establishments when they buy goods; therefore, in response to changing consumer attitudes, enterprises have been making efforts to develop less voluminous packaging materials. The launching of the system served as an opportunity for local governments to become business-minded regarding waste management administration. With the supply of recyclable goods increasing, the recycling industry is also beginning to flourish.

Source: Government of the Republic of Korea.

I. Renewable energy

Should the developing countries go for renewable energy? The countries of the Asian and Pacific region should promote it to the extent they find it economically attractive.

Solar energy could be competitive in specific situations. A remote village with low demand may have to wait for years before electricity reaches it through conventional means. A solar lantern can provide light much sooner and can mean a great deal to such a community (box 19).

Similarly wind energy may be appropriate in certain situations. Governments, however, should be wary of promoting renewable technology by giving undue subsidies. Subsidies are often counter-productive as they kill private initiative to innovate. The subsidy provider may have favourite technologies that are not necessarily the best. Yet, it should be recognized that conventional energy sources often get explicit and implicit subsidies. Renewable technologies must be provided with a level playing field. As renewable technologies are rapidly changing, countries might want to watch and wait, and adopt such technologies when they become economical.

Box 19. The miracle of light

Just two years ago, when twilight arrived in the remote village at the foothills of the Garo Mountains in northern Bangladesh, poor households quickly finished their household chores, children shut their books, and the meagre evening meals were eaten hurriedly. Darkness would fall soon, and everyone would turn in for the night because the families could not afford any fuel to light their homes.

Two years later, there is a dramatic change in the village. As evening casts its long shadow, the hustle and bustle seems to be increasing. Women, their household chores finished, are busy making handicrafts, embroidering quilts or tailoring clothes. Children sit and study, and the menfolk attend cooperative group meetings or adult education classes.

Others gather around the community television and watch programmes broadcast from the capital.

It certainly seems like a miracle to the landless poor, who, after living for decades in the shadows, have been brought into the light by the UNDP-assisted Sustainable Rural Energy Project. A component of the Sustainable Environment Management Programme (SEMP), the project introduced the magic of solar power to the village. With an allocation of US$ 1.14 million, the project is linked to the government-sponsored "Ashrayan" project that provides shelter for the homeless.

To date, some 60 families "have benefited from the clean and renewable energy source that has allowed them to increase their income as well as improve their quality of life. Moreover, the transfer of technology has proved to be very successful as the beneficiaries themselves operate and maintain the system.

Source: http://surf.undp.or.th/Knowledge_Bases/Project_Stories/project_stories.html

J. Conclusions

The analysis in this chapter shows that in order to promote effective environmental governance, there is a need to revamp sectoral planning. This calls for a detailed analysis of the links between the sector in question and the remainder of the economy. For example, energy planning should take into account the needs of the transport, industry and agriculture sectors, as well as the input requirements of the energy sector, the economic and equity impacts of energy prices, and availability as well as security of energy supply. Within the energy sector, it should consider the interrelationships among the sources of energy (for example, coal, oil, natural gas, biomass and renewables), their costs, environmental impacts and other trade-offs.

Such considerations and coordination will require consistent efforts, given the segmented and compartmentalized structure of administration in the Asian and Pacific region, and particularly in view of the legacy of fragmentation of concerns and responsibilities. The situation has been exacerbated by a lack of awareness and appreciation of the interconnections and interdependence between various issues, a lack of knowledge about the tools and methodologies required for factoring environmental costs, and a paucity of trained and skilled personnel.

The governments of the region will need to continuously review mechanisms to ensure that responsibilities are well defined, potential areas of conflict are identified and overlaps in responsibility removed or reconciled. They will also need to ensure that potential areas of cooperation are made known to the agencies concerned for mutual benefit and interaction.

V. *Environmental governance: spatial issues*

Environmental problems vary spatially, ranging from localized smog in a city or a valley through local pollution to the problem of regional haze from forest fires and global warning as a result of the greenhouse effect. Hence, environmental governance needs to line up effectively with multiple scales of decision-making at the local, subnational, national and transboundary levels.

A. Local and national issues

Local and municipal administrations have the closest interface with environmental problems such as land degradation, urban waste, and air and water pollution. The importance of strengthening institutional arrangements at such levels has been increasingly realized in many countries of the region. Consequently, environmental bodies have been set up at the state or provincial levels and in many large and medium-sized cities.

Involvement of governments at the subnational and local levels in environmental management, formulation and implementation of plans and policies, and the monitoring of environmental laws has increased in the post-Rio years. Many countries in the region have devolved power and delegated responsibilities to provincial governments, local bodies and municipalities to enable them to undertake environmental protection measures within the national conservation strategies.

At the provincial level, environmental agencies have been set up with the aim of determining critical resource use, assessing current resource use, implementing national goals, and coordinating the functions of agencies involved in different sectors of the local economy. Local authorities have been vested with environmental jurisdiction. Local authorities such as municipalities, District Councils and village councils have also been involved in micro-planning and the execution of measures related to land use, water management, prevention of forest degradation, and mineral wealth and managing the commons.

In India, all 25 State Governments have set up a separate Department for Environment or kept it together with the existing Forestry Department. The state-level departments regulate the implementation of laws and regulations within their area. They also exercise control over SPCBs. The North West Frontier Province of Pakistan has streamlined the role of the environment unit under the Planning, Environment and Development Department (PE&DD) by creating three sections. The Environment Section scrutinizes and approves projects, as well as prepares and implements relevant parts of the five-year plan. The Environment Wing is responsible for: (a) policy formulation; (b) coordination and implementation of the national and provincial conservation strategies; (c) monitoring of regulations and international Conventions on environment; and (d) the design and implementation of suitable legislation at the provincial level. The Environmental Protection Agency deals with pollution control and checking environmental degradation.

Provinces, autonomous regions and municipalities in China have also organized their leading groups and formulated their own local Agenda 21. For example, Sichuan (the most populous province in China), Shanxi (a coal-rich province) and Guizhou (the poorest province of the region) have formulated their own local Agendas 21. Provinces in Pakistan have also prepared their own conservation strategies in line with the National Conservation Strategy. In the Republic of Korea, 159 out of 248 local governments are in the process of establishing or promoting local Agendas 21. Through this mechanism, local

governments together with citizens and industries will have their roles and responsibilities for environmental protection strengthened through the establishment and implementation of environmental plans that meet local needs. Efforts to prepare subnational level environmental plans and strategies are also proceeding in Indonesia, Malaysia, the Philippines, Thailand and Viet Nam.

In the case of the Pacific islands, institutional mechanisms at the local level for achieving sustainable development have taken different forms. Papua New Guinea, Solomon Islands and Vanuatu have a system of provincial government in which power and responsibility over local affairs have been delegated to elected councils. The Organic Law enacted by Papua New Guinea identifies two layers of government: provincial and district. Control over urban facilities and environment, waste disposal, health and water supply have been vested with the provinces. Vanuatu has adopted a similar system, but unlike Papua New Guinea where integration and coordination mechanisms between the different layers of governance are lacking, in Vanuatu a more proactive approach towards public health and urban amenities has been adopted. For example, the Port Villa Council works closely with the Physical Planning Unit of the Ministry of Home Affairs to regulate use of land, and it coordinates actively with the Department of Health to improve living conditions in the squatter settlements. Provincial administration in Fiji is relatively undeveloped with the concentration of power and responsibilities vested in the central Government. In urban areas, however, local governments have been delegated urban management responsibilities under the Local Government Act.

As the evidence suggests, the devolution of power and responsibilities to the subnational, local and municipal bodies has not followed a uniform pattern across the region. In urban areas, success in achieving integration of environmental and development concerns has been more pronounced compared to rural areas. This is a consequence of greater and more visible environmental problems in urban and industrial cities and towns, the recognition by the local and national authorities of the need to rectify and repair the damage, and better awareness of environmental issues among the urban populace. In rural areas, wherever public participation has been greater, the institutional mechanisms have been more successful in achieving better environmental management programmes related to resource use.

It should be pointed out that international cooperation has also been instrumental in building national and local capacities for environmental governance. Such cooperation has assisted in enhancing the capacity of local governments through institutional strengthening, policy formulation, technology procurement and development, and public awareness and community participation. It has been applied in various forms, depending upon the nature and scope of local initiatives and the mandate of the stakeholders. For example, replication of experiences of different countries with similar types of projects and programmes has helped municipal governments formulate viable and efficient action plans.

Mobilization of resources, including expertise and technology, has also improved the pace and quality of implementation activities in these projects. Moreover, these local initiatives are being brought under one umbrella, by formulating a network of municipal governments to encourage "South-South cooperation". For example, ESCAP with the assistance from the Government of Japanese and the Institute for Global

Environmental Strategies (IGES), has initiated a network of international cooperation known as the Kitakyushu Initiative for a Clean Environment, in order to develop the capacity of municipal governments in Asia and the Pacific.(Box 20) A number of pilot projects have already been initiated under the Kitakyushu Initiative, several of which are showing good results.

Box 20. Kitakyushu Initiative for a Clean Environment

The Fourth Ministerial Conference on Environment and Development in Asia and the Pacific, organized by ESCAP in September 2000 at Kitakyushu, Japan, adopted Kitakyushu Initiative.

The Kitakyushu Initiative proposed the strengthening of local initiatives and the enhancement of partnerships, the creation of a network of local governments to strengthen environmental management capacities at the local level, and support from national governments for those activities, as well as the strengthening of linkages with academia, and collaboration with existing international initiatives. Target setting and monitoring of activities were also proposed, making use of quantitative indicators in action areas such as enhanced integrated urban planning strategies, improvement in air and water quality, hygienic management and reduction of wastes, and capacity-building, awareness-raising and stakeholder participation.

The implementation of the Kitakyushu Initiative Network is planned to be carried out in three stages: (a) Phase 1 – formulation of core activities; (b) Phase 2 – implementation of core activities and expansion; and (c) Phase 3 – region-wide application and review. Three Network meetings were planned for 2001, 2003, and 2004/2005 to review overall Network activities. The results will be reported to the Ministerial Conference to be held in 2005.

The Kitakyushu Initiative Network is open to all local governments of ESCAP member and associate member countries and it encourages the participation of cities that are actively engaged in improvement of the urban environment and intercity cooperation. The eight functions proposed for the network are:

- Assistance in preparing and implementing integrated and sustainable urban development plans and strategies with quantitative indicators
- Periodical monitoring of the implementation status in terms of quantitative indicators
- Promotion of information exchange and the sharing of experiences among participating local governments
- The provision of a platform for the transfer of technology and know-how packages, good practices and a successful municipal/regional model for sustainable development
- Linkages, catalyzation and facilitation of internal and external financial support for international cooperation initiatives of local authorities
- Facilitation of capacity-building activities for environmental administration staff of participating local governments
- The promotion of environmental education programmes in intercity cooperation, such as student exchanges

Encouraging private enterprises to participate in infrastructure development and environmental quality enhancement programmes.

Box 21. Pilot activity in the implementation of the Kitakyushu Initiative for a Clean Environment

The promotion of recycling and reduction of waste. Nonthaburi is located on the outskirts of Bangkok and is a city with a high economic level, as well as a significant level of environmental awareness and capacity. Nonthaburi is engaged in activities aimed at increasing recycling rates by 20 per cent and reducing solid waste by 30 per cent. Because the cooperation of residents is essential in increasing recycling rates, Nonthaburi has focused its efforts on awareness-building activities such as public meetings in local areas. The results in the table below show that Nonthaburi is making good progress towards achieving its goal.

Solid waste and recyclable materials in two communities

Community	March 2002			April 2002		
	Solid waste (kg)	Recycling (kg)	Recycling (%)	Solid waste (kg)	Recycling (kg)	Recycling (%)
Phibulsongkram	27 135	4 384	16.2	23 751	2 375	10.0
Suanglang Muang	5 597	348	6.2	3 915	436	11.1

Source . http://www.iges.or.jp/kitakyushu/Pilot%20Projects/Nonthaburi%20(Collection)/Nonthaburi%20(Collection).htm

B. Transboundary issues and environmental governance

International cooperation also has a transboundary facet. Transboundary issues such as acid rain, haze and environmental pollution, desertification, climate change, ozone depletion, migratory species, species trade, the management of large eco-regional landscape and the equitable use of shared natural resources pose a unique set of challenges to environmental governance. They highlight the need for decision-making processes that go beyond national borders and illustrate the necessity for creating mechanisms at the subregional, regional and international levels to promote ecologically sustainable and socially acceptable development.

Given the complexity and scale of transboundary environmental issues, environmental governance is even more difficult at this level than at the national level. However, just as with national environmental governance, vision, goals and targets, and policies are required to enforce preferred solutions. The situation is more complex because, unlike a national government, no single sovereign authority exists at this level. Yet, it is encouraging to note that a number of intergovernmental institutions are already active in the region at the subregional and regional levels in terms of environmental cooperation. Through these efforts, governments in the region are not only developing subregional and regional action plans and strategies on environment and sustainable development, but they are also implementing programmes and projects. Such cooperation is also helping in responding to the development and implementation of international initiatives.

1. Subregional mechanisms and initiatives

A number of intergovernmental institutions have been established in Asia and the Pacific on a subregional basis for cooperation on environmental matters. These include the ASEAN Senior Official on Environment (ASOEN) for South East Asia with rotating headquarters, the South Asia Cooperative Environment Programme (SACEP) with its headquarters at Colombo, the South Pacific Regional Environment Programme (SPREP) with its

headquarters at Samoa, the Interstate Commission for Sustainable Development in Central Asia (ICSD) with rotating headquarters and the North-East Asia Subregional Programme on Environmental Cooperation with ESCAP as its headquarters.

SACEP, which was adopted in 1982, has implemented a number of projects aimed at developing subregional cooperation in facilitating national capacity-building, particularly with regard to judicious management of shared resources. Specific environmental programmes have been adopted, including the 1982 Regional Sea Programme, the 1995 South Asian Seas Action Plan and the 1998 Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia. Another major achievement of SACEP was the development of a Regional Environmental Natural Resources Centre.

South-East Asia has a long history of cooperation on environmental issues and concerns dating back to the 1977 ASEAN Subregional Environment Programme (ASEP 1), which was followed by the development and implementation of ASEP II and III from 1982 to 1992. Cooperation was enhanced in 1994 by the Bandar Seri Begawan Resolution on Environment and Development, which not only allowed for the harmonization of the region's environmental air and water quality standards, but also led to the development of the ASOEN Strategic Plan for Action on the Environment (1994-1998). The current plan (1999-2004) has already recorded a major achievement in the ratification of the ASEAN Agreement on Transboundary Haze Pollution 2002. Programmes related to the protection of biodiversity are also showing promise, including the protection of heritage parks and reserves.

The North-East Asia Subregional Programme on Environmental Cooperation (NEASPEC) was initiated by ESCAP in 1993 through the integration of various informal subregional talks. NEASPEC holds senior official meetings that work on consensus programmes and projects in three areas: management and mitigation of air pollution; nature conservation including deforestation and desertification; and capacity-building, particularly in environmental monitoring. ESCAP serves as the Secretariat for NEASPEC, which has already developed a framework, a vision document and a core fund. The evolution of NEASPEC activities into legally binding agreements for action, however, is still awaited.

In North-East Asia, subregional cooperation has stemmed from the realization that environmental problems, especially those that require long-term and difficult solutions, could be better addressed by collaborative efforts through the sharing of knowledge and the pooling of resources. Such unified positions on common interest have also allowed the subregion to be vocal and effective in international environmental issues of international forums.

SPREP was established in 1982 by the government and administrations of the South Pacific countries and four other countries with a direct interest in the region. It is the main intergovernmental organization charged with promoting regional cooperation, supporting the protection and improvement of the South Pacific environment and ensuring its sustainable development. SPREP has assisted Small Island Developing States in capacity-building through the development of National Environmental Management Strategies and legislation on environment. In the past decade, SPREP initiatives have focused on biodiversity conservation, waste management, climate change,

impact assessment, and environmental assessment and awareness raising.

Joint projects and activities are developed under the above programmes. In some cases, the cooperation is quite robust such as in ASOEN and SPREP, where it has led to the development of subregional environmental agreements. ASEAN has two such agreements ASEAN Agreement on Transboundary Haze Pollution 2002 (box 22) and ASEAN Agreement on the Conservation of Nature and Natural Resources 1985. SPREP has one, the Convention on Conservation of Nature in the South Pacific. However, even these cooperative mechanisms still leave much to be desired, particularly in terms of conducting transboundary EIAs of projects and the promotion of channels for direct communication among the full range of stakeholders.

In addition to the above, there are a number of other forms of cooperation for specific purposes. One example is the management of shared resources of international rivers, such as the Mekong River Commission (box 23), or regional seas such as the South Asian Seas Action Plan, North-West Pacific Action Plan, the Action Plan for a Coordinating Body of Seas in South-East Asia (COBSEA). Such cooperation is also a good omen for the protection of shared resources, and hopefully the best practices from these forms of cooperation will serve as good examples for promoting similar cooperation elsewhere in the region.

2. Regional mechanisms and initiatives

At the regional level, countries of the Asian and the Pacific region have been providing coordinated responses to global initiatives through the five-yearly Ministerial Conferences, the ESCAP Committee on Environment and Natural Resources as well as at ad hoc intergovernmental meetings. The last Ministerial Conference on Environment and Development was held in Kitakyushu, Japan in September 2001. The Conference adopted the Regional Action Programme for Environmentally Sound and Sustainable Development, 2001-2005 , and the Kitakyushu Initiative for a Clean Environment. The Regional Action Programme reflects the areas of Agenda 21 that are most important for implementation in Asia and the Pacific.

The Regional Action Programme for Environmentally Sound and Sustainable Development, 2001-2005 identifies a set of instruments including economic measures, regulatory control, technological interventions, institutional development, and capacity-building and stakeholder participation in facing the major environmental problems of the region. The Kitakyushu Initiative for a Clean Environment establishes a framework for urban environmental management, based on the experiences of the city of Kitatkyushu, Japan, which is a notable success story of urban environmental rehabilitation in the region. To maximize stakeholder participation, a number of side events were convened in Kitakyushu that dealt with the private sector, women, youth, media, NGOs and environmentally sound technologies. The outcome of these side events was presented to the Ministerial Conference.

Box 22. ASEAN fight against haze in South-East Asia

During 1997, health-threatening smog caused by forest fires in Kalimantan, Indonesia, spread throughout South-East Asia. Estimates have suggested that the smog caused US$ 4.4 billion in damage and wiped out 5 million hectares of forest, agricultural land and bush land, equivalent in size to Costa Rica. About 80 per cent of the fires that have burnt agricultural land, grassland and rainforest areas in Indonesia since 1997 have been blamed on large-scale owners who illegally used fire to clear unwanted vegetation. However these allegations have not been proved. A meeting of the subregional ministers was convened as the main intergovernmental body to plan, organize meetings, establish funds and coordinate regional activities. Since then, the ministers have set up a special fund to finance the fight against the forest fires. Support has been solicited from a number of donors such as the United States and UNEP.

At the fourth meeting of the ministers, held in Singapore on 19 June 1998, Indonesia proposed an aerial surveillance plan, which would enable firefighters to spot fires early and take prompt attention to check their spread. Together with the Indonesian proposal came a Malaysian offer to provide expertise and training, and a pledge from Singapore to provide the necessary communication equipment for the immediate transmission of information to agencies on the ground. Communications between the relevant agencies at the provincial and district levels in Sumatra have also been given high consideration.

In July 1999, South-East Asian environment ministers came up with a more comprehensive plan to stop forest fires through a coordinated fire prevention campaign. The plan piloted in Indonesia included education, fire prevention, firefighting and surveillance techniques. South-East Asian countries have agreed to strictly enforce and develop laws against open burning on their land. As a result of that agreement, Malaysia and Brunei Darussalam adopted a legal sanction called the "presumptive clauses", which presumes or apprehends a landowner as responsible when a fire breaks out on his or her property. Combating forest fires in Indonesia is a continuous action, locally and regionally, which necessitates further cooperation, the pooling of more financial resources, the provision of adequate communication and satellite technologies, and training. The efforts of the subregion's governments to avert a recurrence of the disaster-level blazes also call for changes in forest policy and greater public cooperation in fire prevention and firefighting campaigns.

Sources: Jakarta Post, 20 June 1998; *Business World*, 8 July 1998; ASEAN Secretariat web site, www.aseansec.org and http://www.idn.org/news/0698/df062398-5.htm

Box 23. Mekong River Commission

The Mekong River Commission (MRC) is an intergovernmental body created in 1995 by an agreement between the governments of Cambodia, the Lao People's Democratic Republic, Thailand and Viet Nam. The agreement set a new mandate for the organization "to cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River basin". The two upper States of the Mekong River basin, China and Myanmar, are dialogue partners with MRC.

Specifically, MRC is developing "rules" for water sharing, monitoring the quality of water resources and supporting joint planning within an overall framework of renewable resources management. It has three core programmes: the Basin Development Plan, the Water Utilization Programme and the Environment Programme.

Activities under the newest of the three MRC core programmes, the Basin Development Plan, began in late 2001. It is intended to be used as a planning tool to identify, and set categories and priorities for projects and programmes to be implemented at the basin level. The plan envisages the creation of an environment conducive to investment and sustainable development, based on dialogue between governments, the private sector and civil society players. At a later stage, investment will be sought for a list of approved projects.

The Water Utilization Programme is an extensive programme with many interlinked components. It will provide the tools and related knowledge base needed to enable member countries to gain a deeper understanding of hydrological linkages between the natural environment, water use and transboundary impacts on water, society and the environment. The programme will also formulate and implement appropriate "rules" for ensuring reasonable and equitable use of Mekong River basin water and related resources.

In line with the MRC mandate for regional cooperation, the Environment Programme focused its efforts on transboundary environmental monitoring with major activities in the areas of water-quality monitoring, preparing training materials and developing environmental assessment systems. The programme seeks to improve the water-quality monitoring network in the Mekong basin. It also promotes strategic environmental assessment, cumulative environmental assessment and EIAs, with specific emphasis on transboundary elements.

MRC has also started discussions on flood management and mitigation. An overall Flood Management and Mitigation Strategy for MRC was approved by the MRC Council in 2001, setting the stage for flood issues to become another major focus of MRC activities.

The big challenge for the Mekong basin countries is to find the elusive balance between sustainable economic development and the environment. This balance needs to be maintained not only by national activities but also by close cooperation, particularly between upstream and downstream countries. The strengthening of current cooperation carries a great deal of hope for future development and management of the basin.

Source: Mekong River Commission, 2001, *Annual Report for 2001*

The Committee on Environment and Natural Resources, which is a legislative body of ESCAP, meets annually. During the meetings, senior officials of the member governments review and provide guidance on the implementation of Agenda 21 and outcome of the Ministerial Conferences on Environment and Development as well as other intergovernmental meetings.

Ad hoc intergovernmental meetings are usually held at a high level. For example, the High-level Regional Meeting for WSSD, organized by ESCAP, UNDP, UNEP and ADB, was organized as a culmination of the regional preparatory process to WSSD, which was initiated by holding five subregional meetings in each subregion of Asia and the Pacific. It identified seven priority initiatives for follow-up action including:

- Capacity-building for sustainable development
- Poverty reduction for sustainable development
- Cleaner production and sustainable energy
- Land management and biodiversity conservation
- Protection and management of, and access to, freshwater resources
- Oceans, coastal and marine resources and sustainable development of small island States
- Action on atmosphere and climate change.

Consensus on the identification of these priority initiatives in a highly diverse region points to a very good outlook.

These mechanisms would need to be strengthened and made broader-based particularly for monitoring and implementation of ongoing programmes and initiatives. So far, they have enabled the provision of regional inputs to the global conferences such as UNCED and WSSD as well as the development of Regional Action Programmes to implement the outcome of the Conferences at the regional level. Considerable progress has been made on the implementation of identified initiatives. For example, under the Kitakyushu Initiative, a network of cities and other relevant organizations has been established to promote the exchange of information and replication of best practices, and a number of training workshop have been held. The seven initiatives identified in the Phnom Penh Platform are also under implementation. Hopefully, the cooperation demonstrated in their identification will continue and will flourish with more robust coordination of efforts in their implementation.

3. Global initiatives

The last two decades of the twentieth century witnessed the outpouring of tremendous energy in the creation of international partnerships and the development of an international legal regime to protect the global environment. The Earth Summit, and the Conventions it brought forth, are outstanding examples of this international creativity in meeting the environmental challenges of our common future. However, these plans of action, particularly Agenda 21, and multilateral environmental agreements (MEAs) cannot be successfully implemented unless the global commitments made at UNCED are fulfilled. Despite growing awareness of the transboundary nature of many environmental problems, effective implementation of international legal obligations is slow. Existing multilateral agreements and related institutions should be better utilized through partnerships between developed and developing

countries, in order to assist countries to meet their obligations under them efficiently (box 24). Moreover, the developed countries should make their best efforts to increase their ODA levels and take measures to enhance capacity for effective debt management. This should be accompanied by good governance at the national level as well as by open, equitable, transparent and non-discriminatory multilateral systems.

Box 24. Sustainable development and international law

International environmental law moves beyond the law that is focused strictly on the physical parameters of the problem to be regulated. It starts to take into consideration its socio-economic dimension, which is what sustainable development is all about. For example, Article 1 of the Convention on Biodiversity and Article 3 of the Climate Change Convention show in black and white a real indication of such refocusing. The above provisions are not only setting rights and obligations for environmental protection, but also take into account the associated developmental concerns.

The other phenomenon that was revealed during negotiations on the Ozone Instruments, as well as of the Climate Change Convention, is that more legal instruments are negotiated in circumstances of scientific uncertainty. Thus, ways have to be found of developing instruments that are sufficiently flexible and capable of accommodating change as the scientific evidence becomes clearer.

There is a greater recognition of the need for the widest possible partnership of nations and peoples in addressing the issues of environment and sustainable development. All States, rich or poor, developed or developing, North or South, share common but differentiated responsibilities. Perhaps first with the Ozone Instruments, but certainly enshrined in the Climate Change Convention, is the recognition of the concept of common but differentiated responsibilities where each State could act according to its capability and capacity. This kind of differentiation of obligations will be an important factor in the development of law for sustainable development.

With regard to the unique nature of the implementation process of international law in the field of sustainable development, there is a history of introducing innovative means and mechanisms of implementation. What can been seen in recent environmental treaties is not only the setting of ambitious goals but also the provision of supportive means for the achievement of those goals, be they financial mechanisms, provisions for the transfer of resources or the transfer of technology. These facilitating and supportive means of environmental law will continue to develop, complementing the prohibitive mechanisms that have so long characterized legal regimes.

C. Conclusion

Many of the decisions and initiatives required to promote sustainable development are undertaken on a national, provincial and local level and scale. However, from land-use controls to approaches to water and energy supplies, effective decision-making requires the mobilization of knowledge in the context of local and subnational challenges and opportunity. Over the next few decades, decentralization and devolution of decision-making below the national scale is likely to accelerate within many countries of the region. As decentralization take place, it is critically important that this process be matched by the investment of resources and the building of local and subnational institutional capacities. Many advances in improving environmental performance during the 1990s have derived from policies that are implemented at the local level. However, much remains to be done in decentralizing and enhancing capacity, especially in the areas of sustainable resource management, and control of pollution.

While national and local decision-making is fundamental, transboundary issues make it imperative to promote bilateral, subregional and global environmental cooperation. Such cooperation can be promoted through multi-stakeholder forums, the implemention of joint projects, and the formulation, compliance and enforcement of environmental agreements.

International and regional cooperation is also important in implementing local and national initiatives related to environmental governance. Such cooperation can help to provide information on successful experiences from situations where similar challenges were faced and resolved. International cooperation can also assist in the enhancement of the capacity of local governments through institutional strengthening, policy formulation, technology procurement and development, and public awareness and community participation.

VI. *Conclusion*

There has been a marked deterioration in environmental conditions in Asia and the Pacific. This has led governments in the region to take high-profile actions in terms of the establishment of institutions, legislation and enabling mechanisms in recent years,. This is the reflection of a partial shift in government policies on environmental protection and promotion of sustainable development. However, addressing the underlying causes of environmental degradation requires changing the fundamental ground rules that define who is involved in making environmental management decisions, what power these different actors exercise, and how they are to be held accountable for their decisions. Such innovations in governance are crucial, as they address the underlying systems and relationships through which environmental resources management decisions are made.

When implemented appropriately, these innovations create opportunities for cooperation that can span not only the various tiers and sectoral divisions of government agencies, but also other stakeholders including the private sector. They can also help to mediate the competing goals of different users of environmental resources.

Pursuing effective environmental governance requires balancing the diverse interests of stakeholders. It calls for a shared vision, well-articulated goals and targets in order to realize the vision, an institutional set-up for policy coordination, the use of efficient and equitable policy instruments and measures, and a monitoring, evaluation and accountability mechanism. The review in this study of the current set-up indicates the areas to which further efforts need to be directed, in order to ensure a judicious balance between economic and social development on the one hand, and environmental protection on the other. One important area where intervention will be necessary in the coming years is strengthening and restructuring of the institutional mechanisms, both at the central and the local levels. This will be crucial to enabling a coordinated and integrated approach to policy articulation and programme implementation.

Despite the existence of Ministries of Environment, institutional linkages still need to be established between them and other ministries concerned with environmental matters, between ministries and their departments and agencies, and between central-level agencies and local-level development agencies. Such linkages need to be constructed in a workable fashion to enable them to cover policy formulation, programme implementation, monitoring and evaluation with a clear demarcation of authority, responsibilities and operational modalities. Once such institutional linkages and operational modalities have been established, they will facilitate the integration of environmental policies into the overall national development policies as well as resolve conflicts of interests among the various government agencies.

In terms of policy instruments and measures, most countries in the region have preferred a rigid command and control approach, based on emission or effluent standards rather than more flexible instruments. This has led to high compliance costs and widespread under-compliance. The use of incentive-based instruments and

privatization is on the increase, albeit slowly.

There is a need for a new policy model based on a mix of CAC and incentive-based mechanisms linked to effective governmental management. Application of such a model is showing positive results in Malaysia. In addition to being a combination of measures, it is characterized by the role of the government as a facilitator rather than provider of services, pricing reforms and cost recovery for environmental goods and services such as water and sanitation. This model appears to have good potential for application in those countries of the Asian and Pacific region with financially constrained governments.

Capacity-building, particularly for institutional strengthening, is also required at all levels. The skills to understand the issues, analyse information, formulate policies, and regulate wisely and justly are all needed for effective environmental governance. The importance of capacity-building as a cornerstone for the achievement of sustainable development, particularly for self-empowerment of local communities, cuts across all sectors. Its primary goal should be to develop the capacity to effectively address the policy challenges and necessary institutional reform. It may also include building capacity for the promotion and use of traditional knowledge and practices, local and modern technologies, and advanced sciences in addressing the problems.

Environmental education and training should target the needs of decision makers and policy planners, the formal and non-formal sectors, public awareness, information networking and communications. This will enhance skills, increase awareness and promote participatory governance.

The promotion of the participatory process in policy formulation and implementation is another important area needing attention. Environmental consciousness has already taken root in civil society. It is important for governments to capitalize on it and involve all stakeholders. Involving key stakeholders in assessing the desirability and feasibility of alternative approaches increases the chance that the policy will be politically feasible to implement, and that it will achieve the desired results and avert future conflicts. Open and transparent procedures of decision-making are essential in order to fully reflect the concerns of various stakeholders and ensure their effective participation. For the stakeholders, to participate effectively they would need to be aware of environmental issues, the consequences of various actions and the trade-off.

Among the stakeholders, the role of private sector participants, such as businesses and industry, in the promotion of sustainable development has enhanced with time, and continues to grow through trade liberalization and globalization. Some corporate groups have already started to improve their environmental performance and are employing environmental management tools such as EIAs and environmental audits. Business Councils and charters are also being established, and consensus is emerging on environmental reporting. The governments of the Asian and Pacific region should capitalize on these developments and closely involve the private sector, especially SMEs, in the

formulation and implementation of sustainable development plans.

Gender equity plays an important role. Without equal participation by women, stakeholder interests would not be fully reflected in the policy decisions. Also, since many environmental problems, (for example, fuelwood shortages, freshwater scarcity and indoor air pollution) affect women directly, they should be involved in the search for solutions to these problems.

The role of NGOs and other CSOs is critical to many policies. Good policy formulation and implementation can take place only when someone gathers information, informs others, coordinates concerns and voices them effectively, NGOs are also needed for this purpose in order to mobilize cooperative actions, act as a watchdog over more powerful actors, industry and bureaucrats. This also requires access to information. The right to information is a precondition for the effective functioning of CSOs. Knowledge and information empowers people. With the Internet and the communications revolution, it has become possible to acquire and disseminate knowledge and information at low cost and in a timely fashion.

The role of the electronic and print media is also very important for environmental information and communications. The media have been fairly active in disseminating environmental information and undertaking investigative reports in countries of the region. Such action has been instrumental in raising public concern.

The seriousness of the threat to the environment requires urgent action by all segments of society, governments, the private sector, NGOs and civil society at large. Governments need to take the lead in initiating action through:

- Creating a vision that inspires action
- Setting goals and targets for direction
- Policy coordination for efficiency
- Policy instruments and incentives that stimulate action
- Capacity-building for effective implementation
- Empowerment for equity
- Ensuring the right to information for timely action
- Participation in ownership and enforceability
- Education and awareness for consensus building and participation

Annex

Annex

Annex table 1. Indication of aspects of human well-being

Region/subregion/ country	Total population (millons)	GDP per capita (PPP US$)	Proportion of undernourished in total population (%)	Population below income poverty line (%) $1 a day (1993 PPP US$)	Human Development Index (HDI)	Gender Related Development Index (GDI)	Gender Empowerment Measure (GEM)
	1999	1999	1997-1999	@	1999	1999	1999
United States	280.4	31872	....	....	0.934	0.932	0.738
Developing world							
East Asia and the Pacific							
China	1264.8*	3617	9	18.5	0.718	0.715	....
Dem. People's Rep. of Korea	22.11	....	40	....	....	....	0.358
Hong Kong, China	6.7	22090	....	....	0.88	0.877	....
Mongolia	2.5	1711	42	13.9	0.569	0.566	....
Fiji	0.8	4799	....	....	0.757	0.74	....
Singapore	3.9	20767	....	....	0.876	0.871	35
Samoa	0.2	4047	....	....	0.701	....	....
Brunei Darussalam	0.3	17868	....	....	0.857	0.853	....
Republic of Korea	46.4	15712	....	<2.0	0.875	0.868	....
Papua New Guinea	4.7	2367	26	....	0.534	0.53	....
Cambodia	12.8	1361	37	....	0.541	0.534	....
Indonesia	209.3	2857	6	7.7	0.677	0.671	....
Lao People's Dem. Rep.	5.2	1471	28	26.3	0.476	0.463	....
Malaysia	21.8	8209	....	....	0.744	0.768	0.503
Myanmar	47.1	1027	7	....	0.551	0.547	....
Philippines	74.2	3805	24	....	0.749	0.746	0.47
Thailand	62	6132	21	<2.0	0.757	0.68	....
Viet Nam	77.1	1860	19	....	0.682	....	....
South Asia							
Bangladesh	134.6	1483	33	29.1	0.47	0.459	0.309
India	992.7	2248	23	44.2	0.571	0.553	....
Nepal	22.5	1237	23	37.7	0.48	0.461	....
Pakistan	137.6	1834	18	31	0.498	0.466	....
Bhutan	2	1341	....	....	0.477	....	....
Islamic Rep. of Iran	69.2	5531	....	....	0.714	0.696	....
Maldives	0.3	4423	....	....	0.739	0.735	....
Sri Lanka	18.7	3279	23	6.6	0.735	0.732	0.409

Notes: .... = data not available; * signifies population estimates include Taiwan, province of China; @ =data refer to the most recent year between 1983 and 1999.

Sources: Columns 2 and 4 taken from table 1, www.fao.org; columns 2 and 6 taken from table 1, column 5 taken from table 3, column 7 taken from table 21, column 8 taken from table 22, *Human Development Report 2001.*

Annex table 2. Indicators of health and literacy

Region/subregion/country	Life expectancy at birth (years)		Infant Mortality Rate (per 1,000 live births)		Adult Literacy Ratio (% age 15 and above)	Youth Literacy Rate (% age 15-24)	Children reaching Grade 5 (%)
	1970-1975	1995-2000	1970-1975	1995-2000	1999	1999	1999
Developing world	55.5	64.1	109	61	72.9	84.4	
United States	71.5	76.5	20	7			
East Asia and the Pacific	60.4	68.8	87	34		97.2	
China	63.2	69.8	85	33	83.5	97.5	94
Dem. People's Rep. of Korea							
Hong Kong, China	72	79.1			93.3	99.2	
Mongolia	53.8	61.9		63	62.3	78.7	
Fiji	60.6	68.4	50	18	92.6	99	
Singapore	69.5	77.1	22	4	92.1	99.7	
Samoa	56.1	68.5	106	21	80.2	86.6	85
Brunei Darussalam	68.3	75.5	58	8	91	99.3	
Republic of Korea	62.6	74.3	43	5	97.6	99.8	98
Papua New Guinea	44.7	55.6	90	79	63.9	75.4	
Cambodia	40.3	56.5		86	68.2		49
Indonesia	49.2	65.1	104	38	86.3	97.5	88
Lao People's Dem. Rep.	40.4	52.5	145	93	47.3	69	55
Malaysia	63	71.9	46	8	87	97.3	
Myanmar	49.3	55.8	122	79	84.4	90.7	
Philippines	58.1	68.6	60	31	95.1	98.5	
Thailand	59.5	69.6	74	26	95.3	98.8	
Viet Nam	50.3	67.2	112	31	93.1	96.8	
South Asia	49.9	61.9	128	69	55.1	69.8	
Bangladesh	44.9	58.1	145	58	40.8	50.2	
India	50.3	62.3	127	70	56.5	71.8	
Nepal	43.3	57.3	165	75	40.4	58.5	
Pakistan	49	59	117	84	45	62.7	
Bhutan	43.2	60.7	156	80	42		
Iran Islamic Rep. Of	53.9	68	122	37	75.7	93.7	
Maldives	51.4	65.4	157	60	96.2	99.1	
Sri Lanka	65.1	71.6	65	17	91.4	96.7	

Source: United Nations Development Programme, 2001, *Human Development Report, 2001.*

Annex table 3. Demographic change

Region/subregion/country	Total population (millons)	Annual population growth	Urban population (as % of total)	Population under age 15 (as % of total)	Population age 65 and above (as % of total)
	1999	1975-1999	1999	1999	1999
United States	280.4	1	77	21.9	12.3
Developing world					
East Asia and the Pacific					
China	1264.8*	1.3*	31.6	25.3	6.7
Dem. People's Rep. of Korea	22.11	....	....	....	....
Hong Kong, China	6.7	1.8	100	16.8	10.4
Mongolia	2.5	2.3	63	36.1	3.8
Fiji	0.8	1.4	48.6	33.7	3.4
Singapore	3.9	2.3	100	22.1	7
Samoa	0.2	0.2	21.5	41.4	4.5
Brunei Darussalam	0.3	2.9	71.7	32.4	3.1
Republic of Korea	46.4	1.1	81.1	21.2	6.8
Papua New Guinea	4.7	2.5	17.1	40.4	2.4
Cambodia	12.8	2.4	15.6	44.6	2.8
Indonesia	209.3	1.8	39.8	31.3	4.7
Lao People's Dem. Rep	5.2	2.2	22.9	43	3.5
Malaysia	21.8	2.4	56.7	34.5	4.1
Myanmar	47.1	1.9	27.3	33.5	4.6
Philippines	74.2	2.4	57.7	37.9	3.5
Thailand	62	1.7	21.2	27	5.1
Viet Nam	77.1	2	19.7	34.2	5.3
South Asia					
Bangladesh	134.6	2.4	23.9	39.1	3.1
India	992.7	2	28.1	33.9	4.9
Nepal	22.5	2.2	11.6	41.1	3.7
Pakistan	137.6	2.8	36.5	42	3.7
Bhutan	2	2.3	6.9	43.1	4.2
Islamic Rep. of Iran	69.2	3	61.1	38.7	3.3
Maldives	0.3	3	26.1	44.1	3.5
Sri Lanka	18.7	1.4	23.3	26.9	6.2

Notes: .... = data not available.

* = population estimates include Taiwan, Province of China.

Sources: Column 2 taken from table 1,www.fao.org; columns 3,4,5 and 6 taken from table 5, *Human Development Report 2001.*

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